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

# August 2018

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

# Submission #1318

Submission information

Form: TCN Quarterly Progress Report to iDigBio
Submitted by EPICC
Wednesday, July 11, 2018 - 12:17
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:**
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**Progress in Digitization Efforts:**
As of 6/30/2018, the TCN has fully curated and computer cataloged 1,416,089 specimens (90% of goal) and made 80,420 of these specimens available in the iDigBio portal. The TCN has photographed 40,170 specimens (49% of goal) and georeferenced 20,479 localities (66% of goal). We welcomed a new partner into our TCN, the University of California, Riverside (UCR). At NMNH, they are beginning to reconcile locality records generated during the digitization project with legacy data. At UCR, thesis maps for important Paleocene collections in LACMIP and UCR have been scanned to permit georeferencing in Google Earth. LACMIP is also checking and updating TCN lithostratigraphic assignments and ages for localities in their local area. UCMP is updating a lot of formation names and ages in the UCMP database as well physically rearranging the collections to match these changes, currently mostly in the Paleogene collections.

**Share and Identify Best Practices and Standards (including Lessons Learned):**
A standard infrastructure has been developed for the Virtual Field Experiences (VFEs).

Use local experts and native language speakers to assist with georeferencing of localities in foreign (non-english speaking) countries [Hendy presented on this at recent iDigBio Research conference]. Collaborative development of taxonomic dictionaries to fill gaps in existing data sources [ Estes-Smargiassi presented on this at recent iDigBio Research conference].

UCMP had several Paleobiology Database (PBDB) data entry sessions, with co-PI Pat Holroyd as trainer for Erica Clites and graduate students. These were very productive in providing immediate help with questions and motivating everyone to do data entry. So far, 20 new EPICC-related references have been entered and over 100 new collections added.

**Identify Gaps in Digitization Areas and Technology:**
At the Burke, selecting specimens to be photographed and reviewing the photos for quality control is a slow process; they currently have one volunteer coming in one day per week for a few hours for EPICC photography.

LACMIP have encountered Natural History Museum of Los Angeles IT constraints on the use of Axiell-EMu in our current (offsite facility). While these are being resolved we will not be able to adopt Axiell-EMu and use iDigBio IPT. Data cleaning and preparation for migration continues in mean time.

Editing and uploading photos is taking much longer than anticipated at UCMP, mainly due to poor file organization from early on in the project.

UO continues to have problems sending their images to iDigBio with the IPT. Their current hypothesis is that the version of Tomcat running on our attachment server is not compatible with the newest version of the attachment server software. They will work with UO IT over the summer to troubleshoot and remedy this situation.

**Share and Identify Opportunities to Enhance Training Efforts:**
Many TCN members listened to the Darwin Core Hour webinar "The Problem of Time: Dealing with Paleontological and Zooarchaeological Specimens in Darwin Core". An El Camino College student worked alongside one of LACM's taxonomic experts to learn the taxonomy of late Quaternary fossils and start cataloging them. PRI held another Fossil Bioblitz in April (5 staff, 1 graduate student) continued to work on material from Washington and Oregon. UCMP has had several PBDB data entry training sessions. New undergraduate student employees at UCMP were trained in specimen photography and specimen cataloging. PI Davis (UO) provided individual training to the new graduate student assistant on the project, Kellum Tate-Jones. Paul Barrett trained the three new undergraduate workers who have been taking photographs this term.

**Share and Identify Collaborations with other TCNs, Institutions, and Organizations:**
Working with other Paleo TCNs and iDigBio/VertNet staff to figure out where to put TCN name/funding info and attach it to TCN records. PI Davis has been consulting with PRI on the implementation of the Specify attachment server for their institution. Hendy visited UCR and provided some advice on approaching digitization and curation of their EPICC-related collections. Hendy & Estes-Smargiassi visited UCMP and CAS and identified several hundred lots of EPICC-related collections. Estes-Smargiassi visited ANSP-Drexel and is considering development of a PEN proposal for EPICC with those collections.

**Share and Identify Opportunities and Strategies for Sustainability:**
LACM has begun saving boxes and vials that are being removed from our collection (non-archival) to give to UCR to assist with curation of their EPICC materials.

We are in the process of loading Cooper Center data via Excel as one-time upload to iDigBio (who will presumably send it to GBIF). With loss of institutional funding, this data cannot be served by the institution. The Cooper Center also transferred EPICC photos taken to Erica at UCMP who will add them to CalPhotos to ensure continued availability for future researchers. A volunteer photographer at UCMP is taking high quality photos for EPICC.

**Share and Identify Education and Outreach (E&O) Activities:**
TCN institutions continue to train new undergraduates, graduate students and volunteers on the project.

Modules for second VFE on the open ocean Purisima Formation have been drafted. The development team (White, Duggan-Haas, Ross) plans to send them out for review August 1 with a public launch this fall.

LACMIP staff led a guided field trip with Southern California Paleontological Society (SCPS ) to the Isla Vista Quaternary terrace locality where they collected material. SCPS members then visited the

LACMIP collection and prepared and sorted these fossils. Preparations for students from Pasadena City College to begin working on a research project using EPICC-related collections and media. Preparations with El Camino College to have students undertake independent research projects using EPICC-related collections.

**Google Analytics**

**Other Progress (that doesn't fit into the above categories):**
The Cal Academy Geology/Invertebrate Zoology department is in the process of hiring staff to replace their vacant Collections Manager position, as well as 30 technician hours dedicated to the grant.

**Attachment 1**

**Attachment 2**

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**Source URL:** https://www.idigbio.org/node/564/submission/1318

# Submission #1334

Submission information

Form: TCN Quarterly Progress Report to iDigBio
Submitted by psierwald
Monday, July 23, 2018 - 17:09
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

**Progress in Digitization Efforts:**
FMNH Invertebrates: Total records entered into database as of 20 July 2018: 45,568. Ca. 500 lots have been labeled by volunteers and KGJ. 496 records received additional nomenclatural updates. Intern Philip England started a six-week internship on July 2. To date, Philip took and processed 102 high-resolution photos of land and freshwater gastropods. He also produced ca. 240 composite images of several views per specimen from approximately 1000 previously pro-duced images. These images of North American land and terrestrial mollusks will be used in the identification guide development with our PEN partner CASPNNM.
FMNH Insects: At present, over 177,000 records have been entered into our KE EMu database (representing over 724,000 total specimens databased and barcoded). Data entry of the North American Histeridae pinned collection continues with over 21,000 records entered representing 21,152 specimens. Summer intern has recurated and databased over 1,000 North American Catocala specimens (Lepidoptera: Noctuidae) to date; this effort will continue through the end of summer.
Georeferencing progress, Insects: Since February 2018, one part-time staff member and an intern have georeferenced all digitized insect localities of 26 states comprising 14,386 total localities (8,116 unique localities). Quality of the label information is generally excellent: between 95% and 100% of all localities in a given state are precise enough to be confidently georeferenced. We are monitoring progress, time spent per record, failure rate (locality could not be established: up to 5% per state, often only 1% or 2%), we record which methods were used. Records with existing coordinates are tested for accuracy and, if incorrect, corrected. We are keeping lists of repeatedly encountered sources of error, and are developing a detailed written protocol of the georeferencing workflow. Currently the rate of georeferencing is 4.29 minutes per record, or 2.42 minutes of the total number of georeferenced records. These figures do include a certain effort spent on data cleaning to standardize location fields and speed up the georeferencing itself

Georeferencing progress, Invertebrates: An undergraduate internship for mollusk georefer-encing was added to the ongoing georeferencing of insect specimen localities. The North American land and freshwater georeferencing requires a slightly different protocol, due to the nature of the locality

notations. Currently, this effort focuses on the 7055 localities from Illinois.

Zoological Museum, Michigan, Invertebrates: Over the past two years, the University of Michigan Museum of Zoology (UMMZ) collections have been sequentially moved from the Ruthven Museums building in central campus (their home for 90 years) to a new Research Mu-seums Center four miles away. That process involved shutting down normal programmatic functions for a period of time while collections were prepared for the move, moved, and rehoused in their new home. It impacted our Mollusk Collection digitization efforts over a period of 11 months, shutting them down completely for three months and curtailing them significantly for the remainder. As of May 2018, we have completed the move process and have now resumed full functionality in our new home.
Two undergraduate students conducted data entry of the land snail family Polygyridae and 1,246 new records were added to UMMZ Specify database (05/01/2018 - 07/19/2018). The UMMZ Mollusks database is now available on the LSA IPT server: https://ipt.lsa.umich.edu/resource?r=ummz_mollusks and registered with GBIF, where its rec-ords should now indexed, and will refresh automatically once per month. Currently, a total of 132,570 specimen records are available at GBIF.
The Insect database IPT test server was created and testing functionality continued this period.

DMNH: DMNH added over 5,800 new records to our Specify and Symbiota databases for a total of 42,366 records online. All records are taxonomically updated with extensive, high-quality locality data. Approximately 30% of the on-line records are georeferenced, and > 90% are identified to species using the World Registry of Marine Species (WoRMS) as a taxonomic authority

CMNH: OSU's database xBioD has remained offline during the quarter, on their end progress has been made restoring entering functions and we have remained in communication with Norm Johnson (OSU) regarding estimated timeline for its return. Our digitization workflow has been modified to continue while we wait for xBioD to be restored. In the quarter April-June 2018, an additional 9,284 specimens were assigned barcodes with label data transcribed, including finishing our North American Lepidoptera and starting our global holdings (worldwide moths have been completed and we are 25% through worldwide butterflies. Numbers are slightly down for the quarter as work-study students involved in the project finished half way through the quarter. A total backlog of ~20,000 specimens is awaiting online data entry when xBioD returns.

Auburn: Progress on digitization has slowed this quarter due to outreach and education events, in addition to fieldwork. We have been working to get all of our data available in SCAN and InvertEBase.

Frost: We now have ~70,000 occurrence records on the SCAN Symbiota portal, representing >6,000 taxa. These records are dominated by beetles (Coleoptera), but we have a growing num-ber of Diptera, Hymenoptera, and minor orders (Mecoptera, Plecoptera, etc.) We also finished imaging our entire dry Odonata collection (approximately 39,000 images, representing close to 100,000 specimens). The images are in TaxonWorks, where about 30% have been transcribed and georeferenced, and not yet available in SCAN. We've imaged about 50% of our spider col-lection (2,550 lots photographed so far), and they are queued for transcription in TaxonWorks. We have just started digitizing the larval Odonata collection.

PEN grant 16-01700: Chicago Academy of Sciences
CAS/PNNM Invertebrates: Malacology specimen records in Arctos are being verified with physical specimens in the collection to ensure data was migrated properly. This verification process helps catch errors in transcription, both recent and historic, from taxonomic updates, or from the data migration. New labels with more complete information are being added to specimens.
Documents identified from the CAS/PNNM archives and historical collection management files were transcribed. These documents reported on field expeditions led by the Academy during which time Mollusca specimens had been collected. Information from the documents was compared with

specimen data in Arctos; although species and locality information were given, matches to specimens verified in the collection was unfruitful.
Georeferencing of specimen localities is being conducted using GeoLocate, provided through the Arctos system. As the majority of the specimens in the malacology collection were collected in the early 1900s, historic maps are heavily referenced as geographic features and names have changed over time. These resources are recorded during the georeferencing process. An intern funded through Loyola University's Institute of Environmental Sustainability program is assisting with malacology georeferencing. To date, 2,121 specimen records have been georeferenced.
Our project team is researching mollusk type specimens in the collection and have confirmed the type status and added citations to Arctos records for 107 of the types. Online resources, such as the Biodiversity Heritage Library, have been immensely helpful in the process of tracking historic citations.
Please see attachment illustrating the geographic and temporal breadth of the malacology and entomology collections.
CAS/PNN Insects: Georeferencing entomology specimen localities continues. To date, we have georeferenced 9,832 records. Historical localities often did not provide sufficient detail for georeferencing; for instance, 5,200 of the 18,715 entomological specimen records for North America had no specific locality information and only gave county level or less information.

PEN grant 17-01842: Museum of Northern Arizona: Biodiversity of the Colorado Plateau, start date: 15 April 2018
Overview
MNA invertebrates data: MNA initiated this project by assembling existing information on its invertebrate collections from the Grand Canyon region and the Colorado River basin. MNA is in the process of converting an Access system to an online, exportable format (MNAInverts) for transfer to FMNH InvertEBase and Symbiota Collections of Arthropods Network (SCAN). To do so, MNA is first reviewing the status of databasing on more than 5300 species in its 400,000 invertebrate specimen collection, including a backlog of more than 50,000 prepared, labeled, but not yet databased Mollusca and Arthropoda specimens. Specimens that have not been identified to species, or require additional taxonomic scrutiny are being reviewed, and batches of specimens are being prepared for identification, with our FMNH colleagues and other taxonomists. For example, MNA is just completing assembling a shipment of at least 365 batches of locality-databased but not yet unidentified southwestern Mollusca for delivery to FMNH for identification.
Digitization progress: MNA has completed data entry on its Bombus (Hymenoptera: Apidae) collections from the Grand Canyon region, with 627 specimens identified to species level and all collection locality information databased. Comparable progress is being made on Odonata, Lepidoptera, Coleoptera [e.g., 42 tiger beetle taxa (Carabidae – Cicindelinae) among 582 specimens; 240 Chrysomelidae taxa among 1263 databased specimens).
Dr. Gary Alpert has overseen imaging of specimens. Initial efforts have focused on the invertebrates of Walnut Canyon National Monument in the central portion of the study area. Thus far, he has imaged 258 specimens, including 165 genera, of which 77 (30%) have been identified to the species level, and all specimens have been georeferenced. All images are back up by high resolution TIF documents. Majority of images include frontal, dorsal, lateral habitus, as well as all labels. An example of this work, see http://scan-bugs.org/portal/collections/list.php.

