

Summer 2009
Dear Colleague:

Enclosed please find sample narratives, schedule of completion and summary budget forms from seven successful applications from the 2008-2009 IMLS Conservation Project Support (CPS) grant competition. This packet contains samples that represent different types of conservation projects from both living and non-living collections. They emphasize the overall institutional conservation perspective, the involvement of conservation professionals in all phases of the project, and the importance of the project as one of the highest institutional priorities for collections care. Each of the samples was selected to illustrate a specific aspect of a good application in any category, as described below:

Survey projects

Fairbanks Museum and Planetarium is included as a good model for smaller organizations looking to do a detailed condition survey of a portion of their collection. The application provides good detail on the scope of the collection as well as a good description of their process and methodology.

UC Davis Arboretum is a model of a living collection survey using new GIS technologies. The application describes in detail not only the inventory of the collection, but also the condition surveys of each of the specimens.

Treatment Projects

Kelsey Museum is included as an example of a very clearly written narrative that shows a logical progression of conservation steps.

Memorial Art Gallery is an example of a succinct narrative that provides enough context of the overall conservation plans and ample detail of the appropriate consultants.

Environmental Improvement Projects

New England Aquarium is a sample of how to detail the expected outcomes, expected outputs, and benefits to the audience of a conservation project.

Museum of Northern Arizona application provides a good example of a project that is sensitive to multiple constituencies.

Masillon Museum is included as an example of a clear and concise description of the need for the project, with a well detailed description of project activities.

I hope that these sample narratives will be useful to you as models for structuring a proposal for your conservation needs. Please contact either me at (202) 653-4674 or at chenry@imls.gov or Mark Feitl at (202) 653-4635 or at mfeitl@imls.gov if you have any questions. We would be happy to assist you and discuss any questions you have as you develop your proposal. The application deadline for the 2010 Conservation Project Support grant program is: October 1, 2009

Applications for CPS are available from the grants.gov website (www.grants.gov). We look forward to receiving your application.

Sincerely,

Christine Henry
Senior Program Officer
Conservation Programs, IMLS

1. Statement of Need

The Fairbanks Museum & Planetarium, opened in 1891, is Northern New England's largest museum of natural and cultural history. The Museum's mission is

...to inspire new appreciation and responsibility for our place in the natural world.

The Fairbanks Museum's roots are in Vermont's Northeast Kingdom, at the intersection of the Great Northern Forest and the Connecticut River Watershed. The Museum embraces its leadership in the study, interpretation, preservation, and celebration of the natural history of these working landscapes, their distinctive cultural heritage, and their place in the world and strives to promote their stewardship.

The Museum collects, documents, preserves, studies, displays, and interprets 1) richly representative natural specimens that reveal the evolution, ecology, and diversity of this region; 2) objects of human interaction with this landscape; 3) archives and artistic expressions that enrich our understanding of that interaction; and 4) selected comparative specimens and objects that further its mission. The Museum holds in trust its historic building and the legacy collections of its founder Franklin Fairbanks.

The Museum offers memorable opportunities for visitors and outreach audiences to discover and appreciate their changing place in local and global natural systems through educational programs and exhibitions in a variety of media and in partnership with others.

The Museum holds in trust the most extensive natural history collections in the region, totaling over 50,000 specimens in the permanent collections. These include vertebrate mounts; a significant herbarium; geology and paleontology specimens; fluid collections; marine invertebrates; and insects and other arthropods.

The Museum conducted an IMLS-supported general natural history conservation survey in 1989-90, with consulting assistance from natural history conservator Tamsen Fuller. Though now partially outdated, her report (summary outline attached as Supportingdocument1.pdf) has informed years of improvements in the management and preservation of the Museum's natural history collections.

In 2001, the Museum completed an IMLS-supported environmental survey of the collections with conservator Richard Kerschner of the Shelburne Museum and Ernie Conrad of Landmark Facilities Group.

Recognizing the need to plan for the preservation, storage, and interpretation of its collections within a comprehensive institutional framework, the Museum launched a master planning process in 2002 and engaged Lord Cultural Resources Management

A Detailed Conservation Survey of Lepidoptera and Coleoptera
in Preparation for Rehousing, Treatment, and Movement of the Collection

and Planning to lead this effort. The resulting Master Plan, incorporating the recommendations of Lord's collections specialist Heather Maximea, called upon the Museum to launch complete inventories and condition surveys of the collections; automate the collections records; and provide new facilities for their housing, processing, and care.

Since the adoption of that Master Plan, the Museum has received two IMLS Museums for America grants to support the automation, inventory, and planning for the Museum's collections. The first of these two grants allowed the Museum to complete records automation, inventory, documentation, condition reporting, and planning for many categories of the Museum's historic artifacts. The second grant (currently underway) has supported the same outcomes for the Museum's natural history collections and remaining cultural collections. Thomas Labeledz, University of Nebraska Museum Natural History Collections Manager, has guided the automation and inventory strategies for the Museum's natural history collections.

The Museum is housed in a monumental, Richardsonian Romanesque building designed for the display of collections according to 19th century standards but incapable of sustaining contemporary standards for some collections environments. For several decades the Museum has been able to make incremental improvements to the environmental, storage, and security conditions of its collections. The Master Plan calls for the construction of new facilities for collections, and the Museum is now conducting a capital campaign and has completed schematic design plans for those facilities. Detailed storage specifications are nearing completion for each category of the collections. Construction is anticipated for 2009, followed by the movement of the collections into these new facilities.

In July 2007, Director of Collections Mary Beth Prondzinski joined the Fairbanks Museum staff, bringing a decade of experience in zoology and collections management at the Field Museum. Under her leadership, the current inventory, automation, and planning process has brought new institutional attention to the condition of the Museum's insect collections. These collections, including eighteen large storage boxes of Riker-mounted Lepidoptera, twenty Schmidt boxes of Coleoptera, and nine insect mosaics, have not received detailed conservation attention.

The Lepidoptera, international in scope, date from the late 19th century, and their condition ranges from poor to pristine. Most are from the collection of Joseph P. Chase and date from 1885. One box consists of approximately 1,000 carefully folded moths and butterflies, each individually enclosed in a labeled paper triangle. These, along with many of the Riker mounts, both large and small, require rehousing. The Lepidoptera have been stored in heated spaces but without comprehensive environmental controls. In the past, they have been exhibited and used for educational programs in their old Riker mounts, and some have cracked glass, stained cotton backing, or show evidence of damage by dermestids.

The Coleoptera are from the collections of Professor Alphonse Bel and were entered into the Museum's catalogue in 1891. The twenty homemade Schmidt-type boxes in which they are housed have been stored in a fumigation vault for over thirty years. Archival correspondence in the Museum suggests that this collection may include type specimens from the Arctic, though no research has ever been conducted to confirm this claim. Few of these Coleoptera have been studied, displayed, or interpreted in the past thirty years.

The nine pictorial insect mosaics, created by John Hampson (1836-1923) between 1886 and 1922, primarily from beetles, moths, and butterflies collected near his New Jersey home, were acquired by the Museum from his estate in 1977. These are among the most popular of the Museum's collections. One of the nine has received conservation treatment for damage from dermestids, and one is severely damaged. The rest have been on semi-permanent exhibition since their acquisition. Hampson's personal history is an interesting one, and these works reflect his unusual response to the natural world.

With the exception of the mosaics, the insect collections have been in storage for several decades. The Museum's records indicate that these collections have never received professional conservation attention, in part because the Museum has not possessed the in-house expertise nor adequate facilities for their assessment, treatment, and housing. Instead the Museum has been able to provide only preventive conservation attention through improved environmental controls and pest management practices, such as regular cycles of inspection and monitoring of environmental dataloggers. Unlike the prominent mammal and bird collections, these insect collections have received neither professional treatment nor thoughtful planning. The proposed conservation assessment must precede decisions about the future housing, treatment priorities, planning implementation, and interpretation of these collections. Without the information gleaned from the proposed survey, the Museum will be unable to plan for, preserve, and utilize these collections. [for an overview of the Museum's collections practices, see Collections Policy- Supportingdocument4.pdf]

2. Project Design

The Museum seeks to engage two consultants to conduct this detailed collections assessment. Catharine Hawks, FIIC, is an award-winning conservation consultant and conservation educator in the Museum Studies program at George Washington University. Robert T. ("Tommy") Allen, Ph.D., is a retired professor of zoology and entomology at the University of Arkansas and the University of Delaware who now serves as Research Associate with the Academy of Natural Sciences in Philadelphia (though his residence is in Minnesota). Professors Hawks and Allen will bring a

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combination of natural history conservation expertise and entomology scholarship necessary to survey and complete a conservation plan for these collections.

The goals of this project are to inspect each of the three insect collections and to complete a current condition description of the specimens, linked to the Museum's catalogue records, object provenance, and species status. This review will also produce a written description of the materials, dimensions, and numbers of the existing containers, including any labels and illustrations available, and will make a general determination of the scientific utility of the specimens. Following inspection, the consultants will provide the Museum with treatment rationales; recommend general treatment procedures (cleaning, stabilization, repairs, etc.); offer storage, exhibition, and preventive care guidelines. The general condition assessment report will also provide a list of recommended references for Museum staff use. Together with conservation priorities established during the review, these data will provide the Museum with a conservation plan for these old, fragile, and under-utilized collections. [for Sample Survey form, see Supportingdocument2.pdf].

Museum staff directly involved in the project will include Director of Collections Mary Beth Prondzinski and Registrar George Boden Harris. Ms. Prondzinski will serve as Project Director, scheduling and coordinating all project activities and insuring that the Museum's interests and responsibilities related to these collections are fulfilled. Mr. Harris will make all existing relevant collections records available for the project and will insure comprehensive coordinated documentation is completed during the project. Museum Executive Director Charles Browne, who serves as primary grants administrator for the Museum's federally funded projects, will insure compliance with all project record-keeping and reporting requirements, and will prioritize the proposed project within the full range of normal operations and activities. Bookkeeper Sandra Beck will maintain the project's accounting records, and Program Coordinator Tara Robinson Holt will assist with all educational program arrangements.

The Museum intends that the project consultants conduct this detailed collection assessment during a three-day on-site visit in July 2008. A secured workspace will be made available for the project during that time. The consultants will return to the Museum in February or March of 2009 for a two-day visit to present a full report of their findings and recommendations to the Museum staff and Collections Committee of the Board of Trustees. This written report will be crafted as a conservation action plan for the collections.

In the period between these two visits, the Museum's Collections Department will insure that all records related to these collections, including corrections to nomenclature, automation of catalogue records, and photo-documentation, are updated. They will also apply the preliminary recommendations of the consultants to the housing, storage, and exhibition planning of the insect collections and will

coordinate these with the facilities expansion design team, collections storage consultants, and the interpretive planning team.

The overall goal of the project is to create a conservation action plan for one of the Museum's most fragile and historically neglected collections. The timing of this plan is essential for advancing the Museum's Master Plan, as it will inform the Museum's investments in rehousing, treatment, storage, and interpretation based on the collection's condition, fragility, scientific significance and utility, and provenance.

3. Project Resources: Time, Personnel, Budget

The proposed project grant period is one year, but the project will take place in several discrete "chapters." The Museum has planned for five days with the two consultants on site in two visits – a three-day visit in July 2008 and a two-day visit in February or March of 2009. These days will be devoted to inspection of the collections and compilation of condition assessment data; drafting and presentation of conservation plan recommendations; and preparation and presentation of educational programs. The Museum's Collections staff, Director of Collections Prondzinski and Registrar Harris, will have responsibility for preparing the collections for review; compiling and making available all related catalogue records; organizing, hosting, and documenting the assessment visits; integrating the assessment data into the Museum's automated records; preparing and disseminating the final collections plan within the Fairbanks Museum community and to other partners and stakeholders such as SPNHC; and implementing the conservation plan once the grant is concluded.

The Museum expects the members of the Collections Department to devote a total of fifteen days each (three weeks/120 hours) to this project during the grant period. Significant time will also be dedicated to implementing the conservation plan after the conclusion of the grant period. The Museum is fully committed to this project, as the institutional match for this project will include all staff salaries and benefits, and it will become part of the Collections Department 2008-2009 work plan.

Most of the project budget requested of IMLS provides for the fees and costs of the conservation and entomology consultants. Their hourly rates (Dr. Allen's at a significant discount); travel to and from St. Johnsbury, VT; and subsistence costs represent most of the requested grant. The modest marginal costs associated with the proposed educational programs are also included in the project.

4. Impact

This project will succeed if the Museum acquires the necessary knowledge to implement a conservation plan for its insect collections. Indicators of impact will include comprehensive integration of the assessment data into the Museum's

automated collections database; a prioritized schedule of treatment for the insect collections; a rehousing plan for this collection (including containers, cabinets and shelving, environmental parameters); a detailed plan for the new storage spaces to be allocated to these collections; and the inclusion of the insect collections in the Museum's new interpretive plan.

Another impact will be a change in the knowledge and attitudes of the Fairbanks Museum's audiences and museum peers as they understand more fully the link between the natural history collections housed in museums and the preservation of the world's natural heritage and biodiversity. This impact will be measured by the number of participating museum professionals in the workshop on Insect Collections Preservation by Catharine Hawks; by the public participation in the educational program offered by Mary Beth Prondzinski and Robert T. Allen; by quantifying the public use of the Museum's web-based educational components; and by contributions to the Museum's capital campaign directed toward the housing and care of these and other collections.

Specific products will include:

- 1) an insect collections conservation plan adopted by the Museum staff and Collections Committee of the Board of Trustees;
- 2) a schedule of treatment for these collections; a fully integrated, automated set of collections records for the insect collections;
- 3) a completed plan for the housing and care of the collections in planned new facilities;
- 4) and a deeper institutional understanding of the scientific utility of these collections and avenues for their interpretation.

Educational Components

This project offers rare opportunities for training and public education. Insect collections have very different conservation and preservation requirements from those of vertebrates, yet small insect collections, both in museums and in private collections, are fairly common. Whether organized for scientific research, education, or as a personal pursuit, these collections warrant preservation to sustain and enhance public understanding of biodiversity and to inform future systematics, ecology, zoology, and medical research.

1. Project Design

Catharine Hawks has agreed to offer a workshop (curriculum attached) on insect collection preservation and care, designed for the museum field, during her second visit to the Fairbanks Museum & Planetarium, using the Museum's relatively small and

taxonomically narrow collection as a case study. Her workshop will be promoted through the Vermont Museum and Gallery Alliance (VMGA), the New England Museum Association (NEMA), the Society for the Preservation of Natural History Collections (SPNHC), and Museum Studies programs in New England (e.g., Tufts University, Boston University, College of the Atlantic), with a target workshop audience of 20 – 30 participants from the field. Participants will gain first-hand experience in documentation, assessment, and treatment strategies for the care of insect collections, applicable at their own institutions. [see syllabus – Supportingdocument3.pdf]

A second education opportunity will focus on the general public's understanding of collections conservation, with the Fairbanks Museum's collections again available as a case study. A public program hosted at the Museum for its community will feature presentations by Project Director Mary Beth Prondzinski and consulting entomologist Robert T. Allen. This illustrated program will highlight the importance of even obscure natural history collections to the public understanding and appreciation of biodiversity, the challenges of preserving these collections, and the important opportunity the Museum's planned expansion offers for preserving this and its other collections.

The Museum will make use of its newly developed website (still under development, to be completed in winter 2008) to present an educational program on the importance of preserving and conserving natural history collections. This interactive page of the Museum website will feature photographs of specimens from this collection illustrating the importance of conserving the record of our natural heritage. The Museum will engage a professional photographer to create outstanding, web-quality images of samples from the collection. This page will be linked to other educational content on the website (regional ecology and natural history curricula) to support deeper public understanding and appreciation for natural history collections as learning and research resources. Because of the Museum's large audience of students, teachers, and families, this web page will be designed to be attractive and useful to youth aged 8 – 18.

2. Project Resources: Time, Personnel, Budget

The preparation and presentation of the professional workshop on Insect Collection Preservation and the public program on collections conservation and biodiversity will require content preparation, development of materials for distribution through the program, promotion and marketing, and logistical support. The project consultants will bring experience and scholarship in their particular fields to their educational presentations, which, to reduce travel costs, will be scheduled to coincide with their second visit to the Museum.

Museum staff time on these educational components is factored into their budgeted time on the project as part of the project match. Director of Collections Mary

Beth Prondzinski has considerable experience presenting educational programs for the public, and Program Coordinator Tara Robinson Holt already manages all logistics, promotion and publicity, and scheduling for the Museum's programs. Their commitments to these programs will be part of their 2008-2009 workplans.

In addition to the costs of project personnel and materials for the professional workshop and public program, the remaining educational expense, \$800 for professional photography, will support the creation of high quality images for the web-based education component and the public program. Web page design, text, links, and interactives will be produced in-house according to design standards developed by the web design firm currently developing the Museum's new site.

3. Impact

Catharine Hawks's workshop on Insect Collections Preservation will focus on professional techniques for the management, conservation assessment, treatment, and preservation of insect collections. Hers will be a nuts-and-bolts professional development opportunity for Fairbanks Museum staff and for those responsible for such collections in other New England institutions, including museums, schools and universities, and museum studies programs. The use of the Fairbanks Museum insect collections for this workshop will bring professional attention to the Museum's efforts to systematically and strategically prepare for their preservation. Participating professional peers will gain new knowledge, skills, and perspectives, and the Museum, in turn, will learn from the experience of these colleagues.

The Fairbanks Museum offers an array of popular public programs in natural history, regional rural history, and environmental stewardship. These programs often draw upon the Museum's collections resources, and among the most frequent public inquiries are those questions about preservation of unique or fragile artifacts, archives, and specimens. The proposed public program will shed light on both the inherent value and the importance of preservation of such collections, from both a scientific and a public trust perspective, in a way that enriches the knowledge and appreciation of natural history collections preservation for public program participants.

Without becoming too self-referential, the Museum's very strong experience and track record in designing interactive learning experiences for youth and families will support its effort to use Internet technology and the survey of its insect collections to encourage inquiry and discovery about the role of natural history collections in the preservation of the globe's biodiversity and natural heritage. If successful, this web page will support and link to other science curriculum materials already produced by the Museum on topics in ecology, biology, and earth sciences with a consistent stewardship message. Site visitors will explore insect diversity, receive an introduction

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to insect anatomy, physiology, and biochemistry, and be introduced to the importance of the preservation of natural history collections as essential tools of scientific inquiry.

BUDGET FORM - PAGE FOUR

Section B: Summary Budget

| | \$ IMLS | \$ Cost Share | \$ TOTAL COSTS |
|-----------------------------------|-----------|---------------|----------------|
| 1. Salaries and Wages | | 7,080.00 | 7,080.00 |
| 2. Fringe Benefits | | 1,345.20 | 1,345.20 |
| 3. Consultant Fees | 6,400.00 | | 6,400.00 |
| 4. Travel | 3,060.00 | | 3,060.00 |
| 5. Supplies and Materials | | 2,100.00 | 2,100.00 |
| 6. Services | 800.00 | | 800.00 |
| 7. Student Support | | | 0.00 |
| 8. Other Costs | | | 0.00 |
| TOTAL DIRECT COSTS (1–8) | 10,260.00 | 10,525.20 | 20,785.20 |
| 9. Indirect Costs | 1,539.00 | 1,578.75 | 3,117.75 |
| TOTAL COSTS (Direct and Indirect) | 11,799.00 | 12,103.95 | 23,902.95 |

Project Funding for the Entire Grant Period

| | |
|--------------------------------------|-----------|
| 1. Grant Funds Requested from IMLS | 11,799.00 |
| 2. Cost Sharing: | |
| a. Cash Contribution | 12,103.95 |
| b. In-Kind Contribution | |
| c. Other Federal Agencies* | |
| d. TOTAL COST SHARING | 12,103.95 |
| 3. TOTAL PROJECT FUNDING (1+2d) | 23,902.95 |
| % of Total Costs Requested from IMLS | 49.40% |

* If funding has been requested from another federal agency, indicate the agency's name:

1. STATEMENT OF NEED

The UC Davis Arboretum proposes to conduct a detailed conservation assessment of the 2,200 trees in our living plant collection; develop a long-term conservation plan for the trees; design and build a GIS tree assessment data model that will be distributed to botanical gardens and zoo horticulturists nationwide; and educate our visitors about the conservation of living collections and the ecological services provided by trees.

The Arboretum's first plant collections were trees: taxonomic groupings (eucalypts, conifers, oaks, acacias) and California native trees were established beginning in 1936 and used in research and teaching in UC Davis's renowned plant science departments. Later several significant geographic collections were added, including trees native to the Mediterranean climate areas of the world. In recent years, we have focused primarily on building horticultural collections and demonstration gardens, in response to visitor interests and academic emphases. The mature trees in the collection, however, remain an enormous asset to the Arboretum, to the campus, to the scientific community, and to our visitors. Several factors now coincide to make the trees in the collection our top conservation priority and present an uncommon opportunity to undertake the proposed project.

In 2001, we conducted an extensive self-assessment using a planning process developed by management theorist Peter F. Drucker, which applies business principles to non-profit organizations. We conducted more than 60 in-depth interviews and ten focus groups, and surveyed more than 4,000 people through the mail, in person, and online. Respondents included UC Davis faculty, students and staff, members of the Friends of the UC Davis Arboretum, horticulture professionals, and residents of the region. Following this audience research, we worked with a committee of constituents to develop a ten-year plan, which confirmed the institutional commitment to meet contemporary standards of excellence in collections care and conservation. We also developed a physical and programmatic master planning framework called the Arboretum GATEways Project (Gardens, Arts, and The Environment), which envisions the Arboretum as an open door into the campus, inviting the public in to learn about UC Davis research and teaching and bringing together environmental scientists, artists, university students, and Arboretum visitors in a multi-layered learning experience.

The physical site design for the GATEways Project is currently underway; the next few years will be a period of landscape construction and collection development. In addition, UC Davis will celebrate its centennial year in 2009, with a focus on long-term planning for the campus' next hundred years and funding for several centennial projects. The proposed project will allow us to make informed decisions about tree siting, environmental modifications, and maintenance planning as part of these large-scale campus-level projects.

