



Museums for America

Sample Application MA-30-19-0349-19
Project Category: Collections Stewardship and Public Access

Michigan State University Museum

Amount awarded by IMLS:	\$113,221
Amount of cost share:	\$114,219

Attached are the following components excerpted from the original application.

- Abstract
- Narrative
- Schedule of Completion

Please note that the instructions for preparing applications for the FY2020 Museums for America grant program differ from those that guided the preparation of FY2019 applications. Be sure to use the instructions in the [FY2020 Notice of Funding Opportunity](#) for the grant program and project category to which you are applying.

Support for Rehousing Michigan State University Museum Vertebrate Collections Abstract

The goal of this 2.5-year collections stewardship project is to improve accessibility, environmental conditions, and housing for 5,619 vertebrate specimens that are currently stored in substandard or overcrowded conditions, making them difficult to access. The specimens include rare, endangered, and threatened species dating to the earliest days of the University, a time when specimens were often prepared in a life-like pose, making storage challenging. Rehousing these specimens, and improving access to them, are the Museum's foremost collections stewardship priorities. We are seeking IMLS funds for the necessary cabinetry, archival and rehousing supplies, student labor, and moving costs for the project.

The Museum is committed to preserving collections and ensuring accessibility, with the goal of advancing knowledge and serving users. The focus of our project is to improve environmental conditions and accessibility of 224 mammal tanned skins, 15 mammal taxidermy mounts, 627 taxidermy-mounted birds, 2,000 bird skeletons, and 2,753 bird study skins. Project specimens encompass important series from the Great Lakes Region, as well as North, Central, and South America; Africa; India; and Australia. Many of the birds were contributed by campus faculty and scholars in the early days of the University. The specimens are at risk from one or more of a variety of threats, including damage or loss from physical forces, pests, and environmental contaminants. For the majority, substandard, crowded, or an inefficient storage arrangement restricts accessibility and hampers use.

The tanned skins are currently stored in a crowded, outmoded, hanging system in cabinets with non-archival materials. Some mammal taxidermy specimens are housed beneath the hanging skins, while others are stored unprotected on surfaces. Of the project's 627 taxidermy-mounted birds, 270 lack proper housing. Many of these are large or oddly shaped and have thus been stored where they fit. Some are too large to fit in any current cabinetry, so are in the open, on tables or large salvaged carts where they hinder access to aisles, and are exposed to risk of damage. Birds mounted in flight positions are suspended from a horizontal bar and lack protective dust covers. The remaining 357 taxidermy-mounted birds are already in cabinets, but need to be reorganized, and their cabinets relocated, to maximize space and integrate new cabinetry. Our ornithology skeletal specimens and study skins are also currently in cabinets. However, the skeletons are housed in a non-standard arrangement (with study skins) that impedes use by researchers. In addition, two cabinets of study skins are housed apart from the rest of the skin collection. These problems will be resolved in the planned reorganization. The planned project includes relocating or replacing old cabinets to accommodate new cabinets and shelving that can properly house and protect these specimens according to museum standards and best practices. It is designed after recommendations from conservation General Surveys that were completed in 2017. Project dates are November 1, 2019 to April 30, 2022.

Project staff will 1) *purchase cabinetry, and archival-rehousing supplies*; 2) *update bird taxonomic nomenclature (where needed) in accordance with the new Howard & Moore 4th edition standard reference*; 3) *arrange for campus movers to reposition (existing) or remove (outmoded) cabinets in order to accommodate new cabinets and shelving*; 4) *install archival drawer- or shelf lining materials*; 5) *rehouse project specimens into 28 new cabinets or on new mobile shelving units and construct and install protective dust covers on the shelving*; 6) *update the storage locations of the project specimens in the Specify database and produce new shelf, drawer, and cabinet labels for the rehoused or relocated specimens*; 7) *install a small temporary public display featuring these collections stewardship activities*; 8) *produce other project dissemination products (e-newsletter articles, social media posts, conference presentation)*; and 9) *document and evaluate progress, and complete required reports*.