Georeferencing progress: The plans for conversion of the MNA Access database to the online MNAInverts for export to InvertEBase and SCAN first involves editorial review of existing information quality. This step involves QAQC review and updating of taxonomy, then review of collection locality data, followed by georeferencing. Once this process is completed, within the next several months, the Access information will be converted to the online MNAInverts format, and the formatting template for InvertEBase and SCAN will be developed for automated data transfer. Georeferencing is being checked, and once completed, it will allow for improved efficiency in entry of backlogged data. Labeling of future specimens also is made far more efficient by creating locality

labels directly from the list of GPS-downloaded collection localities visited during the expedition, with subsequent batch preparation of labels

**Share and Identify Best Practices and Standards (including Lessons Learned):**
FMNH Invertebrates: we are in the testing phase of georeferencing workflow for Invertebrates, using the terrestrial and aquatic mollusks from Illinois as the test (over 7,000 sites and locations). An undergraduate internship was added to the ongoing georeferencing of insect specimen localities by two TCN staff, one intern with extensive GIS experience and a TCN/FMNH staff member.
FMNH Insects: Revisited label imaging practices as part of digitization workflow. This pro-cess requires at least 3 individuals following this general overview – #1 organizes specimens into a group where all the collecting information and label data is identical, and then attaches QR code labels to the specimens in sequential order; #2 takes low resolution images of the first representative label from the group, then uploads the image files, resizes/crops and renames each file with a unique identifier, and lastly enters these file names into a spreadsheet; #3 will convert the spreadsheet in preparation for import into the database to create multimedia records to then attach to the collection event records. The specimens can then be entered into the database and returned to the unit trays and drawer put away. This is still a time intensive process, but with several individuals working on specific tasks as part of a team effort, it can be incorporated into the daily workflow if label imaging is a requirement.
Zoological Museum, Michigan, Invertebrates: nothing to report
DMNH: nothing to report
CMNH: nothing to report

Auburn: nothing to report
Frost: Direct transcription of pinned specimens appears to be the fastest approach to acquire the most relevant data (collecting events, taxon). We will use this strategy for all remaining pinned insects except for those taxa that are part of mimicry complexes (some Diptera and Coleoptera species that imperfectly mimic Aculeata), where phenotype data are important for ongoing projects. For specimens in ethanol, a recent focus of ours, imaging followed by transcription is still the way to go.

PEN grant 16-01700: Chicago Academy of Sciences
CAS/PNNM Invertebrates: Specimen label data captured through the inventory revealed sig-nificant data omissions, such as detailed collecting locality information and collecting date. This information has been found to some extent in historic records, including collection management registrars and card systems, institutional records, and correspondence. The process of incorporating this historic data, however, is time consuming. Historic data in analogue form must be converted to digital form; particularly as some hand written documents are challenging to read. CAS/PNNM had volunteers transcribing one set of four collection management registrars, a task that took several years and started well before this grant project. Completion of the transcription process coincided with this project, and we were able to merge the data with specimen inventory data, enriching the specimen records.
CAS/PNN Insects: We are refining our internal georeferencing manual to include quality con-trol measures and better describe potential problem areas for interns and volunteers assisting with georeferencing activities.

PEN grant 17-01842: Museum of Northern Arizona: Biodiversity of the Colorado Plateau, start date: 15 April 2018
MNA is preparing a report on its efforts to improve information management for presentation at a national meeting in 2019.

**Identify Gaps in Digitization Areas and Technology:**
FMNH Invertebrates/Insects: nothing to report
Zoological Museum, Michigan, Invertebrates: nothing to report

DMNH: Georeferencing continues to be the least efficient part of our workflow
CMNH: nothing to report
Auburn: nothing to report
Frost: nothing to report
PEN grant 16-01700: Chicago Academy of Sciences
CAS/PNNM Invertebrates: nothing to report
CAS/PNN Insects: Taxonomic nomenclature for specimens in both the malacology and ento-mology collections is often over 100 years old. Specialists from the Field Museum provided their expertise and assistance, and taxonomic resources, such as the Integrated Taxonomic Information System (https://www.itis.gov/), were consulted to determine the currently accepted names. As specimens are reviewed for quality control in Arctos following the data migration, a few will require further scrutiny. These specimens are strong candidates for re-identification by a visiting expert.

Georeferencing historical locality data is challenging as it is often lacking in detailed descrip-tions and sometimes only provides county level descriptions. For species that have a tighter radius in which they reside during their lifetime, such as mollusks or insects, county level description are not sufficient. It is possible that some additional locality information could be obtained from archival information, but will have to be researched

PEN grant 17-01842: Museum of Northern Arizona: Biodiversity of the Colorado Plateau, start date: 15 April 2018
Backlog of prepared but non-databased specimens remains a problem in digitization. In part, inefficiency can be reduced when specimen autonumbers are applied to both to image titles and to the locality data label and MNA is experimenting with this process.

**Share and Identify Opportunities to Enhance Training Efforts:**
FMNH Invertebrates/Insects: nothing to report
DMNH: DMNH is working with Dr. Janice Krumm (Widener University) to develop a digitized data workshop for ecology faculty located in the mid-Atlantic. We expect to invite local faculty to DMNH for a collection tour in October/November 2018. At this time, we will explore participant's interests and identify possible topics for a 2019 hands-on digital data workshop (place and time TBD).
Zoological Museum, Michigan, Invertebrates: nothing to report
CMNH: nothing to report
Auburn: nothing to report
Frost: nothing to report

PEN grant 16-01700: Chicago Academy of Sciences
CAS/PNNM nothing to report

PEN grant 17-01842: Museum of Northern Arizona: Biodiversity of the Colorado Plateau, start date: 15 April 2018
MNA has overseen training of Mr. Bernardo Murietta in data entry and transfer, and has adver-tised for two additional undergraduate students for the upcoming semester. Training and practice sessions are planned for these students.

**Share and Identify Collaborations with other TCNs, Institutions, and Organizations:**
FMNH Insects: ongoing collaboration with Argonne National laboratory to automate digitiza-tion of pinned insects through a multi-camera system imaging specimens and labels on the pin and assembling the label data through image handling and OCR.
Zoological Museum, Michigan, Invertebrates: nothing to report
DMNH: We are currently planning the course materials and approach for a second DMNH+ Widener University Ecology class to be taught starting in January 2019. As part of the output from the first

class, we have co-authored and presented 2 posters at the Digitization Meeting at UC-Berkeley; 1 poster at the Ecological Society of America; and 1 paper for the journal Per-spectives in Undergraduate Research and Mentoring (PURM). These posters and papers de-scribe the Ecology class, learning objectives, and mentoring outcomes for the students
CMNH: maintained contact with OSU regarding status of xBioD.
Auburn: nothing to report
Frost: We continue to collaborate with the Speciesfile group (University of Illinois) in the de-velopment and testing of their databasing software, TaxonWorks

PEN grant 16-01700: Chicago Academy of Sciences
Dawn Roberts met with Jochen Gerber of the Field Museum to start planning a molluscan re-gional field guide, as part of the PEN's broader impacts. The team is selecting 20-25 species to highlight in the field guide, which will be created for general use, and are planning content.
CAS/PNN Insects: nothing to report

PEN grant 17-01842: Museum of Northern Arizona: Biodiversity of the Colorado Plateau, start date: 15 April 2018
MNA is actively collaborating with several other institutions for verification of taxonomy and information sharing, including: Arizona State University (Niko Franz, Curator), Brigham Young University (Shawn Clark, Curator), the National Museum of Natural History (Oliver Flint, Jr, Curator), Northern Arizona University (Aaron Smith and Richard Hofstetter, Curators), the University of Arizona (Gene Wehunt, Curator), as well as several retired entomologists (Richard Bailowitz and Carl Olson, Tucson; Peter W. Price, Flagstaff; C.A. Triplehorn, Columbus).

**Share and Identify Opportunities and Strategies for Sustainability:**
FMNH Insects/Invertebrates: nothing to report
Zoological Museum, Michigan, Invertebrates: nothing to report
DMNH: nothing to report
CMNH: nothing to report
Auburn: In addition to the full-time collection manager, we have one graduate student that will be digitizing 15/hours per week during the school year. We will also be training undergraduate volunteers to assist with digitization efforts.
Frost: nothing to report

PEN grant 16-01700: Chicago Academy of Sciences
Georeferencing protocols developed during this project will benefit future georeferencing with CAS/PNNM's other collections.

PEN grant 17-01842: Museum of Northern Arizona: Biodiversity of the Colorado Plateau, start date: 15 April 2018
No recent progress to report at this time.

**Share and Identify Education and Outreach (E&O) Activities:**
FMNH Insects: Participated in quarterly Collection Club meeting on July 14th & 15th. Insect collection participants continued transcribing photo slides. Gave behind-the-scenes tour of the insect alcohol collection and lab. Entire TCN staff and interns participated in FMNH members night event and demonstrated the steps of digitization and georeferencing to almost 2,000 museum members as well as presented these at an FMNH Board of Trustees event.
Zoological Museum, Michigan, Invertebrates: nothing to report
DMNH: DMNH is involved in three major educational and outreach activities: 1) The DMNH + Widener University ecology class "Bio 388: Natural History Collections"; 2) Development of a panel-based exhibit "Millions of Mollusks" which is about to begin story development; and 3) the E&O working group on K-12 education.
CMNH: CMNH hosted a Members-behind-the-scenes night that showcased some of our digiti-zation

effort, ~150 guests attended. The Case Western Reserve University work study students concluded for the year.
Auburn: We taught two full weeks of a Jr. Curator Camp for middle school students in June and discussed the importance of digitizing natural history collections.
Frost: We continue to host groups of non-experts in our museum for programs focused on the relevance of natural history collections and the importance of specimen digitization. In the time since our last report we hosted approximately 150 people at museum events where we highlighted the importance of natural history collections. Examples include: Centre County Christian Academy students, Ag LEAP course on ethics in agriculture (for incoming undergrads at Penn State), Autism Support group at Park Forest Middle School, and a tour for KinderCare Pre-K kids.

PEN grant 16-01700: Chicago Academy of Sciences
CAS/PNNM Invertebrates: We are assessing our collection to identify potential specimens to include in species guides for local mollusks as part of our broader impacts. We've added a summer intern from Loyola University who is assisting with georeferencing.
CAS/PNN Insects: Our fourth internship through the NSF PEN grant is assisting with georeferencing entomology specimen localities. We shared information about the NSF PEN grant and a collections interpretive box created as part of the broader impacts with museum visitors during a museum event in July.

PEN grant 17-01842: Museum of Northern Arizona: Biodiversity of the Colorado Plateau, start date: 15 April 2018
MNA provides education programs for school children during the summer months, and our staff taught at a "Bug Camp" for elementary age children in June-July 2018. Mr. Bernardo Murietta is beginning his Master studies at Northern Arizona University in 2018 and has assisted with invertebrate presentations during the summer of 2018.

**Google Analytics**
CASPNNM_Inv Ento Map-Histogram_July 2018.pdf

**Other Progress (that doesn't fit into the above categories):**
FMNH: nothing to report
Zoological Museum, Michigan, Invertebrates: nothing to report
DMNH: Citations of posters and papers in prep:
• Shea EK, Woods JL, Goraya I, Tran TN, Mecouch KE, Perkowski EA, and JL Krumm. 2018. Swimming in the deep end: Designing and completing one-semester original re-search projects using digitized natural history collections. (Poster, Digitization Meeting, Berkeley, CA)
• Krumm JL, Woods JL, and EK Shea. 2018. Diving into the deep end: Teaching upper level ecology and evolution using digitized natural history collections. (Poster, Digitization Meeting, Berkeley, CA)
• Krumm JL, Woods JL and EK Shea. 2018. Enhancing undergraduate classroom experi-ences through collaborative digitized natural history collections research (Poster, Ecological Society of America, New Orleans, LA)
• Shea EK, Sierwald P, Bieler R, and G Rosenberg. In Prep. Developing and using large databases in mollusk research: an introduction to the workshop and Presidential Sympo-sium at the 2017 AMS meeting. (Paper based on Digitizing Mollusks 2017 workshop. To be submitted to the American Malacological Bulletin)
• Sierwald P, Bieler R, Shea EK and G Rosenberg. In Prep. Millions more mollusks: Sta-tus update on mollusk collections in the U.S.A. and Canada. (Paper resulting from the Digitizing Mollusks 2017 workshop. To be submitted to the American Malacological Bulletin)
• Krumm JL, Woods JL and EK Shea. In Prep. Teaching and mentoring across boundaries: collaboration between 10 students, 3 mentors, 2 institutions, and 1 global data set. (Paper to be submitted to Perspectives on Undergraduate Research and Mentoring Special Issue: Mentoring Undergraduate Research in Global Contexts.

CMNH: Two new volunteers Patrica Metzler and Jeremy Sorkins, started working on the digitization.
Auburn: nothing to report
Frost: Our superstar digitizer left the Frost Museum to teach English in Vietnam. We hired a new person who has extensive collection experience and are excited to train him in biodiversity informatics!

PEN grant 16-01700: Chicago Academy of Sciences
CAS/PNNM Invertebrates: nothing to report .
CAS/PNN Insects: nothing to report

PEN grant 17-01842: Museum of Northern Arizona: Biodiversity of the Colorado Plateau, start date: 15 April 2018
No recent progress to report at this time.