As part of the GATEways Project, we are expanding academic partnerships with UC Davis faculty and students. We have worked with a number of classes to develop projects in the Arboretum that engage students in research that has immediate applications, and in interpretive projects that allow them to share their course content with Arboretum visitors. For example, students in an entomology course studied insects in the Arboretum and created a ceramic mosaic mural, featuring plants in the collection and their associated insects. The mural traveled to the U.S. Botanical Garden on the Capitol Mall in Washington, D.C., where it was seen by hundreds of thousands of visitors as part of an exhibit on the contributions of public gardens. The proposed project offers several excellent opportunities for bringing students into the process of conserving living collections and for collaborative outreach projects.

Over the past year, the UC Davis Grounds Division completed an assessment of the trees in central campus. Arboretum staff consulted on the methods and worked with the arborist conducting the assessment. We now have the opportunity to use same assessment format and arborist for an evaluation of the Arboretum's trees. The campus landscape architect will collaborate on the project as an in-kind contribution. Arboretum records will be incorporated into the campus tree database, which will facilitate work scheduling and maintenance tracking, and make it easier for the Arboretum to take advantage of campus resources, such as heavy equipment and contract tree crews.

Finally, the coast redwoods (*Sequoia sempervirens*) in our collection have recently begun showing signs of stress. We suspect that this may be due to reduced rainfall and longer periods of irrigation with more alkaline groundwater. This is perhaps a harbinger of climate change, which is predicted to increase susceptibility to disease in plant populations. This project will give us the opportunity to collect baseline data so that we can track changes in the collection over time. This will allow us to work with campus climate change experts to model expected changes and the collections care practices necessary to respond to a changing environment.

PREVIOUS AND CURRENT COLLECTIONS CARE ACTIVITIES

The Arboretum has made a significant institutional commitment to the conservation of the collections. Our 1998 Strategic Plan identified increasing the size of the horticultural and curatorial staff as a critical need. Since then we have successfully advocated for full-time, permanent funding for the curator and director of horticulture positions, and have added four full-time positions, director of planning and collections, assistant director, landscape manager, and nursery manager, as well as a part-time horticulturist and additional student gardeners. We have also improved our coordination with the campus Grounds Division and advocated for significant increases in in-kind donations of labor, equipment, and special services. Our Ten-Year Plan 2002-2012 restates our commitment to establish and maintain the highest professional standards of collection care.

Responsibility for the routine maintenance of the UC Davis Arboretum collection is held by the assistant director of horticulture. Garden inspections, attended by the assistant director, horticulturist, and garden specialists, are made on a regular basis and generally cover a single Arboretum collection or garden. Strict departmental and campus regulations control pesticide and chemical use in the Arboretum. Our Integrated Pest Management (IPM) program helps conserve important plants within the collection without adversely affecting research underway in the Arboretum.

In 1999, we participated in assessments under both the MAP and CAP programs. The MAP assessment was conducted by Nancy Morin, former Executive Director of the American Association of Botanical Gardens and Arboreta. She concluded that “[t]he collections represent priceless local, regional, national and international resources. They are a community investment, and support must be given for their long-term curation.” The CAP assessment, conducted by Linda McMahan, Director of the Berry Botanic Garden, addressed critical strategic needs of the institution with an analysis of general museum systems, and highlighted the importance of increasing horticultural staff and planning for collection development.

In 1999, we completed a detailed curatorial analysis of our oak collection. In 2003, funding from an IMLS Conservation Project Support (CPS) grant allowed us to undertake an in-depth assessment of environmental conditions and the condition of individual specimens in the oak grove. Our consulting arborist developed recommendations to help us modify our cultural practices, institute the best possible irrigation regime, prioritize major pruning work, and make decisions about how to treat diseased trees or whether any trees should be removed. In 2004, we received an additional Conservation Project Support grant to support implementation of some of those recommendations, including renovation of the irrigation system, treatment of specimens infected with pathogens, improvements to the soil surface, corrective structural pruning, and training for groundskeepers in conservation methods. Because the 300 trees in the oak grove have been recently assessed, we are not requesting funding to include them in the proposed project.

In 2005 we were awarded an IMLS Museums for America grant to move our collection inventory to BG-Base, a botanical garden database program currently used by 160+ gardens, and our collection maps to ArcGIS, the mapping software that is the worldwide industry and government standard, and to integrate mobile technologies into our collection management processes. In 2007 we were awarded an IMLS Conservation Project Support grant to begin developing a standard GIS data model, to be made available to botanical gardens and zoos for mapping and cataloguing their collections. The ArcGIS Botanical Garden & Zoological Park Data Model project led to a groundbreaking agreement with ESRI, the premier provider of GIS software, to provide millions of dollars in free software, training, and support to botanical gardens and zoos through the American Public Gardens Association and the Association of Zoos and Aquariums. Peter Raven, noted botanist, environmentalist and president of the Missouri Botanical Gardens, gave the keynote speech at this year’s ESRI International User Conference, attended by 14,000 GIS professionals. Dr. Raven’s talk centered on the need for biodiversity and species preservation, and he encouraged GIS users to volunteer with their local botanical gardens to contribute their skills to these causes.

The proposed project will allow us to build on the successes of our previous conservation activities and extend them to all 2,200 trees in the collection. It will make it possible to incorporate a tree assessment module into the ArcGIS Botanical Garden & Zoological Park Data Model that is used by hundreds of gardens nationwide.

2. PROJECT DESIGN

The proposed project is a detailed assessment of the condition of the trees in the collection of the University of California Davis Arboretum, including environmental conditions and status of individual specimens. The goals

of the project are to document current conditions and determine appropriate corrective treatment and/or changes to current maintenance practices necessary to safeguard the health of the collection. The proposed project has the following components:

- **Detailed conservation assessment of the 2200 trees in the Arboretum's plant collection.**

The assessment will be conducted by Melanie Gentles, a certified arborist, who consults with the UC Davis Grounds Division and has assessed the trees of the central campus. Her assessment model follows the Neighbourwoods© protocol developed at the University of Toronto by Dr. Andrew Kenney and Dr. Danijela Puric-Mladenovic. Neighbourwoods© was designed to assist communities in conducting an inventory and evaluation of the state of their urban forest. It provides a standardized procedure for collecting information on tree location, species, size and condition, as well as site characteristics and potential conflicts with urban infrastructure. Trees will be identified by species, accession number, and location (GPS coordinates). A photograph will be taken of each tree. Data collected from each tree will include height, trunk diameter at breast height (DBH), canopy spread, condition, maintenance needs, and physical constraints of each tree's growing space. Each individual tree will be examined visually to identify visible signs of stress, pest damage, or pathogens and to document the need for corrective pruning or other structural treatment. The model will also incorporate a hazard assessment for each tree, based on the International Society of Arboriculture (ISA) protocol. It will be compatible with the i-Tree assessment protocol of the USDA Forest Service.

As arborist Melanie Gentles surveys the tree collection, she will identify specimens with symptoms of stress, pathogen infection, or structural weakness that require further investigation. We will contract with John Lichter, MS, consulting arborist, to provide more in-depth examination, problem diagnosis, and management recommendations for high-value specimens. Depending on the condition of the specimen, a variety of techniques may be used as needed to evaluate and diagnose tree health problems.

Soil conditions may be monitored through the laboratory analysis of chemistry, texture, and bulk density. Soil moisture sensor monitoring and water audits may be used to evaluate the current irrigation system and practices. Soil moisture can be tracked with a series of in-ground electronic monitors. When symptoms of fungal and bacterial pathogens are observed, tissue samples will be collected and analyzed to identify the pathogens involved.

Tree structural problems have the potential to not only reduce tree appearance and longevity, but may also pose a hazard to Arboretum visitors. Root crown excavations, ground-penetrating radar, and aerial inspections may be used to examine the structural strength of branches and roots to more accurately predict the likelihood of structural failure. Based on the results of diagnostic work, therapeutic treatments will be recommended.

- **GIS tree assessment data model.**

Geographic information systems (GIS) are quickly becoming the leading solution for the management of the living collections, facilities, and infrastructure of botanical gardens and other similar public landscapes. The ArcGIS Botanical Garden & Zoological Park Data Model has been a catalyst in this process by providing GIS users with a practical template for implementing GIS projects, and additionally providing a common starting point for the integration of similar data sets across multiple institutions.

The Arboretum GIS manager will work with a team of arboriculture industry experts to design and test a new module for the data model that will provide users with the capacity of performing a comprehensive tree conservation assessment using GIS. This module will allow for the capture of all of the information detailed in the above conservation assessment using a combination of the Neighbourwoods© and ISA protocols, and will be compatible with existing i-Tree software. It will also allow for the capture of related data that may affect tree health such as soil chemistry, irrigation spread and volume, water chemistry, and disturbance and impacts. The module will additionally provide for the detailed tracking of tree maintenance history and will be designed to work with existing enterprise asset management systems such as IBM Tivoli Maximo.

The module will be accompanied by a suite of analysis models that will automate the calculation of key indices related to the health and value of the collection. A condition rating model will calculate a numerical value for the overall tree condition, and a hazard rating model will perform a similar calculation for determining pruning or removal priorities. Functionality will be provided for running the existing USDA Forest Service STRATUM and UFORE models for assessing the ecosystems services provided by collection trees.

The tree conservation assessment module and the suite of analysis models will be added to the ArcGIS Botanical Garden & Zoological Park Data Model, and will be made available for free download via both the

ESRI Data Models website and the forthcoming Alliance for Public Gardens GIS website. The data model will be accompanied by supporting documentation to provide user instructions and technical support options.

• **Long-term conservation plan.**

The Arboretum curator and assistant director of horticulture will analyze the data collected, recommendations of the consulting arborists and other experts, hazard and ecosystem services ratings, and geospatial data generated by the GIS module to prepare a long-term conservation plan for the trees in the Arboretum collection. The plan will analyze data based on a curatorial value assessment that will take into consideration the research, educational, conservation, and aesthetic value of each tree. The plan will establish priorities and procedures for replacing trees reaching maturity, managing pests and pathogens, correcting structural problems, and addressing environmental problems with soil and irrigation. The plan will also generate baseline data on the health and value of the tree collection and help prioritize long-term opportunities for adding trees to the collection or removing trees for as necessary for landscape construction.

PLAN TO ENSURE THAT NORMAL MUSEUM OPERATIONS ARE NOT DISRUPTED

The project will have only a moderate impact on routine Arboretum operations. Our work planning is designed to accommodate strategic initiatives like this project in addition to routine work, and we are experienced at managing large-scale projects. Although the proposed project activities are large in scale, we will rely on the expertise of our partners and consultants for much of the work, and project staff will be relatively unobtrusive in the field. Access to the collection will not be limited, and normal curatorial and horticultural activities will continue during the project. Education staff and volunteers will incorporate the activities of this project into their schedule of educational activities. Administrative staff will manage financial accounting and reporting for the project as part of their normal work load.

SPECIMENS THAT ARE THE FOCUS OF THE PROJECT

The Arboretum's collections have been developed over the last 60 years in response to the needs and interests of the campus and community. The collections consist of plants adapted to a Mediterranean-type climate and able to tolerate the climatic extremes of California's Central Valley. Distinct from other western collections because of their tolerance for frost (winter temperatures can drop to 14°F), they are also remarkably tolerant of both drought and extreme summer heat (up to 120°F). The collection contains approximately 2,200 tree specimens representing more than 250 taxa, displayed by taxonomic group or geographic region of origin, or to illustrate horticultural themes, in a series of gardens along both banks of the old north fork of Putah Creek on the University of California's Davis campus.

The Arboretum's geographic collections include trees native to California, the American deserts, Australia, Mexico, Southwestern U.S., South Africa, Chile, and the Mediterranean basin. Of special interest to researchers are the Arboretum's large taxonomic collections of oaks, conifers, and acacias. Horticultural collections feature small trees for home landscapes, many of which have outstanding features such as visually interesting flowers, berries, bark, fragrance, or fall color. The collections also include ancient valley oak trees that served as boundary markers for the Laguna de Santos Calle Mexican land grant and appear on the earliest maps of the area, as well as numerous trees that are rare or threatened in the wild.

CONSERVATION METHODS IN TERMS OF EFFICIENCY, RELIABILITY, AND SAFETY

The University of California, Davis is one of the most prominent plant science research and teaching institutions in the world. The Arboretum strives in all its operations to reflect the excellence of the University, and to make use of the most current research and thinking in the field. Our staff and consultants teach at UC Davis, serve on the boards or chair committees of organizations such as the American Society of Consulting Arborists, the International Society of Arboriculture Western Chapter, the American Public Gardens Association, and the North American Plant Collections Consortium. Their work keeps them abreast of the latest findings.

The assessment techniques that will be used to evaluate the specimens in the collection and their environmental conditions (described above) are established practices in the fields of arboriculture, horticulture, urban forestry, and environmental management. These techniques have been used to evaluate trees in the central campus of UC Davis, as well as in many municipalities. We have determined that the procedures proposed here are efficient and yield valuable data.

All work done at the University of California is subject to stringent safety requirements. All Arboretum staff, students and volunteers are safety-trained and must be tested and cleared before handling power tools, vehicles, or heavy equipment.

Care will be taken to protect the trees in the collection during the conservation activities. Trucks and other heavy equipment will be confined to roadways to avoid soil compaction. Excavation, if necessary, will be limited to several discrete sampling pits and will be carried out either by hand or with an air spade, to minimize damage to tree roots. Tissue sampling will be conducted only when the presence of pathogens has been confirmed visually. Routine maintenance activities will continue on the normal schedule during the project.

3. PROJECT RESOURCES: TIME, PERSONNEL, BUDGET

TIME ALLOCATED TO COMPLETE PROJECT

We have designed this project within a 14-month time frame, and have carefully allocated time to each project activity, taking into consideration the campus academic schedule, seasonal needs of the plant collections, the availability of project partners and consultants, and the overall responsibilities of Arboretum staff. We have also built in “slack” in time estimates to allow for unforeseen complications. The GIS project includes a test phase and subsequent evaluation and modification, in order to identify and correct problems before the general release of the data model.

As shown in the attached schedule of completion, the project components will go forward simultaneously. The initial month is allocated for planning. The tree assessment will take place during months 2-12. Designing and testing the data model will take place in months 2-11. Education activities will take place in months 4-12. The last two months are allocated to data analysis, writing the long-range conservation plan, evaluation, and dissemination of project results.

BUDGET ALLOCATION TO ACCOMPLISH PROJECT ACTIVITIES

The project budget was developed by determining the activities necessary for the project and identifying the labor, supplies, equipment, and services necessary to carry out each activity. We believe that the estimated project costs are reasonable and appropriate to the scope of the project.

Labor costs were determined by estimating the amount of time needed for each activity, assigning specific staff, consultant, or volunteers to each task, and applying the hourly rates of the person(s) assigned. Many of the activities were performed in assessments of campus trees and the Arboretum’s oak grove, by the same staff and consultant, so we were able to extrapolate time and costs for this much larger project. We have used volunteers, student workers, groundskeepers, and entry-level professional staff whenever possible to keep costs down. Because the consulting firm is located in our area, there are no travel or subsistence costs. Supplies and equipment costs were determined by actual quotes from suppliers or records of recent purchases.

Travel costs included are for two staff members to attend the annual meeting of the American Public Gardens Association. The GIS manager will give a presentation introducing the GIS tree assessment module, which will be available free to all botanical gardens and zoo horticulturists, along with associated software, training and support. The project director will report on the tree assessment project and the development of the long-range conservation plan.

Matching funds will include in-kind donations of equipment and staff time as well as expert consultations by leaders in the field of arboriculture, urban forestry, and geographic information sciences. The University of California, Davis has agreed to reduce the indirect costs charged to the grant. This is an indicator of the importance of the project to the campus. This balance of the indirect cost requirement will be applied as a match.

KEY STAFF AND CONSULTANTS

A leadership team of Arboretum staff and professional partners will guide the project. Mia Ingolia, Arboretum curator, will be project director. She will track project activities and budget, integrate the assessment data with the Arboretum’s plant records, and test the prototype data model. She will also co-write the long-range conservation plan. This will occupy 25% of her time for the duration of the project.

Melanie Gentles, a certified arborist, will conduct the tree assessment. She will use the assessment protocol that she has used to evaluate the trees of the central UC Davis campus as well as several municipalities, with additional data fields specific to the Arboretum. This will occupy 25% of her time for 11 months.

Brian Morgan, GIS Manager at the Arboretum and a graduate student in Geography at UC Davis, will manage the GIS component project. He is the lead designer of the ArcGIS Botanical Garden & Zoological Park Data Model, a collaborative project of leading botanical gardens and zoos under the leadership of the UC Davis Arboretum. He will work with a group of expert advisors to design and test the GIS tree assessment data model. This project will occupy 25% of his time for 12 months.

Mary Burke, director of planning and collections at the UC Davis Arboretum, a professional botanist who is nationally recognized as a leader in technological innovation in botanical gardens and arboreta, will oversee the GIS collaboration and lead the long-range conservation planning. This will occupy 10% of her time for the duration of the project.

Emily Griswold, assistant director of horticulture at the Arboretum, will work with the arborists and serve as liaison to the campus Grounds Division. She will collect all the background data needed for the project, assist with assessment activities, and co-write the long-range conservation plan. This will occupy 25% of her time for the duration of the project.

Betsy Faber, education outreach manager at the Arboretum and a graduate student in Science Education at UC Davis, will manage the education aspect of the project. Her expertise is in environmental leadership and informal science education. She will work with UC Davis faculty and students to develop class projects that assist with the assessment project and educate visitors about conserving living collections. She will also oversee docent tours, school tours, the development of the cell phone tour, and other projects. This will occupy 10% of her time for ten months.

John M. Lichter of Tree Associates will be the consulting arborist for the project. He will conduct a detailed horticultural evaluation of approximately 60 high-value specimens with identified problems. Mr. Lichter holds a Master of Science degree in Environmental Horticulture from UC Davis, and is well respected in his field as an expert on tree health, safety, and conservation through corrective treatment. He will provide 80 hours of consultation.

We will hire a student intern to work with Melanie Gentles on the tree assessment and assist with education programs, including school tours, publications, web content, and outreach events. The student will work 10 hours per week (25% time) for 12 months.

We will consult with an outstanding team of experts in arboriculture, urban forestry, and geographic information sciences to ensure that the project meets the highest standards of excellence and is compatible with national and international protocols. Dr. Jim Skiera, executive director of the International Society of Arboriculture and former head of the UC Davis Grounds Division, will review the tree assessment protocol and GIS data model and consult on the long-range conservation plan. Dr. Greg McPherson, director of the Center for Urban Forest Research of the USDA Forest Service, will consult on the ecosystems services analysis component of the GIS module. His expertise is in quantifying cost and benefits of the urban forest. Dr. Mark Schwartz, faculty in Environmental Science and Policy at UC Davis, will consult on the effects of global climate change on botanical collections. Dr. Don Durzan, faculty in Plant Sciences at UC Davis, teaches Analysis of Horticultural Problems and will work with Arboretum staff to develop class assignments that contribute to the tree assessment project. Skip Mezger, UC Davis campus landscape architect, will help ensure that the project will meet the needs of campus landscape planners and facilities managers. A team of advisors to the ArcGIS Botanical Garden & Zoological Park Data Model, including experts from the Missouri Botanic Garden, the Arnold Arboretum at Harvard, and the San Diego Zoo, will review and test the GIS tree assessment module.

4. IMPACT

This project will provide the basis for future conservation activities to safeguard the Arboretum's tree collection. Extensive data, professional analyses, and recommendations will allow us to modify our maintenance practices and apply corrective treatment as necessary. The survey will also provide leverage as we seek funding for future conservation activities.

The project will make it possible to integrate the Arboretum's tree collection records with those of the UC Davis campus. Arboretum trees are maintained both by Arboretum staff and by campus tree crews. Better integration will facilitate work requests and work tracking. As discussed above in Section 1, the project will facilitate

landscape planning and collection development for the Arboretum GATEways Project and the Campus Centennial Plan. The project will also strengthen the Arboretum's links with campus teaching and research in arboriculture, horticulture, and landscape architecture, helping us to meet our educational goals.

The long-term benefits of the proposed project will be improved health and longevity of the Arboretum's tree collection, which will benefit researchers, educators, students, and visitors who use the collection for teaching, research, or recreation. The project has the potential to contribute to the preservation of biodiversity in the wild, since the collection represents a repository of documented genetic material that can be used for research, teaching, or ecological restoration.

The proposed project will result in the following formal products:

- Reports to the Arboretum by arborists conducting the detailed collection assessment and follow-up evaluation of trees with identified problems.
- Long-term conservation plan for the trees in the collection of the UC Davis Arboretum.
- A tree assessment GIS module that will function as a stand-alone data model or as part of the comprehensive ArcGIS Botanical Garden & Zoological Park Data Model.

EDUCATION AND INTERPRETATION

As leaders in informal education at UC Davis and in the regional community, the Arboretum education staff will provide a range of education programs and interpretation services to inform university students, horticulture professionals, K-12 students, Arboretum visitors, and online audiences about the conservation of living collections and the ecological services provided by trees.

- We will partner with UC Davis faculty and students to create class projects that allow students to conduct research in the Arboretum and share their results with visitors. For example, soil science students will take samples in the Arboretum and analyze their chemistry; plant pathology students will examine foliage for evidence of pests or pathogens; horticulture students will take samples of irrigation water and analyze them for pH and dissolved salts; urban forestry students will practice evaluating trees with the assessment model we are using for the project. Students will then work with Arboretum education staff to produce inexpensive temporary signs that will be installed in the Arboretum to inform visitors about the conservation project.
- We will train education interns, docents, and volunteer naturalists to discuss the conservation project during public educational events and tours with visitors and school groups.
- Education staff and interns will create a cell phone tour about the project; signs at several sites in the Arboretum will invite visitors to call in to listen to recorded messages explaining different aspects of the conservation project and the Arboretum's leadership in collections conservation nationally.
- We will present two talks on the project at the annual meeting of the American Public Gardens Association and submit an article to the journal *The Public Garden*.
- We will make the open-source GIS tree assessment module available at no cost to botanical gardens and zoos nationwide and internationally through the collaborative design effort described above. We will present the GIS application to our colleagues with a workshop at the annual meeting of the American Public Gardens Association.

