THE TRANSFORMATIVE POWER OF STUDENT-LED NATURAL HISTORY COLLECTIONS CLUBS

Cheyenne Gerdes, 1,2 Kari M. Harris, 3 Mireia Beas-Moix, 4,5 and Travis D. Marsico 3,6

¹Biology Department, Missouri State University, Springfield, Missouri, 65897, USA
²Present address: Department of Forestry and Natural Resources, Purdue University, West
Lafayette, Indiana, 47907, USA

³ Department of Biological Sciences, Arkansas State University, Jonesboro, Arkansas, 72467, USA

 ⁴ Cheadle Center for Biodiversity and Ecological Restoration, University of California-Santa Barbara, Santa Barbara, California, 93106, USA
 ⁵ Present address: Universitat de Barcelona, Faculty of Library and Information Science, Barcelona, 08014, Spain

⁶Corresponding author: phone: 870-680-8191; email: tmarsico@astate.edu

Abstract.—Many colleges and universities maintain herbaria or natural history collections. Natural History Collections Clubs (NHCCs) are registered student organizations (RSOs) capable of improving conditions in these collections, many of which are threatened by a lack of funding, minimal curatorial staff, and inadequate institutional support. Student involvement through NHCCs can improve conditions in collections at academic institutions by providing volunteers, promoting outreach, increasing funding, and generating enthusiasm in administration, students, and the community. In this paper, we explain the need for such organizations, outline the process of establishing an NHCC, and provide case studies from successful organizations. We also describe a developing network for NHCCs and summarize what has been accomplished by these organizations to date.

Key words.—case study, national network, student clubs, student involvement.

Associate Editor.—Christine Johnson

Introduction

Natural History Collections Clubs (NHCCs) are organizations devoted to engaging, training, and inspiring students at universities and other institutions that have natural history collections. The organizations have three main purposes: 1) educate students about natural history collections and their importance to the underpinnings of biology and biodiversity research; 2) improve collections curation and management by training capable student volunteers; and 3) involve students in research and community outreach using collections (Fig. 1).

Many academic institutions in the USA have some sort of natural history collection, most of which maintain collections with fewer than 50,000 specimens (Prather et al. 2004). These natural history collections often struggle to achieve reliable funding (Dalton 2003; Kemp 2015) and adequate staffing for maintenance and research (Snow 2005). These issues can be particularly chronic at universities where curators of collections have many responsibilities in addition to growing, managing, and curating collections (Snow 2005). Collections at universities and colleges are also especially prone to becoming abandoned or orphaned (West 1988; Danks 1991), and some collections have been closed and consolidated, limiting access to student education potential in biodiversity fields at those institutions (Gropp 2003). The rate at which specimens are being collected from the field has decreased in recent years. Consequently, documentation of the world's biodiversity is in decline (Prather et al. 2004), precisely at a time when cataloguing biota and species distributions is most critical for conservation efforts.

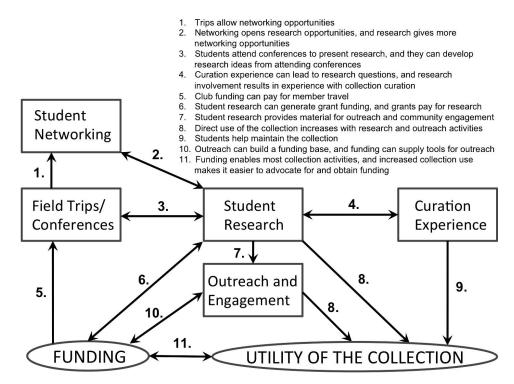


Figure 1. Flow chart depicting the interrelated activities of a Natural History Collections Club (NHCC). Rectangles represent club activities, and ovals represent club outcomes. Arrows are directional or bidirectional depending upon the activity and outcome. For example, funding generated can pay for travel to trips and conferences (5), and those trips result in student networking opportunities (1, directional arrows). Curation experience and student research are linked bidirectionally because curation experience can lead to research questions, and research involvement results in experience with collection curation (4).

These problems can be partially addressed by using NHCCs to train student volunteers and engage stakeholders in collections. Students can participate in collections at their colleges and universities by helping with day-to-day curation responsibilities, large-scale projects, and public outreach. Such involvement represents an opportunity for students to develop skills beyond what is offered in academic courses. Students gain professional experience, develop leadership and management skills, establish connections to faculty and/or staff members, and participate in constructive cocurricular and enjoyable activities (e.g., field trips, conferences, workshops) through NHCC participation. In addition, as a result of working with natural history collections, students can discover a passion for a career that they were unaware existed (e.g., preparator or museum director). Well-managed collections at universities and colleges can provide many benefits for students, including independent study opportunities, jobs, or internships (Snow 2005; Rath et al. 2015; Thigpen et al. 2015).