**Attachment 1**
CASPNNM_Inv Ento Map-Histogram_July 2018.pdf

**Attachment 2**

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**Source URL:** https://www.idigbio.org/node/564/submission/1334

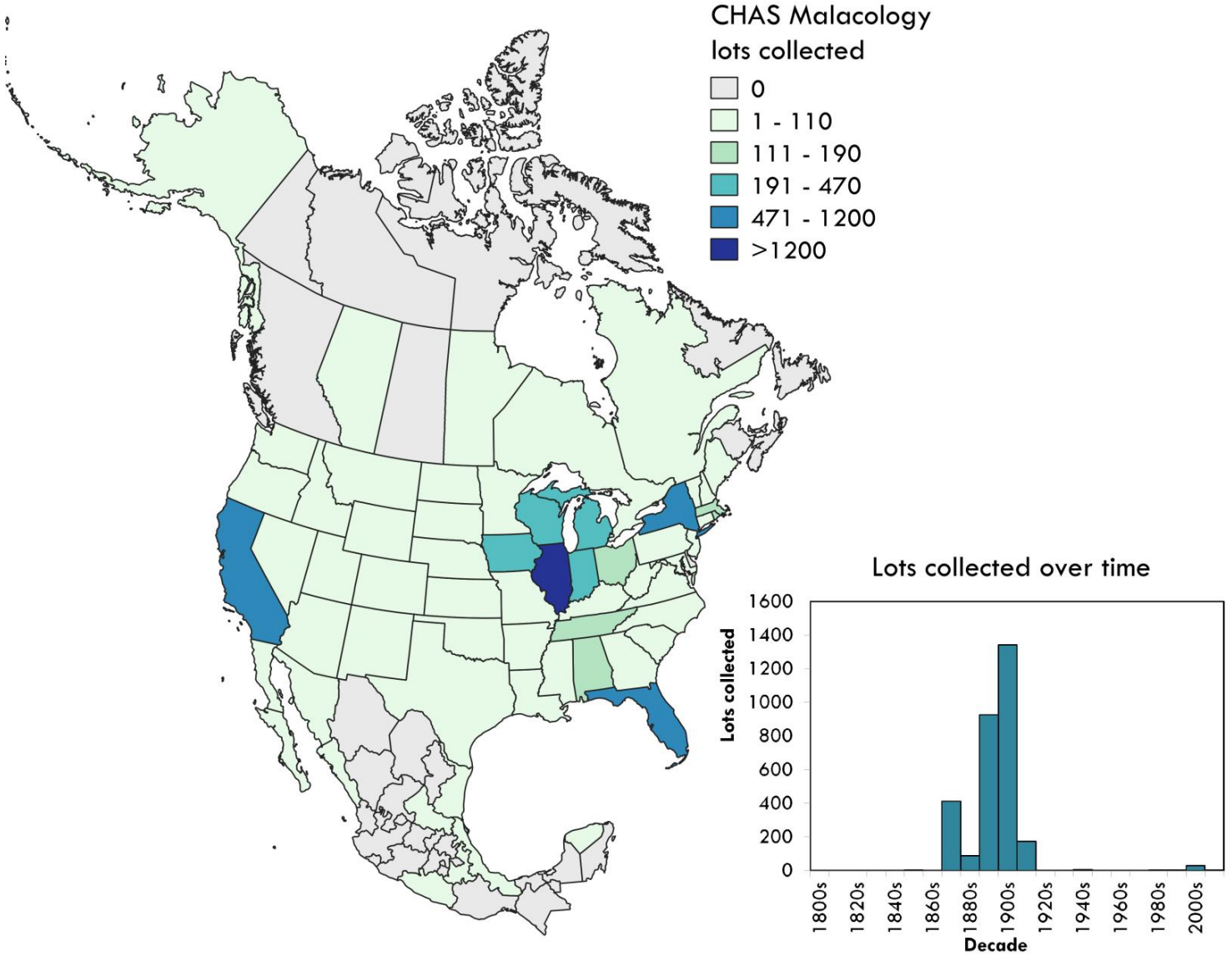
**NSF CAS/PNNM InvertEBase PEN**

**Summary of geographic & temporal breadth of the CHAS Malacology and Entomology Collections**

**Malacology (CHAS:Inv)**

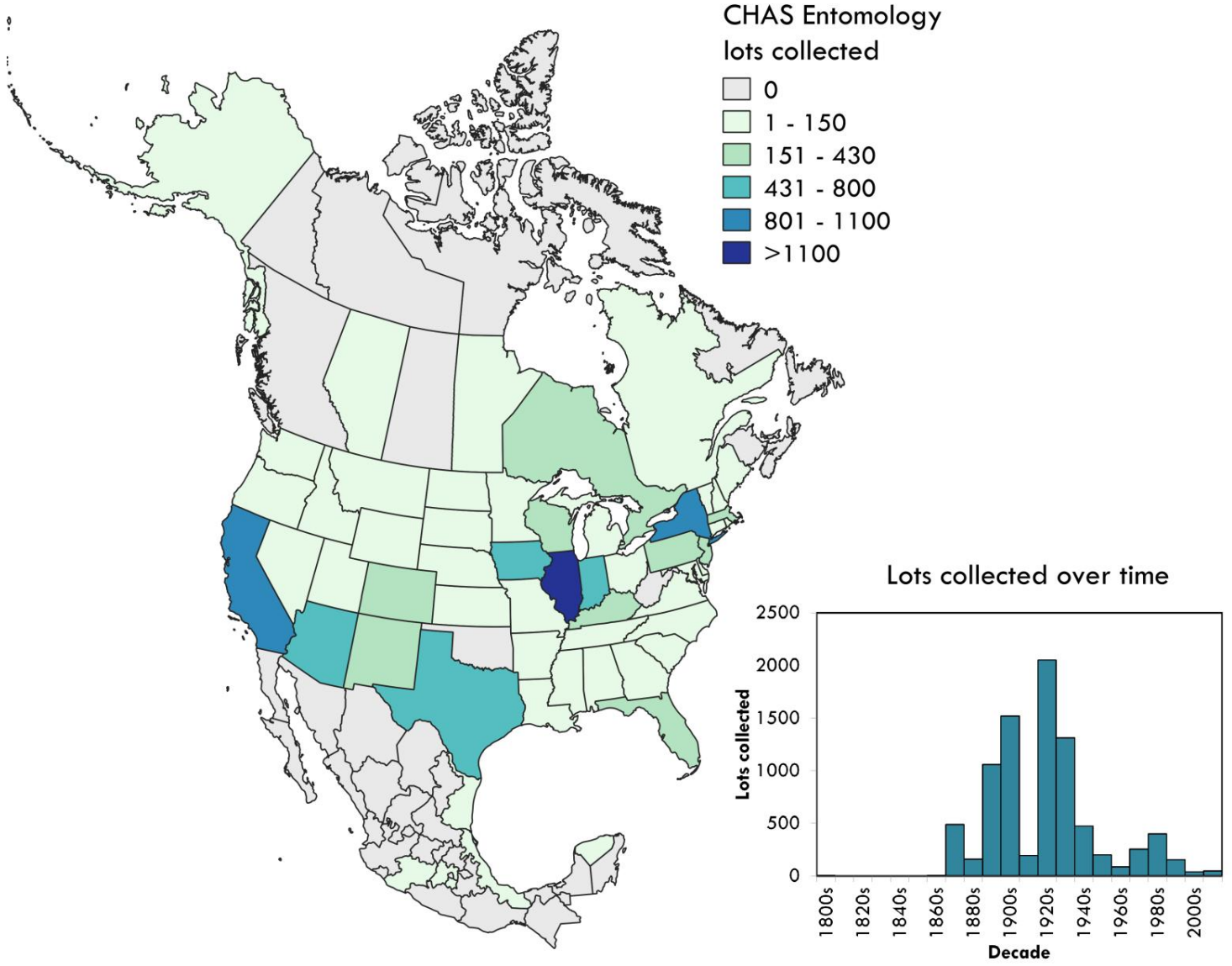
15,321 lots with 117,026 specimens

Number of lots collected in:
Illinois: 2,520
Midwest: 4,411
USA: 8,989



**Entomology (CHAS:Ento)**
26,130 lots with 33,833 specimens

Number of lots collected in:
Illinois: 8,087
Midwest: 10,299
USA: 17,417



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# Submission #1336

Submission information

Form: TCN Quarterly Progress Report to iDigBio
Submitted by neilscobb
Tuesday, July 24, 2018 - 14:16
47.215.133.118

**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

**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

**Google Analytics**

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

**Attachment 1**
LepNet_SCAN_July_2018.docx

**Attachment 2**

**Source URL:** https://www.idigbio.org/node/564/submission/1336

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



# Submission #1337

Submission information

Form: TCN Quarterly Progress Report to iDigBio
Submitted by neilscobb
Tuesday, July 24, 2018 - 14:17
47.215.133.118

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

**Person completing the report:**
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

**Google Analytics**

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

**Attachment 1**
LepNet_SCAN_July_2018.docx

**Attachment 2**

**Source URL:** https://www.idigbio.org/node/564/submission/1337

# Lepidoptera of North America Network &
# Symbiota Collections of Arthropods Network (SCAN)
# Quarterly Report

**July 23, 2018**
**Neil Cobb**

**Progress in Digitization Efforts:**

This is a joint report for the two networks SCAN and LepNet. Many museums are involved in both SCAN and LepNet, including collections that have received funding from both TCNs, collections that are unfunded for one TCN and funded by the other, and some collections that are providing data to both and are unfunded by the ADBC program. Both TCNs share the same database http://symbiota4.acis.ufl.edu/scan/portal/index.php , which depending on the context we refer to as the SCAN-LepNet database or the LepNet-SCAN database. All data presented here were accessed on July 21, 2018. **Table 1** shows the key statistics of Lepidoptera (LepNet) and non-Lepidoptera (SCAN) records to date. These consist of all records and images, including records and images from data providers who have allowed us to post their data on the SCAN/LepNet portal. Providing data from these additional providers increases our ability to georeference, add to taxonomic tables, and more accurately assess the total digitization effort for any given taxon.

Table 1. Records in SCAN/LepNet database, "all data" reflects all arthropod taxa, "Non-Lep" includes all non-Lepidoptera arthropod data, and Lepidoptera includes only Lepidoptera taxa.

| | All data | Non-Lep SCAN | Lepidoptera |
|---|---|---|---|
| Specimen Records | 17,591,029 | 14,812,598 | 2,778,431 |
| # Georeferenced | 14,277,473 | 12,071,465 | 2,206,008 |
| # Imaged | 1,886,152 | 1,335,887 | 550,265 |
| # Identified to species | 9,991,034 | 7,331,694 | 2,659,340 |

The SCAN network started in 2012 and the TCN funding has ended, but SCAN continues to support PEN projects. 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 comprise the NSF-ADBC LepNet and all have established a collection on the LepNet Portal and are serving data directly to iDgiBio via IPT or through DwC archives on the LepNet-SCAN portal. Twenty museums are serving DwC archives to iDigBio and six museums are serving data snapshots with the LepNet portal.

**LepNet** - The LepNet ADBC-funded museums are still on target to meet goals for records and images. An additional 32 collaborators (non-ADBC funded museums that use our data portal to serve their data) have also provided additional records for Lepidoptera. There are 26 collections (referred to as added-

value) that have allowed us to harvest their data via IPT to serve lepidopteran records. **Table 2** shows the top 10 families of Lepidoptera in terms of total occurrences digitized.

Table 2. The number of occurrence records for the top 10 families of Lepidoptera that have been digitized.

| Taxa | # Specimen Records | # Georeferenced | # Specimen Identified to species | # Georeferenced & Ided to species |
|---|---|---|---|---|
| Nymphalidae | 577,188 | 501,607 | 566,828 | 495,528 |
| Noctuidae | 337,198 | 256,157 | 322,093 | 247,288 |
| Pieridae | 275,003 | 215,642 | 272,089 | 213,693 |
| Hesperiidae | 246,545 | 198,585 | 240,192 | 193,380 |
| Erebidae | 241,893 | 184,737 | 225,251 | 174,388 |
| Geometridae | 213,343 | 170,572 | 202,233 | 161,761 |
| Lycaenidae | 200,080 | 166,328 | 195,600 | 163,130 |
| Papilionidae | 117,092 | 86,134 | 115,981 | 85,499 |

What is most encouraging about the lepidopteran records is that 96% of the records are identified to species, which is higher than any of the other major orders. Thus, the primary factor limiting the production of "research-ready" data is due to georeferencing. For Lepidoptera 77% of the records are research-ready (i.e., identified to species and georeferenced) and by georeferencing existing records we should increase that percentage to 90% over the next three years. We realize that many records represent misidentified specimens and we also need to seek additional non-ADBC funding to review as many specimen identifications as possible.

**Symbiota Collections of Arthropods Network (SCAN)** - We have surpassed our overall TCN/PEN goals for the network and have been very successful in supporting data mobilization for unfunded museums and cooperation by larger collections that have allowed there data to be used to help mobilize data from other museums. We sponsored one successful Partners to Existing Networks project through the University of Texas- El Paso that will start digitizing ants from the McKay ant collection. We will initiate a new PEN with The Field Museum, focusing on several ground-dwelling coleopteran families. **Table 3** shows data for the five major taxa we targeted in SCAN. All five groups have enough data to produce scores of papers.

**Share and Identify Opportunities to Enhance Training Efforts:** We are developing resources on the WordPress site http://www.lep-net.org/ . We will expand this to incorporate material from the SCAN drupal project website.

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

Table 3 Number of records for the five focal SCAN taxa groups.

| Taxa | # Specimen Records | # Georeferenced | # Specimen Identified to species | # Georeference & Ided to species |
|---|---|---|---|---|
| Formicidae | 1,048,401 | 868,201 | 546,201 | 436,446 |
| Carabidae | 591,483 | 470,052 | 407,716 | 326,135 |
| Araneae | 237,710 | 188,168 | 206,522 | 149,757 |
| Acrididae | 216,656 | 166,699 | 201,367 | 155,056 |

We are identifying best practices on a weekly basis and sharing those with respective people within LepNet http://www.lep-net.org/ . Most of these are also relevant to SCAN.

Standardization of Images for Research - We developed a consensus for criteria that would make images the most useful for research. We defined criteria that would make images good for computer vision identification (LepSnap) and for ImageJ, a software program designed to quantify pixel qualities http://www.lep-net.org/?p=383 .

Symbiota Programming - Ben Brandt developed six new API endpoints within Symbiota primarily for the facilitation of interactions with LepSnap, but the developments can also be used in several future apps. Two of these endpoints provide taxonomic and vernacular name resolution from a user-inputted string and allows for the auto-completion of scientific and vernacular names from the taxonomic thesaurus within LepSnap as users are typing the names of specimens. In order to facilitate the user login process and permission retrieval within LepSnap, two other endpoints were developed, one to generate user access tokens that can then be stored in the LepSnap app on the user's mobile device and used to automate future login requests in LepNet. The other feature provides the user's permissions and accessibility options within LepNet to the LepSnap app. Additionally, in the development of the token endpoint. We made significant modifications to the Symbiota login methods. Another endpoint delivers occurrence data from a given record identifier from either database primary key or catalog number. This endpoint allows LepSnap to retrieve pre-existing occurrence record data for processing images within the app and populate data fields within LepSnap with these data points.

The final endpoint developed facilitates the actual delivery of the processed image and associated data, including computer vision identifications, from the LepSnap app to the LepNet data portal. This allows for the quick delivery of images and new computer vision identifications from users' mobile devices directly to the data portal facilitating rapid generation of high-quality specimen images. In the development of these API endpoints several improvements were made to the login and batch taxonomic name upload processes within Symbiota to further support the work being done in LepNet and SCAN.

**Identify Gaps in Digitization Areas and Technology:** We need to produce exponentially more occurrence data to understand the biogeography of the focal SCAN taxa and Lepidoptera. For most groups there is not enough data to talk about gaps. We are meeting this need by incorporating additional collections into the SCAN-LepNet database, and harvesting observational records from iNaturalist, Pollardbase, Buguide, LepSoc inventories, and smaller observation sets provided by individual lepidopterists.