EVALUATION

We will evaluate the tree assessment process at several points during the process, to identify problems and ensure that the data being collected meet our expectations and are compatible with the Arboretum's record system. We have seen the results of the assessment carried out on the campus trees by the same arborist using the same measures and will expect the same level of accuracy and depth.

The GIS project will be evaluated by a community of experienced GIS users and domain specialists (arborists and urban forestry professionals) who will advise on the design and test the beta version of the application.

The Arboretum uses a three-part evaluation model for educational programs. For this project, we will begin with a survey of visitors and other audiences to determine interests, questions, and misconceptions about conserving the tree collection and more broadly about the value of trees in the landscape. We will use formative evaluation to test and revise signage, programs, and cell phone tours as they are developed. Finally, we will use summative evaluation to document the entire process and record successes, areas for improvement, and suggestions for future projects.

UC Davis Arboretum IMLS CPS 2009 Schedule of Completion

| | 2009 | | | | | | 2010 | | | | | | | |
|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | July | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug |
| Overall project planning | ----- | | | | | | | | | | | | | |
| TREE ASSESSMENT | | | | | | | | | | | | | | |
| Document current practices | | ----- | ----- | | | | | | | | | | | |
| Visual assessment of specimens | | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- |
| Identify specimens for extended assessment | | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- |
| Detailed risk assessment | | | | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- |
| Soil sampling and analysis | | | | | | | | | ----- | ----- | ----- | ----- | ----- | ----- |
| Laboratory analysis of tissue samples to identify pathogens | | | | | | | | | ----- | ----- | ----- | ----- | ----- | ----- |
| Water audit, soil moisture monitoring | | | | | | | | | ----- | ----- | ----- | ----- | ----- | ----- |
| GIS DATA MODEL | | | | | | | | | | | | | | |
| Consult with design team | | ----- | ----- | | | | | | | | | | | |
| Design and build prototype module | | | ----- | ----- | ----- | ----- | | | | | | | | |
| Test prototype data model with tree assessment data | | | | | | ----- | ----- | ----- | ----- | | | | | |
| Make changes to module for release | | | | | | | | | ----- | ----- | ----- | | | |
| Distribute GIS module and documentation | | | | | | | | | | | | ----- | ----- | ----- |
| LONG-RANGE CONSERVATION PLAN | | | | | | | | | | | | | | |
| Integrate tree assessment data with Arboretum records, GIS module | | | | | | | | | | | | ----- | ----- | ----- |
| Generate priority lists for tree replacement, treatment | | | | | | | | | | | | ----- | ----- | ----- |
| Integrate Arboretum data with campus work order and tracking system | | | | | | | | | | | | ----- | ----- | ----- |
| Prepare report | | | | | | | | | | | | | ----- | ----- |
| EDUCATION AND INTERPRETATION | | | | | | | | | | | | | | |
| Create class projects for UC Davis students | | | | | | ----- | ----- | ----- | ----- | | | | | |
| Work with students to produce signs about conservation project | | | | | | | | | ----- | ----- | ----- | ----- | ----- | ----- |
| Train education interns, docents, volunteer naturalists about project | | | | ----- | ----- | | | | ----- | ----- | | | | |
| Tours with visitors and school groups | | | | ----- | ----- | | | | ----- | ----- | ----- | ----- | ----- | ----- |
| Create cell phone tour about project | | | | ----- | ----- | | | | | | | | | |
| Cell phone tour available to visitors | | | | | | | | | ----- | ----- | ----- | ----- | ----- | ----- |
| EVALUATION | | | | | | | | | | | | | | |
| Front end evaluation—survey visitor interest, questions | | | | ----- | | | | | | | | | | |
| Formative evaluation—test programs, signs, cell phone tour | | | | | ----- | ----- | ----- | ----- | | | | | | |
| Summative evaluation of project | | | | | | | | | | | | | ----- | ----- |
| Report on project at APGA annual meeting | | | | | | | | | | | | | ----- | ----- |
| Article on project in quarterly Arboretum Review | | | | | | | | | | | | | ----- | ----- |
| Reports to IMLS | | | | | ----- | | | | | | | | ----- | ----- |

BUDGET FORM: Section B, Summary Budget

| | \$ IMLS | \$ Cost Share | \$ TOTAL COSTS |
|--|------------------|------------------|------------------|
| 1. Salaries and Wages | 46,173 | 69,475 | 115,648 |
| 2. Fringe Benefits | 10,381 | 17,369 | 27,750 |
| 3. Consultant Fees | 13,200 | 0 | 13,200 |
| 4. Travel | 3,800 | 0 | 3,800 |
| 5. Supplies and Materials | 1,708 | 270 | 1,978 |
| 6. Services | 4,995 | 0 | 4,995 |
| 7. Student Support | 0 | 0 | 0 |
| 8. Other Costs | 1,198 | 0 | 1,198 |
| TOTAL DIRECT COSTS (1-8) | \$81,455 | \$87,114 | \$168,569 |
| 9. Indirect Costs | \$28,510 | \$30,490 | \$59,000 |
| TOTAL COSTS (Direct and Indirect) | \$109,965 | \$117,604 | \$227,569 |

Project Funding for the Entire Grant Period

| | |
|---|-----------|
| 1. Grant Funds Requested from IMLS | \$109,965 |
| 2. Cost Sharing: | |
| a. Applicant's Contribution | \$117,604 |
| b. Kind Contribution | |
| c. Other Federal Agencies* | |
| d. TOTAL COST SHARING | \$117,604 |
| 3. TOTAL PROJECT FUNDING (1+2d) | \$227,569 |
| Percentage of total project costs requested from IMLS | 48 % |

*If funding has been requested from another federal agency, indicate the agency's name:

1. Treatment Project Statement of Need

The Kelsey Museum of Archaeology at the University of Michigan, Ann Arbor, is requesting support for the conservation of 22 large-scale watercolor paintings. The watercolors are the Museum's current highest conservation priority for three reasons: they exhibit considerable condition problems; they suffer from detrimental storage and mounting techniques; and they possess high scholarly significance and interest for the Museum, scholars of art and archaeology, and the general public.

The watercolors were identified and documented as in need of full conservation treatment as early as 1986, and they are currently the Museum's number one collections care priority. This is reflected in the Museum's long-range Conservation Plan, the Institutional Plan, the Preservation Plan, and in the item-specific Conservation Condition Survey. Please see the attached Conservation Plan, Preservation Plan, and Conservation Condition Survey Record included in the Supporting Documents section for more information. The condition survey record is for the largest of the watercolors, which measures approximately twenty feet long by six feet high. The Museum's Institutional Plan exceeds IMLS length requirements for supporting documents and is not included in this application.

The Kelsey Museum's Conservation Plan is a ten-year plan, reviewed every five years, and identifies the Museum's primary conservation objectives for the specified period of time. The current plan, dating from 2005, specifies ten conservation goals in order of importance. The first two goals on the plan are important preventive conservation initiatives that are in progress. These are followed by the most important treatment priority for the Museum's collection, which is the conservation of this watercolor series.

Although the watercolors have long been a preservation priority of the Kelsey Museum, due to lack of specialist expertise in paintings and paper conservation, lack of space, and lack of financial resources for a conservation project of this scale, the needed conservation treatment has not been carried out. Because of the watercolors' size and fragility, they are currently inaccessible for teaching, research, study, or enjoyment by the public. For the first time in the Kelsey's history, a new wing of the Museum, currently under construction, will provide museum-standard climate control and adequate space for the care of all the Museum's collections, including oversize items like this watercolor series. The proposed conservation treatment and flat-mounting of the watercolors, for which we are seeking IMLS support, will stabilize these fragile works of art, ensuring their safekeeping while making them accessible for teaching, research, and the general public.

The Kelsey Museum is a unit in the College of Literature, Science, and the Arts at the University of Michigan housing the University of Michigan's collections of ancient Egyptian, Near Eastern, Greek, Roman, Coptic, and Islamic materials. As a university museum, the Kelsey serves multiple audiences, ranging from the international scholarly community to the students of the University of Michigan and the general public. In all our programs—exhibits, teaching, public outreach, and research—we strive to integrate the needs of these audiences.

The majority of the nearly 100,000 objects in the collection come from Kelsey Museum archaeological excavations in Egypt and Iraq before World War II. These collections were founded in 1893 by Professor Francis W. Kelsey and supplemented with purchases made in his travels to Italy, North Africa, and the Near East in the late nineteenth and early twentieth centuries.

The Museum mounts active programs of excavation, conservation, collections research, and exhibitions, which bring the results of our research to the public in engaging and innovative ways. This is reflected in the mission statement of the Museum:

The mission of the Kelsey Museum of Archaeology is to serve the international academic community, the University of Michigan, and the public through research, conservation, and exhibition of its collections of artifacts from the ancient and medieval cultures of the greater Mediterranean region and through field work. As a public resource the Museum has a corresponding commitment to sharing the knowledge gained through our fieldwork and other research with the general public of all age levels and in all walks of life. (Mission statement approved by the Kelsey Museum Executive Committee, 1995).

As evidenced by the Museum's mission statement, the Kelsey has long been committed to conservation, employing a full-time conservator since the 1970's. The Museum demonstrates its ongoing financial commitment to conservation by currently employing two full-time, professionally trained conservators who specialize in the conservation of archaeological objects. These conservators provide both preventive and active conservation for the Museum's collections, support an active exhibition program, and provide field conservation for the Museum's current excavations. In addition to these staff positions, the Kelsey equips and supports a medium-sized conservation laboratory and funds general collections care. The Museum also funds professional development and continuing education for both conservators and supports their membership in the American Institute for Conservation. Additionally, as part of the current new-wing construction project, the Museum will renovate the existing conservation lab, providing updated facilities, additional space, and new equipment.

2. Project Design

The 22 watercolors that are the focus of this proposal are an artist's illustration of the famous fresco cycle at the Villa of the Mysteries in Pompeii, Italy. The watercolors were commissioned by Francis W. Kelsey, Professor of Latin Language and Literature at the University of Michigan from 1889 to 1927 and founder of the Museum. The watercolors were painted between 1925 and 1927 by Maria Barosso, a highly regarded Italian artist, archaeologist, and archaeological illustrator. The original fresco cycle, thought to have been painted around 60–40 BC, depicts women engaged in activities believed to be associated with the cult of Dionysus. But the exact subject and purpose of the frescoes, as well as the function of the opulent room they decorate, continue to inspire much scholarly speculation and interpretation.

Maria Barosso's beautiful and faithful renderings of these extraordinary wall-paintings are significant for the KMA's history as a university museum because they were commissioned by Kelsey as a teaching and research tool. Kelsey also saw the watercolors as a way to ensure the visual preservation of the fresco cycle, which was discovered in 1909 and began to deteriorate soon after. He wished to document accurately the condition of the frescoes and the technical details of their creation. The watercolors are thus an important artifact of archaeological documentation in an era before photography was a practical or accepted tool. They are also of great relevance to scholars interested in questions concerning the reception of the ancient wall-paintings by artists, historians, archaeologists, and the general public since their discovery. The watercolors are the only large-scale pictorial record of the fresco cycle that is roughly contemporary with its discovery and the only artist's illustration of it ever created.

The watercolors are also of interest for their place in the career of Maria Barosso and as works of art created during the Fascist government of Benito Mussolini, who encouraged the excavation, study, and recording of ancient Roman history. An accomplished artist, Barosso worked as head of drawings for the Superintendency of Monuments for Rome and Lazio and became the first woman to work at the archaeological excavations in the Roman Forum as an employee of the Italian government. These paintings, carried out primarily on site in Pompeii, took fifteen months to complete.

The watercolors are nearly life-size (5/6ths scale); the largest panel is twenty feet long and six feet high. Despite Kelsey's desire for the watercolors to be displayed and available for scholarly research and study, the paintings have only been put on view once since their arrival in Ann Arbor in the 1920's. Due to their great size, they were rolled and stored in the Museum's attic for many years. The rolled storage, dirty and dusty conditions, a wildly fluctuating climate, and poor handling created numerous condition problems. The paintings, which are watercolor and gouache on heavy-weight paper lined with linen or cotton, are now creased, warped, and distorted, with numerous tears and losses along the edges.

A temporary exhibition of the watercolors in the year 2000 focused attention on their condition. For this exhibit the paintings were affixed to rigid panels with small paper hinges. The six largest paintings were removed from the panels at the conclusion of the exhibit and rerolled for storage. Sixteen other paintings remain mounted on panels. When examining the six rolled watercolors, scholars must continue to unroll and reroll the huge paintings in sections to view them. The heavy paintings are extremely difficult to handle, and the physical manipulation required to view them continues to cause mechanical damage. In addition, the prolonged rolled state of the unsupported paintings has caused them to become deformed under their own weight.

The 16 paintings that remain mounted to rigid panels also continue to suffer ongoing damage. These watercolors were not sufficiently relaxed before mounting and are now pulling away from the small hinges, creating numerous localized tears along the edges and further distortion of the paintings. In other areas the hinging system is failing completely. An unsuitable hard plastic edging was used to frame the panels. Where this edging is in direct contact with the watercolors it is gouging the surface

and causing localized skinning, creasing, and tearing. Please see the attached Photographic Documentation (included in the Supporting Documents section) for documentation of the condition problems.

With the construction of the Kelsey Museum's new wing, containing expanded storage and exhibit facilities, the Museum will finally have adequate space to care for the watercolor series correctly. The goals of this project are threefold: to treat the current condition problems; to ensure the long-term preservation of the watercolors by mounting them appropriately on a permanent rigid support; and to provide increased access while ensuring the safekeeping of these fragile works of art. The first two goals of the project, treatment and mounting of the watercolors, will take place in Cleveland, OH, at the Intermuseum Conservation Association (ICA) laboratories and is described in more detail below. The lead conservators for the project will be Wendy Partridge, a paintings conservator who has experience treating large-scale paintings and mural cycles, and Shiho Sasaki, a paper conservator with experience treating and mounting oversize works of art on paper. The third goal of the project, to provide increased access to the watercolors while ensuring their long-term preservation, will be achieved in several ways. Providing a permanent rigid support for each painting will eliminate the risks and damage associated with rolled storage and will minimize handling. As part of this proposal we are also requesting funds for pigment analysis, which will provide information about the composition and light-sensitivity of the pigments. This information will allow us to set appropriate guidelines for access by scholars and students as well as to develop a sound preservation plan for any future exhibition of the watercolors.

The treatment and mounting of the watercolors will follow currently accepted practice for conservation of works of art on paper. As noted above, the lead conservators have worked with similar material in terms of both media and size. The treatment and documentation of the watercolors by the ICA will follow the American Institute for Conservation's Code of Ethics and Guidelines for Practice. Documentation for this project will be incorporated into the Kelsey Museum's collections management and conservation databases and maintained in hardcopy files.

All materials to be used in the treatment and mounting have been tested for use in conservation and are proven to be appropriate, stable, and safe. The order of examination and treatment of the watercolors will be as follows. Following complete photo and written documentation of all 22 watercolor paintings, the pigments will be analyzed by Dr. Paul Whitmore, Director of the Art Conservation Research Center at Carnegie Mellon University. Conservation treatment will include: unrolling of the six rolled paintings, removal of the sixteen currently mounted watercolors from their rigid supports, removal of old hinges, tear repair, reattachment of the watercolor paper to the original lining where needed, filling and in-painting of loss areas in the support if required, gentle humidification and pressing of the watercolors, and mounting of all the watercolors onto aluminum honeycomb panels.

The aluminum panels will be buffered using acid-free board, and the paintings will be mounted using toned continuous Japanese paper edge hinges. The mounting method has been used extensively for oversize works of art on paper and canvas and is a reliable method that has proven to be efficient,

structurally stable, and light-weight. Please see the attached Conservation Assessment and Treatment Proposal prepared by ICA conservators for more detailed treatment information (included in the Supporting Documents section). Please also see the supporting documents section for an itemized list of all the watercolors.

Normal Museum operations will not be disrupted by this project. Although Kelsey Museum collections staff will spend a small percentage of their time communicating with ICA conservators to monitor and discuss the progress of the project, all conservation work will occur at the ICA laboratories in Cleveland and will not impact day-to-day work at the Kelsey. Kelsey Museum conservators will be in contact with the project's lead conservators by telephone and email and will visit the laboratory during the treatment. The Museum's conservators will also provide regular updates on the project to education staff so that they may keep students, docents, and visitors up to date on the work.

3. Project Resources: Time, Personnel, Budget

The proposed time frame for this conservation project, including the education component, is 24 months. Based on estimates by the lead conservators for this project, this is an appropriate allocation of time to undertake all of the project's components. These include: packing and transportation of the paintings to and from ICA's laboratories, scientific analysis of the pigments, conservation treatment and mounting, full documentation of the project, and implementation of the education component for which we are also requesting IMLS support.

ICA, the Intermuseum Conservation Association, is the oldest regional conservation laboratory in the United States. It provides professional, high-quality, and cost-effective art conservation services, and the recently renovated laboratory is fully equipped to handle large treatment projects.

Key staff for the conservation treatment project are as follows:

Suzanne Davis, Curator of Conservation, Kelsey Museum of Archaeology, University of Michigan, Ann Arbor, MI (M.A. in Art History and Certificate in Conservation, New York University, Conservation Center, Institute of Fine Arts, New York, NY, 1998). Ms. Davis specializes in the conservation of archaeological objects, with research interests in field conservation, ceramics, and glass. She is a member of AIC and will, along with Claudia Chemello, co-manage this project for the Kelsey Museum. Ms. Davis has successfully managed projects involving contract conservators, interns, and volunteers for at least nine years.

Claudia Chemello, Senior Conservator, Kelsey Museum of Archaeology, University of Michigan, Ann Arbor, MI (M.S. in Applied Science [Materials Conservation], University of Western Sydney, Sydney, Australia, 2002). Ms. Chemello specializes in the conservation of archaeological objects, with research interests in field conservation and metal objects. She is a member of AIC and will co-manage this project along with Suzanne Davis.

Wendy Partridge, Associate Conservator, Intermuseum Conservation Association, Cleveland, OH (M.A. in Art History and Certificate in Conservation, New York University, Conservation Center, Institute of Fine Arts, New York, NY, 1999). Ms. Partridge specializes in the conservation of paintings and is a Professional Associate of AIC. She will be a lead conservator for this project. Her relevant experience includes work on multiple interdisciplinary projects involving treatment of mixed-media works of art, including murals, painted textiles, and oversize paintings.

Shiho Sasaki, Associate Conservator, Intermuseum Conservation Association, Cleveland, OH (M.A. in Paper Conservation, Royal College of Art, London, UK, 2000). Ms. Sasaki specializes in the conservation of works on paper and is a Professional Associate of AIC. She will be a lead conservator for this project. Her relevant experience includes work on multiple projects involving treatment of oversize paper-based materials, including drawings, historic wallpapers, and photogravures.

Dr. Paul Whitmore, Director, Art Conservation Research Center at Carnegie Mellon University, Pittsburgh, PA (Ph.D. Physical Chemistry, University of California, Berkeley, CA, 1982). Dr. Whitmore specializes in the characterization of art and conservation materials and their aging behavior in indoor environments. Dr. Whitmore has published widely in the conservation and scientific literature and is a Professional Associate of AIC.

Additional staff at ICA who will be involved with this project include: **Emily Helwig**, Associate Paper Conservator (M.A.C., Paper Conservation, Queens University, Kingston, Ontario, Canada, 2002), who will assist with the conservation treatment; **Charles Eiben**, Associate Preparator (B.F.A. Cleveland Institute of Art, Cleveland, OH), who will assist with the mounting design and mounting of the watercolors; and **Christopher Pelrine**, Project Coordinator (B.F.A. Pratt Institute, Brooklyn, NY, 1986), who will coordinate ICA's work flow for this project.

ICA is fully committed to this project for the period of time requested (please see the attached Letter of Commitment included in the Supporting Documents section).

Additional staff at the Kelsey Museum who will be involved with this project include: **Dr. Elaine Gazda**, Curator of Hellenistic and Roman Collections and Professor of Classical Art and Archaeology (Ph.D. in History of Art, Harvard University, Cambridge, MA, 1971), who will consult on the project from a curatorial perspective; **Sebastián Encina**, Coordinator of Museum Collections (M.A. in Anthropology, George Washington University, Washington, D.C., 2002), who will supervise issues of packing, transportation, insurance, and recordkeeping; and **Scott Meier**, Museum Exhibition Coordinator (B.A. in Graphic Design, Indiana University, Bloomington, IN, 1989), who will consult on the mounting methods for the watercolors and on developing and implementing responsible plans for their access and future exhibition. For more detailed staff bios, please see the Project Staff and Resumes section.

All Kelsey Museum staff are fully committed to their responsibilities for this project. Because all conservation work will occur off-site, Kelsey staff responsibilities are limited to overall project management, consultation, and communication, and the impact on day-to-day duties will be minimal.

The budget for this project is primarily for costs associated with the transportation, materials and supplies, and labor involved in the conservation treatment and mounting of the 22 watercolor paintings. The costs associated with treatment were determined from on-site examination by ICA conservators in August 2007. The costs for packing and shipping to and from ICA, as well as costs for materials and supplies, were also determined by ICA staff. The budget also includes the cost for full documentation of the project. ICA conservators based their estimates on similar projects they have undertaken and obtained the costs for materials and supplies from the appropriate vendors. An itemized breakdown of ICA's costs is included in the Budget Justification.

The Kelsey Museum will meet the required 1:1 match by contributing staff time and resources, travel costs for Museum staff to visit the ICA laboratories during the project, and other costs as specified in the attached Detailed Budget and Budget Justification.

4. Impact

The anticipated benefits of this project will be threefold. First, the conservation treatment of the watercolors will improve and stabilize the condition of the paintings. Second, mounting them to a permanent rigid support will provide structural stability and ensure their long-term preservation. Finally, the treatment and mounting will allow, for the first time, regular scholarly and public access to these unique works of art while ensuring their safekeeping for future generations.

