



Museums for America

Sample Application MA-251529-OMS-22
Project Category: Collections Stewardship and Access

Michigan State University (Michigan State University Museum)

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| Amount awarded by IMLS: | \$92,129 |
| Amount of cost share: | \$92,253 |

The Michigan State University Museum will improve the care and management of over 2,000 vertebrate specimens that include rare, endangered, threatened, and extinct species. The museum will hire and train two undergraduate students to assist in rehousing and moving specimens to improved collections storage. Following recommendations from an earlier general conservation survey, project staff will take images, document the conditions, and update the database records of the specimens. The museum will share the specimen images online to increase the accessibility of the material for scholarship and learning. To share project results, staff will install a temporary exhibit that highlights the project's stewardship and digitization activities, and they will present results at a professional conference.

Attached are the following components excerpted from the original application.

- Narrative
- Schedule of Completion

When preparing an application for the next deadline, be sure to follow the instructions in the current Notice of Funding Opportunity for the grant program and project category to which you are applying.

1. Project Justification

Project Proposal & IMLS Program Goals: The goal of this two-year collections stewardship project is to improve accessibility, environmental conditions, and housing for 2,476 vertebrate specimens that are currently stored in substandard or overcrowded conditions, making them difficult to access. The specimens include rare, endangered, threatened, and extinct species dating to the earliest days of the University. Rehousing these specimens, and improving access to them, are the Museum's foremost collections stewardship priorities. We are seeking IMLS funds for the necessary shelving and cabinetry equipment; archival and rehousing supplies; student labor; and moving costs for the project. The proposed project aligns seamlessly with the IMLS Agency-level Goal 3, "*Advance Collections Stewardship and Access*", and Objective 3.1, "*Support collections care and management*". The project addresses the IMLS Project Category of Collections Stewardship and Access and IMLS Museums for America Program Goal 3, to "*advance the management and care of collections and their associated documentation.*" In particular, the project supports the Goal 3 associated objectives 3.2 to "*support conservation and environmental improvement and/or rehousing...*"; and objective 3.3 to "*support database management, digital asset management, and digitization*". Like IMLS, Michigan State University and the MSU Museum place importance on diversity, equity, and inclusion. The project aligns with DEI initiatives and efforts to support the success of future museum professionals and students. The university and Museum support and value the work and contributions of student employees and compensate them accordingly.

Advancement of the Museum Strategic Plan: Founded in 1857, the MSU Museum is a public steward for nearly a million specimens and objects representing natural science and culture worldwide. The Museum employs a staff that is committed to stewardship of these collections; it also provides baseline general fund and endowment support for collections care. Supplemental funding for projects such as the one proposed here is obtained through applications to federal granting agencies. These are submitted in a prioritized manner in accordance with our Strategic Plan (Supporting Document 2a, page 3). Over the past three decades, the Museum has been very effective in securing funds to upgrade the professional care of, and enhance public access to, its collections.

As a long-standing unit of Michigan State University, the Museum and its collections support the university's mission *to advance knowledge and transform lives*. The Museum supports this mission by enhancing and supporting student and professional education; underpinning research, scholarship, and learning with facilities, expert staff, and irreplaceable collections; and providing opportunities for outreach and engagement through exhibitions, programs, and learning opportunities. Michigan State University "will eliminate barriers to access and success, challenge discrimination and bias, and address past and present inequalities". The Museum is committed to upholding these campus values. As the Museum's parent organization, the university, through their Board of Trustees, acknowledges and affirms the Museum's critical role (Supporting Document 3a). The project activities align with the university's mission and also serve to advance core elements of the Museum's *2018-2022 Strategic Plan*. The plan focuses on Five Strategic Initiatives: *Putting MSU Students First; Establishing the Museum as a Premier Teaching, Learning, & Research Center; Expanding the Circle of Participation; Realizing Infrastructural Opportunities; and Building Institutional Strength* (See Plan Summary). This project directly supports and advances components of these initiatives, specifically by engaging MSU students; reimagining exhibits; stewarding and ensuring preservation of, and access to, collections; supporting research and learning; engaging with faculty; and promoting diversity and inclusion. The Plan's goal for Collections Stewardship is to "*Ensure the development, care, preservation, use of, and access to collections to benefit the research and education needs of present and future generations.*" Identified strategies in support of this goal are 1) Manage and house collections according to the highest professional standards, 2) Employ current and emerging technologies to increase access to collections, and 3) Engage in strategic collections development to serve our diverse audiences. Successful implementation of the proposed environmental improvements and rehousing activities will further our goal of managing and housing collections according to the highest professional standards and ensuring access to them now and into the future. Successful completion of this project supports the Museum's commitment to stewardship and advances our goal to manage and house collections in accordance with modern, professional standards and best practices for long-term public benefit. As well, the project provides a platform for student training in collections care and digitization tasks.