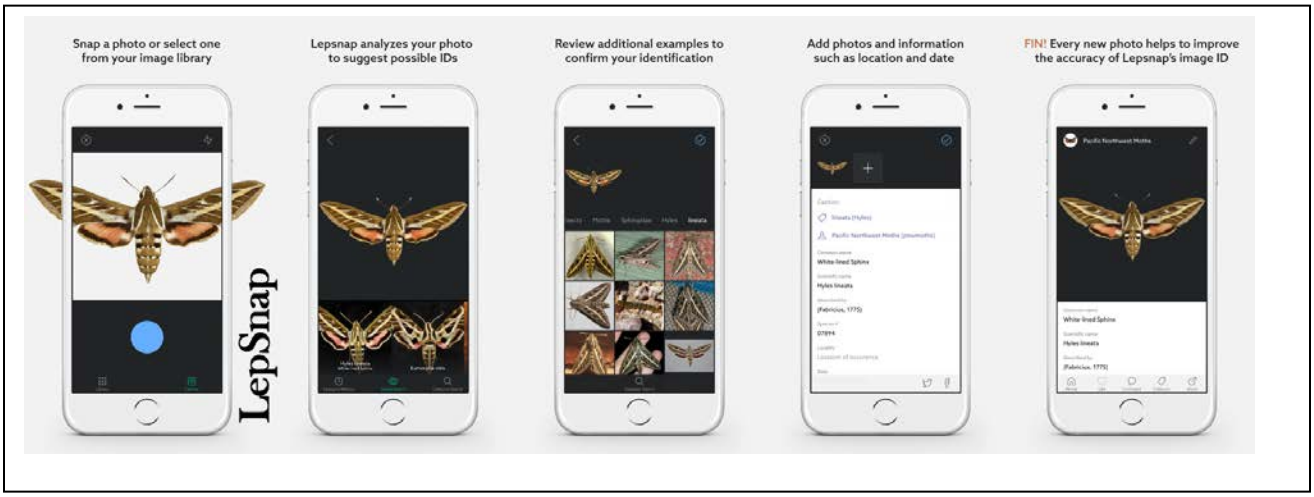
**Share and Identify Collaborations with other TCNs, Institutions, and Organizations:**
We are primarily working with other Symbiota TCNs and other Symbiota portals. We are also generally collaborating with a variety of individuals, projects and organizations to extend the ability to mobilize biodiversity data and promote the use of data in research. We are serving data from 183 collections, we continue to add one collection per month.

**Share and Identify Opportunities and Strategies for Sustainability:** Two museums in SCAN have sustainability plans (CSU and UC-Boulder).

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

Focus on North American Arthropods We continue to provide North American data obtained from any credible sources to increase the quantity of data available to SCAN and LepNet users. We have added five new collections since the last update.

Computer Vision - We are making significant progress in developing the LepSnap app. Our collaborator (FieldGuide) has created both an iOS and an android version of LepSnap. This is initially targeting Lepidoptera but we fully expect it to extend to other arthropod groups within the next two years.




We have collaborated with Andre Poremski (Fieldguide [Fg]) to develop the LepSnap smartphone app and computer vision capacity that will be built into LepNet. We initiated collaborations between Visipedia and Fieldguide and also shared information with iNaturalist and the Cornell Lab of Ornithology, both of whom are also working with Visipedia to incorporate their computer vision algorithms. Fieldguide works with Visipedia directly to develop computer vision integration into LepNet projects. Thus, Fieldguide is taking the lead on three fronts, developing both iOS and Android apps

(**LepSnap**), and **Fg-Batch** (an API service for batch-processing images). LepSnap will allow museum personnel to use their iPhone and Android smartphones to upload images of specimens and apply computer vision to obtain probability identifications. The Fg-Batch workflow will be built into Symbiota (software that runs LepNet database) to process all images with the computer vision workflow, regardless of whether images are from IPT providers or have "live" collections that are managed directly on the LepNet portal. The most important broader impact of this will be to reduce the load on taxonomists for identification requests. We hope to automate the categorization process enough so that individuals can focus on specific groups of interest and not have to spend time sorting through unclassified galleries of images.

Taxonomy Tables - We added the complete taxon table provided by Pohl, Patterson, and Pelham (2016) into the LepNet taxonomy tables and shared a csv version with LepNet collaborators using other databases (Specify, Emu, Arctos).

LepNet Research Advisory Board - We have created a LepNet research advisory board (RAB), which is a subgroup of the LepNet TCN's CoPIs charged with developing guidelines for research projects and grant proposals that are requesting digitized specimen data ahead of online publication. LepNet is receiving requests for Lepidoptera on a regular basis, including requests for student research projects and conservation projects that include sensitive data. Thus, the goal of the RAB is to establish a process that maximizes efficiency of digitization for LepNet, opportunity for collaboration, and publications for those involved (as appropriate). We are tracking LepNet's collaborative research projects online and engaging in regular discussions with PIs and at RAB monthly meetings. While project tracking will help our TCN become more organized, we also hope this new pipeline will generate even more energy and excitement for research that uses digitized collections data. The initial project that precipitated the creation of a research advisory board was the Poweshiek Skipperling project, which was so successful in terms of soliciting participation by museums, we wanted to expand the projects program. We hope that we can ensure that participants are provided attribution (e.g. authorship in checklist publications) and project leads let participants know exactly what they need.

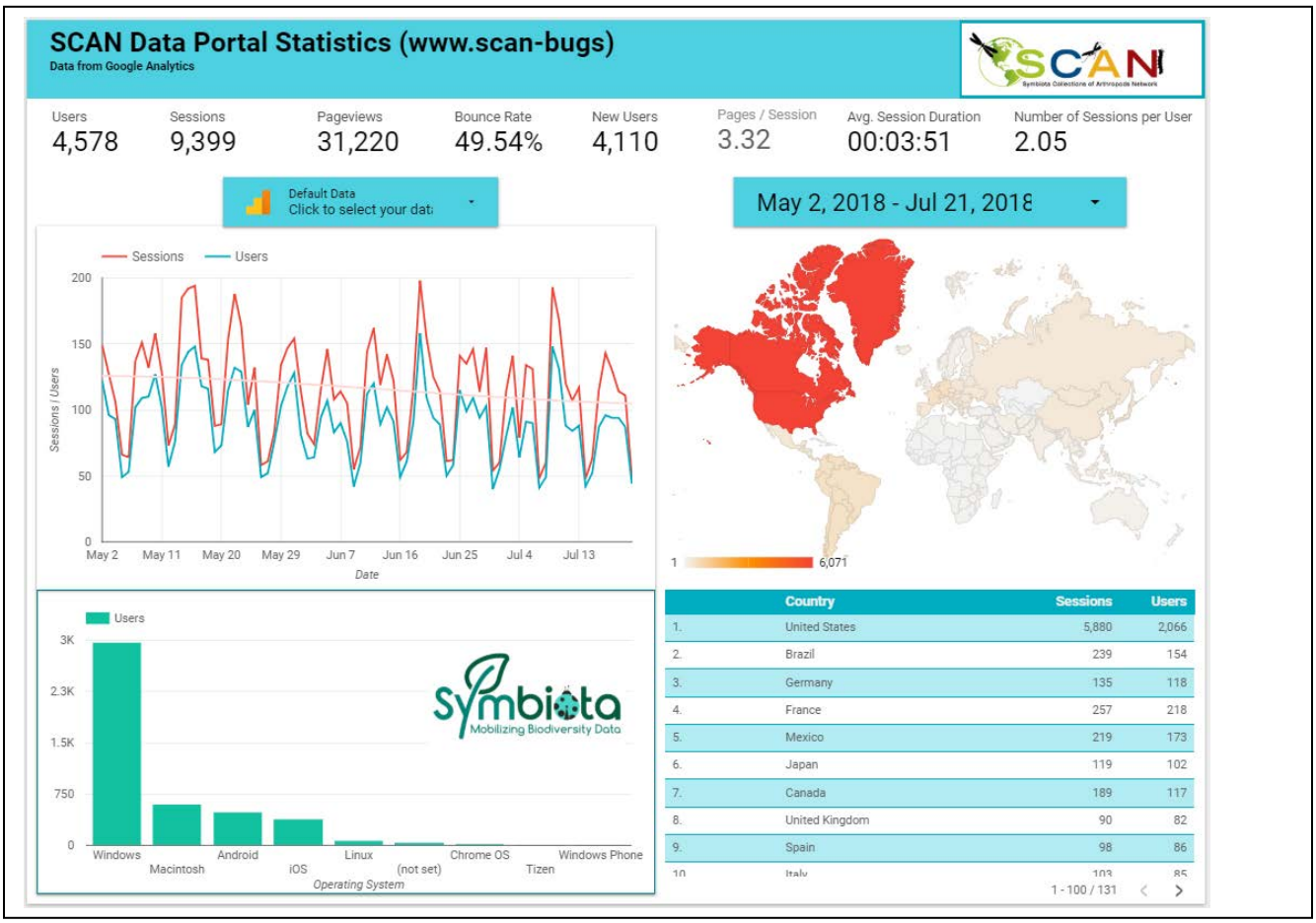
We have identified nine projects to date, each one is described below.

| **Project Name** | **Name, Affiliation (contacts)** |
|---|---|
| Puerto Rico Hurricane Project | Catherine Hulshof |
| Woolly bear tymbal morphology Project | Nick Dowdy |
| Colias eurytheme Project | Matt Nielsen, |
| Agriculturally significant Lepidoptera Project | Jen Zaspel, Bledsoe, Neil Cobb, Klem |
| Pieris biocontrol Project | JJ Weis |
| Mimallonid biogeography | Ryan St Laurent |
| Collection patterns of North American Lepidoptera | Erica Fisher & Anthony Cognato |
| Catocala | Akito Kawahara, Larry Gall |
| Poweshiek skipperling Project | Anna Monafils |

Publications - We have published an overview of the LepNet project (Seltmann et al 2017), and we are planning for a short communication publication on developing standards for images used in research.

Seltmann, K.C. N.S. Cobb, L.F. Gall, C.R. Bartlett, A. Basham, I. Betancourt, C. Bills, B. Brandt, R.L. Brown, C. Bundy, M.S. Caterino, C. Chapman, A. Cognato, J. Colby, S. P. Cook, K.M. Daly, L. Dyer, N.M. Franz, J.K. Gelhaus, C.C. Grinter, C.E. Harp, R.L. Hawkins, S.L. Heydon, G.M. Hill, S. Huber, N. Johnson, A.Y. Kawahara, L.S. Kimsey, B.C. Kondratieff, F. Krell, L. Leblanc, S. Lee, C.J. Marshall, L.M. McCabe, J.V. McHugh, K.L. Menard, P.A. Opler, N. Palffy-Muhoray, N. Pardikes, M.A. Peterson, NE. Pierce, A. Poremski, D.S. Sikes, J.D. Weintraub, D. Wikle, J.M. Zaspel and G. Zolnerowich. (**2017**) LepNet: The Lepidoptera of North America Network. *Zootaxa*, *4247*(1), pp.73-77.

Google Analytics: Below are summary graphical stats for the period since our last report (May 2, 2018 to July 21, 2018) for the SCAN portal, http://scan-bugs.org/portal/index.php and the LepNet data portal http://symbiota4.acis.ufl.edu/scan/lepnet/portal/index.php. The LepNet data portal actually shares the same underlying database with SCAN and so some people that only participate in LepNet still enter, annotate, and review Lepidoptera data from the SCAN portal. We also have a WordPress site http://www.lep-net.org/ that features LepNet but also provides SCAN updates. There was a slight




decreasing trend in use from May to July that likely corresponds to the field season and travel to collecting sites.

# Submission #1344

Submission information

Form: TCN Quarterly Progress Report to iDigBio
Submitted by jrallen99
Wednesday, July 25, 2018 - 16:08
128.138.130.234

**TCN Name:**
SoRo: Using Herbarium Data to Document Plant Niches in the High Peaks and High Plains of the Southern Rockies - Past, Present, and Future

**Person completing the report:**
james.allen@colorado.edu

**Progress in Digitization Efforts:**
We are reporting a slightly abbreviated quarter since we started collecting metrics earlier in the month than we normally do to allow time for our annual report. Nonetheless this quarter was the most productive quarter for the SoRo project to date. Collectively for the current quarter ~May through mid-July 2018 we have entered 35,603 new records, applied 131,695 barcodes, imaged 109,291 new specimens and georeferenced 2,299 new specimens. We had to revise our image total by 6,466 for last quarter due to some reporting of images outside of the scope of this project, but in total for the project we have now generated 76,114 new database records, applied 300,212 barcodes to specimens, imaged 291,957 specimens and georeferenced 8,340 new specimens. Imaging is now complete for NAVA, MESA and ALAM. All of these images are now available through SEINet. Imaging for COCO is ~30% complete and is on pace to be completed in September of 2018. This will complete all of the collections that were scheduled to be imaged by an outside institution (NAVA was imaged at ASC and MESA, ALAM and COCO at COLO).
Undergraduate student worker (Lance Gloss at BRU) completed locality improvement on a subset of BRU specimens including collections made by Augustus Fendler (mostly New Mexico), Daniel Eaton (Utah), C. C. Parry (Wyoming, Utah, Colorado), Elihu Hall and J. P. Harbour (Colorado) and composed a paper on the process.
GREE database was upgraded from Specify version 6.6 to Specify 7 Webservice. The upgrade to Specify 7 provides several advantages to GREE. Most significantly, the database is now hosted by Specify Cloud (part of the Specify Software Project at the University of Kansas) and is accessible through any web browser. Their database it stored remotely by Specify Cloud, backed up through their facility, and they provide technical support. Cloud storage allows multiple individuals to work on the database at the same time and will be helpful as they start to georeference specimens because herbarium staff will be able to do this remotely. Records from this database will be shared with the SoRo portal.
Michael Yost is continuing to remotely georeferenced specimens from MESA and WSC.

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

Harvard swapped out the prototype of their imaging station for a model that was fabricated by a company (vs. home grown) and now includes a table-style base with the option to adjust the height of the work station and a new and improved shutter button at the side of the work station. The camera lens for this station was also changed from a Canon lens to a Zeiss lens with a better zoom and new software was installed. Three additional photo stations are in the process of being put together at Harvard.
RMBL opted to match barcodes to specimen catalog numbers and facilitated the process by dividing the sheets of barcodes into lots of 500 and filing them in a mail sorting cabinet for easy access and sorting. Two students working simultaneously can quickly work through a stack of folders, locating the correct barcodes, without unnecessary confusion.