The results of this project will be disseminated and publicized through a variety of means. The Museum is planning public lectures about the project; the project will be featured on the Museum's website and in its newsletter; and a range of educational activities about the project are planned (please also see the accompanying Education Component Proposal). The Kelsey Museum's audiences encompass K-12 school groups, University of Michigan students and faculty, and members of the public. The Kelsey Museum is projected to receive over 30,000 visitors in the year 2009, and the Museum's website logs well over a million hits annually.

These rare watercolors are considered one of the treasures of the Kelsey Museum and the University of Michigan. The paintings are significant for students and scholars of classical art and archaeology, as well as being magnificent and noteworthy works of art in their own right. This conservation treatment project will ensure that current and future audiences may learn from and be inspired by the rich artistic and cultural heritage represented by these paintings.

BUDGET FORM - PAGE FOUR

Section B: Summary Budget

| | \$ IMLS | \$ Cost Share | \$ TOTAL COSTS |
|-----------------------------------|---------|---------------|----------------|
| 1. Salaries and Wages | | | |
| 2. Fringe Benefits | | | |
| 3. Consultant Fees | | | |
| 4. Travel | | | |
| 5. Supplies and Materials | | | |
| 6. Services | | | |
| 7. Student Support | | | |
| 8. Other Costs | | | |
| TOTAL DIRECT COSTS (1–8) | | | |
| 9. Indirect Costs | | | |
| TOTAL COSTS (Direct and Indirect) | | | |

Project Funding for the Entire Grant Period

1. Grant Funds Requested from IMLS

2. Cost Sharing:

 a. Cash Contribution

 b. In-Kind Contribution

 c. Other Federal Agencies*

 d. TOTAL COST SHARING

3. TOTAL PROJECT FUNDING (1+2d)

% of Total Costs Requested from IMLS

* If funding has been requested from another federal agency, indicate the agency's name:

Narrative

1. Statement of Need

- **How the project ties in to the museum's long-range conservation plan and/or conservation priorities.**

This project centers on the conservation treatment of *Trellised Garden with Animals*, a tapestry that dates from about 1565-1575 and was made in the important Brussels tapestry workshop of Wilhelm de Pannemaker. The proposed conservation of this tapestry, which was identified as of highest priority in a recent detailed condition survey, is an outcome of the museum's long-standing efforts to establish and realize long-range conservation priorities.

The goal of establishing a program for systematic condition surveys with an eye toward establishing treatment priorities has long been at the fore of the Gallery's collections care program. In the museum's 1991 General Conservation Assessment Survey, Tom Branchick's prioritized summary recommended "updating or obtaining a prioritized object specific survey for the collections and applying for funding for the most urgent conservation treatments." During the process of writing the Gallery's Long-Range Preservation Plan in 2002, the Collections Department determined with consultant Barbara Moore that the complete evaluation and treatment of the Gallery's European tapestries was essential to the responsible stewardship of the museum's collections and educational mission to our visitors. The 1991 Conservation Assessment Survey and summary update as well as relevant excerpts from the Gallery's Long-Range Preservation Plan are attached to this application as "Supportingdocument1" and "OptionalAttachment1," respectively.

In 2003-2004, an IMLS-funded detailed condition survey of the tapestry collection was performed by Marlene Eidelheit, director of the Textile Conservation Laboratory (TCL) of the Cathedral of St. John the Divine, in order to systematically evaluate each tapestry, determine its condition, provide a proposed treatment plan and establish treatment priorities based on condition and historical and aesthetic importance. The Gallery is now in the process of seeking funding to conserve the highest-quality tapestries that are at greatest risk and received the highest priority ratings. During the survey, Ms. Eidelheit used a ranking system of 1-5 (1 being low priority, 5 being high) to prioritize treatment based on the three criteria of condition, conservation treatment priority and aesthetic priority. (Relevant sections of this survey document are attached as "OptionalAttachment2".) *Trellised Garden with Animals* was the only tapestry to receive a rating of 3 for condition but a 5 for both conservation treatment and aesthetic priority. In short, *Trellised Garden with Animals* is the highest quality tapestry in the museum's collection; it also needs extensive cleaning and labor-intensive stabilization treatment to be exhibitable.

- **Why this project is among the museum's highest collections care priorities at this time.**

The primary benefit of creating a detailed long-range conservation plan is that it forces the institution to plan major conservation treatment and collections care projects logically and well into the future. The Gallery's Long-Range Preservation Plan was thus written as a guiding document that can enable the Gallery to realize large projects to completion in as timely and judicious a manner as possible. In the case of the European tapestry collection, we determined that, because of their quality and importance, the complexity and expense of conservation, the necessity of treatment before any possibility of exhibition, and, due to light sensitivity, the need to establish a regular rotation schedule as recommended by the conservator for each tapestry, this initiative would play a major role in the conservation treatment priorities of the museum. In particular, nine medieval and Renaissance tapestries, all of which received

high priority ratings during the detailed condition survey, would form the core of a larger Tapestry Initiative that has as its long-term goal both their treatment and in-depth and cooperative conservation and curatorial research, research that over the long term will culminate in publication and new, comprehensive web- and technology-based educational materials. In addition, the tapestry collection is closely intertwined with the history and mission of the museum within the city of Rochester. The Gallery and its original building were founded in 1913. In 1926, the well-known New York architectural firm of McKim, Mead and White designed an addition to the original building that included a monumental gallery space with clerestory windows. This gallery, intended to house the museum's collection of medieval art, spurred the acquisition priority of several medieval and Renaissance tapestries that, because of their integral role in the museum's collection and educational mission, were unfortunately on display for decades. *Trellised Garden with Animals*, chosen by a major donor in 1931 specifically for permanent display in the Renaissance gallery of the original 1913 Neoclassical building, is one of these tapestries. All have now been removed from exhibition; until treated, this essential and historically important group of works that so greatly engage the curiosity and enhance the education of our visitors will remain off view. Although one tapestry has been successfully conserved under this long-term initiative, the necessity of implementing a strict rotation schedule means that there are at least 2-3 years during which it cannot be displayed. The treatment of the remaining tapestries would both allow for at least the minimum rotation suggested by the conservator (maximum 1 year on, minimum 2 years rolled and off view) and provide an even wider variety of visual and educational material to our visitors, especially schoolchildren for whom the Renaissance is a major component of their Social Studies curriculum.

- **How the project ties into the museum's previous and current collections care activities.**

The conservation treatment of *Trellised Garden with Animals* is consistent with both our conservation history and the implementation of our Long-Range Collection Preservation Plan.

Caring for, conserving, documenting and exhibiting the permanent collection is at the core of the Memorial Art Gallery's mission. Implementation of the priorities in the Long-Range Preservation Plan is a staff-wide, interdepartmental effort; staff and institutional resources and funds are allocated equitably among infrastructure and object-based preservation, evaluation, improvement, and treatment. Collections care is practiced on both a daily and long-range basis. For example, while the Memorial Art Gallery does not have a staff conservator, local and regional conservators are utilized for both regular site-visit examinations and, when possible, on-site treatment. The curatorial department dedicates one day per month to the thorough cleaning and inspection of objects in individual galleries. A smaller group of works is cleaned on a weekly basis to minimize the accumulation of dust. An integrated pest control system is in place and the University of Rochester Facilities department provides expertise in the event of infestation. Lighting is kept at levels recommended by standard conservation practices. Temperature and humidity are regulated and monitored through computerized systems. Recent accomplishments of the Facilities department that directly impact the collections include the hiring of a full-time, permanent HVAC mechanic to maintain, monitor and repair the interior building climate control system; systematic cleaning and encapsulation of ductwork; incapacitating old steam pipes in storage rooms; and rebuilding humidifiers for improved control and efficiency. In 2005, the museum resolved the serious issue, noted by Mr. Branchick in the 1991 GCAS, of direct light from the arched glass windows in the Fountain Court gallery by installing panels of Kalwall, a composite window material that diffuses sunlight and radically lowers light levels while maintaining the aesthetic of natural daylight.

The curatorial department itself performs a wide range of collections care activities. For example, a priority within the department has been the complete inventory of all storage rooms in order to facilitate the accurate record keeping, history and coordination of all object locations, conservation records and art

movements in EmbARK, the museum's collection management database. These inventories have also provided staff with the opportunity to rehouse objects when necessary and to take registration photography. At present, inventories of painting, temporary, textile, small object and print storage, which together contain about 75% of all works in storage, are complete; the inventory for the remaining storage room for large-scale sculpture and furniture is scheduled for 2008-2009. In the summer of 2007 a conservator from the Williamstown Art Conservation Center worked closely with the registrar to perform a much-needed 3-day detailed condition survey of the museum's outdoor sculpture. Conservation treatment, whether funded solely by the museum or in conjunction with private or governmental grants, is ongoing and based on both condition and exhibition needs. In the past few years, over 50 paintings, 100 works on paper, one tapestry and several large-scale sculptures have received much-needed conservation treatment. Most recently, in 2008 the Gallery received funding from the Luce Foundation to treat six important American portraits.

The Gallery has also benefited over the past two decades from IMS and IMLS conservation grants that have helped establishment treatment priorities, renovate storage facilities and treat objects that are at risk and support our mission. These include 1985, 1986, and 1988 conservation surveys of prints, drawings and watercolors; sculpture; and paintings and objects. Grants related to upgrades in the environment and housing of objects include a 1996 Environmental Survey of the Fountain Court and a grant in 2000 to completely refurbish permanent storage for works on paper. Treatment grants from 1992 and 1999 supported respectively the treatment of our 17th-century Chinese wall painting *Bearer of Good Tidings* and seven important European and American paintings and frames. In 2004, IMLS funded the conservation treatment of nine sculptures by Gaston Lachaise. In 2003, the Gallery received an IMLS grant for the detailed condition survey of our collection of European tapestries; as an offshoot of this survey, in 2005 the museum was awarded funds by the National Endowment for the Arts for the conservation treatment of a 16th-century Brussels tapestry that had been designated as high priority. It was determined during the 2003-2004 survey that this tapestry was in need of urgent treatment due to the presence of insect frass. On the remote chance that there was insect activity, which fortunately there was not, as a precautionary measure the tapestry was immediately isolated and sent to WACC for several weeks of anoxic treatment. Afterward it was sent to TCL and was conserved with partial funding from the National Endowment for the Arts.

- **The museum's overall financial commitment to conservation as well as the governing authority's commitment.**

The Memorial Art Gallery is committed to the support of ongoing conservation analysis and treatment. As a subscribing member of the Williamstown Art Conservation Center, the Gallery pays dues each year that are applied toward treatment and site visits. Aside from its commitment to WACC, the curatorial department maintains a separate budget line for emergency treatment or treatment by local or specialized conservators. A charitable lead trust established several years ago by an individual donor for conservation projects has provided matching funds for conservation grants and permitted treatment beyond the Gallery's operating funds. Private donors have contributed to the treatment of objects in areas of special interest; the Gallery Council, the primary support organization for the museum, provides a yearly budget line directed to conservation activity. Finally, the Gallery's development and curatorial staff actively seek sources of outside funding for conservation from granting agencies, private foundations and individual contributions. At the Board level, the museum's Strategic Plan has as its first priority the care, interpretation and presentation of the permanent collection and is actively seeking special endowment funds to ensure these activities continue well into the future. The Chief Curator has worked closely with Senior Staff, the University of Rochester and outside consultants to develop a

comprehensive emergency preparedness and disaster plan. Funding was recently received from a local private foundation to purchase supplies for this initiative.

2. Project Design

- **Project goals and objectives.**

The primary objective of this project is the full conservation treatment and resulting documentation for *Trellised Garden with Animals* so that it is again fit for exhibition, research and education. Information learned during the process of conservation, documentation photography by the conservators throughout the course of treatment, and an extensive final treatment report will greatly enhance the material knowledge of the tapestry. This material knowledge is also a key component of curatorial research and educational materials and programming. Two major additional objectives that stem from this treatment include a) updated research by the curator on the tapestry that is then provided to educators and made accessible to the public through labeling and the website, and b) professional high-resolution digital photography suitable for publication. Objective a: The most recent scholarly opinions on the tapestry date from the 1980s; prior to that time, information was limited to basic iconography and workshop practices. The curator will update this research through correspondence and discussion with the conservator, who is a specialist in tapestries; updated publications, including those published in conjunction with recent major tapestry exhibitions; and correspondence and dialogue with colleagues who specialize in European tapestries. Relevant pre-, mid- and post-conservation information and photography will be provided to the education department, which will then be used by education curators for a variety of purposes, including docent training and the preparation of materials related to school tours. The lively, playful imagery of the tapestry is ideal for *Passport to the Past*, the museum's most popular school tour that focuses on ancient through Renaissance art as it relates to the 6th-grade Social Studies curriculum. While not comprehensive, the curator's initial research on the tapestry, when combined with the material knowledge gained from conservation, will also provide a foundation for future study. Objective b: The Textile Conservation Laboratory has worked extensively with the photographer John Taylor in New York City. The museum chose to have Mr. Taylor photograph our Flemish tapestry that was recently conserved at TCL; the results of his efforts, in part due to the appropriate space available at TCL and in part due to his familiarity with the process and specialized nature of tapestry photography, were of extraordinary quality. These high-resolution digital files are large enough for any print or web publication, providing clarity for details well beyond those that the eye can see when the tapestry is on display. This ability to zoom in closely is especially important for scholarly research and eventual use in a web-based or in-gallery technology-based object guide.

- **Museum's plan to ensure that normal museum operations are not disrupted.**

This project will cause no disruption of normal museum operations as all treatment will occur off-site at TCL. Research on key objects in the permanent collection is already a component of the curator's responsibilities. Although packing will occur on site, and the tapestry will be installed by curatorial department members and crew, these activities are part of normal museum activities.

- **Conditions to which the object is currently exposed and why it deserves merit at this time.**

As was the case in many museums, tapestries essential for education and exhibition were displayed for decades without rotation. *Trellised Garden with Animals* entered the collection in 1931, and, to our knowledge, was rarely taken off view until 1993, when the curator of European art at that time removed it from view based on its deteriorating condition, particularly its extreme dryness and a substantial number of slits and abrasions. (See Visual Documentation (attached as Supportingdocument.2), ill. #11-20 for detailed condition photographs.) At the present time, *Trellised Garden with Animals* is being

stored in excellent environmental conditions as well as new and appropriate housing until treatment is possible. During the 2003-2004 detailed condition survey, Ms Eidelheit trained museum curatorial and facilities staff in the proper handling of tapestries; at that time, all the Gallery's tapestries were rolled with polyester padding on new, acid free tubes with clean muslin fabric and Tyvec wrapping. The project deserves merit at this time because of its condition and high priority treatment status as discussed in section one of this application.

- **A description of the object that is the focus of the project.**

The focus of this project is the conservation of the Renaissance tapestry *Trellised Garden with Animals* (ill. #1 (Visual Documentation is attached as "Supportingdocument2")), which was made around 1565-1575 by the Brussels workshop of Wilhelm de Pannemaker. Pannemaker's maker's mark appears in the lower right gallon of the border (ill. #2). *Trellised Garden with Animals* is of extremely high quality and rich with fascinating and imaginative iconography; it is also of great historical significance to the history of 16th-century Brussels tapestries and workshops. Pannemaker himself was a member of an illustrious family of tapestry makers in Brussels, and tapestries from his workshop were commissioned by members of royal and noble families, including Charles V, Phillip II of Spain and the Cardinal de Granvella.

This large and elegant tapestry is finely woven of wool and silk and measures 12'4" x 15'3 3/4". The body of the tapestry shows a lush garden scene with fantastic animals, all enclosed in a trellised walk. The figures of a lion, lioness and their two cubs appear in the foreground (ill. #3). The arch-shaped trellises are heavily laden with grapevines and rest on marble columns elaborately decorated with grotesques; the two grotesques that adorn the front columns hold a mirror in one hand and a serpent in the other (ill. #4). The garden itself is divided by low walls and is filled with urns and lush foliage. The background shows a dense woodland area with deer. The border is of particular interest, as it was designed specifically for a set of tapestries depicting the story of Noah that were ordered from Pannemaker by King Philip II of Spain in 1563. This border, which Pannemaker used in several of his other tapestries, is called a "Genesis" or "Creation" border because it depicts verse I:28 from the Old Testament Book of Genesis, in which God says upon the creation of Adam and Eve: "and God blessed them, and God said unto them, Be fruitful, and multiply, and replenish the earth, and subdue it: and have dominion over the fish of the sea, and over the fowl of the air, and over every living thing that moveth upon the earth." The lower border, with its fantastic waterfowl and fish, one of which is ridden by a putto figure, represents the sea (ill. #6); the upper border depicts the sky and is filled with a wide variety of birds in flight (ill. #5). The two very creative side borders show the transition from sea to sky—in the lower area are serpents and small animals (ill. #7); in the middle, forested areas with hunters; and at the top, a castle and mountains reaching toward the sky (ill. #10). A floral wreath occupies the corners of the upper border (ill. #8). We know from other examples of Pannemaker tapestries that these wreaths were intended to hold the coats of arms of the owner.

- **Conservation methods in terms of efficiency, reliability, and safety.**

The proposed treatment is reliable and is based on the conservator's years of experience with tapestry conservation. The tapestry will be packed according to the conservator's recommendations and shipped to New York City via Northeast Transit, a regional fine arts transit company used frequently by the museum. *Trellised Garden with Animals* will be conserved at the Textile Conservation Laboratory (TCL) of the Cathedral of St. John the Divine in New York City. TCL, which was founded to conserve the Cathedral's own collection of Barberini and Mortlake tapestries but also accepts work from museum and private clients, is considered one of the top tapestry and textile conservation labs in the United States. Ms. Eidelheit is well familiar with *Trellised Garden with Animals* from her thorough examination

during the 2003-2004 detailed condition survey. TCL's equipment is state of the art; treatment, including wet cleaning, humidification, consolidation and relining, will take place on site by Ms Eidelheit and other experienced textile conservators under Ms Eidelheit's supervision.

- **Rationale for the proposed training curriculum, if applicable.**
Not applicable to this project.

3. Project Resources: Time, Personnel, Budget

- **Time allocated to complete project.**

The conservator and curator determined the timeframe for this project based on prior experience and the upcoming deadlines at TCL. Accordingly, the project is designed to last 18 months. The time actually allotted for treatment is about 14 months. The amount of time required by Gallery staff for their various activities is based on prior experience with all aspects of the project, including packing, shipping arrangements and installation. The project curator has allocated 160 hours for the travel and research-oriented components of the project, which includes time to compile an initial body of research on the tapestry, visit the conservation lab to discuss any final curatorial or treatment issues with the conservator and coordinate efforts with the education department. Though not the definitive word, this research, along with informal though informed opinions from tapestry scholars, will provide the basic historical and art historical information that will serve as the starting point for future study. This research activity will commence a few months after conservation has begun at TCL and new information is gathered through various stages of treatment. As seen on the Schedule of Completion, there is enough time bracketed for all activities at MAG that each can be reasonably incorporated into existing facilities and curatorial schedules as well as accommodate the complex schedules of TCL and the photographer. The photographer will need one full day at TCL and one day of processing in order to produce the high-resolution images required by the Gallery.

- **Key staff and consultants involved in the project, their qualifications, commitment to project activities, and how they will balance project responsibilities with other ongoing duties.**

Conservator

Marlene Eidelheit is the Director and Chief Textile Conservator of the Textile Conservation Laboratory of the Cathedral of St. John the Divine in New York City. She conducted the 2003-2004 IMLS-funded detailed condition survey on the Gallery's tapestry collection and is well familiar with *Trellised Garden with Animals*. Ms. Eidelheit and her staff are responsible for the conservation and restoration of the Cathedral's collection of Barberini and Mortlake tapestries as well the textiles of private and institutional clients, including the Metropolitan Museum of Art, the J.P. Getty Museum, and the Detroit Institute of Arts. At the Textile Conservation Laboratory, she oversees the laboratory and all conservation projects, including wet cleaning, mounting, dyeing, analysis, consulting, and surveys.

Memorial Art Gallery Key Project Personnel

Nancy Norwood has been the curator of European art at the Gallery since 2000. She was the project director for the 2003-2004 tapestry survey and is also the director of this treatment project. Ms Norwood will be responsible for communicating and meeting with the conservator to discuss issues involving treatment and progress; art historical research and materials; and working with the registrar, other curatorial staff and crew to install the tapestry on its return from TCL. Ms Norwood is well qualified for this research, as her area of academic specialization is the art and culture of late medieval and early modern Northern Europe, the chronological and geographic frame of the tapestry *Trellised Garden with*

Animals. As research on the permanent collection is a component of her curatorial work, this project will not pose a conflict with other responsibilities.

Monica Simpson has been the Gallery's Permanent Collections Registrar since 1995. She will be responsible for packing, shipping and the tapestry's installation. Ms Simpson worked closely with Ms Eidelheit during the entire tapestry survey, an experience that resulted in intensive training in the handling, care and storage of tapestries. As Permanent Collections Registrar, Ms Simpson is responsible for the coordination of all conservation treatment. She holds a degree in Museum Studies and is highly experienced in collections management and care. Ms Simpson's time on the project is limited to activities that are a normal part of her job responsibilities and will be factored into her schedule accordingly.

- **Budget allocation to accomplish project activities, including both the applicant's contributions and how the applicant will meet the required 1:1 match.**

As outlined in Ms Eidelheit's detailed cost estimate (attached here as Supportingdocument3), the cost of conserving *Trellised Garden with Animals* at TCL totals \$85,853.25; total project costs amount to \$113,991. We are requesting \$56,500 from IMLS to offset the actual conservation treatment; the Gallery has earmarked conservation funds that, along with salary support and indirect costs, will comprise the 1:1 match. In addition, the museum is and will continue to actively seeking funding specifically for tapestry conservation from private national and local foundations and individuals.

4. Impact

- **How the results will be assessed and their significance if known.**

Although no formal assessment is planned, the immediate success of this project will be realized through the material and art historical knowledge that is the natural result of such an intensive and thorough conservation treatment of any work of art. The final treatment report will be critical to such an assessment. A measurable impact will also be seen after the tapestry is seen and studied by tapestry scholars. At least equally important, however, will be the public response of visitors, docents and students to the heralded return of a much-loved tapestry to the Renaissance gallery after an absence of almost two decades.