Statements of Need & Project Specimens: The Museum is committed to preserving collections and ensuring accessibility, with the goal of advancing knowledge and serving learners. In 1993, museum professionals Kate Singley, Lisa

Mibach, and Cathy Hawks performed Conservation General Surveys for the Museum's cultural and natural science collections. Over the next 23 years, their survey report recommendations informed a series of critical collections improvements that resulted in the Museum successfully rehousing the majority (95%) of its collections (Supporting Document 2b). Over 40% of those improvements were supported by IMLS funding. By 2015, the majority of the original survey recommendations had been realized, and standards in the museum field had advanced significantly, leading the Museum to apply for (and receive) funding from IMLS for new surveys. In 2016-2017, four conservation consultants, John Simmons (natural science collections), Mary Fahey (cultural objects), Minoo Larson (paper objects, records and documents), and Frances Faille (textiles) completed new General Surveys and associated reports. Several of their recommendations were addressed immediately, as part of that IMLS-funded project. Those included installation of updated environmental monitoring equipment and systems, lighting improvements throughout the building, improved pest management monitoring and practices, and rehousing of paper documents and paper-based collections. Since the close of that project, the consultants' reports, which contain prioritized recommendations for short-, medium- and long-term activities, have been used to inform environmental improvements and stewardship projects. Many of the readily achievable and short-term recommendations have been completed or are underway, but others, both short- and longer-term, await attention. In 2019, the Museum received IMLS funding for environmental improvements and to rehouse 5,600 specimens including mammal tanned skins, bird taxidermy mounts and skeletons, and some of the bird study skins. Although that project's schedule was slowed due to Covid-19 and a prolonged building closure, work is progressing and rehousing tasks are due to be finished in spring 2022. The project proposed here has been identified as the next priority, as it will address several key recommendations for natural science collections outlined in Simmons' report (Supporting Document 1), while advancing the Museum's strategic goals to ensure preservation and accessibility of collections. This project represents a continuation of our efforts to address prioritized survey recommendations and confront identified stewardship and accessibility concerns for collections.

The natural science collections include over 117,000 vertebrate specimens. While emphasizing Michigan and the Great Lakes Region, these collections are worldwide in scope and provide a record of biodiversity that ranges from 1844 to the present day. The specimens are a critical resource for MSU and the global scientific infrastructure. In accordance with our mission, they are used for research, teaching, exhibits, and outreach. Within each vertebrate discipline, specimens are cataloged into designated research or teaching collections. All are computerized into the *Specify Database System*. Specimen data are widely shared online and utilized every day.

The focus of our project is to improve environmental conditions, housing, and accessibility of 336 mammal taxidermy mounts; 5 taxidermy-mounted reptiles; skeletal elements from 38 large fossil specimens; 1,272 fish skeletons, and 825 bird egg sets. Project specimens encompass important series from the Great Lakes Region, as well as North, Central, and South America; Africa; India; and Australia. The specimens are at risk from one or more of a variety of threats (detailed below), including damage or loss from physical forces and contaminants from wood in the space or improper storage containers. For the majority, substandard, crowded, or an inefficient storage arrangement restricts accessibility and hampers use (Photos; Supporting Document 3b).

The mammal and reptile taxidermy mounts are stored in a crowded room, and because of their large sizes and varying shapes (e.g. leaping tiger, coiled snake, reclining jaguar) have been stored wherever they fit, rather than taxonomically. Head and shoulder mounts of mammals are attached to wood 2x4s that run from floor to ceiling. The arrangement and spacing of this wood framing limits placement of mounts and wastes space. The full body mounts are "parked" on the floor in 4 sections or "bays". Presently, the room lacks adequate aisles. One of the bays holds stacked wooden boxes (10) containing packed bones of Great Lakes proboscideans. A mobile cart in the bay holds dinosaur and other skeletal elements in Hollinger boxes. The current arrangement of this "oversized specimen room" hinders ready access to specimens and exposes them to damage from physical forces and environmental contaminants. All mounted specimens in the room were tested in 2012 for the presence of arsenic using XRF analyzer equipment (a project supported by IMLS). Air sampling tests conducted by MSU Environmental Health and Safety (EHS) indicate no detectable airborne arsenic. However, many of the specimens held there are positive for arsenic. In accordance with MSU EHS, arsenic-positive mounts are housed together and those with greater than 100 ppm arsenic have polyethylene plastic coverings. The Museum follows safety protocols and written Standard Operating Procedures (SOPs) for the safe handling of these specimens.

In a different storage area (in the Museum building), portions of our bird egg collection are housed in plastic (polystyrene) boxes that are exhibiting signs of deterioration. These containers were recently determined to be inappropriate for collections preservation and housing because they can off-gas peroxides. Over 800 of these outmoded containers will be replaced with archival boxes during the project. The planned project will address this outstanding problem along with the “oversized specimen room” issues described above. It includes relocating and rehousing specimens as well as acquiring new shelving and cabinetry systems and archival supplies to properly house and protect specimens according to museum standards and best practices (Supporting Document 3c,d). The project is designed after the 2017 survey report recommendations, MSU EHS directives, and information presented in the 2019 landmark book *Preventive Conservation: Collection Storage*. With the addition of shelving, racks, and cabinetry, plus repurposing an existing cabinet and reorganizing space, the rearrangement plan will allow staff to take better advantage of vertical space, as well as floor space in the collections areas.

Target Groups and Ultimate Beneficiaries: The target groups for our project (i.e. those who will be most immediately and positively affected) are museum professionals, scholars/researchers, and campus community members, including students, faculty, and instructors. Museum professionals (n= 150) comprise members of the MSU Museum staff, including the natural science curatorial and collections staff, and vertebrate divisional graduate students (n=15), as well as natural science collections conference participants (approximately 135). Scholars/researchers (both on- and off- campus) are frequent users of our specimens and their digital data (variable numbers). Additional groups include undergraduate students working on the project (n=2); pre-professionals from the Museum Studies program (approximately 30); and campus faculty and instructors who utilize the Museum and collections for instruction and learning, along with their students in classes (approximately 250). The project’s ultimate beneficiaries include people in the target groups above as well as members of the wider campus community and capital/tri-county area who attend events, exhibits, and programs featuring specimens (approximately 5,000). As indicated in our *2018-2022 Strategic Plan* “in addition to university audiences, the Museum forges connections with local and global communities, schools, and institutions. Through continuing programs of research, exhibitions, public programming, and visitor and researcher services, members of the public engage with the Museum to produce scholarship, meet community needs, explore expanded ways of learning, and participate in powerful experiences with real objects and specimens.” Recent examples of collections use are a testament to their value. Researchers, including graduate and undergraduate students, have used the egg sets, fish skeletons, and fossil collections for studies encompassing a wide range of subject areas, including biodiversity and conservation, molecular evolution, environmental studies, history, paleontology, and zooarchaeology. In the recent past, taxidermy mounts have been used for studies involving seed dispersal by animal hair (epizoochory) and cervid antler dimensions. They also have been featured in multiple MSU Museum exhibits (e.g. *Social Brain Drain, Evolution in Action*) and at other venues (e.g. *Sleeping Bear Dunes Visitor Center*). Teaching specimens are loaned annually for several MSU courses (e.g. *Biology of Mammals, Biology of Birds, Comparative Anatomy, Vertebrate Paleontology*) and students regularly visit the collections as part of their course curriculum (e.g. *Museum Studies, Honors Research Seminar, Marine Biology*). In addition, the Museum ensures that specimen data records are publicly accessible online via participation in multiple national and global data portals (e.g. *Global Biodiversity Information Facility-GBIF, Integrated Digitized Biocollections Network-iDigBio, and VertNet*). In recent months, thousands of our online specimen records were searched, viewed, or downloaded via these portals. For August 2021, there were 378,521 downloads registered on *iDigBio*. The *GBIF* resource lists 128,801 download *events* for our data in a live, reverse chronological array. Multiple annual peer-reviewed publications cite our specimen records. From January to November 2021, over 100 new peer-reviewed publications were listed on the Museum’s Vertebrate Collections Google Scholar Profile. The profile helps demonstrate the research value of our collections. Public outreach is addressed by three floors of galleries and through a variety of programs and events (e.g. *Darwin Discovery Day, Science Festival, National Fossil Day*, and most recently, MSU Science Gallery Detroit onsite exhibits). Prior to the Covid-19 pandemic, the Museum annually hosted over 55,000 building visitors. On September 7, 2021, the Museum building reopened after having been physically closed to the public since March 11, 2020.

2. Project Work Plan With IMLS support, project staff will 1) *purchase equipment and supplies*; 2) *hire and train students*; 3) *update taxonomic nomenclature (where needed) for mounts and eggs using standard references*; 4) *rehouse eggs into new boxes, photograph eggs, and associated data slips*; 5) *arrange for campus movers to assist with move tasks*; 6) *photograph and perform condition*

documentation activities for mounted specimens; 7) rehouse taxidermy specimens onto new wide-span shelving and panels; 8) photograph project fossils; 9) install archival drawer liners in new cabinets for fish skeletons and fossils; 10) transfer fish skeletons to new space-efficient cabinets; 11) rehouse fossils and create cavity mounts and other supports as needed; 12) update storage locations of project specimens, specimen records and image data in the database and produce new shelf, drawer, and cabinet labels for the relocated and rehoused specimens; 13) install a small temporary public display featuring these stewardship and digitization activities; 14) produce other dissemination products; 15) document and evaluate progress, and complete required reports.

Project Activities, Sequence, and Timeline: The proposed activities are interrelated and form a discrete project that can be completed in 2 years with our committed cost-share contributions. Project dates are September 1, 2022 to August 31, 2024. Activities are detailed in chronological order below (See Completion Schedule). Given our previous experience with rehousing projects, as well as space, staff time, and the number and nature of the specimens involved, the activities will be completed within the proposed time span. At the beginning of Year 1, the shelving and archival/rehousing supplies will be ordered. Shortly thereafter students will be hired and trained. We will begin reviewing taxonomic changes to mounted specimens and project bird eggs while awaiting delivery of the shelving and rack equipment. Rehousing of taxidermy mounts and work on the eggs will begin in the first year. While specimens are being relocated and rehoused, they will be inspected for pests. If any are found, the affected specimens will be isolated and treated in accordance with our pest management policy. For fish skeletons, we would use the freezing process described in CCI Notes 3/3, and recommended by Simmons. Disassociated pieces or fragments discovered during the rehousing process will be bagged, labeled, numbered and re-associated with specimen(s). In Year 2, we will complete the fossil specimen rehousing and transfer of the fish skeletons to space efficient cabinets. Activities involving taxonomic updates, photodocumentation and examination reports, shelf or drawer label production, and database additions for the new storage locations will span the two-year duration. Documenting progress and disseminating project results, including installing the small exhibit, will span both years.

Order Shelving Equipment and Archival Supplies (Year 1, September 2022) Laura will order supplies, and the shelving and rack equipment for the taxidermy rehousing component of the project.

Hire and Train Students (Year 1, September 2022) Laura will hire two undergraduate assistants. Students will undergo training in procedures for handling and care of the specimens and their documentation, and digitization and rehousing procedures, directed by Laura. They will also complete mandatory Chemical Safety training through EHS, a Lab Security Awareness module, and onsite specific training on Museum SOPs. This will occur before they perform any work on the project, and especially before they handle specimens. Students work across multiple semesters in accordance with the university calendar (they generally do not work during winter and spring breaks).

Update Taxonomic Nomenclature, where needed (Year 1, September 2022 and continuing) Using standard references (e.g. 2020 Mammal Checklist Reference, the Reptile Database, or Howard & Moore 4th edition) students will record taxonomic updates for project egg sets and mammals and reptiles while the shelving is on order.

Egg Set Rehousing and Digitization (Year 1, October 2022 and continuing) Egg sets (825) from non-passerines will be moved from problematic containers and rehoused into new archival boxes. During the rehousing process, the project eggs will be photographed according to the iDigBio “Standard Views for Vertebrate Specimens” reference for egg specimens. Project staff will also complete image capture of original (usually 19th century) handwritten egg data slips associated with the 825 sets. (Passerine egg containers will be addressed as a future project).

Arrange for campus movers to assist with move tasks (Years 1-2, series of requests) Campus movers will assist with relocating specimens under the direction of project staff (e.g. move wooden boxes to Museum building, shift oversized specimens to adjacent “swing space” prior to delivery of the shelving equipment, remove several outmoded cabinets in order to accommodate arrival of new cabinets at the Museum). The project staff has extensive experience with the management and “choreography” of on-site moves and complex shifts of specimens.

Photodocumentation and condition documentation activities for mounted specimens (Years 1-2, December 2022 and continuing) As part of the relocation and rehousing activities, each mounted specimen will be digitally photographed (for the purposes of documenting conditions as well as sharing images with the public). Image capture protocols and workflows follow the American Institute of Conservation Digital Photography Guide and iDigBio resources, including the iDigBio “Standard Views for Vertebrate Specimens” reference for mammal taxidermy specimens. Examination and condition reporting documents are being completed for each specimen; these are based on forms recommended by staff from the American Museum of Natural History and their reporting

template shared at the 2017 workshop on the care of mammalian taxidermy. The photography station will be set up in adjacent space.

Rehouse taxidermy specimens onto new wide-span shelving and panels (Years 1-2, December 2022 and continuing)

Rehousing and imaging activities will occur in Year 1 and will likely extend into the second year. Shoulder and head mounts will be held on the panels with hook fasteners. Full body mounts and some head/shoulder mounts will be rehoused on the wide-span shelving system. Installation of the new system will make better use of the floor space and vertical space in the room. Additionally, specimens will no longer be stored directly on the floor.

Order cabinetry equipment (Year 1 July 2023) Laura will order the cabinets near the end of the first year.

Image capture of project fossils (Year 2, September 2023 and ongoing) Ahead of, and as part of, the rehousing process, the fossil skeletal elements will be photographed utilizing iDigBio imaging standards. This work will take place at the imaging station for vertebrate specimens in the Museum building.

Install archival drawer liners in new cabinets for fish skeletons and fossils (Year 2, Fall 2023) Upon delivery of the new cabinets, project staff and students will begin to install drawer liners in the Delta Designs cabinets.

Transfer fish skeletons from their current large cabinet to new cabinets (Year 2, Fall 2023-Winter 2024) After delivery of the new cabinets and installation of drawer liners, project staff will move and rehouse the 1,272 ichthyology skeletons from their current very large cabinet to new smaller cabinets, as a strategy to free up space and better accommodate larger fossil skeletal elements.

Rehouse fossil specimens into new cabinetry (Year 2, Winter 2024 and ongoing) Fossil specimens will be rehoused into new Delta cabinets (including the large DDLX cabinet formerly holding the fish skeletons). Drawers will be lined with Volara foam, and cavity mounts and other supports will be created as needed for the fossils.

Cabinet/Shelf Labels & Storage Location Updates (Years 1-2, Fall 2022 to June 2024) Laura and the students will use notebook computers to create and produce updated shelf, drawer, and cabinet labels for all of the rehoused and relocated specimens. Labels will be laser-printed on archival bond paper or cover stock. These staff will also document the new storage locations and add updates to the *Specify* database. These activities will begin in Year 1 after the bird egg rehousing, and continue into Year 2.

Temporary Exhibit (Years 1-2 starting January 2023) Project staff and students will install a small temporary display in the Museum's *Collections Gallery* to share the project's stewardship activities with the campus community and the public. The exhibit will feature some of our specimens and images, and explain the importance of specimens, documentation, imaging, and specimen care. We will use existing museum display cases for this exhibit. After initial set up in early 2023, the displayed materials will be changed out three times during the project (May 2023, October 2023, March 2024). Project images of specimens and images documenting changes to the spaces will inform exhibit content. Other dissemination products are described below.

Approved Equipment, Supplies & Methods: We will be implementing modern standards, demonstrated techniques, and best practices as recommended or developed by leaders in the field (Supporting Documents 1, 3c,d). Products include shelves, panel racks, hooks, cabinets, drawers, archival boxes for bird eggs, Volara foam, unbuffered cotton blotting paper, Tyvek sheeting, and foam block. The new shelving and panel rack equipment is recommended in the 2019 *Preventive Conservation: Collection Storage* resource. The equipment meets museum standards for housing and allows us to make efficient use of our spaces. White cabinets with white drawers from Delta Designs will house the fossil and fish skeletal specimens. The Museum has been using Delta products for the past 25 years, and the cabinets are guaranteed. They come with locks, and conform to a "key plan" in our security protocol. We will use Volara type A foam to line cabinet drawers that will hold fossil specimens; this provides a non-skid, cushioned surface. Cavity mounts and other supports will be fashioned from foam block and Tyvek for fossil skeletal material. We will install unbuffered blotter paper liners in the new drawers for fish skeletons. This will prevent specimens from sliding on the smooth surfaces. Amounts of archival supplies were determined from measurements and counts of drawers, specimens, and outmoded egg boxes (Supporting Document 3d). Taxidermy mounts that have tested positive for arsenic are covered and secured with polyethylene sheeting, as directed by EHS.

Project Risks - Risks include possible delays related to large cabinetry orders and their associated manufacturing and delivery schedules, especially now with supply chain disruptions and the continuing pandemic. There is also the possibility of minor work schedule impacts due to student assistants graduating or reconfiguring their schedules.

The project staff are experienced in responding to changes and course corrections in their normal workdays, especially in terms of deliveries, accommodating parameters of university projects, and managing personnel. In the past, these staff have successfully navigated grant project logistical hiccups related to cabinet delivery delays, returns of damaged supplies, campus construction projects, supply shortages, cost increases, and the global pandemic.

Project Management & Staffing: Key staff are Laura Abraczinskas, Collections Manager for Vertebrate Collections, and Dr. Barbara Lundrigan, Head of the Museum's Natural Science Unit and Curator of Mammalogy and Ornithology (See Resumes, Budget Justification). Both have extensive experience in Museum operations and project management. Two students will be hired and trained by Laura to assist with project activities. Laura is responsible for coordinating vertebrate collections care activities and overseeing database activities for MSU Museum natural science collections. She has worked with vertebrate specimens for 32 years, is an active member of SPNHC, and serves on the MSU Collections Council. Laura worked closely with consultants during the 2017 surveys, and has directed work on nine vertebrate specimen rehousing projects. She will serve as project manager, and will be responsible for ordering supplies and equipment, coordinating deliveries and installations, and moving, documenting, digitizing, and rehousing specimens with the student assistants. She will devote 25% of her time to the project. Barbara has 37 years of curatorial experience and a collections-based research program. She serves on the Leadership Team, Exhibits Committee, and the MSU Collections Council. Barbara oversaw the most recent seven of our specimen rehousing projects. As with those successfully completed projects, she will be responsible for overseeing the mammal and bird-focused components of this project and ensuring adherence to program requirements and MSU and Museum policies and procedures. She will monitor progress and ensure that the project stays on track, making adjustments accordingly. She will also be responsible for collecting data and documenting changes to the spaces for 16 months of the project. She will devote 10% of her time to the project for Year 1 and part (4 months) of Year 2. For the remaining project months, Laura will be responsible for progress tracking, course correction, and evaluation tasks.

Time, Financial, Personnel and Other Resources: The total project cost is \$184,382. We are requesting \$92,129 (50% of costs) from the IMLS for shelving and cabinetry equipment, archival supplies, moving costs, and student labor. IMLS funds will allow us to complete this priority project. MSU is contributing an additional \$92,253 (50% of costs) as cost share for salaries, fringe benefits, and indirect costs for time allocations of the permanent staff. The time allocations were approved by reporting-line administrators. We have some supplies and tools on hand, including moving carts, lab coats, nitrile gloves for handling specimens, some Volara, Tyvek, foam plank, supplies for cushioning/wrapping bird egg sets, and creating cavity mounts, plus tools for cutting foam and paper. The Museum has photography equipment, supplies, hardware and software, and specimen imaging stations. We will furnish label paper (archival buffered bond and acid-free cover stock), magnetic holders for drawer labels, and computers and stands for completing the storage label and location updates. We also have safety supplies and SOPs for working with specimens. For the temporary exhibit, we will use existing display cases and the Museum will cover signage costs. "On hand" materials are not part of the budget.

Tracking Progress and Measuring Performance: For the first 16 months of the project, Dr. Lundrigan will be responsible for keeping the project on track, including adjusting the schedule as needed and implementing steps for documenting progress. Key project benchmarks (e.g. equipment deliveries) will be closely monitored, so that project activities take place in the right order. Coordination among project staff and the student assistants will be facilitated by regular meetings, in which participants report on progress, and describe past or anticipated problems or delays. Digital photos and progress-tracking data will serve to document changes that occurred over the course of the project. Laura will be responsible for progress tracking, course correction, and leading evaluation tasks for the final 8 months of the project. Examples of data to be collected and tracked during the project include 1) number of specimens rehoused and for which taxonomic names and storage locations were updated, 2) number of project specimens and data slips imaged, 3) number of examination and condition documents completed for taxidermy mounts, 4) number of researchers or student scholars who utilized project material, 5) number of students or tour participants for whom project activities were explained or demonstrated, 6) number of visitors to the public exhibit 7) number of attendees for the conference presentation and 8) images documenting rehousing activities and changes

to the spaces. These metrics will contribute toward four performance measures indicated for the project in the categories of Effectiveness, Efficiency, Quality, and Timeliness (see Performance Measurement Plan). Performance measurements include: interval comparisons of rehoused specimens, taxonomic changes, and storage location updates against the total proposed for the project; comparisons of summary counts of project specimens and data records imaged and digitized against total proposed; administration of satisfaction surveys for curatorial staff at the project's beginning and end; timed exercise (before and after rehousing) for curatorial staff to locate/access specimens in the storage areas; and interval assessments of fit between the proposed completion schedule and actual dates of completion for project activities. A compilation of numerical data, along with before-and-after images will document project progress. All project activities will be completed by the end date of August 31, 2024.

3. Project Results

Intended Results and Advancing Knowledge: At the completion of the project, the 2,476 project specimens will be newly housed and protected on shelving, racks, or within cabinets in revised configurations. Project benefits include safe housing for project specimens in a modern arrangement that facilitates ready access by local, state, regional, national, and international users, and knowledge and skills gained by student assistants through training and work on the project. In our experience, hands-on experience solving 'real' problems in the collections is a powerful tool for engaging students and stimulating their interest in the discipline. Activities and results will also be shared and communicated verbally via presentations to campus and community participants during collection tours. Project activities will also be shared with the greater natural history collections community and students in the MSU Museum Studies Program. Documentation of the rehousing and storage upgrade activities will be submitted for a poster presentation at the 2023 and/or 2024 SPNHC conference (depending on conference theme and travel picture). Presentation products authored by key staff will be produced in house and are not part of the project budget. *Completion of this important project will represent a significant improvement over current storage conditions for the specimens and thus furthers the Museum's goals of managing and housing collections according to the highest professional standards and ensuring access for current and future generations.* IMLS funds will allow us to rectify the current substandard conditions, mitigate risks of deterioration to specimens, significantly improve access to collections, support emerging future professionals, and share project results with the local campus community as well as the wider natural history specimen preservation community.

Project Products: multiple notable tangible products will result from our project. 1) An updated database with new storage locations for the 2,476 project specimens; location data will facilitate curation, research use, stewardship, and accessibility of these specimens. 2) enhancements to digital records including specimen images, historical egg data slips, and updated condition reporting forms for taxidermy mounts. 3) A conference poster presentation documenting rehousing activities. 4) A temporary exhibit highlighting project activities; this small display will be mounted in the *Collections Connections* Gallery where it will supplement the gallery theme - specimens, objects, and happenings behind-the-scenes in our Museum. The display will serve to increase access and heighten awareness of the importance of collections and professional stewardship. 4) At least three e-newsletter posts and multiple social media posts; the frequently issued *News & Notes* keeps our supporters informed about progress and activities.

Sustaining Project Benefits and Improvements to the Care, Condition, and Management of the Specimens: Support from the IMLS will allow us to rectify the current substandard conditions; mitigate risks of deterioration to specimens; support emerging and museum professionals, scholars, and reserachers; and significantly improve access to the collections. The project is a critical link in the Museum's progression toward managing and housing collections according to the highest professional standards and ensuring availability of and access to the collections. These lasting benefits will be maintained and extend into the future for the benefit of society. The specimens that are currently in inadequate storage environments will be moved to new systems that meet museum standards. Specimens that should be housed in the same area, but are currently separated, will be brought together by the new storage arrangement, facilitating their curation and use. The risks to specimens from physical forces, wood products, and damaging elements will be mitigated or minimized. The updated records, cabinet labels, and database with storage locations, images, and standard taxonomy will improve access to and management of the specimens. *Completion of the project will ensure long-term preservation and continued availability of the specimens to our audiences for research, teaching, exhibits, and public outreach.*