Institutions also benefit from NHCCs. These clubs can increase awareness about the importance of natural history collections among students and the campus community. Snow (2005) stated that students represent one of the most important linkages for small natural history collections and herbaria. Students who understand the value of collections often become excellent advocates when support is needed from the institution.

In this document, we 1) outline general guidelines for the establishment of NHCCs at a university, 2) share case studies from three very different organizations established at

universities, and 3) explain the perceived benefits of linking individual NHCCs into a Natural History Collections Club Network (NHCCN).

ESTABLISHING AN EFFECTIVE NHCC

Institutions with natural history collections might find need for an NHCC to address problems that their collections face, or to increase the impact of the collection. At collections with curatorial faculty or staff, employees might seek to create an NHCC to educate students, start an outreach program, or train volunteers. Students at institutions with abandoned or neglected collections and no collections staff might seek to establish an NHCC to protect or save what is recognized as a valuable and underutilized resource.

To establish an NHCC, there are important factors and processes to consider. Most institutions will require approval of any new organizations. At colleges and universities, the approval and application process for organizations is likely managed through a Student Activities Board (SAB), Office of Student Life (OSL), or similar administrative unit. When the application is complete, the NHCC will be considered a registered student organization (RSO). The ease of the application process for RSOs can vary widely by institution, but institutions often have similar minimum requirements. Most commonly, a faculty advisor, club officers, and a club constitution are required for RSO establishment (see Appendix for sample constitutions). Some institutions have additional requirements, such as mandatory trainings or orientations for club leadership. Most require that RSOs renew their membership each year and repeat leadership orientations.

Faculty advisors are critical for an NHCC, because they are important in providing oversight and advice for students interacting with the collections, helping students find curation resources, communicating with other faculty members in the department, or assisting in acquiring funding. The level of involvement from the advisors can vary based on a variety of factors, including how new the NHCC is, how knowledgeable students are in curatorial methods, how active student leadership in the club is, how many students are involved, and what other staff or faculty might be able to assist in advising duties. In some cases, the advisor role might be minimal, especially if student volunteers in collections are already skilled in curatorial methods. In many cases, however, advisors might need to provide hands-on training or formal coursework as part of the education, as well as oversight for students establishing new projects or when students are unfamiliar with protocols for a specific collection. For new clubs, guidance from curators and faculty members helps familiarize students with how natural history collections should operate. One of the most important advisor functions is to ensure club continuity during membership turnover. Student organizations on campuses can last decades as long as continuity is maintained and recruitment continues.

Required membership for an RSO is often low, between three and five students (e.g., see A-State Student Organization Registration form at http://www.astate.edu/a/leadership-center/rso/index.dot). However, a larger group of student volunteers is likely to affect greater change in the collections. Although there are several ways to recruit new student members, word-of-mouth recruitment is particularly important, especially if the NHCC is initiated through student interest. Students will likely tap into their peer network to find others interested in NHCC involvement on campus. Students from diverse backgrounds and varied majors such as art, history, biology, environmental science, library science, education, and computer science might find meaningful interaction with collections to their benefit. More likely, membership will be made up of students interested in organismal

biology, anatomy, systematics and taxonomy, and ecology. Nonetheless, a diversity of interests can generate creative ways to improve curation and education. For example, computer science majors might be interested in facilitating specimen digitization efforts or collections web design. Art majors might be interested in designing displays, communicating the value of collections, or learning traditional skills associated with collections such as taxidermy, plant pressing, or scientific illustration.

Social media and student networks, both online and offline, are excellent tools for increasing membership, particularly because students are often good recruiters of peers. Direct promotion of the organization in relevant undergraduate classes such as introductory biology, zoology, botany, ecology, or museum studies courses, or through email listservs or student organization websites is also useful.