- **Information about any intended products that will result from this project.**

The conservator will provide an extensive final treatment report as well as pre-, mid- and post-conservation documentation photography. Curatorial research will be compiled and provided to the education department for the development and production of docent training materials. Information about the conservation of the tapestry, new research and photography will be highlighted on the museum's website and an eventual publication. These products are particularly valuable as the Gallery moves toward in its Strategic Plan initiative to research and publish key objects in the permanent collection.

- **Variety of media and other means the project will use to reach audiences that would benefit from its work.**

The receipt of grant funding, completion of conservation and installation will be published in our semi-annual MAGazine as well as announced to the press via news releases and on our website. There will also be a prominent section on our website that is devoted to the conservation of and new research on *Trellised Garden with Animals*. This will include pre-, mid- and post conservation images along with information that explores conservation techniques and links to new art historical research.

Schedule of Completion: Conservation Treatment Project for the Renaissance tapestry *Trellised Garden with Animals*

| ACTIVITY | 2009 | | | | 2010 | | | | | |
|--|------------|------------|------------|------------|------------|------------|------------|------------|------------|--|
| | Jul Aug | Sep Oct | Nov Dec | Jan Feb | Mar Apr | May Jun | Jul Aug | Sep Oct | Nov Dec | |
| Notification of award; tapestry packed and shipped to TCL | _____ | | | | | | | | | |
| Conservation of tapestry | | _____ | _____ | _____ | _____ | _____ | _____ | _____ | | |
| Conservator writes final treatment report | | | | | | | | | _____ | |
| Curator researches tapestry, compiles information for education department | | | _____ | _____ | _____ | _____ | _____ | _____ | _____ | |
| Curator visits lab to examine tapestry and discuss issues regarding treatment w/ conservator | | | | | | _____ | | | | |
| Photography at TCL; Curator provides research information, new photography and comparative images to Education department for docent preparation and web inclusion; info to PR department to publicize project | | | | | | | | _____ | _____ | |
| Tapestry returned to MAG; installed in Renaissance gallery | | | | | | | | | _____ | |

BUDGET FORM: Section B, Summary Budget

| | \$ IMLS | \$ Cost Share | \$ TOTAL COSTS |
|--|--------------------|--------------------|---------------------|
| 1. Salaries and Wages | \$0.00 | \$3,883.00 | \$3,883.00 |
| 2. Fringe Benefits | \$0.00 | \$1,235.00 | \$1,235.00 |
| 3. Consultant Fees | \$56,500.00 | \$30,954.00 | \$87,454.00 |
| 4. Travel | \$0.00 | \$600.00 | \$600.00 |
| 5. Supplies and Materials | \$0.00 | \$100.00 | \$100.00 |
| 6. Services | \$0.00 | \$3,200.00 | \$3,200.00 |
| 7. Student Support | \$0.00 | \$0.00 | \$0.00 |
| 8. Other Costs | \$0.00 | \$0.00 | \$0.00 |
| TOTAL DIRECT COSTS (1-8) | \$56,500.00 | \$39,972.00 | \$96,472.00 |
| 9. Indirect Costs | \$0.00 | \$17,518.00 | \$17,518.00 |
| TOTAL COSTS (Direct and Indirect) | \$56,500.00 | \$57,490.00 | \$113,990.00 |

Project Funding for the Entire Grant Period

| | |
|---|--------------------|
| 1. Grant Funds Requested from IMLS | \$56,500.00 |
| 2. Cost Sharing: | |
| a. Applicant's Contribution | \$57,490.00 |
| b. Kind Contribution | \$0.00 |
| c. Other Federal Agencies* | \$0.00 |
| d. TOTAL COST SHARING | \$57,490.00 |
| 3. TOTAL PROJECT FUNDING (1+2d) | \$113,990.00 |
| Percentage of total project costs requested from IMLS | 50 % |

*If funding has been requested from another federal agency, indicate the agency's name:

1. STATEMENT OF NEED

Strategic Planning and Evaluation

During 2006, the New England Aquarium undertook three major planning and evaluative efforts: development of a five-year strategic action plan (launched January 2007), application for American Zoo and Aquarium accreditation (granted September 2006), and renewal application for American Association of Museums accreditation (self-study submitted 2006; site visit scheduled October 2007).

Through these processes, NEAq completed a rigorous self-evaluation that included programs, operations, exhibits, and facilities. The *Institutional Collection Plan* was revised (excerpts attached) as an important element of the accreditation applications. A new strategic document, *Action Plan 2007-2011* was created to guide the institution through the next five years. NEAq's Capital Plan was updated and incorporated into the Action Plan. It originally was developed in 2002 (excerpts attached), when consultants worked with staff to evaluate and prioritize capital needs. Although much has already been accomplished, this plan continues to guide improvements. Capital projects of all kinds—exhibit renovation, life support system upgrades, structural repairs—are now scheduled within the Action Plan.

Action Plan 2007-2011 confirms the institution's commitment to responsible care of its living collections. The Plan's first priority is centered on the exhibit pathway and includes all capital needs. Within this priority, one objective is to "implement an integrated capital improvement plan." The first stated assumption for all capital improvements is that NEAq will "Prioritize infrastructure improvements affecting environmental quality needed to maintain the health of the animal collection." (See attached excerpt from Action Plan)

Institutional Commitment to Capital Improvement and Collection Conservation

The New England Aquarium (NEAq) is, by its nature, a capital-intensive institution. Now nearly 40 years old, it is in need of consistent modernization, repairs, and upgrades. Each year's operating budget includes funding for capital projects, and when a surplus is achieved—as has been true each year since 2003—additional funds are added to these efforts. We seek further funding from individuals, corporations, and foundations. Between 2004 and the present, NEAq has invested more than \$7 million into building modernization projects. While many of these projects concern facilities and systems—such as electrical upgrades and structural repairs—high priority is given to projects that concern the health and presentation of our valuable living collections.

Major capital projects during the past three years have included a major electrical upgrade; installation of a new cooling tower, sump pump, and soil pipe; window replacement; new exhibit piping; concrete repairs throughout the building; re-design and construction of our Gulf of Maine exhibit; and upgrades to life support at various exhibit bays. We recently received a grant to replace filters for our largest two exhibits, the Caribbean Reef and Penguin Tray, which were our top priority in terms of life support. We will complete that project in the spring of 2008. An IMLS Conservation Project Support grant in 2000 allowed NEAq to make improvements to the Caribbean Reef's aeration chamber in a successful effort to improve water quality and clarity. Replacing the filters will further improve conservation of that collection.

Another project currently underway is a complete upgrade to the building's air conditioning system. When the Aquarium opened in 1969, it was anticipated that 600,000 people would visit annually. We now regularly exceed twice that number, yet still use the original air conditioning system. This is particularly challenging in summer, when peak visitation coincides with high heat and humidity. The rack chiller cannot always hold its set point and temperatures creep up. A grant from the Harold Whitworth Pierce Charitable Trust has allowed us to begin planning and preparation for replacement of the system. This IMLS proposal is directly tied to that effort: the same water we use for air conditioning is used for chilling in exhibits. During the summer, the temperatures in the tanks climb, often past their target temperatures, threatening the safety of our living exhibits.

Conservation Need: environmental improvements in chilled-water exhibits

The New England Aquarium presents aquatic animals from around the globe in exhibits that simulate the species' natural habitats. Different temperatures are maintained in various exhibits, from the Caribbean Reef to

our Gulf of Maine Boulder Reef. The most challenging temperatures to maintain are in the cold-water galleries. (We use the term “gallery” to refer to a series of related and adjacent exhibit tanks.)

When the Aquarium opened in 1969, the chilled water system was state of the art, with a 160-ton rack chiller providing air conditioning and chilled water for the cold-water exhibits. The chilled water was delivered to each gallery through cast iron piping and booster pumps pushed the water through each tank’s individual heat exchanger. The chilled water would pass through these ‘carbate’ heat exchangers, blocks of carbate material immersed either in the exhibits themselves or in a reservoir adjacent to the exhibits. The exchangers cooled the exhibit water through immersion. Over time, the cast iron piping delivering the chilled water became occluded and the carbate exchangers could not keep up with the chilling demands. The carbate exchangers required additional floor space or if placed directly into the exhibit, took up valuable exhibit area. Because of their age, it also became very difficult to service the exchangers and hard to find parts if they needed repair.

Because of the inefficiency and inadequacy of the original system, the Aquarium has taken steps toward improving and updating it. The old cast iron piping has been replaced with PVC pipe and has been insulated. Most of the booster pumps—which used large amounts of electricity—have been removed and new, more efficient circulation pumps have been installed on the main chilled water line. In addition, we have replaced 12 carbate heat exchangers with titanium plate & frame heat exchangers. We also installed several flow meters to improve our ability to measure and adjust the water flow through the new heat exchangers.

Efforts to date have improved conditions for the animals, reduced staff time spent on troubleshooting, and freed up space previously used for the large carbate exchangers. Nevertheless, we are still experiencing elevated temperatures in many of the tanks during the hot summer months. (See attachment, which shows optimal temperatures versus actual temperatures). Because monitoring temperature is difficult with the current system, we are often responding to increased temperature, rather than preventing it. Portable chillers can be brought online for tanks in emergency situations. They are effective in bringing down the water temperature, but we only have a limited number and cannot always service all of the exhibits with rising temperatures. In addition, these chillers take up valuable space behind the galleries and draw large amounts of electricity.

There are three main consequences to rising temperatures. First, and most important, is that above-normal temperatures can stress all of the animals in our cold-water collections, adversely affecting their health. High temperatures are especially dangerous for invertebrates, such as anemones, crabs, and lobsters. We have experienced some mortality among these animals. Second, responding to temperature increases, making adjustments, repairing old and outdated equipment, and caring for affected animals are all time-consuming and stressful for staff. Finally, the new equipment is much more energy efficient than the old system and the Aquarium is committed to both limiting its carbon output and reducing energy expenses. Completing the upgrade of the chilled water system will address all three of these issues.

How the project meets the highest conservation needs

NEAq’s highest conservation need is to maintain the health and well-being of its live animal collection. Efficient, modern life support systems are critical to maintaining optimal environmental quality in aquatic exhibits and the health of the animals within. Continuing to upgrade the life support system and replacing outdated equipment will support the Aquarium’s highest conservation need and will ensure that the animals are provided with the best possible environment. As some of the animals in our cold-water exhibits are showing signs of stress—with some mortality attributed to rising temperatures—it is vital we that address the situation.

2. PROJECT DESIGN

Goals

The New England Aquarium will improve environmental conditions for the living collections in its cold-water exhibits through upgraded heat exchangers and installation of monitoring equipment. This environmental improvement project will allow the Aquarium to achieve the following goals:

- To maintain target temperatures more consistently in cold-water exhibits;
- To reduce stress on the animals caused by tank temperatures above optimal ranges;
- To decrease staff time and attention spent monitoring and addressing temperature issues during the warm summer months; and
- To eliminate the need for emergency chillers, thereby reducing electricity use.

Objectives

To achieve the above goals, the New England Aquarium will continue making improvements to the chilled water system. We will replace the eight remaining carbate heat exchangers with plate & frame heat exchangers and will install monitoring equipment on exhibit and cold-water piping. This equipment will be critical to ensure the system is working properly, allowing staff to monitor each exhibit more easily and make adjustments as needed.

Replace carbate heat exchangers with plate and frame exchangers: There are eight remaining carbate exchangers: two in the Freshwater Gallery and six in the Cold Marine Gallery. The carbate exchanger system is outdated, difficult to maintain, and takes up valuable floor space. By contrast, plate and frame heat exchangers are extremely efficient in chilling water, take up very little space, can be mounted anywhere (on the ceiling or wall), are easy to service, and are modular—plates can be added or removed if necessary. (See photos and equipment specifications)

Plate and frame heat exchangers are a pack of corrugated metal plates with portholes for the passage of two fluids, between which heat transfer takes place. The plates form channels so that the two media (in this case, water circulating from the exhibits and chilled water from the Aquarium's rack chiller) flow through alternate channels. There is no leakage or intermixing of the waters. The corrugation provides a passage between the plates, supports the plate against each other, and creates a strong turbulence resulting in maximum heat transfer efficiency.

Install flow meters: We will install flowmeters to measure water flow on both the exhibit-water side and the chilled-water side of each heat exchanger. This equipment will facilitate the monitoring and adjusting of exhibit temperature. Staff Aquarists will be able to optimize the chilling process by increasing or decreasing flow through the plate and frame exchangers.

There are currently 7 flowmeters and we will install another 21. Until all exchangers have flowmeters, our information is imperfect: we do not know how an adjustment at one exhibit will affect overall flow through the system and, thus, alter the temperatures in other exhibits.

Install Temperature Gauges: Temperature gauges in various key locations along the chilled water system also will help with temperature adjustment. The temperature gauges provide important information on the efficiency of the whole cooling system. To maintain target exhibit temperature most effectively, staff must know the temperature of the chilled water so that they can adjust flow to obtain optimal temperatures.

Install Circulating Pumps: We will install eight small, low-energy pumps to circulate exhibit water to and from each new heat exchanger.

Activities:

NEAq staff members installed the eight plate and frame exchangers currently in service. These same staff members will install the exchangers and redirect the water flow from the existing carbate exchangers.

- The Project Manager for this initiative, Barbara Bailey, will order the required equipment. She will work with vendors to ensure correct specifications. She will also monitor results of the installations and track the budget.

- NEAq Mechanics will make mounting frames for the heat exchangers, install the chilled-water piping and connect the plate and frame heat exchangers to the main system. They will also install the flowmeters on the chilled-water side of the system.
- Aquarists will connect the new heat exchangers to the exhibits and holding tanks. They will run and connect the plumbing, install circulating pumps, and attach flowmeters to the exhibit-water side of the system. They will also dismantle and remove existing carbate heat exchanger. This includes two that are submerged in reservoirs below two holding tank systems. Removal of these will be more challenging. The holding tanks will have to be emptied and the animals temporarily moved.
- After each new exchanger is brought online, an Aquarist will closely monitor the exhibit's temperature to ensure all is in working order.

Effect on normal museum operations

All of the work proposed here will take place behind the scenes, out of view of visitors. Installing the equipment will not disrupt the collections in any way. Exhibits will remain connected to the existing heat exchangers until the new equipment is fully installed. We will connect the chilled water lines first and then, finally, the exhibit lines. This transfer will be quick enough that it will not adversely affect temperatures, and we will monitor exhibit temperature to ensure minimal impact. If a problem occurs, we will have the emergency chiller equipment on hand.

Description of the collection

The majority of exhibits that will benefit from the proposed upgrades are in the “Northern Waters of the World” gallery, known internally as the Cold Marine Gallery. We also propose to upgrade two exhibits in our Freshwater Gallery, as described below, as well as related holding areas for all described exhibit animals.

The goal of the *Northern Waters of the World* gallery is to educate the public about cold-water biodiversity and habitats. The gallery displays both New England (“East Coast/Gulf of Maine”) and Pacific Northwest (“West Coast”) marine habitats.

East Coast/Gulf of Maine exhibits include:

- **Boulder Reef Community.** This 3,400-gallon exhibit recreates the bolder-strewn bottom habitat found throughout the Stellwagen Bank National Marine Sanctuary, and elsewhere in the Gulf of Maine. Signature species include Acadian redfish (*Sebastes fasciatus*), haddock (*Melanogrammus aeglefinus*), Atlantic wolfish (*Anarhichas lupus*), red deep-sea crab (*Geryon quinquedens*), stalked tunicate (*Boltenia ovifera*), and northern red anemone (*Urticina felina*).
- **Sandy Bottom Community.** This 2,500-gallon exhibit features 20 species that frequent gravel- or sandy-bottomed habitats. This exhibit displays such food fish as Atlantic cod (*Gadus morhua*), pollock (*Pollachius virens*), Atlantic halibut (*Hippoglossus hippoglossoides*), winter flounder (*Pseudopleuronectes americanus*), and sea scallop (*Placopecten magellanicus*). Other species include spiny dogfish (*Squalus acanthias*) and chain dogfish (*Scyliorhinus retifer*). There are two Conservation Program Species in this exhibit: Barn door skate (*Dipturus laevis* – IUCN Red List) and Atlantic sturgeon (*Acipenser oxyrinchus* – CITES listed).
- **Isles of Shoals.** The animals and habitat in this 560-gallon exhibit illustrate a characteristic common to many bottom dwellers—camouflage. The 23 species on display include American lobster (*Homarus americanus*), lumpfish (*Cyclopterus lumpus*), ocean pout (*Zoarces americanus*), and smooth sunstar (*Solaster endeca*).
- **Eastport Harbor.** This 560-gallon exhibit re-creates a habitat as would be found in a New England harbor such as Eastport, Maine. It is representative of the Gulf of Maine's high-current, nutrient-rich, consistently cold waters. The 35 species displayed include Acadian redfish (*Sebastes fasciatus*), ocean pout (*Zoarces americanus*), rock gunnel (*Pholis gunnellus*) and numerous invertebrates such as hermit crabs, sea cucumbers, seastars, red soft coral (*Gersemia rubiformis*), and scarlet psolus (*Psolus fabricii*).

- The 560-gallon Goosefish exhibit features this important food fish species in the Gulf of Maine. The goosefish (*Lophius americanus*) has an unusual appearance and unique morphological adaptation (fishing lure) that make it appealing to visitors.

West coast/Pacific Northwest exhibits include:

- Pacific Coast Tidepool. This 560-gallon exhibit features the high-energy dynamic characteristics of exposed tidepools. An artificial “wave” crashes into the exhibit approximately once a minute. Among the 11 species displayed are sea stars, sea urchins, opaleye (*Girella nigricans*), striped surfperch (*Embiotoca lateralis*), and giant green anemones (*Anthopleura xanthogrammica*), which carpet the bottom of the exhibit. (See Photo)
- Pacific Giant Octopus. The Pacific octopus (*Octopus dofleini*) residing in this 810-gallon exhibit has extremely high visitor appeal. The exhibit includes 19 other species, such as anemones and sea stars. (See Photo)
- Pacific Northwest. This 560-gallon exhibit features a West Coast boulder reef, a complex habitat. The 76 species include invertebrates such as vermilion seastar (*Mediaster aequalis*), orange sea pen (*Ptilosarcus gurneyi*), red sea urchin (*Strongylocentrotus franciscanus*), and feather duster worm (*Eudistylia vancouveri*). Fish displayed include blackeye gobies (*Coryphopterus nicholsii*), black surfperch (*Embiotoca jacksoni*), painted greenling (*Oxylebius pictus*), and grunt sculpin (*Rhamphocottus richardsonii*). (See Photo)

Also affected will be two freshwater exhibits requiring cooled water, both of illustrating New England river systems:

- Trout Stream is a 250-gallon, single-species exhibit housing New England brook trout (*Salvelinus fontinalis*). Native to New England, these trout are an important recreational fish and have high recognition among visitors. In the wild, they face numerous conservation and habitat issues, including introduced trout species and habitat destruction (e.g. dams).
- Atlantic Salmon. This 3,100-gallon exhibit houses Atlantic salmon (*Salmo salar*) and other New England river species. This local watershed display communicates several environmental issues and displays species of economic, recreational, regional, and ecological note. Atlantic salmon is a Conservation Program Species (State of Massachusetts listed).

We include animal holding tanks in our proposed project, as maintaining optimal temperature is also critical in these environments. Holding tanks are used to quarantine animals that will be introduced into exhibits, to hold animals being treated medically, and for collections management—such as when animals are being moved from one exhibit to another, or when an exhibit is being cleaned or renovated.

3. PROJECT RESOURCES

Time

This project will begin on or soon after May 1, 2008. If funded, we will finalize specifications and contact our suppliers to order the equipment. The plate and frame heat exchangers are custom-built and may take one to two months to arrive. In the meantime, we will order the other equipment and supplies.

The mechanics will install the temperature gauges soon after they arrive. They will also begin installing flow meters on the chilled-water side of existing plate and frame exchangers. Working with the husbandry staff, mechanics will identify where the new exchangers will go, and then they can begin fabricating the hanging frames for these exchangers. All of this work will be completed by the end of June, when we expect to have received the new heat exchangers. At this time, we should already begin to see an improvement. The additional flowmeters and temperature gauges will allow Aquarists more control over exhibit temperature.

After the plate and frame exchangers arrive, we will schedule their installation over the following two and a half months—most likely between the first of July and the middle of September. The exhibits with the most critical

need will be scheduled first, so that they are online for the peak heat of summer. We will prioritize based on the collections themselves, meaning that those with more invertebrates and those experiencing the highest temperatures in the past will be converted first.

Personnel

New England Aquarium staff members will complete all activities in this conservation project. Staff members from the Facilities and Animal Husbandry departments will work together to ensure the equipment is properly installed and that the results are monitored. These departments work together regularly on equipment maintenance, repair, and upgrades, and the tasks required for this project are within the normal duties of all involved. Staff contribution of time is counted toward the Aquarium's cost share.

John Dayton, Director of Animal Husbandry, will oversee this project and will supervise the Aquarists. Mr. Dayton has over 30 years of experience managing complex aquarium systems. He is responsible for the proper husbandry and management of all NEAq live animal collections and exhibits. His time commitment should be minimal, estimated at 3 hours.

Steve Smith, Facilities Manager, will be responsible for oversight of the facilities staff working on this project. Mr. Smith is responsible for upgrades and renovations throughout the building and this project is within his normal duties. He will contribute 3.5 hours to the project. Mr. Smith has been in this position for 23 years. His normal responsibilities include oversight of mechanics, electricians, and carpentry; maintaining heating, ventilation, and air conditioning systems; and maintaining the process chiller loop that cools exhibits throughout the Aquarium.

Barbara Bailey, Project Manager and Office Supervisor, will work with vendors to ensure correct specifications for the equipment. She will coordinate with facilities staff to order equipment and schedule installation, will track the budget, and will monitor the work and the results. Ms. Bailey will contribute 45 hours to this project. Ms. Bailey has worked at the New England Aquarium for 22 years, 14 in her current position. She has managed many similar projects.