**Identify Gaps in Digitization Areas and Technology:**
Long term storage of large files continues to be a challenge for many collections. NAU tried to use dropbox file requests and google drive team folders as working drives for temporary storage of images before QC but they were too slow – even after installation of a Gigabit port. They now have a shared drive on the NAU server that is working much faster. JPGs are uploaded to IDIGBio from here then both DNGs and JPGs are archived on an external hard drive dedicated to the project and on a business dropbox administered by NAU. Discussions continue with the NAU library about housing the DNGs with them as well.
Camera mounts are proving to be a challenge with the Ortery system. UNM ran into difficulty with their first attempt to modify the Ortery Photosimile 200 Light Box and mount a camera on this setup. They redesigned the camera mount, added a Nikon D850 camera, but it is now producing superior images compared to their Photo E Box Plus 1419 fitted with a Nikon D800E.
New technology and systems require new parts and some of the equipment for the Nikon D850 are not readily available including the camera itself.
We have not officially launched our SoRo webportal, so we do not currently have analytics to provide.

**Share and Identify Opportunities to Enhance Training Efforts:**
Rick Williams at RMBL offered training for students and researchers in the use of the herbarium database and iNaturalist for data discovery and making photo-documented field observations. He also provides frequent help with plant identification using keys and online resources for students and PIs at RMBL, encouraging the collection of vouchers and additions to the collection. He frequently consults with the RMBL Science Director, researchers and students to locate potential study sites near RMBL using the plant distribution data in the SoRo database.

**Share and Identify Collaborations with other TCNs, Institutions, and Organizations:**
COLO and the City of Boulder Open Space and Mountain Parks Herbarium were able to secure funding to digitize that collection. The collection has now been officially registered in the Index Herbariorum as CIBO. The herbarium was imaged at COLO during this quarter and the CIBO database will be ported to the SoRo SEINet portal and its 2800 plus database records and images will be added to the portal next quarter.
The Brown database from the NEVP TCN is now being shared with SEINet through the NANSH portal. We should be able to replicate this process to include collections from Yale in the future.

**Share and Identify Opportunities and Strategies for Sustainability:**
Rick Williams at RMBL completed the online course “Strategic Planning for Herbaria” offered by iDigBio and the Society for Herbarium Curators to develop a strategic plan for the herbarium and facilitate long-term growth and sustainability. He also received an internal grant from ISU College of Science and Engineering to fund database development and management for the Consortium of Pacific Northwest Herbaria. RMBL has included collections and data archives as an emphasis in their new 5-year strategic plan.

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

Rick Williams at RMBL started curating an iNaturalist project “RMBL Biota” to document distribution, diversity and phenology of local organisms, particularly plants. The project now has almost 10,000 photo-vouchered observations collected by almost 1000 participants.
Ross McCauley at FLD continues to integrate herbaria and herbarium databases in to his teaching. This summer he taught a Field Botany course and students extensively used the collection and herbarium databases. All students additionally competed a collection project following standard herbarium specimen preparation and those specimens will be accessioned into the FLD collection soon.
The first two SoRo interns at NYBG have now completed their internships. Alexandria Sun finished on 13 July 2018 and Maya Tagliavia finished on 20 July 2018. Both interns received training in herbarium best practices and digitization protocols. Digitization training included use of the Garden’s herbarium collections management system, data entry standards, and the use of imaging equipment in the Garden’s Digital Imaging Center. Both interns also attended weekly lectures by Garden curators and visiting scholars organized through the Garden’s Science, Conservation and Humanities seminar series. They also participated in the Garden’s Summer Intern Enrichment program, which includes tours and lectures focused on other departments at the Garden, including the molecular lab, systematic botany, economic botany and horticultural programs.

**Google Analytics**

**Other Progress (that doesn’t fit into the above categories):**
The SoRo project was able to purchase Ortery Photosimile 200 lightboxes for the remaining collections that start to digitize in the fall. We are still in the process of procuring all of the revised equipment for the project. CO-PI Allen is working with these collections to determine the best time for onsite visits.
At NAU, “Kimdura polyester labels were discontinued for our small desktop printer. Quotes from various sources were more than twice the price (vendors were charging a fee for rerolling onto the 1 inch cores needed for our printer). Finally I talked to a brilliant customer service rep who said to just buy the large industrial roll sold as a stock item by everyone, suspend it behind the printer, and feed through the slot in the back of the printer. Hallelujah! It is working flawlessly, doesn’t have to be changed as often (ca 4000 labels per roll) and brought the cost per label to less than 1 cent.” This solution may be a viable option for smaller collections that do not need to order thousands of barcodes at a time.
CSCN had an alumnus donate his personal herbarium last week,
http://www.csc.edu/modules/news/public_news/view/11871
As legacy systems begin to have problems, primarily ballasts in Photo eBoxes and macro lenses on camera bodies equipment needs to be updated. RM volunteer did some consulting on a light box rebuild for another institution after retrofitting their systems with LED lighting.

Staff Hired
5 new hires for the project were initiated this quarter. This brings the total staff hired and trained under this project to 63.

**Attachment 1**

**Attachment 2**

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**Source URL:** https://www.idigbio.org/node/564/submission/1344

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# Submission #1348

Submission information

Form: TCN Quarterly Progress Report to iDigBio
Submitted by djbarroso
Tuesday, July 31, 2018 - 12:24
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:**
barroso@illinois.edu

**Progress in Digitization Efforts:**
* 11,800 records from the Wilhelm G. Solheim Mycological Herbarium (RMS) were transcribed to Stage 2.

* An estimated 13,000 specimens were received from Iowa State University (ISC) to be digitized. Of these, to date, 1,560 have been imaged and transcribed to Stage 2.

* Georeferencing was completed for the following collections: Pringle Herbarium (VT) (17.4% deemed not georeferenceable); University of South Alabama Herbarium (USAM) (4.4% not georeferenceable); University of South Florida Herbarium (USF) (100% done); and Acadia National Park Herbarium (HCOA) (100% done).

* 670 fully georeferenced records from the College of the Atlantic / Acadia National Park Herbarium were published to iDigBio.

* Collector names for 68,000 records were cleaned/re-formatted and uploaded for the University of Tennessee Fungal Herbarium collection (TENN-F).

* The GenBank sequence submission module was completed and made available to the community.

**Share and Identify Best Practices and Standards (including Lessons Learned):**
* Bringing older prevailing practices up to current standards (e.g., adherence to DarwinCore, parsing of data into proper fields, proper use of capitalization, etc.) requires constant mindfulness and vigilance on the part of every digitizer/transcriber, to maintain data quality. Proper supervision and quality checks are essential.

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

* A gap in technology that had existed for some time was the fact that the lightboxes and fluorescent bulbs in use in most digitization projects were discontinued. This was successfully bridged by retrofitting one of our lightboxes to use LED lighting instead of its stock fluorescent bulbs.

* We learned that more strips of LEDs were required than originally planned (a total of 5 strips per panel were used, instead of 3); and, we combined RGB with all-white LEDs for a color temperature closer to the original 5500K of daylight.

* The end result was a lightbox with lighting that is as good as, or better, than the original, and is also more durable and sustainable.

**Share and Identify Opportunities to Enhance Training Efforts:**
* It is desirable to have new digitizers/transcribers overlap with those that are ending their tenure, in order to facilitate training by the transmission of expertise from one to the next.

**Share and Identify Collaborations with other TCNs, Institutions, and Organizations:**
* Three videoconferences were held with MiCC software developers and representatives from the United States National Fungus Collections (BPI), to plan for the clean-up and ingestion of approximately 35,000 new records into the MyCoPortal. The ingestion of these records, and the georeferencing of the BPI collection, will begin this Fall.

* As of July 25th, 2018, approximately 18,000 records from the Rene-Pomerlau Herbarium (QFB) are being readied by the local institution for ingestion into the MyCoPortal.

* The Canadian National Mycological Herbarium (DAOM) is planning to begin adding their collection of approximately 320,000 records to the MyCoPortal in 2019.

* Discussions are being held for the ingestion of 400,000 new records from Kew Royal Botanic Gardens (IMI) into MyCoPortal.

* Representatives from the State University of New York College at Cortland (CORT) and the New York State Museum have stated their intention to update and increase their datasets next quarter.

**Share and Identify Opportunities and Strategies for Sustainability:**
* Retro-fitting our lightboxes to use LEDs instead of their original stock fluorescent bulbs makes them sustainable into the foreseeable future.

**Share and Identify Education and Outreach (E&O) Activities:**
* News article in the iDigBio newsletter, on "The Oldest Specimen in the Mycoportal" (https://www.idigbio.org/content/oldest-specimen-mycoportal)

* News article in the iDigBio newsletter, on the Microfungi Collection Consortium Teacher's Workshop (held in Athens, GA, in July 2017) (https://www.idigbio.org/content/microfungi-collection-consortium-teachers-workshop#)

* News article in iDigBio newsletter, "MyCoPortal helps save life!", at: https://www.idigbio.org/content/mycoportal-helps-save-life (July 2018)

**Google Analytics**
MyCoPortal_Data_Studio_2nd_quarter2018.pdf

**Other Progress (that doesn't fit into the above categories):**
* Please see MyCoPortal Data Portal Statistics generated from Google Analytics (attached).
* Diego Barroso was hired as Project Manager.
* Ashley Maras was hired as transcriber.

## Attachment 1

## Attachment 2

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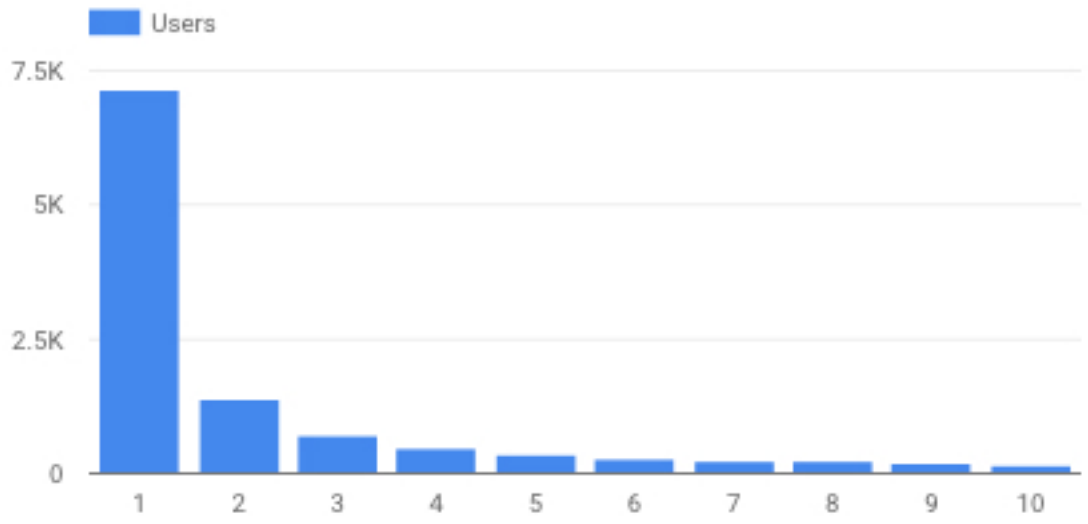
**Source URL:** https://www.idigbio.org/node/564/submission/1348

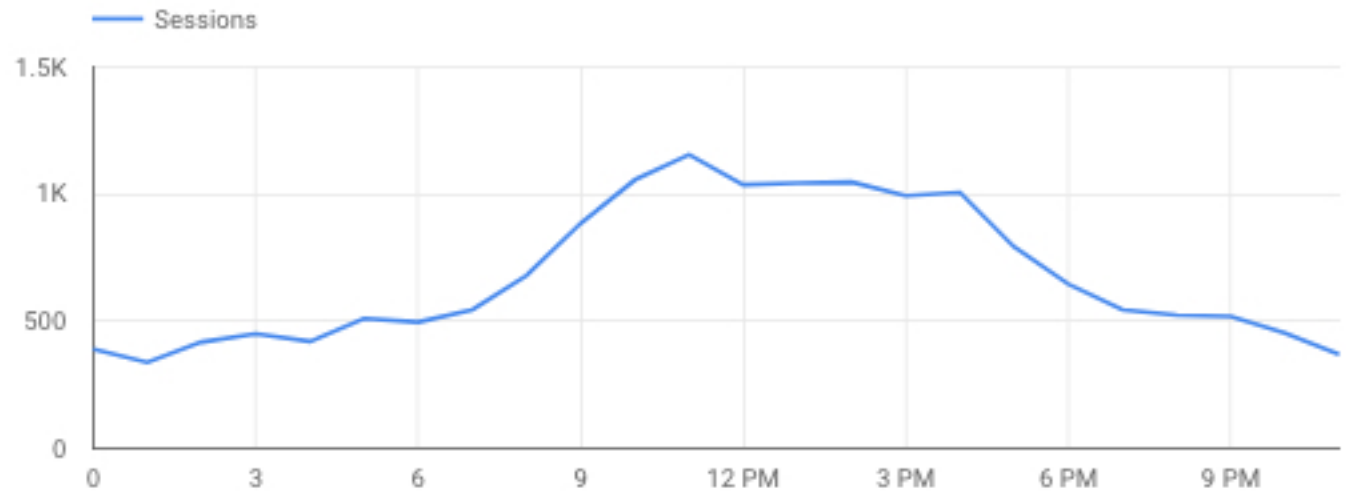
# MyCoPortal Data Portal Statistics

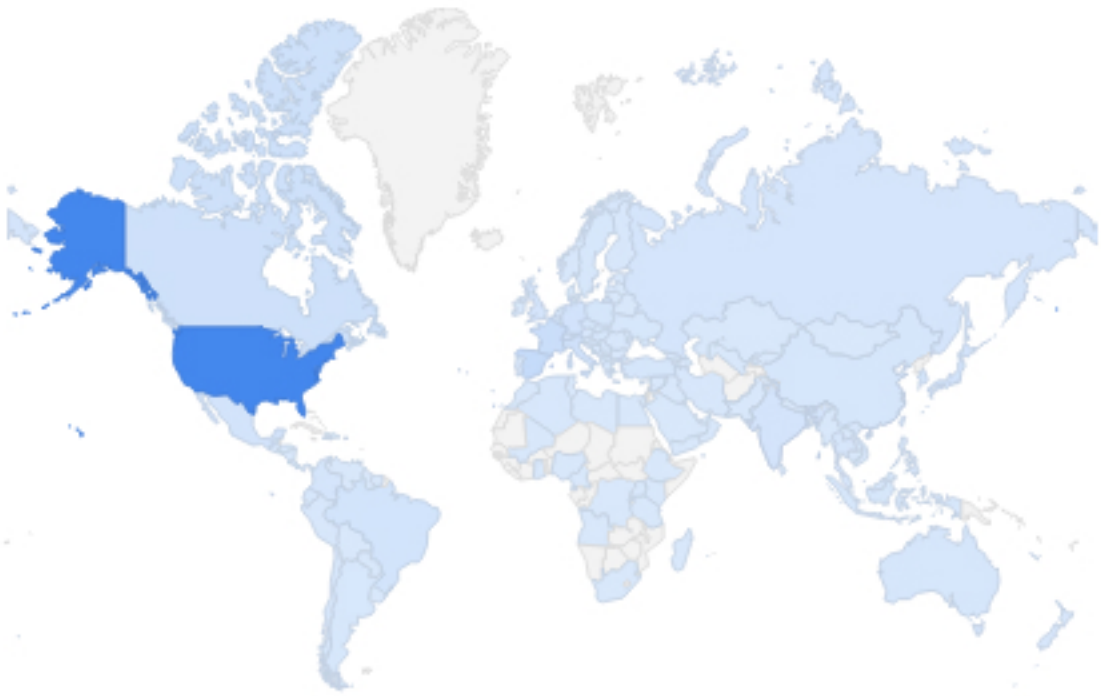
**www.mycoportal.org** **Data from Google Analytics**