A critical aspect of NHCCs is self-driven student fundraising for the collections and for activities that engage their membership (Fig. 1). Most universities offer lines of funding for student clubs, which can help RSOs acquire supplies, travel to conferences, or visit other collections. Although universities have different methods for providing funding, many institutions have a system that allows RSOs to petition for money to fund specific events and causes. Funding lines are often available through the Student Government Association (SGA), SAB, Associated Students (AS), OSL, or similar program, and RSO members are typically required to prepare an application and/or a short presentation for a funding committee, because often they are in competition with other RSOs for allocations. Funding requirements often involve participating in events on campus, making hosted events open to all students, and attending additional meetings. There might be stipulations on what these lines of funding will pay for, with some universities providing money only for travel or event hosting, whereas other universities allow a wider range of uses, including the purchase of supplies or conference registration fees. Each NHCC should investigate what its university offers. Generally, the maximum money available per year for established NHCCs has ranged from \$250 to \$1,500, although often the funding committee provides less than the maximum.

An RSO is also required to raise funds outside of university provisions. Fundraising might involve bake sales, raffles, or seeking donations. It is important that students are willing to fulfill these requirements so additional funding is available the following year. For small clubs that serve small collections, an additional \$250 or \$1,000 in funding makes a significant difference in what students are able to achieve for their collections.

When students raise money for the club and the collections, whether through university sponsorship or by traditional fundraising, administrations are more likely to invest as well. The ideal situation is a positive feedback loop of funding. Outside funding agencies are likely to take proposals more seriously if a collection is already supported by students, faculty, staff, and administrators of the institution. Likewise, institution administrators are more likely to support a collection if they see that it is supported by grants and student activities (Snow 2005). Something as simple as receiving modest club funding for student trips or curatorial supplies can kickstart a chain of funding successes (Harris 2014).

Although funding can reward involved students with field trips, events, and conference registrations, another core activity of a club should be volunteerism in the collections (Fig. 1). Student volunteer activities in collections can range from digitizing specimen data, preparing new specimens, making or updating display cases, cleaning abandoned collections spaces, or organizing and repairing damaged collections (e.g., refilling ethanol in jars, cleaning insect frass). Clubs can have "workdays" or "curation days" in which members work together to accomplish large tasks relatively quickly, such as complicated skeleton

articulations or moving heavy equipment. Moreover, these workdays allow curators and more-experienced students to teach less-experienced students curatorial methods in a group setting. Students benefit from training and can enjoy working with their peers. Collections benefit from the volunteer efforts, but it is important that collections do not take advantage of unpaid student laborers. Student volunteers are not meant to replace paid staff. However, an NHCC with a few hours of voluntary group curation activity every few weeks can make meaningful improvements in a collection.

NHCCs improve the outreach and public education that many institutions provide (Fig. 1). University students can make collections available and exciting to the general public through tours, outreach events, and becoming involved with the community outside the university. Students in NHCCs have presented to scout troops, created booths for campus events, brought specimens to classrooms, and led tours for K–12 students during science events. These activities can be great biodiversity outreach events, excellent publicity for collections, and improve the image of collections in the community. In our experience, NHCC members have found participating in outreach rewarding, especially when children are involved.

The RSO model for NHCCs is also adaptable to accommodate the different needs of the various collections at different institutions. For universities with large, well-curated collections and paid staff, volunteers, and funding, NHCCs can improve outreach efforts and serve as a network to unite people who already work in the collections. For universities with small, abandoned, or orphaned collections, an NHCC might focus on restoring and maintaining collections where there is no curatorial staff. The NHCCs at an institution can fill whatever niche is needed, as determined by the students and faculty who are involved.

CASE STUDIES

Arkansas State University

Arkansas State University (A-State) houses biodiversity collections representative of Arkansas. The Department of Biological Sciences houses several research and teaching collections, including mammals (~32,500 specimens), birds (~800 specimens), amphibians and reptiles (~33,000 specimens), fishes (~141,000 specimens), insects (~23,000 specimens), aquatic macroinvertebrates (~212,000 specimens), mussels (~2,200 specimens), and plants (~25,000 specimens). Collections here have no operating budgets and curators are given no release time for curatorial duties. In 2013, many of the collections were improperly stored and degrading as a result of years of neglect. The herbarium has been an active collection, and in 2012 a group of students began working to digitize the collection as a part of a National Science Foundation Scholarship in Science, Technology, Engineering, and Mathematics (NSF S-STEM) scholarship program. Members of this team, which included one graduate and two undergraduate students, participated in a collections management course taught by herbarium curator, T. D. Marsico in the spring of 2013 with six other students.