Staff Mechanics will contribute approximately 112 hours to this project. They will make mounting frames for the heat exchangers. They will mount the exchangers and connect them to the main system, installing PVC piping for chilled water. They will also install flowmeters on the chilled-water side of the system. **Al Munn**, Lead Mechanic, will supervise this work and participate in the installation process directly. He will contribute an additional 112 hours. Staff mechanics are responsible for the Aquarium's equipment upgrades and maintenance. The tasks required for this project are within the normal duties of these staff members. Mr. Munn has worked for the Aquarium for 11 years, 5 as Lead Mechanic, and has overseen many similar projects.

Staff Aquarists will be responsible for connecting the heat exchangers to the exhibits and holding tanks. They will run and connect the plumbing and install circulating pumps. They will also attach flowmeters to the exhibit-water side of each system. **Michael Kelleher**, Assistant Curator, will directly supervise the work performed by the Aquarists and make decisions regarding pipe and equipment location. He will spend 18 hours on this work. Mr. Kelleher has worked for the Aquarium for 27 years, serving as Assistant Curator since 2004. He has participated in previous installation and oversight of new equipment in the cold marine gallery.

Budget

The total budget for this project is \$85,746 and we are requesting \$42,120 from IMLS. This request is to cover equipment and supplies. (See attached specs and price lists for flowmeter, pump, and temperature gauges)

NEAq will match this grant with a combination of staff time, overhead, and cash. Staff contribution accounts for \$11,523 of the budgeted cost share, including fringe benefits. Our federally negotiated indirect cost rate is 39.1% for exhibit-related work. This has been applied to total direct costs. (Our rate stipulates that equipment cost more than \$5,000 per piece to be excluded from the overhead calculation.) Our contribution through overhead is \$24,103. In addition, we will cover \$8,000 of the cost of equipment and supplies through other

funding. Each year since 1970, the Edwin S. Webster Foundation has provided grants to the Aquarium, with the past five going toward “critical capital” projects—important maintenance and upgrades. We will plan to attribute \$8,000 of this grant (expected in December 2007) toward this project.

If for some reason we do not receive a grant from the Webster Foundation, we will use another source. The Aquarium is currently raising funds from its Trustees, Overseers and closest circle of donors to support the goals of the Action Plan described above. For this cost share, we can either use funds already raised for the Action Plan, or use the IMLS grant as a challenge for a specific donor. In either case, we are fully confident that we will be able to raise the \$8,000 needed.

4. IMPACT

Assessing Outcomes

The primary outcome of this project will be healthier animals. We hope to reduce stress that these animals, particularly invertebrates, can experience with elevated temperatures. Although we cannot be 100% sure that mortality has been caused by rising temperatures, we will track mortality in these exhibits during the summer and compare with past years. We will also monitor the health of all of the animals in these exhibits to see if there are fewer health issues than in past years.

This result is dependent on another outcome, achieving and maintaining optimal temperature in each of the exhibits that use chilled water. We will assess this by continuing to record temperatures in these exhibits, comparing them with both optimal temperatures and average temperatures from past years (see attached). In July of 2007, 67% of the tanks using chilled water in the Cold Marine Gallery and Freshwater Gallery had average temperatures above optimal range. Of these, temperatures exceeded optimal by, on average, 2.85 degrees. We will assess our success against this benchmark.

Another outcome is the reduction of staff time and attention spent trying to maintain optimal temperatures. Primarily, we will track how often—if at all—we have to use the portable emergency chillers. We will track this during summer 2009, the first summer when all of the new equipment will be in operation.

To achieve these outcomes, we must accomplish the activities described in this proposal. We will measure the following results:

- Successfully installing all of the necessary equipment;
- Ensuring that staff can operate equipment, maintaining optimal flow to achieve target temperatures; and
- Remaining on schedule—completing project by the end of November of 2008.

Benefits to the Aquarium and its visitors

Optimal temperatures, if consistently maintained, will benefit the collections, Aquarium staff, and visitors. Clearly, the primary benefit is to the animals themselves. Another important result will be a reduction of staff time and effort. In addition to maintaining old equipment and responding to emergencies, staff are responsible for collecting some of the animals for the exhibits. The invertebrates most affected by rising temperatures are not endangered animals, but we do strive to collect as few animals as possible so that we have minimal impact on their wild populations, and because collecting is time consuming and often difficult in local waters.

Visitors may not notice the health of an anemone or crab, but the exhibits experiencing high temperatures can look less hearty, and stressed animals can be less active. For example, anemones appear much less robust in these conditions and, with their mortality, some tanks are more sparsely populated. We expect the exhibits in question to be more vibrant during the summer because of this conservation project.

New England Aquarium

Chilled Water System Improvement Project - Timeline

Project Week 1 Start Date: On or about May 1, 2008

| TASKS | Prelim. | Week 1 | Week 2 | Week 3 | Week 4 | Week 5 | Week 6 | Week 7 | Week 8 | Week 9 | Week 10 | Week 11 | Week 12 | Week 13 | Week 14 | Week 15 | Week 16 | Week 17 | Week 18 | Week 19 | Week 20 | Week 21 | Week 22 | Post | |
|---|----------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|------|--|
| Design & Costing | | | | | | | | | | | | | | | | | | | | | | | | | |
| Preliminary system design - sizing of heat exchangers | complete | | | | | | | | | | | | | | | | | | | | | | | | |
| System pricing - heat exchangers/flowmeters/equipment | complete | | | | | | | | | | | | | | | | | | | | | | | | |
| Obtain baseline system data: flow rates/temps/etc. | complete | | | | | | | | | | | | | | | | | | | | | | | | |
| Develop equipment/materials lists | complete | | | | | | | | | | | | | | | | | | | | | | | | |
| Finalize specifications and review | | | | | | | | | | | | | | | | | | | | | | | | | |
| Order equipment/materials | | | | | | | | | | | | | | | | | | | | | | | | | |
| Receive flowmeter/plumbing supplies/all other equipment | | | | | | | | | | | | | | | | | | | | | | | | | |
| Receive heat exchangers | | | | | | | | | | | | | | | | | | | | | | | | | |
| Installation | | | | | | | | | | | | | | | | | | | | | | | | | |
| Install flowmeters, temp gauges | | | | | | | | | | | | | | | | | | | | | | | | | |
| Fabricate hanging frames for heat exchangers | | | | | | | | | | | | | | | | | | | | | | | | | |
| Break down C6/7 holding to set up for new equipment | | | | | | | | | | | | | | | | | | | | | | | | | |
| Install heat exchangers and make plumbing connections | | | | | | | | | | | | | | | | | | | | | | | | | |
| Testing and Evaluation | | | | | | | | | | | | | | | | | | | | | | | | | |
| Adjust system to achieve design flow rates | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monitor system operation for potential problems | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monitor water temperatures for potential problems | | | | | | | | | | | | | | | | | | | | | | | | | |
| Evaluate effectiveness in meeting project objectives | | | | | | | | | | | | | | | | | | | | | | | | | |
| Final Report | | | | | | | | | | | | | | | | | | | | | | | | | |

Date: October 1, 2007

Author: John Dayton, Director Animal Husbandry

BUDGET FORM - PAGE FOUR

Section B: Summary Budget

| | \$ IMLS | \$ Cost Share | \$ TOTAL COSTS |
|--|------------------|------------------|------------------|
| 1. Salaries and Wages | 0.00 | 9,020.00 | 9,020.00 |
| 2. Fringe Benefits | 0.00 | 2,503.00 | 2,503.00 |
| 3. Consultant Fees | 0.00 | 0.00 | 0.00 |
| 4. Travel | 0.00 | 0.00 | 0.00 |
| 5. Supplies and Materials | 42,120.00 | 8,000.00 | 50,120.00 |
| 6. Services | 0.00 | 0.00 | 0.00 |
| 7. Student Support | 0.00 | 0.00 | 0.00 |
| 8. Other Costs | 0.00 | 0.00 | 0.00 |
| TOTAL DIRECT COSTS (1–8) | 42,120.00 | 19,523.00 | 61,643.00 |
| 9. Indirect Costs | 0.00 | 24,103.00 | 24,103.00 |
| TOTAL COSTS (Direct and Indirect) | 42,120.00 | 43,626.00 | 85,746.00 |

Project Funding for the Entire Grant Period

| | |
|--------------------------------------|-----------|
| 1. Grant Funds Requested from IMLS | 42,120.00 |
| 2. Cost Sharing: | |
| a. Cash Contribution | 8,000.00 |
| b. In-Kind Contribution | 11,523.50 |
| c. Other Federal Agencies* | 0.00 |
| d. TOTAL COST SHARING | 19,523.50 |
| 3. TOTAL PROJECT FUNDING (1+2d) | 61,643.50 |
| % of Total Costs Requested from IMLS | 49.12% |

* If funding has been requested from another federal agency, indicate the agency's name:

1. Statement of Need

The goal of this project is to improve the environmental conditions under which a portion of the Native American basket and textile collections of the Museum of Northern Arizona (MNA) are housed. MNA proposes to do this through the purchase of 24 Delta Design cabinets for installation on compactor shelving in the new Collection Center at MNA, for which construction is scheduled to begin in the Fall of 2007. Improvement of environmental conditions is identified as the top priority preservation need in the MNA's 2005 Preservation Plan and in the Collections section of the MNA 2006-2011 Institutional Plan (see attachments).

MNA has successfully sought funds to purchase cabinets and compactors for other parts of the collection that also will be moved to the new Center. In November 2006 MNA received a Save America's Treasures (SAT) grant to purchase cabinetry for the archaeology holdings that will be placed in the new Center. In July 2007 MNA received \$575,000 from the NEH Stabilization program to purchase compactors and the majority of cabinets required for the ethnology collections. The NEH-funded project has been declared a "We the People Project", and includes ongoing consultation with MNA's conservation consultant (Matthew Crawford) as well as the hiring of a Move Coordinator, who will assist in moving collections to the new Center. The basket and textile cabinets, which are the focus of this IMLS-CP proposal, are the last equipment required by MNA to complete the re-housing of 1st and 2nd priority anthropology holdings. First priority collections consist of all that are organic (katsina dolls, textiles, baskets, etc.) or highly sensitive to the environment such as archives (maps, documents, images, sound recordings, etc.). Second priority collections include inorganic objects which may have been reconstructed or stabilized in the past with environmentally sensitive adhesives or consolidants.

A portion (1,769) of the basket and textile collections are housed in Steel Fixture cabinetry and these museum quality cabinets will be moved from current storage in the Anthropology Building into the new Center. However, the remaining 1,122 baskets and textiles, which are the focus of this grant, are stacked and/or folded in wood or wood and metal cases. For two reasons, these non-mobile cases will not be moved into the Collection Center. First, they are not museum quality and second, the Center floor plan is designed to have limited space for non-mobile storage units. For this reason the collections within these old cabinets must remain in the Anthropology Building (see attached floor plan), which lacks state-of-the-art environmental controls, until new museum quality cabinetry can be purchased for installation on compactors.

MNA has known that a significant effort was required to improve the environment and preservation of its collections since the first surveys were conducted in the late 1980s. Beginning in 1988, consultants have consistently advised MNA that its collection facilities are substandard and inadequate (1988 MAP II by Lynn Denton and 2004 CMAP by Jane MacKnight; 1989 IMS Conservation Assessment by Jeanne Brako (attached); 1990 IMS Environmental Assessment by Steven Weintraub (attached), 1999 Archaeology Condition Assessment by Matthew Crawford). As Jeanne Brako noted "It is recommended the Anthropology Department be considered for rehousing in a new, larger multi-purpose facility. This is the only realistic way to significantly improve collections facilities for this important collection." It was also noted that collection areas were crowded, that cabinets were substandard, and that there were too few collection staff to care for collections.

Care of collections and the construction of a new collection center were made a top priority when a new MNA administration and board came into place in 2004. Previous to 2004, MNA's Collections Department made whatever efforts it could to improve care of collections and many of the recommendations put forth by museum and conservation surveys have been implemented. Besides the surveys mentioned above, MNA conducted IMS funded IPM (Wendy Jessup) and fire protection (Joseph Chapman) surveys in 1991. In 1987 an NSF grant purchased 15 roll storage Steel Fixture cabinets to rehouse Navajo textiles. These textiles were re-documented under an NEH grant (1988) and photo-documented under a Marshall Fund of Arizona grant (1989). A 2004/05 Museum Loan Network grant completed the photography and documentation of 200 additional Navajo textiles. MNA computerized its anthropology holdings into the Argus computer system under an NSF grant (1990). In addition, environmental monitoring was reinstated in Collections in 2001 with upgraded ACR data loggers and participation in the IPI's assessment of the PEM monitor and Climate Notebook software.

These early efforts to improve collection preservation were hampered by two factors. One was the lack of a preservation plan to guide collection efforts. MNA's Preservation Plan was created in 2003 (NEH grant with Jude Southward, consultant conservator) using recommendations from earlier museum and conservation reports. A second factor that limited progress was the previous administration and board's focus on issues that

lay outside the realm of collections. Then in 2004, with the onset of a new administration and board, long-term collections preservation was identified as a top institutional priority, along with endowment building. In 2004 the current administration sought and obtained \$3 million in private funding for the planning and construction of a new collection center. This new facility will address one of the top long-term conservation needs underscored by the 1989-1991 conservation surveys and supported by the 1988 and 2004 MAP II surveys. With the new Preservation Plan MNA in place, MNA completed a CMAP (2004) and was awarded an NEH grant (2004) to rehouse the Native American jewelry collection in a Delta Design cabinet. In 2005 MNA received an IMLS-CP grant to resolve emergency and top priority preservation needs of the fluid preserved collections. In addition, the award of NAGPRA (2005, 2006, 2007) and IMLS-MFA (2005) grants have increased collection staff levels so that the Museum can gain intellectual and physical control over collections in preparation for a move to the new Center in 2007-08.

As an indicator of MNA's current commitment to collections management the private funding that MNA received for the construction of a new collection facility came in response to the current administration's public expression of the urgent need to correct adverse conditions in collections. The \$3 million is restricted to the construction of a new climate-controlled, highly secure repository which has been registered with the US Green Bldg council for LEED Certification (Leadership in Energy and Environmental Design). The Center is scheduled to be completed in 2008 to meet a minimum of a LEED standard of Silver. MNA staff and board members spent 2005 preparing a master plan of MNA's 200 plus acre campus under the guidance of the Center's architectural firm, Roberts/Jones Associates, Inc. The goal was to form a 25-year plan for campus development and to determine a site for the new Center (see site and floor plans). Planning was essential since three structures on MNA grounds-McMillan Homestead, Coyote Range, and Akin Barn-are listed as nationally significant in the Federal Register and several other historic structures are eligible for listing. During the second phase of planning MNA, the architect, and conservation consultant (Matthew Crawford) developed environmental parameters in line with green building design. MNA also worked with Rick Cronenberger (NPS Architect, Denver, CO) on the development of storage, space, and environmental parameters. MNA realizes that this first construction phase, even with compactor capability, will not house all of the collections at the Museum, so prioritizing collections was important in the early planning phases for this new construction (see space memos).

With construction funding secured, MNA has turned its attention to addressing the next top priority preservation needs, specifically the preservation threat posed by inadequate cabinetry and an insufficient level of collection staff to implement collection improvements. MNA's 2003 Preservation Plan was revised in 2005 to address the opportunities presented by the \$3 million building construction funds and the need to focus on cabinetry replacement and expansion of collection staff. The IMLS-MFA-grant-funded Registrar and Collections Assistant and the NPS NAGPRA-grant-funded NAGPRA Specialist have become permanent staff in the Collections Department. To help in planning, MNA received an IMLS-CP grant in 2007 to bring in conservators to conduct detailed condition surveys of the textile and katsina doll collections. The Southwestern Foundation funded a project (June 2007) to hire a consultant archivist to create storage parameters and organization system for MNA archives once they are consolidated in the new Center.

The activities described above demonstrate that MNA is committed to collection preservation. As outlined in its 2004 mission and vision statement, which underscores preservation and conservation as core goals and tenets of the institution, MNA's Board is committed to the preservation of collections under their care. Although faced with difficult financial challenges in recent years, MNA has devoted what financial resources it could towards improving collections care. The number of projects completed in the past year, which is documented in the Executive Summary of the Preservation Plan, is an indication of MNA's dedication to collection preservation. MNA will be devoting staff time and almost half of the supplies needed for this project.

2. Project Design

The goal of this project is to ensure the preservation of 1,122 Navajo, Hopi, and Southwestern cultural baskets and textiles. The objective is to improve the physical storage of these textiles while also providing safe access by staff, practitioners, and researchers. This goal and this objective will be achieved through the purchase of 24 Delta Design cabinets for installation on compactor shelving in MNA's new Collection Center and consultation between MNA, Textile and Object Conservators, and a Hopi cultural traditional practitioner.

The Collections Department is directly responsible for the care and management of MNA's collections. The activities and tasks described below fall directly in line with the Department's mandate which was given new impetus when MNA secured the \$3 million for the construction of the new collections facility. The Collections Department oversees environmental monitoring, IPM, and housekeeping in collections and is responsible for the daily management of collections. This staff will be directly involved in all aspects of this project, from guidance to implementation. This project is a top priority activity for 2008-2010 on which MNA Collection staff will be focused, which is the move of 1st and 2nd priority collections into the new Collection Center. During this time, and in consultation with the NEH supported Move Coordinator and conservation consultants, collection activities (exhibits, loans, research visits) will be reduced or temporarily cease depending upon staff availability, collection involved, and the state of moving and re-housing activities.

The scope of MNA's collections is unmatched on the Colorado Plateau. Widely recognized as a nationally significant resource, they consist of over 650,000 cataloged objects and specimens in archaeology, ethnology, fine art, history and memorabilia, botany, zoology, geology, and paleontology, as well as extensive archive, photo-archive, and library holdings. Together, MNA's collections tell the story of the Plateau's peoples and natural environment and serve as the basis for research, public programs and exhibits both at MNA and at other institutions that study and interpret this region.

The 1,122 baskets and textiles that are the focus of this project are part of a larger Southwestern Native American basketry (1,399) and textile (1,492) collections that total 2,891 objects. The basket collection is largely composed of pieces by Hopi, Navajo, Paiute, and Apache weavers with smaller holdings from Tohono O'odham, Pima, other northern and southern Arizona tribes, and a small number from California groups. These collections are tapped for exhibits and research projects. In recent years MNA has received increasing requests from Hopi and Havasupai practitioners to access collections for researching early basketry making techniques.

A total of 977 baskets are small or shallow and are stored in 20 half size Steel Fixture metal cabinets that were purchased in 1980. These Steel Fixture cabinets will be moved into the new Collection Center. The remaining 422 baskets are larger or oversize and are stored in a fixed wood and metal unit with 6 horizontal sections, two oversized wooden cabinets, three wood and metal cases or in open storage on top of cabinets (see image attachment). Included in the 422 are burden, pitched, storage, and other types of basket containers from the tribes mentioned above. The fixed and wooden cabinets have doors that cannot be sealed to protect contents from infestation or environmental changes in the storage room. MNA's conservation consultant, Matthew Crawford, has viewed these cabinets and recommends that they be replaced. MNA proposes to purchase 12 new Delta Design cabinets (68"W x 86"H x 35"D).

For the textile collection MNA also proposes to purchase 12 new Delta Design cabinets. This collection consists of 1,492 Navajo, Hopi, Zuni, Mexican, and Hispanic weavings that are primarily untailed, flat, and woven. Of this number 792 Navajo textiles are housed in 15 Steel Fixture cabinets. Most of the contents are stored on rolls because they are flat and untailed with a few pieces laid flat in drawers. The remaining 700 textiles, which are Hopi, Zuni, and other non-Navajo pieces, are in 16 stacked, closed, wood and metal cases (48"H x 24"W x 24"D) in the textile storage room within Anthropology Collections (see image attachment). These textiles are rolled or folded and stacked and consist of runners, serapes, blankets, saddle blankets, rugs, robes, belts, sashes, garters, and other types of textiles. The larger pieces are generally longer than they are wide. Since the average width (which is usually the smaller dimension) is 48 inches, the textiles are folded in both directions so that they fit within the 24"-square wooden drawers. Oversized textiles (wider than 6 feet and up to 12' in width) are stored on open cantilever shelving and in muslin or polyethylene tube plastic sealed with ties. The plastic tubing is being replaced with muslin by the time this project begins. These textiles are a high priority for re-housing in museum quality cabinetry because of the potential for damage from folding and storage in the current wooden cases. They were identified as a high re-storage priority in the 1989 General Conservation Survey report. During this project these textiles will be moved into new Delta Designs and existing Steel Fixture, powder-coated, roll storage cabinets.

MNA's Navajo textile collection is widely recognized as "...one of the most important collections of Navajo textiles in public or private hands" (Webster, 1989 analysis report). The Hopi textile collection is one of the largest and most varied of its kind in a public institution. Eastern Pueblo weaving declined after Spanish contact, but continued among the more isolated Hopi for a longer period of time. MNA co-founder Mary-

Russell Ferrell Colton was very committed to helping ensure the continuation of Hopi crafts and for this reason started the annual Hopi Craftsman Show at MNA in 1930. A number of the pieces in MNA's Hopi textile collection were purchased from these yearly events. Today there are few Hopi weavers and the Museum is working with the Hopi Tribe to preserve this traditional art form. Beginning in the summer of 2005 a weaving class composed of Hopi men came to study textiles in MNA's collection. (Traditionally men weave in Hopi culture.) The instructor, Austin Lomatewama, will continue this study with future classes.

Besides the 700 textiles in the wooden cabinets, the care and storage of 217 smaller Navajo textiles that measure two or three feet in width will also be affected by the project. These 217 textiles are currently inefficiently housed in roll storage cabinets that will accommodate textiles up to five feet in width. By reorganizing these 217 textiles in conjunction with the 700 listed above, this project both will increase the number of rolled textiles and will maximize space utilization within new and existing museum quality cabinetry.

MNA requests a year to complete the project. The following includes a description of the activities that will be completed to reorganize storage and minimize unnecessary handling of these collections.