MYCOLOGY COLLECTIONS PORTAL

| Users | New Users | Sessions | Number of Sessions per User | Pageviews | Pages / Session | Avg. Session Duration | Bounce Rate |
|---|---|---|---|---|---|---|---|
| 8,151 | 7,127 | 16,332 | 2 | 49,111 | 3.01 | 00:03:35 | 55.39% |




| | Country | Sessions ▼ |
|---|---|---|
| 1. | United States | 7,279 |
| 2. | Spain | 971 |
| 3. | France | 730 |
| 4. | Canada | 524 |
| 5. | Italy | 499 |
| 6. | Germany | 362 |
| 7. | Brazil | 316 |
| 8. | Mexico | 281 |
| 9. | Japan | 269 |
| 10. | India | 264 |
| 11. | South Korea | 257 |

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Apr 1, 2018 - Jun 30, 201

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



# Submission #1352

Submission information

Form: TCN Quarterly Progress Report to iDigBio
Submitted by cskema
Wednesday, August 1, 2018 - 10:49
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

**Progress in Digitization Efforts:**
Please see attached pdf.

**Share and Identify Best Practices and Standards (including Lessons Learned):**
Please see attached pdf.

**Identify Gaps in Digitization Areas and Technology:**
Please see attached pdf.

**Share and Identify Opportunities to Enhance Training Efforts:**
Please see attached pdf.

**Share and Identify Collaborations with other TCNs, Institutions, and Organizations:**
Please see attached pdf.

**Share and Identify Opportunities and Strategies for Sustainability:**
Please see attached pdf.

**Share and Identify Education and Outreach (E&O) Activities:**
Please see attached pdf.

**Google Analytics**
2018_08_MAM_Data_Portal_Statistics.pdf

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

**Attachment 1**
2018_08_MAM_Quarterly_Progress_Summary.pdf

**Attachment 2**

**Source URL:** https://www.idigbio.org/node/564/submission/1352

# Mid-Atlantic Megalopolis TCN
# Quarterly Progress Report
# May – July 2018

**Progress in Digitization Efforts:** The current numbers for progress of digitization efforts by specimen category are shown in Table 1 and Figure 1. Staff at BALT have received a light box and completed imaging training on 16-17 July 2018. Staff at CM, the newest PEN to MAM, completed imaging training on 30-31 July 2018. The imaging blitz at TAWES has been scheduled for 13-15 August 2018. All MARY records from the three imaging blitzes previously conducted by MOAR in collaboration with MARY staff have been sorted to category of completion in the MAM portal and, if relevant, merged with legacy data. The latest numbers resulting from that work are reported here.

**Share and Identify Best Practices and Standards:** See Identify Gaps section below.

**Identify Gaps in Digitization Areas and Technology:** PI Cynthia Skema (MOAR) presented at the Botany meeting in Rochester, Minnesota (22-25 July 2018) on research on focus quality issues in herbarium specimen imaging, including comparing Nikon and Canon focus abilities, and improving and characterizing the MAM FineFocus protocol.

**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 Activities:** MAM was well represented at this year's Botany meeting, as detailed in Identify Gaps section above and as follows. PI Cynthia Hong-Wa (DOV) presented a poster, entitled "The Mid-Atlantic Megalopolis (MAM) Project at the Claude E. Phillips Herbarium (DOV): New opportunities through collection digitization." Megan King, in collaboration with PI Lena Struwe (CHRB), presented a talk entitled "The MAM Project at Rutgers University – Digitization of the Mid-Atlantic Flora to investigate urban floristic changes." Working with PI Janelle Burke (HUDC), Amber Durand, an undergraduate at Howard University, presented a talk entitled "Videos as Outreach Tools to Build Community in Natural History Collections Research: Examples from Howard University," and showed one of the three videos she has produced as part of the work. All of these videos are currently available on YouTube:

- What Type of Research Can You Do With Natural History Collections? (https://youtu.be/bmhrn8LZlDY)
- How to Find a Lab With Natural history Collections? (https://youtu.be/zLye0qz1_hw)
- Why Does Research with Natural History Collections Matter? (https://youtu.be/6oRs0BRb400)

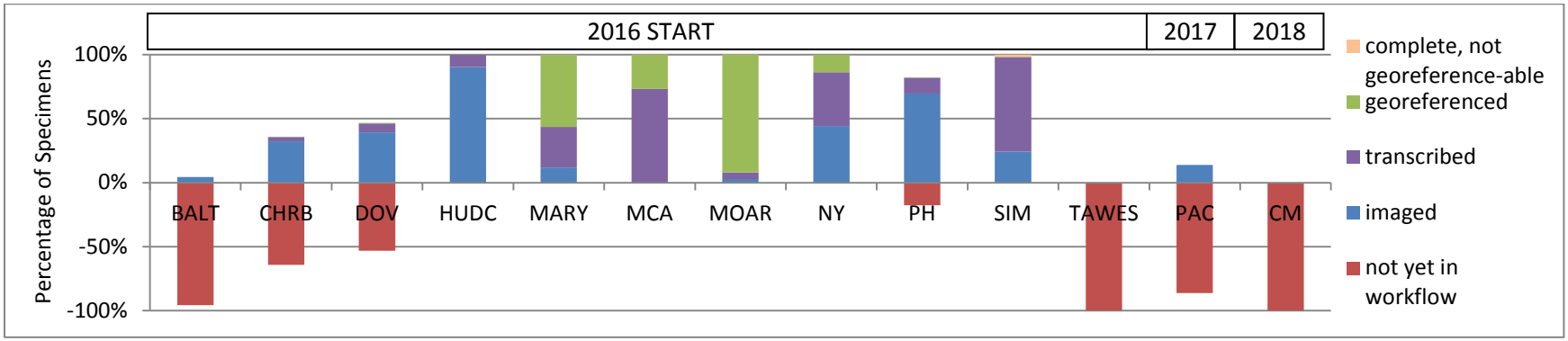
**Other Progress:** Nothing to report.

**Table 1.** Digitization of specimens by stage of completion and herbarium for MAM TCN.

| | HERBARIUM[1] | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Specimen Stage (Processing Status)** | BALT | CHRB | DOV | HUDC | MARY | MCA | MOAR | NY | PAC | PH | SIM | **Totals** |
| # specimens imaged (no stage, not in Symbiota yet) | 1,398 | 1,793 | 0 | 900 | 0 | 0 | 0 | 129,181 | 1,685 | 1,165 | 359 | **136,481** |
| # specimens imaged, and uploaded to Symbiota with skeletal data, transcription/review may be in progress (Unprocessed + Expert Required + Pending Review) | 0 | 14,632 | 19,584 | 7,822 | 4,483 | 0 | 0 | 0 | 7,168 | 183,697 | 4,613 | **241,999** |
| # specimens as above + completely transcribed and transcription reviewed (Stage 1) | 0 | 1,749 | 3,527 | 941 | 12,256 | 37,354 | 1,062 | 123,179 | 0 | 33,361 | 16,450 | **229,879** |
| # specimens as above + georeferenced (Stage 2) | 0 | 64 | 261 | 1 | 19,992 | 13,677 | 19,389 | 40,586 | 0 | 595 | 1 | **94,566** |
| # specimens that need special attention, e.g., go back to sheet (Stage 3) | 0 | 0 | 0 | 27 | 41 | 12 | 618 | 0 | 0 | 0 | 415 | **1,113** |
| # specimens imaged, transcribed, ± georeferenced + closed as complete (Closed) | 0 | 0 | 0 | 0 | 1,635 | 19 | 20 | 0 | 0 | 0 | 395 | **2,069** |
| **Totals** | **1,398** | **18,238** | **23,372** | **9,691** | **38,407** | **51,062** | **21,089** | **292,946** | **8,853** | **218,818** | **22,233** | **706,107** |

[1] Index Herbariorum acronyms for herbaria correspond to institutional names as follows: BALT = Towson University, CHRB = Rutgers University, DOV = Delaware State University, HUDC = Howard University, MARY = University of Maryland, MCA = Muhlenberg College, MOAR = Morris Arboretum of the University of Pennsylvania, NY = New York Botanical Garden, PAC = Pennsylvania State University, PH = The Academy of Natural Sciences of Drexel University, SIM = Staten Island Museum

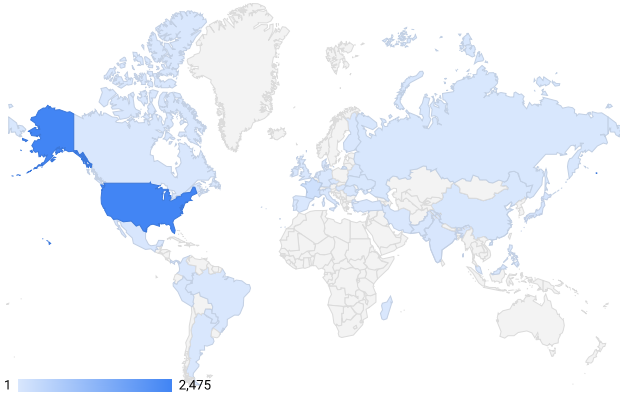
**Figure 1.** Percentage of specimens by stage of completion and herbarium for MAM TCN. With this presentation of digitization progress, the final goal for each institution is to have a mostly green column above the X axis (could potentially have orange up to roughly 10%). Note that CM only recently completed imaging training and TAWES has not yet entered the project. (Specimens not yet in workflow are set as negative numbers.)



# MAM Data Portal Statistics

www.midatlanticherbaria.org

| Users | New Users | Sessions | Number of Sessions per User | Pageviews | Pages / Session | Avg. Session Duration | Bounce Rate |
|---|---|---|---|---|---|---|---|
| 798 | 717 | 2,876 | 3.6 | 11,752 | 4.09 | 00:04:37 | 45.76% |

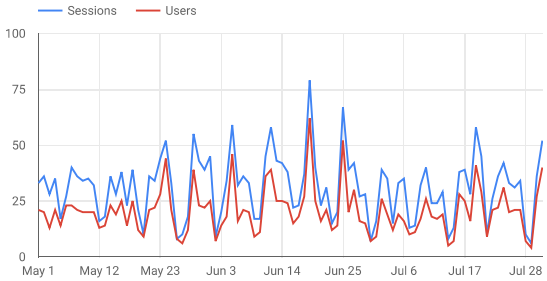



Default Data
Click to select your data

May 1, 2018 - Jul 31, 2018

| | Country | Sessions ▾ | Users |
|---|---|---|---|
| 1. | United States | 2,475 | 508 |
| 2. | France | 179 | 179 |
| 3. | Japan | 49 | 4 |
| 4. | Panama | 33 | 2 |
| 5. | India | 22 | 16 |
| 6. | Mexico | 14 | 11 |
| 7. | China | 13 | 11 |
| 8. | Russia | 13 | 13 |
| 9. | Ukraine | 11 | 5 |

1 - 37 / 37



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



# Submission #1353

Submission information

Form: TCN Quarterly Progress Report to iDigBio
Submitted by mwdenslow
Wednesday, August 1, 2018 - 12:48
76.120.67.210

**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

**Progress in Digitization Efforts:**
All SERNEC:
There are 108 collections serving data through the SERNEC portal. There are currently 4,249,601 specimens records and 365,654 (9%) of those records are georeferenced. There are currently 3,668,901 imaged specimen images available. There are currently 47 collections publishing to iDigBio.

Kentucky:
Two students hired to work on imaging over the summer. Berea imaged 672 specimens while EKY imaged 119.

South Carolina:
There are presently nine collections reporting to iDigbio in SC: USCH, CLEMS, NBYC, USCS, FUGR, FMUH, CONV, WINU and SALK. Also, we expect to add a new collection (SBAC -- the Silver Bluff Audubon Center Herbarium) by the end of July, 2019. In May & June 2019, USCH employed 2 students and added approximately 6,264 digital specimens. CLEMS employed one student and one volunteer and added 6,251 digital specimens. NBYC employed four students and added 4,424 digital specimens.

**Share and Identify Best Practices and Standards (including Lessons Learned):**
All SERNEC:
The SERNEC – TCN protocols continue to be updated as needed and are posted on the SERNEC resources site (http://sernec.appstate.edu/resources).

**Identify Gaps in Digitization Areas and Technology:**
All SERNEC:
Nothing to report

Kentucky:
We have abandoned the Photo eBox as no replacement lights can be found to order.

**Share and Identify Opportunities to Enhance Training Efforts:**
All SERNEC:
Nothing to report

**Share and Identify Collaborations with other TCNs, Institutions, and Organizations:**
All SERNEC:
Nothing to report

**Share and Identify Opportunities and Strategies for Sustainability:**
All SERNEC:
Nothing to report

**Share and Identify Education and Outreach (E&O) Activities:**
All SERNEC:
SERNEC continues to have a large on active presence on Notes from Nature (https://www.notesfromnature.org/active-expeditions/Herbarium) with many expeditions running concurrently.

**Google Analytics**

**Other Progress (that doesn't fit into the above categories):**
All SERNEC:
Nothing to report

South Carolina:
We are working to incorporate a newly-created herbarium at the Silver Bluff Audubon Center (on the Savannah River near Augusta, GA/ N. Augusta SC). The collection has roughly 750 specimens.

**Attachment 1**

**Attachment 2**

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# Submission #1362

Submission information

Form: TCN Quarterly Progress Report to iDigBio
Submitted by BruceL
Wednesday, August 8, 2018 - 16:29
24.225.98.220

**TCN Name:**
Digitizing Fossils to Enable New Syntheses in Biogeography- Creating a PALEONICHES

**Person completing the report:**
blieber@ku.edu

**Progress in Digitization Efforts:**
For the University of Kansas portion of the project, led by PI Bruce S. Lieberman (BSL), the grant finished up at the end of June and we are working on writing up the final report to NSF. We have a total of 297,441 specimens databased associated with this project. Further, we now have a total of 265,505 databased specimens that are also georeferenced associated with this project. In addition, a total of 11,623 localities have been georeferenced associated with this project. All of our major taxonomic groups from the relevant time intervals have been completely databased. Further, all pertinent localities have been georeferenced. All relevant specimens and taxa have been imaged.

Regarding the portion of the project at the Paleontological Research Institution led by PI Jon Hendricks, the grant also expired at the end of June, and while specimen digitization was never a major part of PI Hendricks' portion of the original PaleoNiches TCN funding, 906 specimen lots (>6,850 specimens) of Plio-Pleistocene fossils from the southeastern United States have been incorporated into PRI's Specify database over the past couple of years and numerous localities associated with these lots have been georeferenced. Many of these records have already been shared with iDigBio and remaining records will be ported over in the near future.

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

**Identify Gaps in Digitization Areas and Technology:**
N/A

**Share and Identify Opportunities to Enhance Training Efforts:**
N/A

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

**Share and Identify Opportunities and Strategies for Sustainability:**
N/A

**Share and Identify Education and Outreach (E&O) Activities:**
Regarding the portion of the project at the Paleontological Research Institution led by PI Jon Hendricks, they are excited to announce that they have produced 3 completely new curricular exercises that utilize content from the Neogene Atlas of Ancient Life and other data sources to help students learn about ancient biodiversity. These activities are all online now and may be accessed at the E&O portal for our project at: http://www.digitalatlasofancientlife.org/teach/.

Exercise 1 (by Dr. Amie Patchen): Species Diversity and Classification

Website: http://www.digitalatlasofancientlife.org/teach/species-diversity-and-classification/

Alignment: Elementary school; NGSS DCI 3-LS3-1, 3-LS4-1.

Description: In this set of activities, students observe images of fossil shells, ask questions about those fossils, and sort the fossils into categories based on their physical characteristics. Parts 1 and 2 introduce students to the fossils, encourage careful observation, and focus on the scientific practices related to asking testable questions. Parts 3 and 4 address content related to 3rd grade NGSS DCI, as well as the crosscutting concept of patterns. While the content is most closely aligned to the 3rd grade standards, the practices related to asking questions and identifying patterns to categorize data could be useful for a variety of grades. The particular practices, concepts, standards, and related evidence statements for each activity are outlined.

Exercise 2 (by Dr. Amie Patchen and Dr. Jonathan Hendricks): Species Across Time and Terrain

Website: http://www.digitalatlasofancientlife.org/teach/species-across-time-and-terrain/

Alignment: Middle school; MS-LS4-1.

Description: In this set of activities, students figure out why fossil marine shells are found on land and why they vary from place to place. The activity uses as an example a set of species found in the fossil record in the Tamiami formation in southern Florida. Using data from the fossil record, they examine the spread of those species across the southeastern United States 3 million years ago, and the existence or extinction of those species over time. Students are asked to examine similarities and differences among the species, use information about the species to figure out past environments where the shells were found, and make data tables, bar graphs, line graphs, and pictures to organize and analyze the data.

Exercise 3 (by Andrielle Swaby): Neogene Mollusk Communities

Website: http://www.digitalatlasofancientlife.org/teach/neogene-mollusk-communities/

Grades: University-level paleontology or historical geology class; adaptable for high school science classes.

Description: In this activity, students will investigate changes in the diversity of coastal mollusk communities during the Late Pliocene Epoch. Students will first identify which geological formations are aligned temporally. Then, they will assess a set of bivalve and gastropod genera found in three states: Virginia, Georgia, and Florida. By comparing and contrasting genera from the different samples, they will be able to:
1. compare how diversity changes along the North American coastline
2. use their knowledge of the life habits of major genera to understand what the environment was

like in the sampled areas
3. generate a sketch of what the ecological community might have looked like
Students should take away the following big ideas:
• Diversity increases as you move closer to the tropics.
• Understanding the ecology and life habits of fossil animals allows us to understand what the ancient environment was like.
• As a general rule, bivalves are more numerous than gastropods in most mollusk communities.
Students should also learn how to collect data consistently from each sample, and graph their results in a bar graph format.
This activity uses the following terms and concepts:
• paleoenvironment, paleoenvironmental reconstruction, paleoecology
• taxa, species, genera, families, communities, species diversity, gastropods, bivalves
• life history, life habits, infauna, filter feeders, deposit feeders, shelf environments
• formation, member, Pliocene, organic content

In addition, information and images for an additional 36 species were added to the Neogene Atlas of Ancient Life, bringing the total (current) number of species pages on the Neogene Atlas to 629. They still have a backlog of additional images that will be added to the Neogene Atlas as time allows. Moving forward, PI Hendricks will continue to maintain the Neogene and Pennsylvanian Atlases that were generated as part of the PaleoNiches TCN.

**Google Analytics**

**Other Progress (that doesn't fit into the above categories):**
Regarding the Paleoniches grant, it is now completed, and this will be our last update to iDigBio.

For the University of Kansas portion of the project, led by PI Bruce S. Lieberman (BSL), a paper describing research led by BSL's former graduate student Kayla Kolis on the relationship between geographic range and rates of speciation and extinction based on Geographic Information Systems (GIS) analyses is about to be submitted for publication. BSL also described the Paleoniches project in a talk at a special session on "Big Data" at the 5th International Palaeontological Congress in Paris, France.

**Attachment 1**

**Attachment 2**

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



# Submission #1365

Submission information

Form: TCN Quarterly Progress Report to iDigBio
Submitted by BruceL
Wednesday, August 8, 2018 - 23:27
24.225.98.220

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

**Person completing the report:**
blieber@ku.edu

**Progress in Digitization Efforts:**
Regarding the University of Kansas (KU) portion of the project, led by PI Bruce S. Lieberman (BSL) and with major involvement from collections manager Julien Kimmig (JK),

we have databased 29,749 fossil specimens total, with 5,334 specimens databased since the last reporting period. All of these specimen records are also georeferenced. In addition, we have georeferenced 1,939 localities since the last reporting period and have now georeferenced a total of 5,157 localities associated with this project. We also generated 200 new images.

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

since the last report, efforts at the Paleontological Research Institution (PRI) have focused on the development of new, interactive 3D models of fossils from PRI's collections using a process called photogrammetry (example: https://skfb.ly/6zMMU). An undergraduate student from SUNY-Geneseo has assisted with this endeavor this summer and--to date--over 160 such models have been generated and put online. These may all be freely accessed at: https://sketchfab.com/DigitalAtlasOfAncientLife. Nearly all major groups of fossil macroinvertebrates are now represented in this collection; our target is to have 200 fossil models online by the end of August.

The next step will be to integrate these models into the Digital Encyclopedia of Ancient Life open access paleontology textbook (www.digitalatlasofancientlife.org/learn/). They are also in the process of organizing the models into "Virtual Teaching Collections" (VTC's) akin to drawers of fossils that an instructor might bring out for students to examine in a paleontology lab. While not better than real specimens in hand, these virtual specimens will allow students to study virtual specimens--in many cases with important features annotated--outside of the classroom. They expect that instructors at schools lacking significant fossil collections may also find the VTC's useful for instruction. VTC's will

be organized based around both taxonomic groups and ancient ecosystems. For example, the first VTC that we have developed focuses on Devonian Fossils from New York state: http://www.digitalatlasofancientlife.org/vtc/devonian/.

As part of the process of creating digital models of PRI fossils, they have also added some fossils to PRI's Specify database. In particular, they have databased 272 specimens (66 lots) total (all databased since the last reporting period). Most of these have not yet, however, been georeferenced.

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

they have databased 80,388 Cretaceous specimens total, with 8,325 databased since the last reporting period. 74,804 of these specimen records are also georeferenced. In addition, they have georeferenced 13 localities since the last reporting period and now georeferenced a total of 2,291 Cretaceous localities associated with this project. They also generated 3,096 new composite (multiple view) images.

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

they have databased 3,758 Cretaceous specimens (2,437 Vertebrate and 1,321 Invertebrate). 2,437 of these specimen records are also georeferenced. In addition, they have now georeferenced a total of 533 Cretaceous localities associated with this project. They also generated 1,243 new images of 159 Vertebrate WIS specimen during this reporting period and now have a total of 5,399 images of WIS specimens.

Regarding the University of New Mexico (UNM) portion of the project, led by PI Cori Myers (CM):

They have databased 830 Cretaceous specimens total, with 12 databased since the last reporting period. 96% of these specimen records are also georeferenced. In addition, they have georeferenced 15 localities since the last reporting period and now georeferenced a total of 120 Cretaceous localities associated with this project.
They now have a total of 416 of our specimen records uploaded and 96 georeferenced localities. They imaged 1 new specimen and have produced a total of 19 images thus far. In other positive news, all of their data is now being published from Arctos to iDigBio.

Regarding the American Museum of Natural History (AMNH) portion of the project, led by PI Neil Landman and co-PI Ruth O’Leary,

they have databased 2,626 Cretaceous specimens total (represented by 62 specimen lots), with 2,408 databased since the last reporting period (all other specimens georeferenced to date in this project were previously databased). In addition, they have georeferenced 16 localities since the last reporting period and now georeferenced a total of 619 Cretaceous localities associated with this project.

Regarding the University of Texas (UT) portion of the project, led by Rowan Martindale and Lisa Boucher,

they have 23,790 Cretaceous cataloged records, representing ~80,000 specimens total, with 1,405 new records databased since the last reporting period (8,674 previously databased specimens were

also newly identified as Cretaceous). Of the total number of specimen records, 21,045 have been georeferenced. In addition, they have now georeferenced a total of 4,570 Cretaceous localities (out of 5,682 total) associated with this project (1,057 localities georeferenced since our last report). They generated 1,640 new images since Oct 20, 2017. The total number of images attached to their Specify database is 219.

Regarding the South Dakota School of Mines & Technology (SDSMT) portion of the project, led by co-PI Laurie Anderson,

they have databased 25,562 Cretaceous specimens total (1,834 lots), with 4,687 specimens databased (461 lots) since the last reporting period. 25,337 of these specimen records (1,794 lots) are also georeferenced (the remaining 226 specimen records [49 lots] that are not georeferenced lack sufficient geographic information for effective georeferencing). In addition, they have georeferenced 30 localities since the last reporting period and now georeferenced a total of 557 Cretaceous localities associated with this project (362 of these georeferenced localities are associated with collection objects, the remaining 195 georeferenced localities are in the database but are not yet used by one or more collection objects).

**Share and Identify Best Practices and Standards (including Lessons Learned):**
Regarding the UNM portion of the project, they have realized that communication is very important. Having several goals running concurrently is useful in situations when others are not communicating well or are on vacation/out of town. The broad Arctos community has been very helpful for troubleshooting the process of specimen data digitization and publication.

**Identify Gaps in Digitization Areas and Technology:**
Regarding the UNM portion of the project, they found that the auto-publish settings in IPT of Vertnet were not working correctly. David Bloom reviewed this and reset the auto-publish settings. All parts of their data set are being published from Arctos to iDigBio now.

**Share and Identify Opportunities to Enhance Training Efforts:**
Regarding the KU portion of the project, BSL has a new female graduate student who just arrived that will be working on this project.

Regarding the UNM portion of the project, they have successfully trained 5 individuals to work in the digitization process. These consist of 2 volunteers (undergraduate students), 2 graduate students, and 1 undergraduate student. A high school student also will begin volunteering this month.

**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:**
Regarding the PRI portion of the project, the Virtual Teaching Collections they are making, mentioned under "Progress in Databasing Efforts", are also valuable in this regard.

**Google Analytics**

**Other Progress (that doesn’t fit into the above categories):**
Regarding the KU portion of the project, we have a paper in press at the journal “Proceedings of the Royal Society” that focuses on the relationship between organismal physiology and long term species survival in the fossil record. It describes research on fossils conducted during the course of

this project and the lead author is Luke Strotz (LS), the post-doc supported by the grant, and other authors include BSL, collections manager JK, and Erin Saupe, faculty member at Oxford University. This work used museum specimen data available at iDigBio. LS also presented on this research at a special session of the 5th International Palaeontological Congress (IPC) in Paris, France. We found that over the long term species that survive longer in the fossil record tend to contain organisms with lower physiologies, implying that for this aspect of macroevolutionary dynamics it is possible to directly scale up from the organism to the species level. This work provides the first test that used the fossil record to assess the well known macroecological hypothesis called the metabolic theory of ecology. In addition, BSL described the Cretaceous World project in a talk at a special session on “Big Data” at IPC as well.

Regarding the PRI portion of the project, their social media activity continues. For instance, The Digital Atlas Twitter account (@PaleoDigAtlas) currently has 1,074 followers and has produced 753 tweets.

Regarding the UNM portion of the project, social media projects are ongoing and seem to have steady interest. UNM Paleo has been the most active via Facebook and Twitter. Further, CM participated in an NSF “Twitter Take-over” about Cretaceous Western Interior Seaway (WIS) sharks for the Discovery Channel’s celebrated Shark Week broadcasting.

UNMPaleo has also just finished summer fieldwork in the WIS of South Dakota and Montana. This provided hands on training for students working in collections and education in the process of specimen curation and digitization from the “ground” up.

**Attachment 1**

**Attachment 2**

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**Source URL:** https://www.idigbio.org/node/564/submission/1365

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# Submission #1389

Submission information

Form: TCN Quarterly Progress Report to iDigBio
Submitted by dcblackburn
Tuesday, August 14, 2018 - 14:47
10.243.21.179

**TCN Name:**
oVert: Open Exploration of Vertebrate Diversity in 3D

**Person completing the report:**
david.c.blackburn@gmail.com

**Progress in Digitization Efforts:**
Since 1 September 2017 (when our TCN officially began), we have added more than 1,700 media files to MorphoSource as part of the oVert TCN. We have CT-scanned >5,500 fluid-preserved specimens representing >2,000 genera of amphibians, reptiles, fishes, mammals, and birds, including specimens from across the institutions forming the oVert TCN as well as other US institutions such as the North Carolina Science Museum.

While scanning is on-going at institutions across the TCN, we have developed priority lists of target species using iDigBio specimen data. We have shared lists for fishes and reptiles such that different institutions can begin prioritizing and mobilizing specimens in their collections for imaging. We have worked with iDigBio staff Kevin Love on generating these priority lists by taking the type species of each genus listed in the Catalog of Fishes and Reptile Database and then determining US institutions that have representative specimens of these species, prioritizing specimens from oVert-participating institutions that have associated locality data and tissue samples.

**Share and Identify Best Practices and Standards (including Lessons Learned):**
We have been working closely with staff at both iDigBio (Dan Stoner, Kevin Love) and MorphoSource (Doug Boyer, Julie Winchester) on several issues related to the oVert TCN. We have developed mechanisms to share information on these media in MorphoSource with both iDigBio and individual scientific collections. We have set up a system in which MorphoSource generates a file with Audubon Core data for media files for specimens from a given collection (e.g., FLMNH Herpetology). This file can then be included in the IPT published by a given museum such that information on these media files can be ingested by iDigBio as part of the normal publishing method used by many US museums. RSS feeds are then published for each collection (using referenceID ingested by MorphoSource from iDigBio) that contain a CSV file with these Audubon Core data. Last, embedded within that RSS feed, are also included usage statistics about downloads and views of media files as well as further information characterizing the users and natures of download requests. In this way, collections can quickly access usage statistics on media files generated by oVert and hosted by MorphoSource. This information is now accessible for all institutions (both within oVert and otherwise) from https://www.morphosource.org/About/report

We have worked with the technology staff at FLMNH to develop a protocol by which institutions can ingest information from the RSS into their IPT so that these media are then discoverable via, e.g., iDigBio; the code for this protocol (developed by Warren Brown at FLMNH) is available on GitHub: https://github.com/FLMNH/MorphoSourceRSSDownloader

We continue to work on standardizing CT-scanning workflows across institutions. CoPI Ed Stanley has completed visits to the MCZ, FMNH/Univ. Chicago, and Michigan, where he worked with scanning staff to optimize workflows for scanning and uploading media files to MorphoSource. In August 2018, he will visit TAMU, and plans are in the works for a similar visit to Friday Harbor Labs at UW. We have created a set of 'reference scans' for several specimens and physical references standards that will reveal how different scanning technologies at participating institutions generate comparable digital datasets. These reference datasets have been shared via MorphoSource and a UF undergraduate is working with Ed Stanley (at UF) to collect quantitative data on these scans to determine comparability in data quality among institutions.

We continue to work on text that institutions can use for their policy for digital data ownership. We are working with MorphoSource and local IT departments at each institution to accomplish this task.

**Identify Gaps in Digitization Areas and Technology:**
Following our recent progress integrating metadata from iDigBio into MorphoSource, we have moved on to developing other methods to reduce the amount of time it takes to upload datasets and integrate them into MorphoSource. UF graduate student Natasha Vitek has been working with oVert to develop python codes to populate the data files used for batch-uploading media files to MorphoSource; the first version of this code is available on GitHub (https://github.com/nsvitek/CT_tools/tree/master/morphosource_batch_convert).

We continue to deal with challenges of long-term data storage for the project, since scanning produces large amounts of 3D data.

**Share and Identify Opportunities to Enhance Training Efforts:**
In Year 1, we have focused on training staff at CT-scanning institutions in an effort to standardize scanning. We have also focused on developing resources (both guides and code) that facilitate sharing of media files with MorphoSource. We are preparing an on-site workshop at UF for oVert scanning operators in Fall 2018. In addition, the oVert team has been developing digital media (both PDFs and short videos) that provide background information about CT-scanning as well as guides on creating, sharing, and using media generated by the oVert TCN. Files are available via the oVert iDigBio wiki and videos are available on the MorphoSource YouTube page (https://www.youtube.com/channel/UCusG--ELmxbSHNuTIcVL5mQ). Several institutions have undergraduate and doctoral students working as grant-funded technicians, which provides an opportunity for training students in CT research methods. ANSP has involved high school students from the Women in Natural Sciences program in working with CT data generated by oVert. In addition, oVert is supporting training of students and scientists at Friday Harbor Labs through an open call for proposals for 'mini projects' that can be accomplished in a week or two of scanning effort at that institution. Scripps Institution of Oceanography recently highlighted oVert in a new display at the Birch Aquarium. Similarly, images and 3D prints of oVert-related specimens will appear in an upcoming exhibit in the Reynolds Gallery at the Memorial Student Center at Texas A&M University.

We have also recently advertised opportunities for training in CT-scanning at Friday Harbor Labs as part of the Broader Impacts of the oVert TCN (http://bit.ly/ScanWithoVert). While at scientific conferences, we are disseminating this advertisement to solicit applications from undergrad and graduate students as well as professionals.

**Share and Identify Collaborations with other TCNs, Institutions, and Organizations:**
Almost as soon as the oVert TCN began in September 2017, there was wide interest from colleagues and institutions in the US and internationally in participating in or collaborating with our project. We have started some work with unfunded US-based institutions, including the North Carolina State Museum and Brigham Young University, in which we will CT-scan selected high-value specimens representing key taxa that are otherwise not available in oVert-participating institutions. We are discussing opportunities to work with other institutions that have ongoing collaborations with oVert-participating institutions, such as scanning large marine mammal specimens through connections at Texas A&M-Galveston, and scanning mammal specimens of interest at the University of Minnesota through the University of Chicago. Lead PI Blackburn has also been involved in conversations with colleagues in other countries, providing opportunities for sharing lessons learned from oVert for similar initiatives in Australia, Czech Republic, etc. Michigan hosted visiting researchers from Oxford for scanning opportunities, and have been working together on developing scanning methods. The first PEN proposal (oMEGA) submitted by Leif Tapanila (Idaho State University) has been funded. The oMEGA PEN will use light-based scanning to image individual skeletal elements of large vertebrates (e.g., whales) that would otherwise not be included within oVert due to size limitations of CT-scanning. We anticipate other PEN proposals associated with oVert in October 2018 involving the CT group at the University of Texas – Austin (UTCT) to mobilize via MorphoSource legacy data in UTCT and DigiMorph as well as from the University of New Mexico to image skeletons of small mammals, especially rodents.

**Share and Identify Opportunities and Strategies for Sustainability:**
The oVert TCN builds on existing resources by adding media files to an existing database platform, MorphoSource (supported by Duke University and the US National Science Foundation), and each institution is individually responsible for long-term storage of original media files if they choose to do so.

The University of Florida has also recently entered into a licensing agreement to share CT scans generated using UF funds (i.e., not funded by NSF) with Interspectral (http://www.interspectral.com/). Revenue generated through licensing CT datasets from UF specimens will be used to support curation, research, and education at FLMNH. While not directly funded by oVert, this strategy of licensing media files for commercial use may provide funds that sustain data storage and museum curation into the future.

**Share and Identify Education and Outreach (E&O) Activities:**
UF oVert participants met with staff at the UF Center for Precollegiate Education and Training in June 2018 and worked with CPET staff and a participating educator (Jennifer Broo) to develop high school lesson plans using oVert-generated data. The goal is to make digital and 3D-printed models resulting from oVert broadly accessible to K-12 educators via MorphoSource or on-line platforms such as Sketchfab. This will guide our first on-site educator workshop in the summer of 2019.

During June–August 2018, UF undergraduate Amber Singh and UF graduate student Rachel Narducci both worked to create 3D models for education and outreach for oVert, in part informed by the work with CPET in June 2018. The models that have been prepared will be hosted on both MorphoSource and Sketchfab and are intended to integrate with topics typically covered in AP Biology (i.e., convergent evolution, functional anatomy). In addition, models were created to help guide curation of small vertebrate fossils, such as representative vertebrae from different snake and salamander species. This is in preparation for a contributed talk at the upcoming Society for Vertebrate Paleontology meeting in New Mexico in October 2018.

Information about products from the oVert TCN are regularly communicated on social media (https://twitter.com/hashtag/overttcn). Social media coming from oVert is received well on-line and often used by the US National Science Foundation in their social media feeds.

### Google Analytics

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

As of this report, there are seven scientific publications citing one of the 16 oVert TCN Awards. In addition, there have been so far 16 presentations at professional meetings related to oVert, including 14 at the recent Joint Meeting of Ichthyologists and Herpetologists in Rochester, NY in July 2018. These publications and presentations are detailed on the oVert iDigBio wiki page: (https://www.idigbio.org/wiki/index.php/OVert:_Open_Exploration_of_Vertebrate_Diversity_in_3D).

### Attachment 1

### Attachment 2

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**Source URL:** https://www.idigbio.org/node/564/submission/1389

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# Submission #1409

Submission information

Form: TCN Quarterly Progress Report to iDigBio
Submitted by chrisneefus
Wednesday, August 15, 2018 - 16:33
132.177.112.80

**TCN Name:**
The Macroalgal Herbarium Consortium: Accessing 150 Years of Specimen Data to Understand Changes in the Marine/Aquatic Environment

**Person completing the report:**
Chris.neefus@unh.edu

**Progress in Digitization Efforts:**
We have nearly completed imaging and transcription, although some of the digitizing institutions, most notable NYBG, UC Berkeley and Harvard have yet to upload a significant number of their data to our portal. Georeferencing is progressing very well; most of the specimens on the portal that have been fully transcribed have been georeferenced. (see the attached summary chart).

**Share and Identify Best Practices and Standards (including Lessons Learned):**
We are using the same digitization workflow as all of the other herbarium projects and find that they work well.

**Identify Gaps in Digitization Areas and Technology:**
The one issue we are contending with is the inability of some digitizing institutions to easily transfer data and images from their institutional collection systems to out portal.

**Share and Identify Opportunities to Enhance Training Efforts:**
We have used a combination of online training documents and videos plus in-person instruction.

**Share and Identify Collaborations with other TCNs, Institutions, and Organizations:**
Like a number of the other institutions, a number of our TCN members are participants in other TCN's as well.

**Share and Identify Opportunities and Strategies for Sustainability:**
The best strategy for sustainability is to make the data and tools on the portals indispensable. To that end, we are developing a new set of analysis tools for the Symbiota Spatial module.

**Share and Identify Education and Outreach (E&O) Activities:**
We continue to make presentations at local and national meetings that demonstrate the value of the portal. We also regularly use the Macroalgal Portal and other TCN portals in our undergraduate and graduate courses.

**Google Analytics**
MacroalgaeGoogleAnalytics.png

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

**Attachment 1**
digitization numbers 08-15-18.pdf

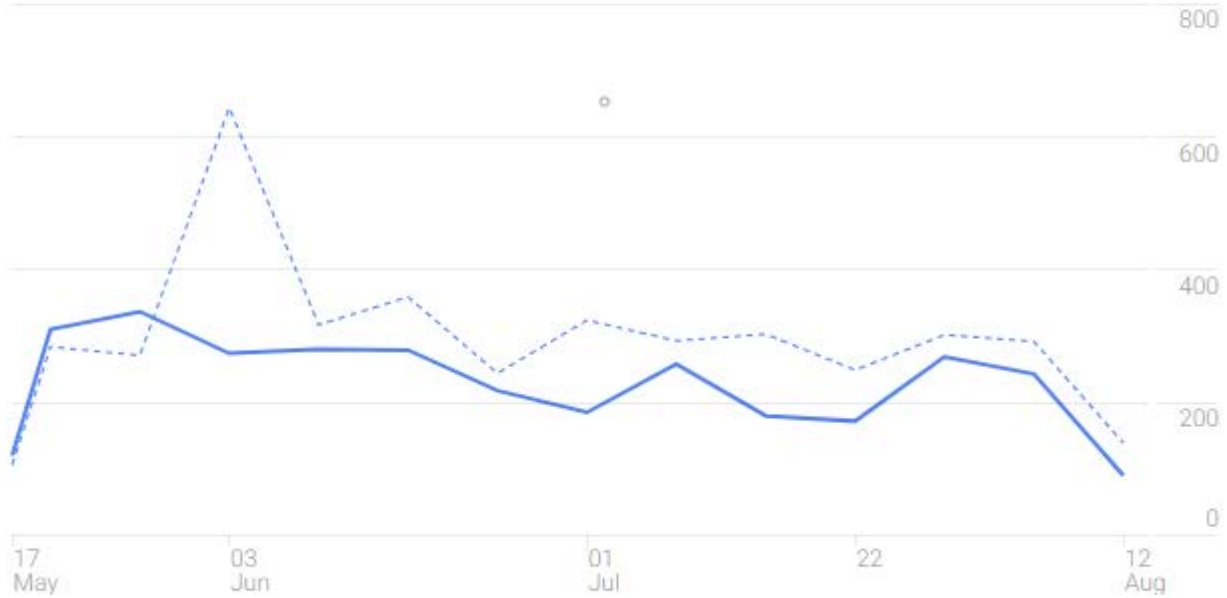
**Attachment 2**

**Source URL:** https://www.idigbio.org/node/564/submission/1409

| | | | | Percent Complete | | | | |
|---|---|---|---|---|---|---|---|---|
| **Digitizing Institution** | **Start** | **Collections** | **Specimens** | **Records Created** | **On Portal** | **Imaged** | **Transcribed** | **Geo-referenced** |
| University of New Hampshire | Year 1 | 10 | 140,493 | | | | | |
| New York Botanical Garden | Year 1 | 5 | 172,613 | | | | | |
| University of North Carolina | Year 1 | 7 | 62,435 | | | | | |
| University of Michigan | Year 1 | 5 | 95,589 | | | | | |
| University of Washington | Year 1 | 3 | 25,775 | | | | | |
| Duke University | Year 1 | 1 | 17,828 | | | | | |
| University of Alaska SE | Year 1 | 1 | 9,889 | | | | | |
| Bishop Museum | Year 1 | 1 | 65,000 | | | | | |
| Field Museum | Year 1 | 1 | 48,058 | | | | | |
| Oregon State University | Year 1 | 1 | 12,120 | | | | | |
| University of Guam | Year 1 | 1 | 7,913 | | | | | |
| University of California - Berkeley | Year 2 | 9 | 230,869 | | | | | |
| University of Hawaii | Year 2 | 1 | 4,730 | | | | | |
| Harvard University | Year 2 | 1 | 125,000 | | | | | |
| Academy of Natural Sciences | Year 3 | 1 | 37,816 | | | | | |
| University of Vermont | Year 3 | 1 | 3,062 | | | | | |
| | Totals | 49 | 1,059,190 | 811,471 | 784,243 | 718,810 | 615,843 | 552,649 |

Google Analytics | All accounts

| 2.6K | 4.4K | 52.72% | 3m 40s |
| --- | --- | --- | --- |
| ↓24.1% | ↓19.3% | ↓6.1% | ↓4.2% |
| vs last 90 days | | | |




Last 90 days

AUDIENCE OVERVIEW