At the completion of the project, the 5,619 project specimens will be newly housed and protected in cabinets or on mobile shelving in a revised configuration. A compilation of numerical data, along with before-and-after images will be used to document progress and assess the overall effectiveness of the project. Project beneficiaries include scholars and researchers (both on- and off campus) who use our collections and data; campus community members and public visitors who view exhibits, tour collections, and attend programs; emerging professionals; and staff who are responsible for collections and access. Project benefits include mitigated or minimized risks to specimens, and increased access to specimens by staff and myriad public users, thus insuring continued availability of these specimens for research, teaching, exhibits, and outreach programs. In summary, IMLS funds will allow us to rectify the current substandard conditions, mitigate risks of deterioration to specimens, significantly improve access to collections, and support emerging future professionals.

Completion of this important project will represent a major improvement over current storage conditions for the specimens and thus further the Museum's goals of managing and housing collections according to the highest professional standards and ensuring access for current and future generations.

1. Project Justification

Project Proposal: The goal of this 2.5-year collections stewardship project is to improve accessibility, environmental conditions, and housing for 5,619 vertebrate specimens that are currently stored in substandard or overcrowded conditions, making them difficult to access. The specimens include rare, endangered, and threatened species dating to the earliest days of the University, a time when specimens were often prepared in a life-like pose, making storage challenging. Rehousing these specimens, and improving access to them, are the Museum's foremost collections stewardship priorities. We are seeking IMLS funds for the necessary cabinetry, archival and rehousing supplies, student labor, and moving costs for the project.

The Museum is committed to preserving collections and ensuring accessibility, with the goal of advancing knowledge and serving users. In 1993, museum professionals Kate Singley, Lisa Mibach, and Cathy Hawks performed Conservation General Surveys for the 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), Minoa 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. These include 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. The proposed project has been identified as a foremost priority, as it will address, at one time, 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.

Project Specimens and Statements of Need: Founded in 1857, the MSU Museum is one of the oldest museums in the nation and is a public steward for nearly a million specimens and objects representing natural science and culture. The natural science collections include over 117,000 vertebrate specimens, including mammals, birds, reptiles, amphibians, fishes, and fossils. 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 collections are a national resource, and 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.

The focus of our project is to improve environmental conditions, housing, and accessibility of 224 mammal tanned skins, 15 mammal taxidermy mounts, 627 taxidermy-mounted birds, 2,000 bird skeletons, and 2,753 bird study skins. Many of the birds date from the early days of the university and were contributed by campus faculty and scholars. 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, pests, and environmental contaminants. For the majority, substandard, crowded, or an inefficient storage arrangement restricts accessibility and hampers use (Photos; Supporting Document 3b). The mammal tanned skins are currently stored in a crowded, outmoded, hanging system in cabinets with hangers fashioned from PVC pipe and vinyl-coated electrical wire. Some mammal taxidermy specimens are housed beneath the hanging skins, while others are stored unprotected on cabinet tops or surfaces in the ornithology spaces. Of the project's 627 taxidermy-mounted birds, 270 lack proper housing. Many of these are large or oddly shaped (e.g. bird in flight) and have thus been stored where they fit, rather than

taxonomically. Some are too large to fit in any current cabinetry, so are in the open, on folding tables or large salvaged carts where they hinder access to aisles, and are exposed to risk of damage. Birds mounted in flight positions are suspended from a horizontal bar and lack protective dust covers. The remaining 357 taxidermy-mounted birds are already in cabinets, but will need to be reorganized, and their cabinets relocated, to maximize space and integrate new cabinetry. All project mounts were tested in 2012 for the presence of arsenic using XRF analyzer equipment (a project supported by IMLS). Air sampling tests in the spaces indicated no detectable airborne arsenic. However, many of the large mounted birds are positive for arsenic. In accordance with MSU Environmental Health and Safety (EHS), arsenic-positive mounts will continue to be stored separately from the others. The Museum follows safety protocols and written Standard Operating Procedures (SOPs) for the safe handling of these specimens. Our ornithology skeletal specimens and study skins are also currently in cabinets. However, the skeletal specimens are housed *with* the study skins, a non-standard arrangement that impedes use by researchers. In addition, two cabinets of study skins are housed apart from the rest of the skin collection, in the midst of a room otherwise dedicated to bird mounts. Both problems will be resolved in the planned reorganization.