- **Activity 1: 24 Delta Design LTD storage cases and supplies ordered by Registrar (1 month).** Delta Design requires 90 days for assembly and delivery, so these cases will be ordered when MNA is notified of the award. The new cases are required to ensure that the 1,122 textiles and baskets are properly housed. As designed, the cases have anodized aluminum poles that suspend the textile tubes. With the addition of a rolled textile this pole becomes heavy and unwieldy, especially for one person. Alternatives to the pole are being investigated. In consultation with the textile conservator, the method currently used by the Costume and Textile Department at the Museum of Fine Arts (MFA), Boston, is being tested. The MFA conservator replaced the heavy poles with a 2" interior diameter archival, cardboard tube. This smaller tube, cut to the length of the pole, was slipped through the 3" interior diameter tube that holds the textile. The ends of the 2" tube then rest in the pole cradles within the case. This system has been successfully used at the MFA for the past two years and is an easy and affordable solution to the problem. It is estimated that 27 cartons (36 tubes each) of 10' by 2" diameter tubes will be required for suspension purposes. To minimize waste 15 cartons (16 tubes each) of 10' by 3" diameter tubes and 10 cartons of 12' by 3" diameter tubes will be ordered for rolling of flat, untailed textiles. MNA already has polyethylene foam and tissue on hand for the basketry collection. The supply list will include 2" and 3" acid-free tubes, unbleached cotton tying tape (1-1 1/2" wide) and unbuffered tissue.
- **Activity 2: On-site workshop to determine textile storage techniques with MNA Collection staff, Textile Conservator, and Hopi Cultural Traditional Practitioner (1 month).** During the 2007 IMLS CP project to assess the condition of the MNA textile collection, Cara Varnell (Textile Conservator) demonstrated several textile storage methods and mounts which would safely house textiles and minimize unnecessary handling. The NAGPRA Specialist and Collections Manager discussed with the conservator the details of textiles that Hopi weavers are interested in studying which are not easily determined from images. MNA is honored to have a close working relationship with the Hopi Tribe and employing methods that would facilitate access by practitioners is a goal. It became clear to MNA staff and the conservator that it is important to solicit the advice of a Hopi weaver in discussions to ensure the preservation of textiles while still allowing weavers the access they need. The textile conservator and the Hopi weaver will spend 2 days on-site in joint consultations with Collection staff. The textile conservator will be available for further consultations throughout the project for an additional two days of consultation.
- **Activity 3: Consultation by Collection staff with Objects Conservator to determine housing methods for baskets placed in new Delta Design Cabinets (1 month).** No cultural issues are anticipated with the rehousing of the basketry collection. The Object Conservator (Matthew Crawford) is periodically on campus and has offered to provide a rehousing workshop. He has already viewed the baskets during a previous on-site visit and will advise on external and internal mounts required to ensure preservation of pieces. Staff will also communicate with him via email and phone.
- **Activity 4: Preparation of tubes for suspension and rolling of textiles by MNA Collection Staff and Volunteers (1 months).** Once received, the 3" diameter acid-free tubes will be cut to 2, 3, 4, 5, and 6 foot lengths for installation in new and existing cases. The 2' and 3' Navajo textiles already have acid-free tubes and

will be moved to new storage on these tubes. The Navajo textile tubes, which are buffered, are covered with an acid-free tissue barrier layer. Over the years the tissue has not proven to be durable and the MNA and the textile conservator are still discussing alternatives. The final solution will be determined during the current 2007 IMLS-CP grant.

- **Activity 5: Delivery and installation of Delta Design cabinets on compactors in new Collection Center by Space Saver personnel (2 months).** Representatives of Space Saver will install compactor carriages and cabinets. Installation and compactors for all anthropology cabinetry is funded under the NEH Stabilization grant and is mentioned here because it is an important activity to ensure the success of this IMLS project.
- **Activity 6: Preparation of Delta Design cabinets by Collections staff and Collection Volunteers (2 weeks).** Cabinets will be carefully vacuumed to ensure interiors are free of dust and other contaminants. Drawers and shelves will then be installed into their desired positions.
- **Activity 7: Inspection and freezing of baskets and textiles for placement in new cases (9 Months).** Baskets and textiles will be inspected by MNA collection staff in consultation with the two conservation consultants and Move Coordinator (to be hired 2/2008) to determine procedures for ensuring that no infested objects are placed in the new Center. The majority of the current cases in which the baskets are stored are unsealed and therefore susceptible to pest activity. All baskets will be wrapped and frozen in accordance with MNA's IPM protocol before being moved into the new facility. This activity will commence once the new cabinets are ready to receive collections and will continue until the collections are all moved.
- **Activity 8: Baskets moved into new cabinets by Collection staff and Volunteers (3 months).** In consultation with the Object Conservator, the basket collection will be moved into the 12 new cases. Storage mounts will be created at this time. No cultural concerns about housing techniques are anticipated.
- **Activity 9: Lists of textiles to be moved into existing and new storage will be generated by Collections Manager (1 month).** All of the Museum's textile and basket collections are computerized into the Argus database and lists will be generated and updated by collection staff.
- **Activity 10: Textiles moved into cabinets by Collection staff and Volunteers (7 months).** Textile rehousing will require more time to complete than the baskets will require. Besides the creation of special mounts for some textiles, it will be important to plan the placement of textiles within the appropriate size case. Two of the existing 5' wide Navajo cases (which hold 2' and 3' wide textiles) were purchased from Steel Fixture in 1988. Each 5' wide bar holds one 2' and one 3' textile, each on its own acid-free tube. Arranged numerically, this plan produced a complicated inventory system, but the most pressing problem is that there are far more 3' wide (150 total) textiles than there are 2' wide (67 total) textiles. The result is that space in the second 5' wide cabinet is severely under utilized and contains mostly 3 foot wide textiles. The contents of these two Navajo textile cases will be moved into cases that accommodate 4' and 6' wide textiles. The two 5' wide cases will then be used to hold textiles between 4 and 5' in width. The new four foot wide Delta Design case (with a capacity of 120 two foot wide textiles) will hold all 79 of the 2' wide Navajo, Hopi, and Southwestern textiles. The two 6' wide cases (with a combined capacity to hold 120 six foot textiles or 240 three foot textiles) will hold all 180 of the 3-foot wide textiles and all 6-foot wide textiles currently folded and stored in wood and metal cabinets. The 52 oversize textiles on cantilever shelving are already rolled onto acid free tubes and will be placed on Delta Design roll storage inserts in the two proposed oversized cabinets. The textiles will then be wrapped with a dust cover.
- **Activity 11: Argus database updated and cabinet lists created (duration of project) by Collection staff.** This will ensure that locations remain current and up-to-date at the close of the project.

The conservation/preservation methods employed will be appropriate for the type of collection. Housing is the primary issue for the baskets and textiles that are the focus of this project. These baskets are stored in wooden cabinets or in open storage and the textiles are currently housed in small wood and metal cabinets or on open metal and wood cantilever shelving. Existing cases are internally constructed of wood and all drawers are wooden, a less than ideal material for the construction of housing units. Within this environment textile fibers can degrade and become more brittle over time. In the case of folded textiles, permanent fold lines can result as individual brittle fibers fracture apart. Due to their size these textiles currently must be folded many times so that they will fit within the 2-foot x 2-foot-square wooden drawers. In the 1989 General Conservation Survey

report author Jeanne Brako stated: “wooden storage units that were designed and fabricated in-house over numerous years are probably providing an environmental buffer to the specimens... [but that] ...M[etal] cabinetry should be instituted as available for several areas of the collection. The textiles that are stored folded...should be moved to metal cabinetry... [because]...the alleviation of the physical stresses of folding and layering outweighs the benefits of environmental buffering...” After the Museum re-implemented environmental and microclimate monitoring in 2001, MNA determined that no additional Rh buffering is offered by wood over metal cabinetry (see Rh Comparison attachment).

This project will remove these baskets and textiles from deleterious storage in wood and metal cabinetry. The rehousing materials selected will be either neutral or acid-free buffered. Some of the supplies are on hand while others like the unbuffered abaca tissue and tubes will be purchased. The baskets will be placed on polyethylene padded shelves. As appropriate, acid-free buffered tissue, already on hand, will be used to cushion pieces. Carrying trays will be created from acid-free boards as determined with the object conservator. Ideal housing for untailed textiles is flat storage. However, such storage is prohibitively expensive and requires more space than is currently available. The next best option for storing flat textiles is in roll storage that places little mechanical stress on textiles. The goal, therefore, is to place these textiles in powder-coated, metal, roll storage cabinetry. To fulfill the needs of the basket and textile collections, storage cases must meet several requirements. They must be constructed of stable, inert materials, be vented but sealable, have drawers that allow easy access to textiles, and fit into MNA’s currently available space. Two years ago MNA selected Delta Design LTD as its manufacturer of choice because of this company’s experience, as well as service and ability to construct cabinetry of certain sizes. The doors and the drawers in all Delta Design cases have heavy duty extension suspensions to render them easy to pull out so that even textiles in the back of the drawer can be reached without removing textiles in front.

3. Project Resources: Time, Personnel, Budget

A total of \$107,311.80 is requested from IMLS for this project which MNA anticipates completing in one year based on past experience. IMLS funding will allow MNA to purchase 24 Delta Design cabinets, continue consultation with its two conservation consultants, include a Hopi practitioner in decisions on textile housing methodology, and pay for Delta Design cabinet shipping and a portion of the supplies.

MNA will provide \$107,467.42 in support which will be part of a larger initiative to move 1st and 2nd priority collections into the new Collections Center when it opens in 2008. MNA will provide almost half of the cost of supplies. As part of MNA’s match, three MNA Collection staff will be involved. This staff includes the Collections Manager (30%-536 hours), the NAGPRA Specialist (80%-1456 hours), and Registrar (20%-364 hours). The Collections Manager, Elaine Hughes, is head of the Collections Department and will serve as the Project Director. She will be involved in consultant consultations, organization, inventory updates, and daily tasks as needed. She has an MA in Museum Science from Texas Tech University and 20 years of professional museum experience in collections management. She worked at MNA for seven years from 1986-92 as the Anthropology Collections Manager and rejoined the Museum in her current position five years ago. She is the lead grant writer for collection improvement projects. The NAGPRA Specialist, Gloria Lomahaftewa, will be the most involved of the Collection staff in the daily activities of this project. Her position was originally grant funded under two successive NAGPRA grants (submission of new summaries-2005/06 and follow-up consultation with 4 Tribes-2006-07) but will become a permanent Collections position upon the conclusion of the NAGPRA grant in October 2007. She will work with the other staff in consultations and will be directly responsible for overseeing volunteers and the rehousing of the basket and textile collections. She has 23 years of experience in the museum field. She worked at the Heard Museum and joined MNA’s staff in 2005. Her experience includes work with both exhibits and collection rehousing projects. The Registrar, Kara Kelly, will order supplies, oversee object freezing/preparation and will help with daily tasks as needed. Kara has an MA in Museum Studies from the University of Kansas. Her 10 years of work history includes experience with geology, paleontology, history, archives, archaeology, ethnology, and fine arts collections, at institutions such as the Natural History Museum and Biodiversity Research Center at the University of Kansas, Jackson County Parks and Recreation (administrator of historic sites), and Union Station Kansas City Inc. which administers the Kansas City Museum and its collections. Collection staff will be aided in this project by trained collection volunteers (see volunteer training attachment). This group of primarily retired professionals has been

volunteering with MNA since the mid 1990s. Collection staff has provided several training sessions in the handling of collections. MNA's Volunteer Coordinator performs background and security checks and has complete information and references for volunteers in Collections. Their time commitment to this project is for an average of 21 hours per week. Volunteers will cut tubes, prepare cases, and work with staff on other tasks.

Three consultants will be hired to ensure the success of this project. Austin Lomatewana will serve as the Hopi cultural traditional practitioner consultant. He has over 40 years of weaving experience. He previously taught Hopi weaving at the Hopi Jr-Sr. High School and for the past three summers has taught traditional weaving at Hopitutuqaiki, the Hopi School, Inc. He will spend a total of two days on this project. Cara L. Varnell, textile conservator, will continue consultation begun in 2007 under an IMLS-CP condition assessment project. She will come for a second on-site visit to work with staff and the Hopi practitioner in the development of textile storage methodology. She has her certificate in conservation from the Textile Conservation Centre at Hampton Court Palace in England and has been a working conservator for the past 25 years. She worked for the Fine Arts Museums in San Francisco, The Metropolitan Museum of Art and the Los Angeles County Museum of Art. For the past 8 years she has been in private practice with institutional and private clients throughout the country. She will spend a total of four days on the project. Matthew Crawford of Crawford Conservation Studio is the objects conservator who will continue his consultation with MNA. He has an MS in Art Conservation from the University of Delaware, Winterthur Art Conservation Program. Mr. Crawford performed an archaeological condition assessment in 1999 for MNA, is the conservation consultant for MNA's proposed collection center, and condition assessed MNA's katsina doll collection under the 2007 IMLS-CP grant. During his visit in August he had a quick overview of the MNA basket collection. He has worked extensively with Native American collections particularly southwest material culture as a conservator at the Arizona State Museum (1994-1997) and at the Denver Museum of Nature and Science (2000 – 2002). He will provide advice on basketry rehousing methods for a total of two days. Letters of commitment and resumes are attached.

Delta Design, Ltd was selected in 2003 by MNA as the museum cabinetry company that the Museum would use in future cabinetry purchases. This selection was recommended by Jude Southward the conservation consultant who helped MNA write its 2003 Preservation Plan. MNA has purchased several cabinets since this time from Delta Design. The company is reliable and responsible and is willing to make cabinets to MNA's size specifications. The cabinets have silicone gaskets, filtered vents which can also be closed, locks, constructed of 18 gage steel, and are powder coated. The requested 6' and 12' cases have bi-fold doors. Delta's price quote and specifications are attached. The regional installer for Spacesaver is Concert Architectural Interiors in Phoenix, AZ. This company is trained in the installation of Spacesaver compactors and Delta Designs cabinetry and has been working closely with MNA architect, Jim (James) Roberts.

4. Impact

Benefits resulting from this project will include both immediate improvement at the object and collection level, as well as long-term improvements at the institutional level. This project will remedy the imminent risk of deterioration to baskets and textiles from exposure to the wood present in the current wood and metal cabinetry and improved IPM control over these holdings through inspection and placement in cabinets with state-of-the-art environmental seals. Additionally, by reorganizing the 214 Navajo textiles, this project will maximize space utilization within new and existing museum quality cabinetry.

There will also be direct benefits to the public and users of the collection. The stacked baskets and textiles are less accessible for research and teaching purposes, but will be more accessible once this rehousing project is completed. MNA conducts public tours of collections (3rd Fridays of each month) with a focus on the life of collections behind the scenes (grant, loan, research projects; preservation needs; initiatives and challenges). The state of housing for textiles is one of the topics addressed and, if funded, this project will allow MNA to show proper textile housing for all, rather than for just the Navajo textiles.

Information about this project will be integrated into MNA's public web site. Within the next two years MNA will make the Navajo textile collection the first of its collections to be available via MNA's web site to its local, regional, national, and international audience. As a part of this web presence, MNA will include a section that describes the textile improvement projects that have occurred and agencies that made the projects possible. The intent is to educate the public about the time, effort, and resources needed to make such collections accessible while still preserving them.

BUDGET FORM - PAGE FOUR

Section B: Summary Budget

| | \$ IMLS | \$ Cost Share | \$ TOTAL COSTS |
|--|-------------------|-------------------|-------------------|
| 1. Salaries and Wages | | 55,608.28 | 55,608.28 |
| 2. Fringe Benefits | | 13,902.00 | 13,902.00 |
| 3. Consultant Fees | 5,080.00 | | 5,080.00 |
| 4. Travel | 613.21 | | 613.21 |
| 5. Supplies and Materials | 101,618.59 | 6,200.00 | 107,818.59 |
| 6. Services | | | 0.00 |
| 7. Student Support | | | 0.00 |
| 8. Other Costs | | 21,221.84 | 21,221.84 |
| TOTAL DIRECT COSTS (1-8) | 107,311.80 | 96,932.12 | 204,243.92 |
| 9. Indirect Costs | | 10,535.30 | 10,535.30 |
| TOTAL COSTS (Direct and Indirect) | 107,311.80 | 107,467.42 | 214,779.22 |

Project Funding for the Entire Grant Period

| | |
|--------------------------------------|------------|
| 1. Grant Funds Requested from IMLS | 107,311.80 |
| 2. Cost Sharing: | |
| a. Cash Contribution | |
| b. In-Kind Contribution | 107,467.42 |
| c. Other Federal Agencies* | |
| d. TOTAL COST SHARING | 107,467.42 |
| 3. TOTAL PROJECT FUNDING (1+2d) | 214,779.22 |
| % of Total Costs Requested from IMLS | 4,996.00% |

* If funding has been requested from another federal agency, indicate the agency's name:

1. STATEMENT OF NEED

Massillon Museum respectfully requests a Conservation Project Support Grant from the Institute for Museum and Library Services in the amount of \$150,000 to be matched in excess of 1:1 by the Museum in order to purchase appropriate storage equipment to ensure the long-term preservation of the collections.

Founded in 1933, the Massillon Museum is an art and history museum serving the community through diverse programming and exhibitions. Funded by a city tax levy, the Museum is considered a shared resource and illustrates its local commitment through the slogan, "Your Massillon Museum." The city of Massillon has a population of approximately 35,000, but the Museum also serves a region that extends beyond the city in a 60 mile radius. As an admission-free museum, we make art and history available to all members of the community, and most all our programming is offered free of charge. In March 2008, the city exercised its support of the Museum by passing our replacement levy by a margin of 800 votes, the largest ever in our levy's 20-year history.

The mission of the Massillon Museum states that it has an obligation to "collect, preserve and exhibit art and artifacts to enrich our community through education and experience." As do all museums, the Massillon Museum has a responsibility to preserve its collections for posterity. Our Museum is, however, unique in that it was the first in Ohio to propose a tax levy that constitutes its main source of funding. As an integral part of the community with an education driven mission, the Museum collections represent not only the history of Massillon and its surrounding communities; they extend to represent cultures from around the world.

The breadth of our collections reflects the history of our community. While many of our collections are regional in focus—the circus collection was donated by Dr. Robert Immel, a beloved Massillon dentist—others illustrate the city's rich history and the Museum's longstanding commitment to educating our community about different cultures, ideas and artistic styles from around the world. Among the Native American objects are, for instance, a beautiful collection of Chitimacha baskets from St. Mary's Parish, Louisiana. A fifteenth century Renaissance painting by the Italian artist Sano di Pietro reflects the city's once industrious geography of steel factories, wheat fields and the canal, all of which generated wealthy residents.

The Massillon Museum's storage facilities accommodate numerous collections varying in media and context. For example, objects representing local Ohio Canal history include a collection of glass plate negatives and original photographic prints, all of which warrant very different environmental conditions than do the oil painting *Medieval Forest* by Ralph Albert Blakelock, or the 1864 letter addressed to a Methodist minister of Massillon and signed by President Abraham Lincoln. Our photographic collection, archives and works of art on paper will be best preserved under cool, dry conditions, while our general collections require moderate temperature and humidity. Therefore, we plan to have two different environmental zones.

The collections form the basis for our exhibitions and programming, making good, long-term preservation of the collections one of the Museum's highest priorities. The permanent collection galleries are rotated frequently to enable a variety of objects to be displayed. Objects from our collection are integrated into the Third Grade curricula in the Massillon City Schools as part of an interactive workbook we developed. Our website features a number of teacher lesson plans organized thematically and based on our permanent collection. Monthly history group meetings and Brown Bag Lunch lectures are often enhanced with displays of collection objects. In addition, we receive research requests from all over the world to facilitate scholarship or creative pursuits such as film documentaries. Thus, our collection is essential to our mission, and ensuring its safekeeping is paramount. Without proper care, its value as an educational tool and visual experience is severely compromised.

In 1996 when the Massillon Museum moved into its current structure—a 1930s art deco building—the large third floor collection storage area was left essentially unfinished. The space does not have humidity control. Coverings over the many windows in the space consist of blinds. Lighting is poor, and is not zoned. Falling ceiling matter creates dust. The fact that the freight elevator opens directly into the storage room further compromises the environment and security, as does the fact that there is no workspace outside of the collection room. Storage equipment consists, for the most part, of open shelving of various sizes and shapes on which objects are arranged, an assortment of boxes, open rails for hanging clothing, and cubbies for the framed art. These storage methods are inefficient, crowded, and do not in any way meet the needs of the collection.

Since 2004, the Museum has made great strides in many areas. In October of that year, the Museum adopted a new collections management policy (*see attached introduction and table of contents 14a*), and in November the Museum completed a CAP Assessment. Using the prioritized recommendations in that assessment as a framework, the Museum has followed a program of improvements, particularly in the area of collections storage. By following this step-by-step plan, the Museum is ensuring that the collection will receive the care it deserves. Initial improvements include:

- purchasing monitors to record temperature and relative humidity in the storage and exhibit areas;
- installing shelving to raise collection objects from the floor;
- continuing, on a regular basis, to replace acidic storage boxes and folders with acid-free supplies;
- installing UV filters over lighting fixtures in the storage area;
- inventorying and photographing categories within the collection for which catalogue records were scattered, incomplete, or missing entirely (dolls; jewelry; shoes and accessories; books; flat files; photographs and photographic equipment; Native American baskets and pottery);
- replacing plastic dust covers over shelving units with fire-resistant coverings;
- implementing a pest monitoring system;
- introducing dehumidifiers in those areas registering higher-than-acceptable readings;
- refurbishing existing wooden shelving with barriers to prevent damage from off-gassing materials.

In addition to these activities, a grant from the Intermuseum Conservation Association has allowed us to evaluate our framed art to determine conservation needs and ascertain which works should be removed from current acidic and/or cumbersome housing and which could benefit from treatment and cleaning.

In 2006, the Museum was awarded an IMLS Conservation Project Support Grant and a Hoover Foundation grant for the purpose of planning a complete renovation of the third floor storage room. Consultants William Lull (HVAC specialist, Garrison/Lull), Phillip Steiner (engineer, AltieriSeborWieber), Jeff Day (architect, Harris/Day Architects), and James P. Kulick (engineer, Scheeser*Buckley*Mayfield, Inc*) worked with conservator Barbara Moore to develop a design for the third floor and its environmental control systems. A room-within-a-room approach will be used to ensure tight and energy-efficient environmental control (*see attached Third Floor Plan 14b*). Two different environments will be created: a cool, dry environment for the archives, and a stable, moderate environment for the general collection. The freight elevator will no longer open directly into the storage room, and a research/curatorial workspace will be provided so that these activities do not have to take place within the storage room itself. Funding is currently being sought from Federal and private sources for the space renovation and environmental controls described above, and the Museum has already garnered support from its local legislators, who have allocated \$425,000 from the State of Ohio for the project. (This information is offered to give a picture of the entire project, but this IMLS-CPS proposal requests only the specified storage equipment.)