Students observed the state of the collections at A-State during the course and felt an urgency to help restore them. Both the ichthyology and aquatic macroinvertebrate collections were in dire need of immediate assistance, and the class developed a triage plan to salvage them. To reach this goal it was necessary for students to 1) find help and work beyond the extent of the class, and 2) secure funding to purchase needed jars, ethanol, and other supplies. The innovative solution to solve both of these problems was to create a collections

club, which led to the formation of the Natural History Collections Curation Club (NHC3) at A-State that held its first meeting in February 2013.

The club served as a hub for students interested in natural history. By hosting work-days, coordinating volunteer hours, and setting up training workshops, the members of the A-State NHC3 provided a workforce for the collections. Additionally, the club was able to secure funding for collections materials. At A-State the SGA Action Funds can be used for supplies and materials. In spring 2013 the club was approved for \$500 to purchase new jars for the aquatics collections. Administrators were impressed with this student-led effort to improve university resources. As a reward for their hard work, the chair of the Department of Biological Sciences, Dr. Thomas Risch, sponsored an NHC3 trip to the Field Museum in Chicago. The club members continued to work and improve the collections, and they were able to gain recognition from the Dean of the College of Sciences and Mathematics, Dr. John Pratte. Pratte used funding as a means to encourage the club to continue its efforts and purchased curation supplies, sponsored trips to museums and conferences, and hired a part-time employee for the collections. In total, the college has invested nearly \$45,000 in the Natural History Collections Curation Club since 2013.

In 2015 the NHC3 at A-State began to encourage student members to participate in collections-based research. Three students attended the 2015 meeting of the Society for the Preservation of Natural History Collections (SPNHC). The students presented posters about the NHC3 concept and work they had been doing to rehydrate desiccated fish specimens (Rath et al. 2015; Thigpen et al. 2015). Since then, those students and several others have also been able to present their research at other professional meetings. Some of these students had never encountered natural history specimens just a year prior to their presentations at SPNHC 2015, yet, through this club, they became actively engaged and interested in the field of natural history.

As of the fall semester 2017, faculty members at A-State have been awarded three federal grants related to natural history collections and biodiversity research and education, at least in part due to broader impacts that include the involvement of the NHC3 and its volunteer student membership (NSF DUE: 1564954, T. D. Marsico, PI; NSF DBI: 1561743, B. Fluker, PI; NSF DBI: 1744392, K. M. Harris, PI). The Curation of Collections course taught in spring 2013 for the first time has been formalized into a regular course, and for the fall 2017 semester has an enrollment of 22 graduate and undergraduate students. At SPNHC 2017 in Denver, Colorado, there was a half-day Natural History Collections Club Network workshop aimed at explaining and engaging university faculty and students to develop NHCCs and join them in a national network. Eight A-State faculty members and students attended and presented their research associated with natural history collections at this international meeting.

University of California-Santa Barbara

The Cheadle Center for Biodiversity and Ecological Restoration (CCBER) is a center under the Office of Research at the University of California–Santa Barbara (UCSB). CCBER houses regionally focused collections of terrestrial plants (~90,000 specimens), lichens (~700 specimens), algae (~8,000 specimens), amphibians and reptiles (~18,500 specimens), mammals (~3,500 specimens), birds (~9,400 specimens), and an extensive plant anatomy collection (~65,000 slides). The founders of the plant and animal collections, Drs. C. H. Muller and Mary Erickson, respectively, initially developed the collections in 1945. The curation of the collections is conducted by one full-time collections manager with the help of student interns and volunteers.

In September 2011, CCBER created the Collections Internship Program, a 10-week program aimed to expose students to the field of natural history collections curation and possibly encourage them to discover a passion for a profession that they did not know existed. The internship consisted of three hours of class per week and included lectures, hands-on training, and field trips. Every academic quarter the internship program had a different focus: for example, vascular plants, algae, vertebrates. Students earned a unit of academic credit for participating, and after the end of the internship had the option to continue helping with the curation of the collections as independent interns or volunteers. In January 2014, the CCBER collections internship program officially became a UCSB course entitled Curation of Natural History Collections.

In June 2013, the CCBER collections manager (M. Beas-Moix) attended the 28th SPNHC Annual Meeting in Rapid City, South Dakota, to give a presentation about the CCBER Internship Program. At the meeting she attended a talk about the NHC3 by K.M. Harris, who at that time was working toward her Master's degree in Biology. Over the summer of 2013 and beginning of fall 2013, Beas-Moix met with UCSB students who were already helping with the curation of CCBER collections to discuss the creation of a collections club similar to the one that Harris had successfully created at A-State. In October 2013 the Natural History Collections Club at UCSB was officially established.

The first months were mostly devoted to outreach and advertising of the club in order to increase membership. This was accomplished through booths on campus and the participation in promotional activities that the UCSB OSL offers. The current membership list includes over 50 students, although an average of 15 students per quarter actively participate in all the activities. Members of the club have participated in several collection curation projects, including the topping-up and replacement of the herpetology collection preservative (\sim 18,500 specimens), the preparation and mounting of over 1,000 plant specimens, and the imaging, barcode labeling, and databasing of 3,800 plant specimens.

Besides providing immeasurable help with the curation of CCBER collections, the club has also become a social platform for students to meet like-minded peers, have fun, and enrich their college experience. Students have used the club to organize workshops on animal preparation, talks about natural history-related topics of their interest, potlucks, and other social events.

Funds raised during the first two years of the club totaled \$500: \$250 in start-up funds provided by the Associate Students Finance and Business Committee and \$250 for participating in a restoration project organized by the UCSB Coastal Fund. At the early stages of the club, funding was not a priority. Instead, officers were focused on defining the role of the club and building a robust core membership. However, as the club becomes more established and the officers become more experienced and aware of all the funding possibilities, fundraising will gain in importance. The funds will be mostly used to cover the costs of field trips to other natural history museums and to purchase food for smaller social club events to attract prospective members and thank existing members for their service.

Missouri State University

Missouri State University (MSU) is an undergraduate and master's level institution. The school has an active herbarium, but no other significant curation efforts are ongoing. The Biology Department houses several small vertebrate collections primarily used for teaching. However, the mammal collection at MSU, while including some teaching specimens, also includes an estimated 1,000 + research specimens that had not been actively curated in decades. The collection mostly represented biodiversity from the local area, including

parts of the Ozark Plateaus and the Tallgrass Prairie regions. Due to the lack of an official curator, or any paid or volunteer staff, few study skins were labeled to species, and many specimens were highly damaged or missing data. There was no institutional or departmental support for the collection, because specimens had not been used or cared for in years.

In an effort to restore the collection to a functional state, MSU students established a branch of the NHC3 at MSU in the fall of 2014. Establishing the NHC3 involved writing a constitution, meeting a minimum number of involved students, and finding at least one faculty mentor. Completing a registration process and attending club training were also required for the establishment and maintenance of a student organization at MSU. Most club members were students interested in pursuing mammalogy as a career.

The first year, 10 to 15 students were involved in some way, either by attending an NHC3 event or by volunteering. A core group of about six students were most active. Students involved with the organization cleaned and organized specimens, digitized tag data, and prepared new specimens. The organization also hosted bird and mammal specimen preparation demonstrations for students and faculty.

Dozens of collective hours were used toward the improvement of the collection. Specimens were sorted and placed in better containers, and tag data were added to an excel spreadsheet. Students made the collections area safer and cleaner by moving field equipment that had been improperly stored and by removing trash and clutter. The club also created new specimens through the mammal preparation demonstration. The freezer allocated to the collection was cleaned and deiced.

The MSU NHC3 also began hosting field trips for club members, with support coming from the Office of Student Engagement and the Biology Department. The club also received funding (\sim \$250) for the 2016–2017 year from MSU's student organization grant system to purchase curation materials.

The club has several short-term goals, such as completing the digitization of the mammal collection and identifying all unlabeled specimens to species. The long-term goal of the club is to acquire better curation conditions and perpetuate student interest in collections, so that specimens can be housed safely and permanently. Overall, the goal is to restore collections to a useable state and see the specimens used in research.

NHCC NETWORK

The existing NHCCs, located at A-State, UCSB, MSU, Georgia Southern University, and Pittsburg State University (PittState) in Pittsburg, Kansas, have formed the Natural History Collections Club Network (NHCCN) (Fig. 2). The NHCCN seeks to bring the concept of NHCCs to other interested universities as a way to enhance student interest and excitement for collections and, in turn, convince university administrators that university collections have significant value in fulfilling their core missions of research, education, and public outreach. The NHCCN also serves as a hub of communication and collaboration between existing clubs. As of July 2017, after a workshop held at SPNHC 2017 in Denver, Colorado, there are at least eight additional universities interested in starting NHCCs. We expect to nearly triple the network over the next year as these clubs and potentially others are added. Ten universities were represented at the SPNHC workshop. These included three universities with established NHCCs (A-State, PittState, and UCSB) and seven universities without established NHCCs (California State University—Monterey Bay, California State University—San Jose State, Central Michigan University, Oklahoma State University, University of California–Riverside, University of New Mexico, and Virginia Polytechnic Insti-



Figure 2. Map of existing and potential Natural History Collections Club Network (NHCCN) clubs. Blue labels represent existing clubs, and red labels represent universities that have expressed interest in joining the network. Existing clubs include: 1) Arkansas State University, 2) University of California-Santa Barbara, 3) Missouri State University, 4) Pittsburg State University, and 5) Georgia Southern University. Potential clubs include: 6) California State University-San Jose State, 7) California State University and 5) 8) University of California-Riverside, 9) University of New Mexico, 10) Oklahoma State University, 11) Central Michigan University, 12) University of Florida, and 13) Virginia Polytechnic Institute and State University.

tute and State University) (Fig. 2). Separate from the SPNHC workshop, Georgia Southern University has joined the network and the University of Florida FERN club has expressed interest in becoming part of the NHCCN (Fig. 2).

The network aims to develop resources that can be used by current and future NHCCs, including free-use documents such as sample club constitutions, instructional videos for students and faculty working in collections, workshops for those interested in starting their own clubs, and possibly financial resources for club members to attend relevant meetings. In addition, having accountability and structure between institutions will hopefully provide a way to document club activities across the nation and quantify successes NHCCs have in their collections.

Three of the four original network clubs (A-State, MSU, and PittState) have already joined together for a club network field trip and service project. This trip took place in March 2016, when the three NHCCs met in St. Louis, Missouri, after coordination among club leadership and planning from PittState club advisor, Dr. Neil Snow. The clubs participated in a behind-the-scenes tour of the herpetarium at the St. Louis Zoo. At the zoo, herpetarium staff educated club students and advisors about keeping living collections for display and education and conservation projects, including the captive breeding and release program of the federally endangered Ozark hellbender (*Cryptobranchus alleganiensis bishopi*). The clubs then met at the Missouri Botanical Garden Herbarium (MO) and took a tour of the herbarium and the library. During the herbarium day, the clubs participated in a service project of organizing boxes of returned loan specimens of Myrtaceae into stacks alphabetical by genus to assist herbarium staff in filing the returned specimens. This first club network field trip introduced club members to each other from partner institutions, educated members on living collections and one of the largest herbaria in the world, and provided an opportunity for a service project.

Conclusions

Natural history collections at universities across the country are facing shortages of staff and funding at a time when these collections are critical for global biodiversity conservation efforts. Student involvement is an untapped resource for these collections. Motivated students can improve and preserve collections, faculty can inspire and inform that motivation, and NHCCs are an effective way for faculty and students to work together to accomplish their goals.

The NHCCs that have been established since 2013 have collectively prepared, improved, or otherwise preserved thousands of specimens. The clubs have been involved in the digitization of over 20,000 specimens. At least 90 students have been involved with NHCCs in some way, and 11 student presentations at professional conferences were based on activity launched from NHCC involvement. At NHCC institutions, there have been speakers, demonstrations, and field trips made available through NHCCs that would not have otherwise existed. At least \$7,500 has been raised for NHCCs since 2013, entirely by students. Much of that funding was through programs only available to RSOs, and the rest was raised through fundraisers or by students directly requesting funds from administrators.

The structure of student organizations at universities lends itself well to managing student volunteers in collections. Faculty oversight and more experienced students in club leadership roles provide the opportunity for inexperienced but enthusiastic volunteers to make major headway in collections care, specimen digitization, funding acquisition, and community outreach. This model of student involvement offers new potential for collections.

tions to make the most of their resources, preserve and digitize more specimens, and involve and educate more people about the importance of biodiversity and natural history. Today's students are the ones who will advocate for collections in the future, but there is no need to wait. They can advocate for collections right now, when many university collections are in desperate need.

ACKNOWLEDGMENTS

We thank all of the students and faculty advisors involved in their NHCCs over the last few years. Their commitment to natural history collections and biodiversity conservation has been awe-inspiring. We also thank the National Science Foundation for funding research, education, digitization, and infrastructure initiatives that are supported by students in NHCCs NSF DUE-1060209 (NSF EF-1410098, NSF DBI-1561743, NSF DUE-1564954, and NSF DBI-1744392). Finally, we thank our manuscript editor, Dr. Christine Johnson, for edits that improved our manuscript.

LITERATURE CITED

Dalton, R. 2003. Natural history collections in crisis as funding is slashed. Nature 423(6940):575.

Danks, H.V. 1991. Museum collections: Fundamental values and modern problems. *Collection Forum* 7(2): 95–111.

Gropp, R. 2003. Are university natural history collections going extinct? BioScience 53(6):550.

Harris, K. Funding: It's about time. 2014. SPNHC Connection 28(1):26–27.

Kemp, C. 2015. Museums: The endangered dead. Nature 518(7539):292-294.

Prather, L.A., O. Alvarez-Fuentes, M.H. Mayfield, and C.J. Ferguson. 2004. The decline of plant collecting in the United States: A threat to the infrastructure of biodiversity studies. Systematic Botany 29(1):15–28.

Rath, M., A. Hook, K. Jones, S.M. Loerch, L. Martin, A. Mross, and B.L. Fluker. 2015. Rehydration of desiccated fish specimens in the Arkansas State University Museum of Zoology Ichthyology Collection. 30th Annual meeting of the Society for the Preservation of Natural History Collections, Gainesville, Florida (18–22 May 2015). [Poster].

Snow, N. 2005. Successfully curating smaller herbaria and natural history collections in an academic setting. Bio-Science 55(9):771–779.

Thigpen, C.S., M.M. Rath, A.T. Hook, K.M. Harris, and T.D. Marsico. 2015. NHC3: A novel approach to encourage student participation in natural history collections. 30th Annual meeting of the Society for the Preservation of Natural History Collections, Gainesville, Florida (18–22 May 2015). [Poster]

West, R.M. 1988. Endangered and orphaned natural history and anthropology collections in the United States and Canada. *Collection Forum* 4(2):65–74.

APPENDIX: SAMPLE NHC3 CONSTITUTIONS

Constitution of The Natural History Collections Curation Club, Arkansas State University

Article I: Name

The official name of the organization shall be: "The Natural History Collections Curation Club"

Article II: Purpose

The Natural History Collections Curation Club (NHC3) recognizes the scientific and historical value of biological collections, and is dedicated to assisting in the preservation, maintenance and organization of A-State's scientific collections. NHC3 recognizes the opportunity this affords members to gain experience working with museum specimens as well as the benefit provided to the school as a whole by making collections fit for use in scientific works.

Article III: Membership

Voting members must currently be enrolled at A-State and should be in good academic standing—a minimum of 2.0 GPA.

- 1. All students meeting these qualifications are eligible for membership
- 2. Membership will be revoked if a member fails to remain in good academic standing, or if a member's behavior opposes the club's purpose as stated in this constitution.

Article IV: Officers

Officer positions and responsibilities shall be:

- President—The president is responsible for organizing meetings and communicating with members, as well as organizing any events that may occur.
- Vice-President—The vice-president assumes the president's duties if the president is unable to complete them. The vice-president also assists the president in organizing events and communicating with members.
- 3. Secretary—The secretary is responsible for taking minutes during meetings and maintaining an email list of members. The secretary will be responsible for ensuring that minutes reach each member via email. They may also assist in event preparation.
- 4. Treasurer—The treasurer is responsible for maintaining the club's finances, and may also assist in event preparation, especially those preparations that involve club finances.
- Election of officers will be held in the fall semester of each year. Nomination of officers will be open to all members, and a vote by all members will determine the winner. The term of office shall be for one year. Should vacancies occur, a second vote will be held, in the same manner as the first
- Impeachment charges may be brought against any of the officers for negligence or inappropriate behavior.
 In this case, the officer in question will be informed, and a vote will be taken by the officers and adviser to determine if the impeachment succeeds.

Article V: Organization Structure

The executive committee shall consist of all named officers and the club adviser. The executive committee shall be responsible for all club organization and activities, including the duties listed for each office. The club holds the right to create other committees for other purposes as needed.

Article VI: Faculty Adviser

In order to qualify to be the Faculty Adviser for the organization, the individual must be a full time faculty or staff member of Arkansas State University.

Article VII: Rules and Procedures

- The organizational meetings will be announced by the officers and communicated to the membership.
 There is no set attendance policy, though nonattendance at meetings where a vote is held forfeits the member's vote at that meeting.
- Members are strongly encouraged to donate some piece of their time and/or effort to the biological collections in some way.
- 3. Behavior must be in agreement with the club's purpose.
- 4. Official business will be discussed at announced meetings.

Article VIII: Finance

Because this organization is in many aspects a volunteer organization, no dues will be collected.

Article IX: Amendments

All amendments to this constitution must be made by the following process:

- 1. The amendment must be approved by 3 of the 4 officers, as well as the adviser.
- The proposed amendment must be presented in writing to the membership present at an official, announced club meeting.
- 3. Discussion should occur
- 4. A majority vote among the entire membership allows the amendment to become an addition to this constitution.

Article X: Nondiscrimination Clause

The Natural History Collections Curation Club shall not discriminate on the basis of race, creed, national origin, ancestry, sex, age, handicap or sexual orientation in the selection of its members or its programs.

Article XI: University Records

The Natural History Collections Curation Club shall maintain a list of current officer and contact information, contact information for the faculty adviser, and the most recently amended constitution in the Leadership Center.

Constitution of The Natural History Collection Curation Club, Missouri State University

Date Created: 8/29/14 Date Modified: 9/4/14

PREAMBLE

We, the members of this organization, do ordain this constitution of the Natural History Collection Curation Club, of Missouri State University, Springfield, Missouri, as the Constitution for the members of the Natural History Collection Curation Club. In accordance with the rules and regulations of Missouri State University, the Laws of the State of Missouri, and the Laws of the United States of America.

Article I

Purpose of Organization

Section 1. The name of the organization is the Natural History Collection Curation Club (NHC3)

Section 2. The purpose of this organization is to promote the goals of natural history collections on campus, to protect and curate specimens, promote research, and cultivate appreciation for the value of these historic biological items.

<u>Section 3.</u> This organization is affiliated with a loose network of Natural History Collection Curation Clubs across the nation. We have partners in Arkansas and California. No national or regional dues are required, and our affiliation with these schools has been confirmed by the founding NHC3 leaders.

Article II

Membership

Section 1. Membership is open to any student interested in the collection, preparation, preservation, curation, research, or appreciation of biological specimens and natural history collections.

Section 2. To qualify for membership in this organization, an interested party must be a student, faculty, or staff member of Missouri State University.

<u>Section 3.</u> Non-Missouri State or off campus members wishing to join this group must seek approval from the elected president of the organization.

Article III

The Executive Officers

Section 1. President—The president will preside over club meetings, organize events, and serve as a representative for the club.

Section 2. Vice President—The vice-president will assist the president in presiding over club meetings, organizing events, and serving as a representative for the club. In the event that the president is absent, the vice president will assume the roles of the president.

Section 3. Secretary—The secretary will record meeting minutes and be responsible for club documentation.

Section 4. Treasurer—The treasurer will be responsible for the management of club funds.

Section 5. Other Offices may be instated as they are needed.

<u>Section 6.</u> To qualify for the position of Executive Officer, a member must be a student of Missouri State and have a GPA must be at least 2.0.

Section 7. Officers will be elected by majority vote of present members at the start of each term.

Section 8. Elections will be performed on the first meeting of a new school year, or as need as positions become vacant.

Section 9. Officers will be elected by a simple majority of votes cast.

<u>Section 10.</u> In the event that an officer falls below the qualifications for the office, he or she will be asked to leave the officer position until those qualifications are filled.

Article IV

Installation of the Executive Officers

Section 1. Term of office is one year. Officers may be elected multiple years.

Article V

Resignation of Executive Officers

Section 1. An officer may resign at any time by announcing the resignation to the club during a meeting. This leaves the officer's position vacant, allowing it to be filled as soon as is necessary.

Article VI

Impeachment and Removal from Office

Section 1. Impeachment can be proposed by a majority vote. Once the impeachment process has begun, a 2/3 majority vote is required to remove the officer from office.

Article VII

Filling Executive Officer Vacancies

Section 1. In the event that a needed position becomes vacant, nominations will be taken from the membership and executive council. A final majority vote of the club membership is required to instate any officer.

Article VIII

Meetings

<u>Section 1.</u> Meetings will be convened approximately once a month, but will be convened by notices through email with a scheduled date and time.

Article IX

Amendments to the Constitution

Section 1. Amendments to the constitution can be proposed by making a motion to amend during a meeting. Section 2. A majority vote is required to confirm the amendment.

Article X

Ratification

Section 1. This constitution shall be fully ratified once approved by a simple (>50%) majority vote of membership, after its submission to and approval by the Office of Student Engagement, and after its submission to and approval by the Student Government Association.

Section 2. A simple majority (>50%) of votes by members confirms the constitution.

Article XI

Empowerment

Section 1. This constitution will take effect after it is accepted by both the Office of Student Engagement and Student Government Association of Missouri State University, and by a >50% majority in quorum vote accepted by the members of the Natural History Collections Curation Club.