The mammals and birds will be rehoused from their current substandard conditions into new cabinets or on mobile shelving units enclosed with protective dust covers. Taxonomic nomenclature for the bird specimens will be updated to the new Howard & Moore 4th edition standard reference (where needed). Storage location updates will be added to the *Specify* database, and new cabinet and shelf labels will be produced for the rehoused or relocated specimens. Project staff will also produce several products for sharing results and enhancing public access to the project information and specimens. The planned project includes relocating or replacing old cabinets to accommodate new cabinets and shelving units that can properly house and protect these specimens according to museum standards and best practices. It is designed after Simmons' 2017 survey report recommendations (Supporting Document 1). A 2018 consultation with the campus fire marshal informed parameters for reconfiguration of the spaces. These included height allowances for cabinet stacking. With the addition of cabinetry and shelving, plus repositioning existing cabinets and reorganizing their contents, the rearrangement plan allows staff to take better advantage of the vertical space, as well as floor space in these areas.

Project Beneficiaries and Benefits: At the completion of the project, the 5,619 project specimens will be newly housed and protected in cabinets and mobile shelving in a revised configuration. *Completion of this important project will represent a significant improvement over current storage conditions for the specimens and thus further the Museum's goals of managing and housing collections according to the highest professional standards and ensuring access for current and future generations.*

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." Project beneficiaries include scholars and researchers (both on- and off campus) who use our collections and data; campus community members and public visitors who view exhibits, tour collections, and attend programs; emerging professionals; and staff who are responsible for collections and access. Recent examples of collections use are a testament to their value. Researchers, including graduate and undergraduate students, use the bird and mammal collections for studies encompassing a wide range of subject areas, including biodiversity and conservation, molecular evolution, environmental studies, law enforcement, history, and zooarchaeology. In 2017-2018, we hosted 34 onsite research visitors and loaned over 185 specimens to other museums. Recent borrowers of specimens include the American Museum of Natural History, University of Florida Museum, and the National Museum of Natural History. Teaching specimens are loaned 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. *Foundations of Museum Studies*, *Honors Research Seminar*, *Marine Biology*). Specimens are also loaned for exhibits and programs held in our Museum (e.g. *Bird Conservation Stories*, *Echoes of Silent Spring*) or at off-site venues (e.g. *US Science and Engineering Festival* in Washington DC).

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 October 2018, there were 31,402 downloads registered on

iDigBio and *VertNet*. The *GBIF* resource lists 66,927 download *events* for our data in a live, reverse chronological array. Multiple annual peer-reviewed publications cite our specimen records. Public outreach is addressed by three floors of permanent and changing galleries and through a variety of programs and events (e.g. *Darwin Discovery Day*, *MSU Science Festival*, and *National Fossil Day*). The Museum hosted 55,630 building visitors in the last 12 months.

Project benefits include mitigated or minimized risks to specimens, and increased access to specimens by staff and public users, thus insuring continued availability of these specimens for research, teaching, exhibits, and outreach programs. A less tangible, but also important outcome will be the sense of accomplishment 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. IMLS funds will allow us to rectify the current substandard conditions, mitigate risks of deterioration to specimens, significantly improve access to collections, and support emerging future professionals.

Advancement of the Museum Strategic Plan & Supporting IMLS-Level Goals: 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 financial 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). Over the past 30 years, the Museum has been very effective in securing funds to upgrade the professional care of, and enhance public access to, its collections.

As a 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. 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 several of the new initiatives, specifically with regard to engaging MSU students; reimagining exhibits; stewarding and ensuring preservation of, and access to, collections; supporting research and learning; engaging with and cultivating faculty; promoting diversity and inclusion; and supporting mentors, mentees, fellows, and post-docs. 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 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.

The proposed project aligns seamlessly with IMLS Agency Goals. In particular, it supports the agency-level goal to “*Increase Public Access*”, as identified in the IMLS Strategic Plan. Our project also aligns with desired outcomes related to “*supporting the unique role of museums and libraries in preserving and providing access to collections and content*” and more broadly, “*ensuring access to information for all Americans*”. As well, the project aligns with the Museums for America grant program goal to “*support projects that strengthen the ability of a museum to serve its public*”. 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.

2. Project Work Plan

Specific Activities: With IMLS support, the project staff will 1) *purchase cabinetry and supplies*; 2) *update bird taxonomic nomenclature (where needed) in accordance with Howard & Moore*; 3) *arrange for campus movers to remove (outmoded) or reposition*

(existing) cabinets in order to accommodate new cabinets and shelving; 4) install archival drawer- or shelf liner materials; 5) rehouse project specimens into 28 new cabinets or on new mobile shelving units and construct and install protective dust covers over the shelving; 6) update storage locations of project specimens in the Specify database and produce new shelf, drawer, and cabinet labels for the rehoused or relocated specimens; 7) install a small temporary public display featuring these stewardship activities; 8) produce other dissemination products; 9) document and evaluate progress, and complete required reports.

Project Maturity Level & Approved Cabinetry, Supplies & Methods: From the scaling descriptions in the IMLS resources, our project identifies at the “mainstreaming” maturity level. We will be implementing modern standards, “tried and true” techniques, and best practices as recommended or developed by leaders in the field (Supporting Documents 1, 3c). The proposed activities are “proven, stable, and mature”. Our project was designed in response to Simmons’ 2017 recommendations to 1) purchase metal shelving with adjustable shelves to accommodate the various sizes of birds and cover shelving units with dust covers; 2) reconfigure and/or replace shelving and cabinets in the space to accommodate the bird specimens, and consider use of taller cabinetry; 3) reduce crowding of the mammal skins and bird mounts, and upgrade the tanned skin system with a configuration that makes better use of the space. Products include cabinets, drawers, shelves, rolling racks (that convert to mobile shelving units), Volara foam, unbuffered cotton blotting paper, Tyvek sheeting, Coroplast board, Velcro tape, cotton twill tape, and a safety ladder (Supporting Document 3c, d). The new cabinets meet museum standards for housing and security, and the cabinet/shelving heights and arrangements in the spaces were approved by the campus fire marshal. White cabinets with white drawers or shelves from Delta Designs will house most specimens. The Museum has been using Delta products for the past 24 years. The cabinets are guaranteed, they meet conservation standards, and their custom sizes allow us to make efficient use of the space. The cabinets lock, and conform to a “key plan” in our security protocol. We have devised a creative dual use for the mobile shelving as follows: The Global Industrial components will be assembled first as wheeled “garment racks” to temporarily relocate the hanging tanned skins. Upon completion of the mammal skin rehousing, the racks will be reconfigured for ultimate use as mobile shelving units for the big and tall mounted birds. Conversion from “hanging garment style” to “mobile shelving style” will be accomplished by removal of the horizontal hanger bar and addition of extra shelves. One of the “garment” units will retain the hanger bar to accommodate hanging bird mounts in flight positions. We will use Volara type A foam to line cabinets and shelves that will hold taxidermy mounts; this provides a non-skid, cushioned surface. Following a technique described by Conservator Cathy Hawks for supporting large tanned skins and bear rug-style specimens, we will utilize Volara to support any folded portions, and create Tyvek “booties” to go over claws and paws (Supporting Document 3c). We will install unbuffered blotter paper liners in the new drawers for tanned skins and drawers for the shifted skeletons and ornithology study skins. This will prevent specimens from sliding on the smooth surfaces. Following Conservator Gretchen Anderson’s technique, we will create Tyvek dust covers to fit over the shelving units (Supporting Document 3c; “Open Shelving Option” in referenced resource). The amounts of archival supplies were determined from measurements and counts of drawers, shelves, and mobile units.

Project Risks - Risks include possible delays related to large cabinetry orders and their associated manufacturing and delivery schedules. 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, and campus construction projects.

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 28 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 rehousing projects. She will serve as project manager, and will be responsible for

ordering supplies and cabinets, coordinating deliveries and installations, and moving, documenting, and rehousing specimens with the student assistants. She will devote 20% of her time to the project. *Barbara* has over 34 years of curatorial experience and a collections-based research program. She serves on the Exhibits Committee and the MSU Collections Council. Barbara oversaw the most recent six of our vertebrate rehousing projects. As with those successfully completed projects, she will be responsible for overseeing 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 over the course of the project. She will devote 10% of her time to the project.

Project Activities, Sequence, and Timeline: The proposed activities are interrelated and form a discrete project that can be completed in 2.5 years with our committed cost-share contributions. Project dates are November 1, 2019 to April 30, 2022. 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, cabinets and archival/rehousing supplies will be ordered. Shortly thereafter students will be hired and trained. We will begin reviewing taxonomic changes to the ornithology project specimens while awaiting delivery of the Year 1 cabinets. Rehousing of mammal tanned skins and a portion of the skeletal materials will occur during 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 dry specimens, we 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 skeletal specimen rehousing. We will also start to shift study skins into different cabinets, and start the taxidermy mount work, both of which will be completed during Year 3. Activities involving taxonomic updates, shelf or drawer label production, and database additions for the new storage locations will span the 2.5-year duration. Documenting progress and disseminating project results, including installing the small exhibit, will also span all years.

Place Orders for Year 1 Cabinetry and Archival/Rehousing Supplies (Year 1, November 2019) - Laura will order the cabinets, supplies, hanging racks/mobile shelving, and the ladder. Racks will be assembled as needed for the project.

Hire and Train Students (Year 1, November 2019) - Laura will hire two undergraduate assistants. Students will undergo training in procedures for handling and care of the specimens and their documentation, directed by Laura. They will also complete mandatory Chemical Safety training through the MSU EHS office, an online Laboratory 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 will work across multiple semesters and in accordance with the university calendar (they generally do not work during winter and spring breaks).

Begin to Update Bird Taxonomic Nomenclature, where needed (Year 1, November 2019 and continuing) - Using Howard & Moore, students will work on taxonomic updates while the cabinets are being manufactured. They will begin with bird skeletons, and move through the project study skins and mounts.

Arrange for Campus Movers (Year 1, January to February 2020; Year 2, January 2021) - To accommodate new cabinets and shelving, the outmoded tanned skin cabinets will be removed (Year 1) and several existing cabinets will be shifted or repositioned (Year 2) ahead of each new cabinet delivery. These cabinet moves are central to the space reconfiguration plan for project specimens. Prior to removal or shifting of cabinets, their contents will be emptied by project staff and students *one unit at a time*, while preserving the order of the specimens. During these phased moves, the specimens will be secured temporarily in adjacent “swing space”, in the nearby microscope or cataloging rooms. The project staff has extensive experience with the management and “choreography” of on-site moves and complex shifts of specimens.

Tanned Skin Specimen Rehousing (Year 1, January to April 2020) - Approximately two weeks prior to the scheduled Year 1 cabinet delivery (estimated February 2020), the existing tanned skin cabinets will be emptied and their contents transferred temporarily to the new hanging racks. Movers will remove and transfer the old cabinets out of the building. Project staff will clean the floors in the vacated area. The 11 new tanned skin cabinets are designed to store the skins flat on the drawers. Upon delivery of the new cabinets, project staff and students will

begin to install paper drawer liners. Volara will be installed for support of large skins (per Hawks' methods) during the rehousing process, which involves transfer of tanned skins from hanging racks to flat storage on the drawers.

Bird Skeletal Specimen Rehousing (Years 1-2, April to October 2020, winter 2021) - Ornithology skeleton boxes will be removed from the existing study skin cabinet drawers and relocated to carts or mobile shelving units. The drawer liner papers (unbuffered cotton blotter paper) from the old cabinets will be transferred to the new cabinets. Once drawer liners have been installed, specimens will be transferred to the new bird skeleton cabinets. Skeleton boxes may need to be sorted or re-ordered prior to rehousing, depending on taxonomic updates.

Place order for Year 2 Specimen Cabinets (Year 1, September 2020) - Laura will order the 13 Year 2 cabinets.

Bird Study Skin Rehousing (Year 2, November 2020 to April 2021) - Our reconfiguration plan necessitates a shift of two study skin cabinets from one room to another to achieve taxonomic continuity of the study skin collection. As with the skeletal shift and rehousing process, study skin cabinet drawers will be emptied while preserving the proper taxonomic and numerical order of the specimens. Carts or mobile units will be used to relocate specimens to the swing space. As with the skeletons, we will reuse the existing drawer liners in the cabinets.

Mammal & Bird Taxidermy Mount Rehousing and Construction of Mobile Shelving Dust Covers (Years 2-3 January 2021 to March 2022) - Project staff will install cabinet or shelf liners (Volara foam) before transferring specimens (individually) into new cabinets or onto mobile shelving units. Dust covers will be made to cover the mobile units.

Cabinet/Shelf Labels & Storage Location Updates (Years 1-3, February 2020 to April 2022) - 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 tanned skin rehousing, and continue into Year 3.

Temporary Exhibit (Years 1-3 starting March 2020) - 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 public. The exhibit will feature some of our specimens and images, and explain the importance of specimens and specimen care. We will use existing museum display cases for this exhibit. After initial set up (March 2020), the displayed materials will be changed out four times during the project (September 2020; February, August, December 2021). Project images documenting changes to the spaces will inform exhibit content. Other dissemination products are described below.

Project Budget and Resources: The total project cost is \$227,440. We are requesting \$113,221 (50% of costs) from the IMLS for cabinetry, shelving, archival supplies, moving expenses, and student labor. IMLS funds will allow us to complete this priority project. MSU is contributing an additional \$114,219 (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 Museum Director Dr. Mark Auslander. A Support Letter from Director Auslander is included (Supporting Document 3a). We have some supplies and tools on hand, including moving carts, lab coats, nitrile gloves for handling specimens, a sewing machine, some blotter paper and Volara, plus tools for cutting foam and paper. The Museum will furnish label paper (archival buffered bond and acid-free cover stock), magnetic holders for drawer labels, and notebook 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 costs for signage. "On hand" materials are not part of the budget.

Tracking Progress and Measuring Performance: Dr. Lundrigan will be responsible for keeping the project on track, including adjusting the timeline as needed and implementing steps for documenting progress. Key project benchmarks (e.g. cabinet deliveries) will be closely monitored, so that project activities take place in the right order. Coordination among project staff and the assistants will be facilitated by regular meetings, in which participants report on progress, and describe past or anticipated problems or delays. Dr. Lundrigan will examine the changing impacts of the project activities on collections accessibility and use. Digital photos and progress-tracking data will serve to document changes that occurred over the course of the project. A comparison of before-and-after data will be used to determine the overall effectiveness of the project. Before the project's end, staff will gather information and prepare the final narrative report. All project activities will be completed by the end date of April 30, 2022.

Sharing Project Results: The temporary exhibit will serve to highlight the project and inform public audiences about our stewardship efforts. Activities and results will also be shared on social media, and communicated verbally via presentations to campus and community participants during collection tours. The project involves dramatic taxidermy-mounted specimens, which tend to be of special interest to visitors. For the first time, cabinets of mounted birds (arsenic free) will be accessible for viewing by people on collections tours in the reorganized space. 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 2020 and/or 2021 SPNHC conference (depending on conference theme). Presentation products authored by key staff will be produced in house and are not part of the project budget.

3. Project Results

Picture of Success & Data for Reporting: Success includes 1) safe housing for 5,619 bird and mammal specimens in a modern arrangement that facilitates ready access by local, state, regional, national, and international users; and 2) MSU student assistants who gained real-world experiences by participating in a meaningful project designed to safekeep natural heritage and advance knowledge for long-term public benefit. Data that will be collected and tracked during the project include 1) numbers of specimens rehoused and for which taxonomic names and storage locations were updated, 2) numbers of visitors or tour participants for whom project activities were explained or demonstrated, 3) numbers of visitors to the public exhibit, 4) numbers of researchers or student scholars who utilized project material, and 5) images documenting rehousing activities and changes to the spaces. A compilation of numerical data, along with before-and-after images will be used to assess the overall effectiveness of the project.

Improvements to the Care, Condition, and Management of the Specimens: 5,619 specimens that are currently in inadequate storage environments will be moved to new systems that meet museum standards. Those 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 and damaging elements will be mitigated or minimized. The updated cabinet labels, and database records indicating storage locations 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.*

Tangible Results: Four notable tangible products will result from our project. 1) An updated database with new storage locations for the 5,619 project specimens; location data will facilitate curation, research use, and accessibility of these specimens. 2) A conference poster presentation documenting our rehousing activities. 3) A temporary public exhibit highlighting project activities; this small exhibit 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 public access and heighten public awareness of the importance of collections and professional stewardship. 4) At least three online newsletter articles and multiple social media posts; the frequently issued *Museum News & Notes* keeps our supporters informed about progress and activities. In addition to an initial press release for the project, we will plan for one newsletter submission per year. Completion and delivery of tangible products such as e-newsletter articles, social media posts, the exhibit display, and the poster presentation(s) are additional indicators of success.

Sustaining Project Benefits: Support from the IMLS will allow us to rectify the current substandard conditions, mitigate risks of deterioration to specimens, support emerging future professionals, 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 the collections. These lasting benefits will be maintained and extend into the future for the benefit of society.

Schedule of Completion
 Support for Rehousing Michigan State University Museum Vertebrate Collections
 November 1, 2019 – April 30, 2022