As part of the 2006 planning project, Barbara Moore worked with Curator Alexandra Nicholis over a period of two weeks to measure and evaluate every inch of space occupied by collection objects, taking into account growth in certain areas and decreases in others. Based on this work, Moore developed specifications for the numbers and kinds of storage equipment and storage supplies needed to house the collection safely. Jeff Weatherston (Weatherston Bruer Associates) then developed an efficient layout for this storage equipment within the available space (*see attached Storage Equipment Layout 14c*).

Collections care continues to be one of the most important strategic initiatives of the Massillon Museum's long-term institutional plan, and the Museum's staff and Board are fully engaged in this project. The Museum's commitment to improving care of its collections is demonstrated through the many improvements made in this area in the last three years. In addition, the curator has been enrolled in the Collection Care Certificate Program at the Campbell Center for Historic Preservation. As her first course in summer 2007, she took Environmental Monitoring and Control, and in 2008 she completed Computer Software for Collections Management and Collections Management in Storage. This training has already helped her to better understand the language associated with a collections storage project of this nature, therefore enhancing discussions with the consultants regarding microclimates, vapor barriers, humidity control and storage cabinetry.

2. PROJECT DESIGN

Description of the objects that are the focus of the project.

The Museum's permanent collection encompasses over 100,000 objects in 94 categories. The largest and most important collections are the photography; paintings; household artifacts; Native American, costumes; decorative arts; Civil War; and circus collections. Interesting individual collections include the archeological and ethnographic collections from Abyssinia; City records; and glass canes. While it is impossible to go into detail about the entire collection at this time, it is possible to note some of the more rare and significant collections within the Museum.

One of our most prized collections is that of over 55,000 photographs. This collection includes photographs from well-known photographers such as Aaron Siskind, Nell Dorr, Belle Johnson, and Harry Callahan, in addition to local pioneers such as Abel Fletcher and Ohio Canal photographer William L. Bennett. The collection houses photographic equipment, paper photographs, glass plate negatives, tintypes, and daguerreotypes that chronicle the history of the town and the surrounding region. The collection continues to grow, as the Museum recently acquired 6,000 company photographs from Republic Steel as a donation in conjunction with the 2004 exhibition, *Framework of a Community: The Steel Industry in Stark County*. Initiative has been taken to transfer the photography collection into safer, more stable housing, as well as to digitize the images.

The photography collection is frequently researched by members of the community, artists and scholars. Requests have been made recently for inclusion of our photographs in PBS, HBO and ESPN documentary films. A collaborative project with the Monroe City Historical Society in Missouri has been initiated by the Massillon Museum Curator to research a collection of prints by Victorian photographer Belle Johnson. Johnson was a Monroe City native and the town's residents hold a vast number of her photographs, as does the Massillon Museum. Therefore, through this collaboration we hope to obtain oral histories and publish our research in book form.

Another significant holding is our Civil War era collection. Many of the items in this collection are rare and many have ties to Massillon. Of particular interest are the military objects, including an original, full color army diploma from Camp Massillon; frock coat belonging to Massillon native General Samuel Beatty; a coat belonging to Massillon soldier Dwight Jarvis; bullet molds; pistols; photographs; soldiers' diaries; and documents in the form of orders, journals, and letters, including one bearing the original signature of Abraham Lincoln.

The Massillon Museum has a large costume and textile collection, a majority of which dates to the 19th century. The bulk of this collection was acquired from the wealthy industrialists and their families who settled in Massillon at the turn of the century. Within this collection of historic garments and accessories are Victorian wedding gowns; three intricately beaded opera capelets; First Lady Ida McKinley's wedding corset; evening gowns dating from the 1870s–1960s; men's and women's hats; shoes and boots; a fur coat worn by actress Lillian Gish; an authentic Bloomers costume from the 1840s; military costumes representing the Civil War, Spanish-American War, World Wars I and II, Korean War and Vietnam War; sports and medical uniforms; and a variety of other clothing and accessory types, including an early 1800s child's cotton dress which was featured in the thesis and exhibition of Anne Bissonnette, Ph.D, curator of the Kent State University Museum.

The Museum's collection also includes rare textiles such as a Phase II Navajo Chief's Blanket. Another rare and valuable textile, a nineteenth-century Kashmiri paisley shawl, was recently researched by Kent State University professor Laurie Addis for a series of contemporary weavings that were shown in London in winter 2008 and subsequently in the Massillon Museum.

The collection of artifacts from Abyssinia (present day Ethiopia) is of special significance to the Massillon Museum, as it is among the first collections on which the Museum was founded. Objects were acquired by Massillon natives A.P.L. Pease, Horatio Wales and Robert P. Skinner while on a trade mission to Abyssinia in 1903. They acted as ambassadors and were responsible for establishing relations between the US and eastern Africa. The collection of approximately 500 objects consists of a wide variety of materials which includes, but is not limited to, photographs; journals; government issued documents and personal correspondence; and ceremonial artifacts awarded to Robert P. Skinner by King Menelik of Abyssinia which include such objects as a shield, dagger, and carved tusks; musical instruments; jewelry; and medals. The Museum's art collection features paintings by internationally recognized artists such as Ralph Albert Blakelock and regional artists such as sculptor Popeye Reed and painters Victor Schreckengost, William T. Mathews and Clyde Singer. The

Museum holds the largest known collection of Mathews' artwork. He was an England native who settled in Navarre, Ohio as a young man. Schreckengost, Mathews and Singer have all been the subjects of major retrospectives in the past three years.

Conditions to which the objects are currently exposed and why they merit attention at this time.

The large third floor storage room was not renovated, as the exhibit galleries were, when the Museum first moved to the building in 1996. The space is not in good condition. Falling ceiling matter, improper window coverings, and exposure to dust threaten the many objects on open shelves. In the event of a fire, objects on shelves would be damaged by smoke or water. Since the storage area does not have zoned lighting, the objects on the shelves are also exposed to light whenever work is conducted in any part of the storage room. The Museum has mounted curtains in front of many of the shelving units to give them some protection from these hazards, and every year we add more acid-free boxes to protect objects; but clearly these are not satisfactory methods in the long run.

Unlike the exhibit galleries, there is no humidity control in the storage room. In the last two years, dataloggers have recorded relative humidities ranging from 12.5 to 68% RH over the course of a year, with temperatures ranging from 61 to 71 degF. Clearly these conditions do not promote the good long-term preservation that we wish to provide for our collection. The storage room is also extremely crowded, with collection objects on every available surface. Thousands of artifacts are laid out on ranges of metal and wooden shelving, and many objects are piled in cardboard boxes, making them difficult to access. In other cases, there are so many objects on a shelf that finding one involves handling many, risking damage. This crowding is, in large part, the result of inefficient storage methods, because so much space is wasted in shelf headroom.

Project Goals and Objectives

Pre-Grant Activities (Fall 2008–July 2009)

The Collections Storage and Environmental Improvement Project will take place over a period of two years, from 2009-2011. The entire project includes the purchase of storage equipment in which to safely house the collections and alleviate overcrowding; creation of a room-within-a-room approach; installation of two HVAC rooftop units to condition each of the two rooms separately; space-efficient design which will facilitate a currently nonexistent research area with examination table and extra office space for collections staff; secured access to all collections; and zoned lighting to minimize the collection's exposure to light. *The Museum is asking IMLS to support one specific portion of this project—the purchase of storage equipment. However, for clarity's sake, information is offered below on the other key activities relating to this project as well.*

Environmental Planning: The Museum is currently finalizing specifications for HVAC equipment to maintain conditions recommended by the conservator, specialist and engineers for the two storage environments.

Move Assistant: The Museum will advertise for a move assistant to begin work when the grant project begins. This individual must have previous museum training and experience, and will be given additional training in arts handling by the Massillon Museum and be introduced to our inventory and documentation procedures. This individual will work exclusively on the move during the two years of the project, assisting with packing, moving, tracking and related inventories. When not involved in the moving phases of the project, the Move Assistant will perform registration duties by helping with the process of converting the collection information to our PastPerfect collections management database.

Construction: We are currently in the process of obtaining bids from a minimum of three firms on the physical improvements of the collections storage area, and the Museum will choose the construction company before the grant period starts. An estimate of costs has been provided by Harris/Day Architects for planning purposes. *(see attached Construction Cost Estimate 14d)*

Off-Site Storage: The collection will be stored off-site at Midwest Fine Arts Service in Lorain, Ohio. This newly renovated fine arts storage facility is temperature and humidity controlled.

Project Year 1 (September 2008–August 2009)

Packing the Collection: The Museum has selected a specialized museum packing firm (Andy Rock Fine Arts led by Packing & Transport Coordinator, Andy Rock) to undertake the packing of the collection and moving it to the off-site storage facility. The Curator, archivist, Collections Assistant and Move Assistant will assist them in these tasks. This stage of work is scheduled to take 6 months. To maintain cost effectiveness and to eliminate the packed objects from being moved more

times than necessary, the Museum staff has designated a cleared space within the collections storage area to serve as the holding area until we have one truckload worth of material to move. This will save on transport fees, allow us to pack and document individual collections strategically, and ultimately prove safer for the collections. Andy Rock, along with a team of three trained specialists, the Curator, and the Move Asst., will document each artifact as it is packed. The condition of each artifact will be assessed and noted by the Curator and Move Asst. before it is packed. Prior to the actual move, a Project Procedures Manual will be developed by the Curator and Packing & Transport Coordinator, to include detailed instructions and procedures for dealing with scenarios such as damage during transport. Each package moved into storage, whether it be boxed, crated or soft-packed, will be equipped with a bar code label for ease of tracking.

Place Orders for Storage Equipment: The Executive Director and Curator will place the orders for the storage equipment *specified in this proposal* from Delta Designs Ltd with assistance from conservator, Barbara Moore. (Feb-March 2010)

Construction: Engineer Phillip Steiner (AltieriSeborWieber) will participate in the project by planning appropriate fire suppression systems, handicap accessibility, and ensuring that the load capacity of the floor is placed properly to accept the cabinets. Renovation and construction of the "room-within-room" collections storage areas will occur during the spring of 2010. This work is expected to take 6 months. The conservator will review the finishing materials of the walls and floor to make sure they are appropriate for use in a museum storage area, and she will do this via e-mail and telephone conferences. Security cameras and secured access doors will be installed, as will appropriate lighting. Additional room outside of the locked storage areas will accommodate research areas, examination tables and space for the Curator to work (*see attached Third Floor Plan 14b*). All emergency exits will be maintained as they currently exist, with reinforcement given for security. The room-within-a-room construct will eliminate all windows from the storage area, therefore ensuring further protection.

Install Cabinets: Upon completion of the construction of the space, the storage equipment will be delivered and installed by Sept 2010.

Purging, testing and balancing the HVAC equipment: Under the direction of William Lull, we will allow a time period of approximately 3 months to ensure that the HVAC system is functioning correctly and for the space to acclimatize before collections are moved in (Sept–Nov 2010). Datalogging monitoring devices will be installed.

Order Storage Supplies: We will order supplies from the conservator's list (*see attached Storage Supply List 14e*) to be ready for the move-in. (Sept-Nov 2010)

Project Year 2 (September 2010–August 2011)

Collections move-in: The collection will gradually be moved back into the Museum and placed in the new collections storage area. As we move the collection back category by category, we will unpack and install the collections in the new cabinets. We plan to begin with the archival collections, followed by the painting collection, the three-dimensional collection (i.e. furniture, sculptures, musical instruments), textiles and clothing. The conservator will oversee the start of the two move-in phases to ensure correct storage methods. She will be here for four days to begin the archives collections move, and will return for four days to assist with the three-dimensional move. (Dec 2010-Aug 2011)

Order Storage Supplies: The museum will purchase additional supplies for the second half of the move. (April 2011)

Conservation methods in terms of efficiency, reliability and safety.

Museum staff has thoroughly researched the storage methods recently used in rehousing projects by other museums, and has worked with conservator Barbara Moore to identify the safest and most efficient storage methods for the different parts of our collection.

Under an IMLS-CPS grant, the Curator and Conservator conducted a detailed Space Needs Survey of the collection. Working on a shelf-by-shelf and box-by-box basis, they determined the square footage and the headroom needed for items to be housed properly and without crowding, and from this information determined how many drawers, shelves, pallet racks and cabinets would be needed. They also developed a list of the storage materials (acid-free tissue, boxes, textile rolls, etc.) required for our collection.

Cabinets and shelving will be powder-coated steel with inert gaskets (*see attached Cabinet and Shelving 14f*). All storage supplies will be standard acid-free products. In general, small three-dimensional objects will be stored in padded drawers,

sometimes within acid-free trays. Larger three dimensional items will be on shelves, usually within cabinets. Furniture will be on pallet racking. Large flat textiles will be rolled on tubes, while smaller textiles will be boxed or stored laid out in drawers. Robust clothing will be hung on hangers of appropriate size and shape (ordered from Henry Hangers), and fragile costumes will be boxed or laid in drawers. Framed art will be hung on painting racks, and matted art on paper and photographs will be placed in drop-front boxes with interleaving.

Museum's plan to ensure that normal museum operations are not disrupted.

The Museum has committed staff resources by re-organizing the exhibition schedule for the next two years to include more rented exhibitions. This will allow staff to devote many hours to the collections storage project. In addition, the hiring of a Move Assistant for both years of the project and the participation of the Packing & Transport Coordinator and his team will help to ensure that normal day-to-day operations can still be carried out.

3. PROJECT RESOURCES: TIME, PERSONNEL, BUDGET

Time Allocated to complete project.

The project as requested from IMLS will take a total of two years. The main steps in Year 1 are devoted to moving the collection to off-site storage (6 months); renovation of the existing space (6 months) and installation of storage equipment (2-4 weeks). During Year 2, the collections will be moved back into the museum and installed in the new storage equipment. Condition reports will be generated for the unpacking as they were for the packing. We will be devoting the entire 12 months to this activity. *Time commitments for individual staff members and the conservator are detailed below.*

Key Staff and Consultants Involved in the Project:

Full-Time Staff

Christine Fowler Shearer, Executive Director, will guide the project with regards to Museum policy and will be responsible for overseeing the various phases and their completion according to the timeline. She will spend nearly 30% of her time on the project during Year 1, overseeing the meetings with consultants and project committee and securing additional funding for the project. During Year 2, Shearer will again be spending 30% of her time on this project, authorizing the schedule proposed by Curator and consultants, seeing to it that the project consultants and museum staff keep strictly to this schedule, attending meetings organized by the Curator and project committee, and communicating progress to the Board of Directors, staff, and the public. As the Executive Director is responsible for public visibility, she will work with the Public Relations Coordinator to make the project goals and progress known to the community. This is in keeping with her daily responsibilities as a public figure. Shearer holds an MA in art history from the University of Notre Dame. She has more than 10 years of museum experience.

Alexandra Nicholis, Curator, will spend 50% of her time on the project in Year 1, maintaining constant communication with consultants, organizing the project committee, training the Move Assistant, overseeing the packing and move of collection objects which requires frequent visits to the off-site storage facility, and ordering storage cabinets and supplies. During Year 2, almost 75% of her time will be spent on this project, and activities will include scheduling meetings with consultants, contractors and the project committee, overseeing the Move Assistant and his/her maintenance of progress reports and documentation, overseeing the room-within-a-room construction from beginning to end, installation of the storage equipment, and facilitation of staff training on the new equipment and environmental controls. In order to focus most of her attention on this project, the curator will not organize exhibits for the duration of this project, and the executive director will assist in renting exhibits that are already fabricated. As more than one third of the Curator's time currently goes into organizing exhibits, she will now have that time freed for this project. Nicholis holds an MA in art history from Case Western Reserve University. She has more than 7 years of museum experience.

Amanda Altimus Pond, Archivist, She will spend 20% of her time on the project in Year 1, attending project committee meetings, assisting the Move Assistant with documentation, overseeing the packing and tracking of archival materials and their transport to off-site facility. During Year 2, the Archivist will continue to participate in project committee meetings and undergo training on acclimatizing archival materials from the cooler temperatures of the storage room to other environments, obtaining information and documentation from Move Assistant for institutional archives, and assist the Curator with overseeing the installation of storage cabinets and supplies. Pond will balance these activities with those she currently engages in by hiring two unpaid interns to assist with the continuation of inventorying and rehousing of archival materials.

We will hire a **Move Assistant** with previous museum experience and will train him/her as needed. He/She will maintain records and documentation for the Curator in every stage of the project, attend all project committee meetings and keep meeting minutes. The Move Assistant will also assist the Curator in scheduling meetings and coordinating the move to and from the off-site facility, as well as maintaining communication with the packers. When not involved in the moving phases of the project, the Move Assistant will perform registration duties by helping with the process of converting the collection information to PastPerfect.

Contract, Part-Time and Adjunct Staff

Andy Rock of Andy Rock Fine Arts will serve as the Packing & Transport Coordinator. He will oversee the packing and temporary relocation of collection objects from the Museum to the off-site facility. He will also oversee the move of the collections back to the Museum. He will fabricate mounts as needed, in consultation with the conservator and will train the entire project team on proper packing and moving techniques. He worked for over 26 years at the Cleveland Museum of Art as an art handler/installation technician and as the Chief Packing Specialist. He has extensive knowledge in the safe handling, mounting, installation and display of objects.

Christopher Craft, Museum Assistant, who has an MA in arts education from the University of Akron, has worked with the collection as a museum assistant at the Massillon Museum for the past three years. Craft works 20 hours per week and will spend approximately 50% of his time on this project in Year 2, assisting with the rehousing of the collection.

Barbara Moore, independent conservation consultant, will review final architectural plans in Year 1 to ensure that temperature, relative humidity and materials used in the construction are consistent with a safe storage environment. She will then spend 8 days at the Museum, on two separate occasions, during the move-in period to review with the staff storage methods for different collection items. Moore has been working closely with the Massillon Museum since its CAP Assessment grant in 2004. She holds a graduate diploma in conservation from the University of London and is a professional associate member of the American Institute for Conservation.

The Museum has been actively pursuing financial support for this project. A large portion of the funding has been obtained through the Ohio Cultural Facilities Commission, thanks to the support of the Museum's state legislators. Additionally, local foundations have expressed interest in offering additional support to this project.

4. IMPACT

The goal of this project is to prolong the life of the Massillon Museum's collections. The current storage conditions are highly inadequate and pose a severe threat to the artifacts in its care. Proper temperature, humidity and particulate controls, lighting, security, access for research and examination, fire suppression, and storage will all be improved upon the completion of the Collections Storage and Environmental Improvement project.

The creation of two separate rooms within the larger storage room will greatly impact the safekeeping of our artifacts in a positive way. Not only will the archives be maintained in the smaller room under lower temperatures, increasing their lifespan by years, but they will be contained and organized. Organization is something the Massillon Museum collections currently lack in their unstable environment. Overcrowding forces objects to come in direct contact with one another frequently. Lack of proper storage equipment and materials compromises artifacts, and a lack of organized space makes it nearly impossible to meet the needs of certain collections. In addition to compromising the longevity of collections in our care, all these issues contribute to a severe decrease in staff efficiency. It is often difficult to locate or track collections under the current conditions.

The benefits of the project go beyond the internal workings of the Museum and staff. Upon completion of the project, staff will educate the community about the project through articles in the local papers, the Museum newsletter, and at our annual meeting for members. In addition, we will offer our facility as an example to other institutions looking to improve their collections storage areas. The Executive Director and Curator will also provide panel discussions to interested organizations to disseminate their knowledge on the Collections Storage and Environmental Improvement project.

| | Sept | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug |
|---------------------------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Install Cabinets | ■ | | | | | | | | | | | |
| Purge, test, balance HVAC | ■ | ■ | ■ | | | | | | | | | |
| Order Storage Supplies | ■ | ■ | ■ | | | | | | | | | |
| Collections Move-In | | | | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| Order Storage Supplies | | | | | | | | ■ | | | | |

**Massillon Museum
Schedule of Completion
Year Two**

BUDGET FORM - PAGE FOUR

Section B: Summary Budget

| | \$ IMLS | \$ Cost Share | \$ TOTAL COSTS |
|-----------------------------------|------------|---------------|----------------|
| 1. Salaries and Wages | 0.00 | 158,450.00 | 158,450.00 |
| 2. Fringe Benefits | 0.00 | 39,612.50 | 39,612.50 |
| 3. Consultant Fees | 0.00 | 96,000.00 | 96,000.00 |
| 4. Travel | 0.00 | 3,775.00 | 3,775.00 |
| 5. Supplies and Materials | 150,000.00 | 188,450.00 | 338,450.00 |
| 6. Services | 0.00 | 383,578.00 | 383,578.00 |
| 7. Student Support | 0.00 | 0.00 | 0.00 |
| 8. Other Costs | 0.00 | 79,236.00 | 79,236.00 |
| TOTAL DIRECT COSTS (1–8) | 150,000.00 | 949,101.50 | 1,099,101.50 |
| 9. Indirect Costs | | | 0.00 |
| TOTAL COSTS (Direct and Indirect) | 150,000.00 | 949,101.50 | 1,099,101.50 |

Project Funding for the Entire Grant Period

| | |
|--------------------------------------|--------------|
| 1. Grant Funds Requested from IMLS | 150,000.00 |
| 2. Cost Sharing: | |
| a. Cash Contribution | 842,651.50 |
| b. In-Kind Contribution | 106,450.00 |
| c. Other Federal Agencies* | |
| d. TOTAL COST SHARING | 949,101.50 |
| 3. TOTAL PROJECT FUNDING (1+2d) | 1,099,101.50 |
| % of Total Costs Requested from IMLS | 14.00% |

* If funding has been requested from another federal agency, indicate the agency's name: