

Dear Colleague:

LIVING COLLECTIONS
Summer, 2001

Enclosed please find sample narratives, schedules of completion, and summary budgets from three successful applications from the 2001 IMLS Conservation Project Support (CP) grant competition.

The attached samples were selected because they demonstrate how individual institutions with different conservation needs successfully developed projects that address those needs. We feel these narratives are logically and clearly presented, and give sufficient information to support the request.

This packet contains three samples that represent different types of conservation projects. 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 the highest institutional priority for collections care.

In addition, there are four samples of funded education components. We hope that these samples give you the impetus to partner with your staff educators to develop your own creative way to educate the general public about your conservation project.

The samples included in this packet are listed on the back of this letter.

No endorsement by IMLS of any personnel, conservation facilities, private firms, or conservation procedures and methods identified in the narratives should be assumed.

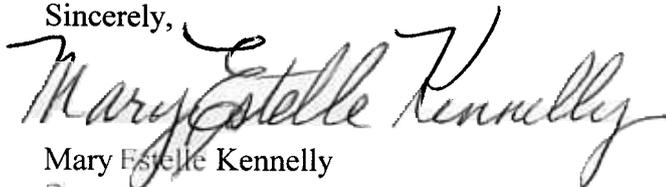
I hope that these sample narratives will be useful to you as models for structuring a proposal for your conservation needs. IMLS program staff is available at (202) 606-8539 or imlsinfo@imls.gov, and will be happy to discuss any questions you have as you develop your proposal.

The application deadline for the 2001 Conservation Project Support grant program is:

October 15, 2001

Applications for CP are available from the IMLS Web site (<http://www.imls.gov>), or by calling IMLS at 202-606-8539. We look forward to receiving your application.

Sincerely,



Mary Estelle Kennelly
Director

Office of Museum Services



INSTITUTE
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SERVICES

Sample Conservation Projects: Living Collections

<u>Project Type</u>	<u>Museum</u>	<u>State</u>	<u>IMLS Award</u>	<u>Match</u>	<u>Total Project Costs</u>
General Survey	Denver Botanic Gardens	CO	\$10,320	\$12,815	\$23,135
Environmental Survey	Mendocino Coast Botanical Gdns.	CA	\$30,899	\$42,323	\$73,222
Research	Zoo Atlanta	GA	\$52,638*	\$58,047	\$110,685

*This figure includes \$9,968 for an education component

Sample Education Components:

<u>Museum</u>	<u>State</u>	<u>Education Award</u>	<u>Total Grant Award</u>
Nebraska State Historical Society	NE	\$4,369	\$39,375
Riverside Municipal Museum	CA	\$4,435	\$39,005
Science Museum of Minnesota	MN	\$9,975	\$53,915
Zoo Atlanta	GA	\$9,968	\$52,638

DENVER BOTANIC GARDENS: NARRATIVE QUESTIONS

1. What is the design of the project?

Denver Botanic Gardens (DBG) requests \$10,320 grant from the Institute of Museum and Library Services to conduct a general conservation survey of its living and nonliving systematics collections, its grounds, and its facilities during 2001. DBG holds diverse collections, which include 15,100 living species, and 56,000 nonliving systematics specimens in vascular plant and mycological herbaria, on its 23-acre site in central Denver. DBG's collections are displayed throughout the grounds and in a tropical conservatory. Six greenhouses provide collections storage and propagation areas. Over DBG's fifty-year history, its collections have expanded considerably and undergone a number of improvements in care and storage. Recent renovations have greatly improved DBG's ability to display and conserve its collections. In 1998, DBG redesigned its tropical conservatory to not only improve the plant displays, but more importantly, to replace outdated electrical and mechanical systems and improve access to the facility for those with disabilities. In 2000, DBG underwent major renovations to its outdoor gardens to create more stunning displays and to incorporate a greater number of native, rare, and endangered plants, and, in December, DBG will open a new research facility that will house the nonliving systematics collections, making these collections more accessible to staff and visitors. In the near future, DBG will make major improvements to its greenhouses, which are outdated and needing extensive repairs to ensure that collections storage is optimal.

With recent improvements in the grounds and facilities and with plans for the future, this is the ideal time for DBG to conduct a general conservation survey to establish standards and priorities for collections care and to ensure conservation of both living and nonliving collections. The overall objective of the general conservation survey is to provide the necessary detailed information concerning the general conditions of the collections, to identify strengths and weaknesses in the collections, to create standards for care, and to establish future conservation priorities. Without a general conservation survey, the efforts of the collections staff may be compromised. DBG will use the survey report to develop a Long-Range Conservation Plan, which is essential to support future acquisition and conservation of all collections.

DBG will undertake four primary activities in 2001 to complete the general conservation survey. A collections team from DBG consisting of the Director of Research and Conservation (systematics), Director of Horticulture, and the Curator of Collections (living collections) will work with three project consultants to complete the project: Dr. Dieter Wilken, Vice-President for Programs and Collections at the Santa Barbara Botanic Garden (project leader, general facilities and grounds, and outdoor living collection surveyor); Dr. Ron Hartman, Curator of the Rocky Mountain Herbarium (systematics collection surveyor), and Charles Hubbuch, Director of Plant Collections at Fairchild Tropical Garden (indoor collection surveyor) (Attachment 1 and 2). The survey team consists has been chosen to address the diversity of DBG's collections and to include individuals who are well-versed in Rocky Mountain regional flora, systematics collections, and tropical species. Curators and managers of individual collections (such as orchids, water lilies, etc.) will interface with the survey team as needed.

Activity 1: Update inventories (10/1/00-5/1/01). Before the proposed grant period begins, a team of DBG's collection staff will work with DBG's Plant Records Department, which oversees all acquisitions, accessions, and deaccession records, and conducts inventories, maps plantings, and creates display labels, to update current inventories of the living collections. Using updated lists from DBG's collections database, *BG-BASE*[™] for all taxa in the living collections, collections staff will record the presence/absence of all taxa, as well as add any new taxa since the last inventory. These inventories will form the core data set for the living collections. The systematics collections will be surveyed in the existing herbarium cases and updated on *BG-BASE*[™].

Activity 2: General Conservation Survey (June 2001). In June 2001, a three-member team led by Dr. Dieter Wilken will conduct a survey of DBG's living and nonliving collections. The diversity of DBG's collections necessitates this large team to ensure that each collection is afforded the proper expertise and a thorough review. In addition to surveying the outdoor living collections, Dr. Wilken will be responsible for addressing all general institutional issues. Charles Hubbuch will survey the indoor and tropical collections and Dr. Ron Hartman will survey the herbarium collections. The survey team will be onsite for three days to complete the survey. Each survey team member will use a survey form template drawn from AIC and NIC recommendations (Attachment 4). After completing the onsite survey, Dr. Wilken will compile the survey results and complete a formal report, which will be the basis for DBG's Long-Range Conservation Plan.

Activity 3: Staff Training (June 2001). At the end of the three-day general conservation survey, consultants will hold a half-day workshop for DBG collections staff, which includes the Research and Conservation staff and the Horticulture staff. Dr. Wilken will lead a general session on collections care standards. Each consultants will then work with smaller groups to discuss specific methods for each collection area—outdoor, indoor, and systematics.

Activity 4: Long-Range Conservation Plan (12/01/01 – 4/30/02). Once DBG staff receives the general conservation survey report, they will begin developing the Long-Range Conservation Plan. Working with DBG's Executive Director, the team will identify institutional strengths and weaknesses, develop standards for collections care, establish conservation priorities, and create a comprehensive plan that prioritizes conservation and preservation projects. The plan will include priorities for the next ten years, identifying those priorities that can be accomplished through DBG's normal operating budget and those which will require additional funding. Potential sources of funding for each project will be included in the plan. Once the plan is finalized, it will be presented to the Board of Trustees for approval and coordination with broader institutional priorities. The Board will be updated on a regular basis on progress toward goals. The plan will be revisited each year to reassess accomplishments and priorities.

2. What is the object(s), historic structure(s), or specimen(s) that is the focus of this project?

Nonliving Systematics Collections

Denver Botanic Gardens holds 56,000 specimens in its nonliving systematics collections, which are comprised of two distinct areas—vascular plants and mycology. The Kathryn Kalmbach Herbarium (vascular plants) holds nearly 36,000 specimens (including 5,000 specimens donated by the University of Denver). A large majority of the specimens are native to Colorado with many representing plants from the Front-Range area that stretches from Colorado Springs to Fort Collins. Taxonomic strengths include *Carex*, *Penstemon*, *Astragalus*, *Poaceae*, *Orchidaceae*, and *Brassicaceae*. DBG actively collections new specimens with approximately 1,000 new accessions each year. Staff are also developing a working herbarium of all the vascular plant taxa found in Rocky Mountain National Park for the National Park Service.

The Herbarium of Fungi holds nearly 20,000 specimens, mostly from Colorado, with particular strength in *Basidiomycetes*, *Ascomycetes*, and *Myxomycetes*. Each year, about 500 specimens are accessioned and all accessions are documented with 35mm slides taken *in situ*. DBG is working to link the accession records and slides using *BG-BASE™*, thus enabling users of an online collections database to identify the taxa. This collection represents one of the few existing mycological herbaria in western North America.

DBG's systematics collections are a significant resource for the community. Herbaria staff regularly participate in the production of popular field guides, in plant identification for the public, in the Colorado Mycological Society mushroom fair, and in poison center calls. Several federal agencies, including the

Bureau of Land Management, the U.S. Forest Service, and the National Park Service routinely use these collections as do national and international visiting scientists who are conducting inventories of Colorado habitats.

Living Collections

DBG's living plant collection consists of 15,100 inventoried species, 9,800 in outdoor environments, and 5,300 in protected environments and the tropical conservatory. This diverse plant collection includes strong representation from the five ecological zones of the Rocky Mountain region: plains, foothills, montane, subalpine, and alpine. Significant displays of native, rare, and endangered plants are included in the Plains, Montane, Rock Alpine, Colorado Quartet, and Wildflower Treasures gardens. Through the PlantSelect program, DBG collaborates with Colorado State University to seek out, display, and distribute the very best plants from the intermountain region to the high plains. DBG also has extensive collections from similar climates in the Eastern and Southern Hemispheres. Significant collections under glass are the orchids, bromeliads, and waterlilies. The orchid collection has more than 963 taxa, in more than 180 genera. One highlight of this collection is *Stanhopea* and *Encyclia* from Mexico. The waterlily collection of the genus *Nymphaea* represents one of the largest cultivated collections in the world with over 20 species and 320 cultivars. In 1983, DBG initiated the world's first water garden society. Today, DBG works closely with the world's most prominent hybridizers within and outside of the United States in evaluating and introducing new hybrids. DBG has recently been appointed to the position of Registrar for Nymphaeaceae by the International Waterlily and Water Gardening Society. In addition, DBG tropical conservatory holds a collection of plants that emphasizes the ecology, natural resources, and the diversity of life in one of the worlds' most threatened ecosystem.

3. How does the project relate to your museum's ongoing conservation activities?

DBG was reaccredited in 1997 by the American Association of Museums, and is one of only 12 botanic gardens with this honor. Its mission is to be the leader in the stewardship of Rocky Mountain regional landscape and to encourage and increase the public's enjoyment and knowledge of plants and horticulture. Hence, DBG works to acquire an unequaled collection of plants from the Rocky Mountain region and similar regions around the world. Each year, DBG acquires about 2,000 new accessions for its living collection. Currently, DBG's approach to the care of the living collections has been adequate for basic maintenance, however, environmental conditions in the greenhouses have been especially challenging with a constant loss of heat and humidity that causes environments that are difficult to manage and control. DBG employs curators and horticulture staff who specialize in the physical care of the collections. These individuals are responsible for the routine horticultural care and repropagation of the collections. All aspects of the care and maintenance of the systematics collections are performed by the manager of the vascular plant herbarium and the associate curator of the herbarium of fungi. Herbarium specimens are mounted on acid-free pape and stored in archivally-sound storage cabinets.

Currently, DBG maintains separate non-public databases for the living plant collections, the vascular plant herbarium, and the herbarium of fungi. Since 1990, the Gardens has employed the use of the widely adopted collections management software *BG-BASE™*, and so far, has succeeded in documenting a large part of its collections. A permanent record, consisting of the accession number, scientific and common names, author, source, origin, date of acquisition, and garden location is maintained in the database for each plant in the collection. In addition to the records held in the database, work has begun on digitizing and barcoding specimens held in the Kathryn Kalmbach Herbarium. These images will not replace the actual specimens, but rather enhance and supplement vascular plant records.

Over the last year, DBG has worked to improve its collections management capabilities by adding a Plant Propagation module to *BG-BASE™* to organize and record all related data concerning the propagation of

the living plant collections. Curators of the living collection are responsible for providing updated inventories of their collections to the Plant Records Department. In addition, the contents of the living collections and herbaria were released on the World Wide Web in June 2000. For the first time ever, DBG offers online visitors access to the collections database. The online database is updated monthly with thousands of changes occurring between each update. The collections database can be searched as part of a multi-site that is a result of coordinated data from a group of twenty botanic gardens and arboreta. The website is hosted by the Royal Botanic Gardens, Edinburgh.

4. What are the anticipated benefits of this project?

The results of the general conservation survey become the blueprint that DBG will use to create a Long-Range Conservation Plan, which is crucial for the ongoing care, management, and conservation of DBG's collections. Initially, the strengths and weaknesses in environmental conditions and overall health of the living collections should be clearly identified. The general survey will define critical areas, such as staff development training, conservation problems, or collections policies management, that must be strengthened for DBG to develop and implement the highest horticultural standards.

5. How will the applicant ensure that ongoing museum functions are not inhibited by these project activities?

The general conservation survey is an integral step in the management and care of all of Denver Botanic Gardens collections, and thus, is an integral part of the jobs of its all staff dealing with collections issues. Although there will be a time commitment required from collections team (Director of Research and Conservation, Director of Horticulture, and Curator of Collections), the executive director, the horticulture staff, and the research staff, that commitment should be minimal for each individual and should not inhibit the ongoing operations of any department or of the organization as a whole. Denver Botanic Gardens is committed to allocating sufficient resources to the project and will contribute the necessary staff time to ensure the project is well managed and well executed. DBG's cost share will total \$12,815 or 55% of the total project costs.

Through the Long-Range Conservation Plan, DBG will identify activities that will become part of the organizations general operations. This plan will also identify those priorities that will require additional funding and possible funding sources for completing these projects. DBG will seek funding through federal grants (IMLS and other appropriate agencies), local and state government, private foundations, corporations, and individuals.

6a. What are the proposed conservation methods and why are they conservationally sound?

DBG will undertake the general conservation survey as a method of analyzing its current collections care and conservation methods, the general condition of its facilities and grounds, and as a means to create a long-term plan for further improving its methods. DBG has chosen highly qualified consultants to participate in the project to ensure that the survey will meet the highest conservation standards. Each project consultant brings both specific expertise in an area of DBG's collections as well as knowledge and experience in the latest conservation methods for living and nonliving plant collections. In addition, DBG will ask that the consultants use a survey format that is widely used and accepted in the field.

DBG has allotted three days for the survey to allow enough time for a thorough survey, yet guarantee that the project is efficient and manageable. On the first day of consultants' visit, they will meet with the project team, other relevant staff, and the Executive Director before conducting a general review of conditions, staffing, policies, and practices. On the second day, each consultant will work individually with the project team member which corresponds with their area of expertise. During this time, the consultants will do in-depth review of each collection area. On the third day, the consultants will complete any additional review of collections, grounds, and facilities, and then lead a half-day workshop

for DBG collections staff. Following the visit, Dr. Wilken will compile the results of the survey and complete a formal report to be submitted to DBG.

6b. Describe your rationale for the proposed training curriculum:

On the final day of the general survey, the consulting team will conduct a half-day workshop for DBG staff and volunteers who work with both living and nonliving systematics collections. These staff and volunteers consist of five collection curators, approximately thirty horticultural specialists, five herbaria and research staff, the plant records manager, and volunteers who regular work in collections care. The consulting team brings a wealth of experience and expertise in collections care and management to the project and DBG is eager to benefit from this expertise. DBG envisions a two-part workshop that will include a general overview of best practices in plant collection care by Dr. Dieter Wilken followed by smaller sessions pairing the appropriate DBG staff with the appropriate consultant. The smaller session will allow for specialized instruction on specific collections and specimens. DBG will ask that each presenter provide overview materials that can be used as reference to staff.

7. How does the project budget support the project goals and objectives?

The project budget reflects the estimated costs for conducting the general conservation survey, holding a half-day workshop on collections care, and developing a Long-Range Conservation Plan. DBG worked with each consultant to determine appropriate fees for their onsite and offsite work. Travel costs are based on current federal government mileage rates (.31/mile), current airfare rates (from Miami to Denver and from Santa Barbara, CA to Denver), and local hotel rates (\$130/night). Per diem costs are based on DBG's daily rate of compensation (\$45/day). All salary and fringe benefit costs are based on actual salaries and fringe benefits for all individuals involved in the project. The hourly wage for staff who will participate in the workshop session is based on an average hourly wage for those employees. DBG currently does not have a federally negotiated in-direct cost rate agreement and will therefore use a rate of 10% of the direct costs. If the project is funded, DBG will work to negotiate a rate with an appropriate federal agency.

8. What are the qualifications and responsibilities of the project personnel?

Dr. Carol Dawson, Director of Research and Conservation, has led DBG's research efforts since 1987. She brought over nine years of experience conducting applied biological research for a major oil company. As Director of Research and Conservation, Dr. Dawson coordinates the growth and improvement of DBG's research efforts, focusing on the study of the demography and ecology of rare plants species. She also develops strategies for collecting and maintaining native plant species, promotes public awareness through lectures and interpretive literature, and develops partnerships with universities and government agencies. She oversees research staff, the mycology department, and the vascular plant herbarium. Dr. Dawson will serve as the project director for the general conservation survey. She will oversee and coordinate all project activities as well as be an integral part of the collections team, which will create the Long-Range Conservation Plan. She will also serve as the contact for the nonliving systematics collections and will work closely with Dr. Ronald Hartman during the collection survey.

Rob Proctor, Director of Horticulture, joined DBG in 1999. Mr. Proctor is a world-renowned horticulturist who specializes in Colorado plants, garden design, container gardening, and vegetable gardens. As the Director of Horticulture, he is responsible for managing all aspects of horticulture including gardens, collections, and displays. He also works to improve the standards for gardens maintenance and establishes uniformly high design standards. Mr. Proctor will be part of the collections team and will work to establish the Long-Range Conservation Plan. He will work with Dr. Dieter Wilken and Mr. Hubbuch during their survey of the living plant collections on the grounds, in the greenhouses, and in the tropical conservatory. He will also help coordinate the involvement of specific collection curators as needed.

Panayoti Kelaidis, Curator of Collections, is a renowned horticulturalist, photographer, and plant collector, has been with DBG since 1980, serving first as Curator of the Rock Alpine Garden until 1999 and then as Curator of Collections since that time. Mr. Kelaidis is responsible for the inventory, maintenance, and integrity of DBG's entire living collection. During his tenure at DBG, Mr. Kelaidis has contributed greatly to the growth of DBG's collections by conducting dozens of expeditions throughout the western and central United States. He has published over 100 articles in horticultural publications and has received many prestigious awards including the Arthur Hoyt Scott Garden and Horticulture Award from the Scott Arboretum of Swarthmore College. Mr. Kelaidis will be part of the collections team and will help develop the Long-Range Conservation Plan. Mr. Kelaidis will work closely with Rob Proctor, Dr. Wilken, and Mr. Hubbuck during the survey of the living collections on the grounds, in the greenhouses, and in the tropical conservatory.

Dr. Brinsley Burbidge, Executive Director, joined DBG in 1999 after serving as the Executive Director of Fairchild Tropical Garden in Florida for four years. Dr. Burbidge brought a wealth of experience, having had previous positions in administration, education, and marketing with the Edinburgh Botanic Gardens in Scotland and the Royal Botanic Gardens at Kew. As DBG's Executive Director, he provides leadership, management, and direction to personnel, programs, and facilities. During this project, Dr. Burbidge will work with the collections team to develop and finalize the Long-Range Conservation Plan. He will also be responsible for presenting the plan to the DBG's Board of Trustees and helping to integrate the plan into the institutions long-range plans and goals. His contribution to this project will be included in the in-direct portion of the project.

Dr. Dieter Wilken, Lead Consultant, is the Vice-President for Programs and Collections at the Santa Barbara Botanic Garden. He is responsible for all programs in horticulture, education, and research. He manages the senior staff in Education and Horticulture, the Library, and the Herbarium. He also manages the Garden's program in plant conservation, in cooperation with the Center for Plant Conservation. He has consulted on recovery plans for endangered species, plant identification, and distribution patterns of native flora of California. Dr. Wilken will be responsible for coordinating and compiling the general survey, writing the final survey report, and conducting the survey for DBG's outdoor collections, general facilities, and grounds. He will also lead the staff training, focusing on general collections care session and on a small group session on outdoor collections care.

Dr. Ronald Hartman, Herbaria Consultant, is the Curator of the Rocky Mountain Herbarium, including the National Herbarium of the U. S. Forest Service and the W. G. Solheim Mycological Herbarium at the University of Wyoming. He is the principal investigator on more than thirty-eight major floristic studies in the Rocky Mountains, with over 360,000 numbered collections and 380,000 specimens databased. He teaches numerous classes for the Botany Department, including Taxonomy of Vascular Plants, Plant Biosystematics, Botanical Description and Nomenclature, and Herbarium Curatorial Techniques. During the project, he will evaluate the systematics collections and conduct a small group training session on systematics collections care.

Charles Hubbuck, Indoor Collections Consultant, is the Director of Plant Collections at Fairchild Tropical Garden in Miami, Florida. He is responsible for the direction of the horticulture department, supervision of on-site and community horticultural activities, development of new exhibits, oversight of plant society activities at Fairchild, coordination of the internship program, and leadership of the Horticultural Committee with Board of Trustees members. He has extensive field experience around the world with tropical plants, especially in palm and cycad identification. During the survey, he will evaluate the greenhouse and conservatory collections and conduct a small group training session on indoor collections.

Project Budget Form

SECTION 3: SUMMARY BUDGET- CP AND EDUCATION COMPONENT

Name of Applicant Denver Botanic Gardens

IMPORTANT! READ INSTRUCTIONS IN PART 4 BEFORE PROCEEDING

DIRECT COSTS	IMLS	MATCH	TOTAL
SALARIES AND WAGES <i>(PERMANENT STAFF)</i>	_____	<u>8,780</u>	<u>8,780</u>
SALARIES AND WAGES <i>(TEMPORARY STAFF HIRED FOR PROJECT)</i>	<u>-</u>	_____	_____
FRINGE BENEFITS	_____	<u>1,932</u>	<u>1,932</u>
CONSULTANT FEES	<u>6,700</u>	_____	<u>6,700</u>
TRAVEL: DOMESTIC	<u>3,120</u>	_____	<u>3,120</u>
FOREIGN	<u>-</u>	_____	_____
SUPPLIES & MATERIALS	<u>500</u>	_____	<u>500</u>
SERVICES	_____	_____	_____
OTHER	_____	_____	_____
TOTAL DIRECT COSTS	<u>\$10,320</u>	<u>\$ 10,712</u>	<u>\$21,032</u>
INDIRECT COSTS*	<u>\$ _____</u>	<u>\$ 2,103</u>	<u>\$ 2,103</u>
			TOTAL PROJECT COSTS
			<u>\$23,135</u>
AMOUNT OF CASH—MATCH			<u>\$ 12,815</u>
AMOUNT OF IN-KIND CONTRIBUTIONS—MATCH			<u>\$ _____</u>
TOTAL AMOUNT OF MATCH (CASH AND IN-KIND CONTRIBUTIONS)			<u>\$12,815</u>
AMOUNT REQUESTED FROM IMLS			<u>\$10,320</u>
PERCENTAGE OF TOTAL PROJECT COSTS REQUESTED FROM IMLS (MAY NOT EXCEED 50%)			<u>45 %</u>

Have you received or requested funds for any of these project activities from another Federal agency? (please check one) Yes No

If yes, name of agency _____ Date _____

Amount requested \$ _____

1. WHAT IS THE DESIGN OF THE PROJECT?

Mendocino Coast Botanical Gardens (MCBG) requests funds to map its plant collections. The project includes the purchase and installation of BG-Map, an AutoCAD based mapping system designed to interface with BG-Base, our plant records database. Specific project activities are as follows. The first step is conversion of existing site maps (including property boundaries, elevation contours, streams, buildings and major trails data) into a digital basemap. During this initial phase of the project, we will also be installing survey monuments in strategic locations around the Gardens. These monuments, which will serve as reference points for mapping our collections, will be surveyed by a local professional to establish accurate x,y,&z (latitude, longitude and elevation) data for each monument location. Equipment purchases during this period include an electronic total station (ETS) for data collection and a plotter for production of paper maps. The next phase involves the project consultant's site visit for BG-Map software installation and training. When all equipment and software are in place, data acquisition can begin. This is accomplished by setting up the ETS over a monument (representing a known point), calibrating the ETS by sighting another known point, and then sighting and "capturing" plant location data. Data is logged to a Hewlett Packard 200LX handheld computer, mounted on the ETS tripod. Following this, data is downloaded from the handheld to a desktop computer and placed into the BG-Map/AutoCAD system. Once training is complete, the Gardens' Plant Recorder will map our collections, with assistance from interns and volunteers. As will be discussed below, the mapping project will be used to upgrade our records and collections. Once this is done, the final phase of the project involves placement of our records on BG-Base's internet based multi-site search engine.

The ultimate goal of this project is to complete a thorough inventory of our collections. We see this as a tripartite process that involves our database, labeling and the mapping of our collections. The Stanley Smith Horticultural Trust funded our acquisition of BG-Base a little over a year ago. Since that time we have worked to tie our field collections to previously existing paper records and enter that information into BG-Base. 90% of this phase is complete. Approximately six months ago, the Gardens purchased a computerized engraving system that allows us to produce both permanent accession and display labels. Now that our database records and permanent accession labels are in place, we seek to add the third leg of our documentation system, the mapping of our collections. That is the objective of the proposal before you.

This proposal calls for Mark Glicksman, developer of BG-Map software, to be on-site for three days, in addition to 30 hours of off-site work, preparing base maps. Kristina Van Wert, MCBG Plant Recorder, will spend 40% of her time the first year and 25% of her time the second year on this project, for a total of 1352 hours. In addition, Executive Director Rich Owings anticipates spending a total of 120 hours on this project.

The schedule of completion calls for us to begin immediately upon notification of award. Preparation of base maps, the purchase of critical components (total station, plotter, software) and the installation and surveying of monuments will take approximately two months. Software installation and training will proceed as soon as these prerequisites are met. Once this is done, surveying of collections will begin in earnest. Just like

gardening, a plant recorder's work is never finished, though we should have well over 90% of our collections surveyed by the time winter rains arrive in November 2002. Remnant, unmapped plants will probably be those in remote locations, or "problem" specimens which turn up during the mapping process (e.g., specimens without an accession number). Plants in the latter category that cannot have their collections data verified will become candidates for removal.

Products include computer and paper-based maps, though the ultimate product is the continued improvement of our collections' documentation. Field surveys are an essential step in the process, allowing plants to be checked against other forms of documentation, ensuring that all of the Gardens' collections match their records. It will also assure correct nomenclature and lead to the removal of unverified plants. By doing so, this project will have benefits that go far beyond documentation. Since many of the Gardens' 40 year-old plantings are on a tight spacing and overgrown, removal of undocumented specimens will improve environmental conditions for the remaining collections. Resolution of identification, source and nomenclature issues will enhance interpretive efforts and have a significant impact on the conservation value of our *ex situ* collections. Many rare species are held in our collections, especially in our tender species rhododendrons. The continued verification activities supported by this grant will have an enormous impact on the quality of these collections. For plants that are verified to be documented wild origin species material, our records will be placed on the internet, allowing the international botanical and horticultural community access to this information. For species that cannot be verified as documented wild origin, we will immediately begin an effort to seek propagules that will allow us to upgrade these holdings.

To protect our collections from root damage caused by installation of survey monuments, the monuments will not be placed on a rigid grid system. They will instead be placed at strategic locations around the Gardens that allow for the best visibility of collections and where they generally will not interfere with plantings (i.e., in locations away from major roots, at the edge of paths, etc.). BG-Map will in many cases protect plants from damage and enhance their health, since we will be able to track the location of underground utilities and minimize unnecessary digging. Plant health will also be enhanced as overgrown specimens of little or no value are removed, reducing competition for sunlight and other resources.

2. WHAT IS THE OBJECT(S), HISTORIC STRUCTURE(S), OR SPECIMEN(S) THAT IS THE FOCUS OF THIS PROJECT?

Currently our records show that we have 1946 accessions, with 2237 individual specimens. Approximately 75% of these are woody plants, the object of our mapping efforts. Rhododendrons are the Gardens' signature plant, with 976 separate accessions and 1179 individual specimens.

These specimens are the heart of our collections. They include tender rhododendron species uniquely suited to our climate. This group includes many rare species that cannot be grown in North America outside a narrow range along the Northern California coastline. With many of these species endangered or threatened in their native habitats in

Vietnam, Myanmar and other countries in Southeast Asia, this collection represents a globally important *ex situ* conservation effort. The documentation needs of this collection alone justify our mapping efforts. Other collections include species fuchsias, camellias, heaths and heathers, Mendocino County Heritage Roses, bigleaf rhododendrons, and Mendocino Coast rhododendrons. Several of these collections have significant conservation value as well.

Our mission is to interpret, display and nurture our unique gardens and the ecology of the Mendocino Coast. As such, we have programs in the areas of display, conservation and education, both in terms of our gardens and the natural environment. Our coastal location with its maritime climate is what makes us truly unique, allowing the cultivation of tender species rhododendrons and a wide range of mediterranean flora. Mediterranean plants are native to California and other areas with a similar climatic pattern, defined by wet winters and dry summers. Though fortunate to be able to grow a wide range of taxa, the Gardens strives to limit its collections to those uniquely suited to our climate and/or those with historical significance. This latter group is exemplified by taxa that have been the focus of the Mendocino Coast gardening community for generations, including fuchsias, rhododendrons and our heritage roses.

As can be seen, our collections are of and about the Mendocino Coast. Some *ex situ* collections, such as our mediterranean plants, address the horticultural opportunities provided by the climate of our broader region. Our tender species rhododendrons represent a nationally and internationally significant germplasm reservoir. With six native plant communities on-site, including eight rare native species, preservation of our indigenous flora is also a very important conservation goal. While it would be very difficult to map all of these holdings, the proposed mapping system will help us record locations of our rarest natives, and assist in efforts to restore and interpret these plant communities in many ways.

NOTE: This project includes training on BG-Map related equipment and software. After consulting with IMLS, it was determined that this did not fit their description of a training project or a major training component, which generally involves treatment of collections. Hence, there is no additional discussion of it here, nor is question 6b included in this text.

3. HOW DOES THE PROJECT RELATE TO YOUR MUSEUM'S ONGOING CONSERVATION ACTIVITIES?

We have significantly upgraded our conservation activities in the last few years. Prior to 1998 record keeping was intermittent, using various software packages customized at the Gardens. In late 1998 the Gardens was awarded a \$19,930 grant from the Stanley Smith Horticultural Trust to upgrade documentation. A decision was made to use BG-Base, the most common standardized plant records database in the world, currently used by 126 gardens world-wide. In 1999 we hired the Gardens' first Plant Recorder. Though initially grant funded, this position has been successfully transitioned to our operating budget as permanent staff. During the past year we have evaluated over 90% of previously existing paper and computer based records, and begun to link them to collections in the field through a laborious process of hand mapping. The recent addition of permanent accession labels greatly reduces the possibility of lost documentation.

Our top priority for collections' conservation is to complete our inventory efforts by thoroughly mapping the collections. Though some of this has been done by hand, the process is difficult, prone to inaccuracies and does not allow us to link database records to a precise location, but only to a general bed location. The BG-Map system will allow us to locate plants to within 0.1 inch. The ultimate conservation benefit is not necessarily the accuracy of such records however. For this project, the process and the product are inextricably linked. By verifying locations of specimens and correlating them with our accession records, we will be able to authenticate many of our holdings and prioritize others for replacement with better documented specimens.

Last year we invited Dr. Linda McMahon, former Executive Director of the Berry Botanic Garden, to assess the status of our conservation efforts under the Conservation Assessment Program (CAP). Her recommendations included continued improvement of record keeping, securing funding for plant records, permanent accession labels, and computer based mapping, once financial resources become available.

According to the IMLS Conservation Project Support Guidelines, the CAP report is the equivalent of a general conservation survey. We are pleased to report that we have accomplished all of Dr. McMahon's collections management recommendations other than establishment of a computerized mapping system.

Mapping of collections has been documented as our greatest collections care need. This need is especially compelling since we have 47 acres of property to track.

4. WHAT ARE THE ANTICIPATED BENEFITS OF THIS PROJECT?

This project will benefit us by upgrading our documentation practices to botanical garden standards. For our audience, the results are far reaching. From ensuring the correct nomenclature on display labels, to allowing us to generate many types of interpretive maps, this project will enhance interpretation in multiple ways. But the impacts go beyond such direct benefits. This project will ultimately result in decisions to remove and replace poorly documented specimens that are crowding more valuable ones. The Gardens were planted 40 years ago, on the tight spacings commonly used in young gardens. As often the case, thinning has not been as ruthless as it should have been and the health of our collections are now in jeopardy. By enabling the verification process to move forward, your support will ensure that critical decisions are made with sound information to back them up. Our audience includes nursery professionals and plant breeders, to whom accurate nomenclature, origin and other accession data is critical. On a larger scale, the public garden community, conservationists and humanity in general will benefit from the conservation of the rare and endangered species represented in our collections. There are many collections management benefits to this project as well, though space limitations preclude a detailed listing.

In addition to the benefits described above, once the bulk of our mapping and verification activities are complete, MCBG will place its plant records database on the multi-site search engine for BG-Base. In doing so, we will be joining 17 other gardens (as of October 10, 2000) who are making their collections data available on the internet. If the

education component of this project is approved, we will also be placing a kiosk with a touch screen monitor near our entrance to enable visitors to search our holdings and print maps allowing them to locate specific plants or collections they wish to visit.

5. HOW WILL THE APPLICANT ENSURE THAT ONGOING MUSEUM FUNCTIONS ARE NOT INHIBITED BY THESE PROJECT ACTIVITIES?

The bulk of the Gardens' match will come in the form of our Plant Recorder's time, which is split between plant records and gardening, with approximately 50% devoted to each. This is intentionally flexible, since the seasonal requirements of each duty quickly change. Our Plant Recorder spent her first year setting up systems, transferring records to BG-Base and producing labels for our collections. Now in her second year we are dedicating most of her plant records time to mapping of the collections. Far from inhibiting garden activities, your support of this project will allow us to meet our goals for the coming two years and increase the overall efficiency of our documentation efforts.

6a. WHAT ARE THE PROPOSED CONSERVATION METHODS AND WHY ARE THEY CONSERVATIONALLY SOUND?

MCBG's Executive Director had extensive experience with BG-Map during his 10 years as Horticulturist at The North Carolina Arboretum. He considers BG-Map, in combination with the Electronic Total Station (ETS), to be the most efficient means of collecting location data currently available to us. Although Global Positioning Satellite (GPS) technology could be used, we consider an ETS to be faster and much better at collecting data under canopy. ETS setup does add some time to the process, but once this 15 minute operation is done, data collection is rapid.

In past experience with BG-Map, the writer of this proposal has found all hardware (including ETS and the field data collector) and software (AutoCAD and BG-Map) to be extremely reliable. In addition, BG-Map has provided superior support, including continual enhancements and upgrades.

Perhaps the most innovative part of this project will come at the end, when we will join only 17 other gardens who jointly post their collections data on BG-Base's multi-site search engine.

BG-Map is the most common collections mapping software in the world, in use at 25 public gardens. This is likely to increase in the future as it builds on BG-Base, the most common botanical gardens database, currently used at 126 institutions worldwide. BG-Map links intimately with BG-Base and effectively functions as a geographic information system, allowing maps to be sorted anyway the database can.

This system has few, if any, safety issues, to either collections, staff or visitors. The flexibility allowed in locating survey monuments ensures that significant root damage can be avoided.

7. HOW DOES THE PROJECT BUDGET SUPPORT THE PROJECT GOALS AND OBJECTIVES?

The budget was developed on the basis of a proposal supplied by BG-Map. The proposal included information on all additional items and services MCBG would be responsible for providing.

Standard BG-Map costs paid by all gardens purchasing the system were supplied in the quote referenced above. All other hardware and software expenses were priced at multiple dealers to determine the lowest possible cost. Where possible (e.g., with AutoCAD), governmental/educational price discounts were utilized. Survey expenses required to locate reference monuments were placed on competitive bid. Labor costs were determined by estimating the actual number of hours required to implement the project activities. Actual personnel costs were used for Garden staff. Volunteer labor was valued at \$7.00 per hour and intern assistance at \$10.00 per hour.

8. WHAT ARE THE QUALIFICATIONS AND RESPONSIBILITIES OF THE PROJECT PERSONNEL?

Mark Glicksman, developer of the BG-Map Botanical Garden Mapping System/GIS is the only consultant involved in the project. His responsibility is to create an AutoCAD base map of the Gardens (using existing survey maps), provide and install BG-Map software, provide a Hewlett Packard 200LX handheld computer preloaded with Total Station Interface and Garden Notepad software, train the staff in use of the system, and provide a user's manual along with one year and three months of support. As developer of BG-Map, Mr. Glicksman is uniquely qualified to do this work.

Kristina Van Wert, MCBG Plant Recorder, will be responsible for implementation of the BG-Map system at the Gardens. She will field map collections and adjoining landmarks, and will cross reference accessions data, location information and labeling. She will be responsible for supervising all volunteer, intern and staff assistance in the project. Ms. Van Wert's background includes cataloging National Park Service collections. Having entered years of MCBG collections data into BG-Base, labeled collections in the field, and initiated paper mapping of our collections, Ms. Van Wert is the ideal person to lead our mapping efforts. The Gardens are fortunate to have such a capable and motivated individual in this position.

Rich Owings, MCBG Executive Director, will be responsible for supervision of the Plant Recorder and will provide technical assistance as needed. Mr. Owings has 13 years of successful experience in collections documentation, including installation of both BG-Base and BG-Map at The North Carolina Arboretum.

These are the key project personnel. No other staff, volunteer or intern will have anything other than a supporting role in this project.

Project Budget Form

SECTION 3: SUMMARY BUDGET - CP AND EDUCATION COMPONENT

Name of Applicant Mendocino Coast Botanical Gardens

IMPORTANT! READ INSTRUCTIONS IN PART 4 BEFORE PROCEEDING

DIRECT COSTS	IMLS	MATCH	TOTAL
SALARIES AND WAGES <i>(PERMANENT STAFF)</i>		18,750.10	18,750.10
SALARIES AND WAGES <i>(TEMPORARY STAFF HIRED FOR PROJECT)</i>		12,210.00	12,210.00
FRINGE BENEFITS		3,475.61	3,475.61
CONSULTANT FEES	800.00		800.00
TRAVEL: DOMESTIC	1250.00		1,250.00
FOREIGN			
SUPPLIES & MATERIALS	26,867.70		26,867.70
SERVICES	6,245.00		6,245.00
OTHER	1,504.90		1,504.90
TOTAL DIRECT COSTS	\$36,667.60	\$ 34,435.71	\$ 71,103.31
INDIRECT COSTS*	\$ 0	\$ 6,887.14	\$ 6,887.14
			\$ 77,990.45
AMOUNT OF CASH—MATCH			\$ 1,000.00
AMOUNT OF IN-KIND CONTRIBUTIONS—MATCH			\$ 41,322.85
TOTAL AMOUNT OF MATCH (CASH AND IN-KIND CONTRIBUTIONS)			\$ 42,322.85
AMOUNT REQUESTED FROM IMLS			\$ 36,667.60
PERCENTAGE OF TOTAL PROJECT COSTS REQUESTED FROM IMLS (MAY NOT EXCEED 50%)			47% %

Have you received or requested funds for any of these project activities from another Federal agency? *(please check one)* Yes No

If yes, name of agency _____
 Amount requested \$ _____

Date _____

Zoo Atlanta
Georgia
Research

1. WHAT IS THE DESIGN OF THE PROJECT?

The proposed conservation project addresses the largest issue currently facing zoos in managing gorillas: the management of males in all-male groups. The overall objective is to identify variables associated with the long-term success of all-male groups. Specifically, we propose to conduct a multi-institutional study that will allow us to: 1) provide basic activity budget and social dynamics data on all-male groups; 2) look at behavioral differences between groups comprised of different age classes and with males of different rearing histories; 3) look for an effect of the physical and social environment on behavior within groups; 4) look for behavioral changes in group dynamics over time. At the present time, no scientific studies of captive all-male groups have been published, although Stoinski, Hoff, Lukas & Maple have submitted a paper comparing the behavioral profiles of all-male groups at Zoo Atlanta and Santa Barbara (1). Through the proposed study, the Gorilla Behavioral Advisory Group (GBAG) hopes to both increase our basic understanding of all-male groups and address applied issues surrounding their successful long-term management.

Project Activities

To provide the greatest sample size for our study, we intend to include all all-male groups in some aspect of the proposed project. All institutions housing all-male groups will participate in interviews designed to provide a high-level assessment of the impact of physical and social environments. A subset of institutions, representing 80% of males living in all-male groups, will be included in a more in-depth behavioral study. Institutions were selected either because of their unique situations (i.e. Como Zoo, Cleveland Zoo, and St. Louis Zoo with multiple silverbacks) or because they will provide us with a range of age classes (Zoo Atlanta, Santa Barbara, Memphis, Disney; see Appendix A). The males at these institutions represent 80% of males living in all-male groups. Data collection will begin between June 2001 and September 2001. Our short-term goal is collect at least two years of data on each of these groups and create a firm research base at each institution that will enable continued data collection in the future. Such a base will help us achieve our long-term goal of five years of data per group.

Training and Interobserver Reliability

All of the above institutions have already preliminarily agreed to participate in the study. The first task of this study will be to work with the institutions to set the ground work for the project. This ground work will include long-distance communication with institution's point person for the project, as well as their identified data collectors. This communication will include an overview of the project, as well as basic background on gorilla behavior, behavioral methodologies, and some basic data collection exercises that the data collectors can use to begin familiarizing themselves with the project. Next, an individual (either the project coordinator or research assistant) will spend four days at each institution. During the first day, s/he will train volunteers in the methodology used for data collection. Days Two and Three will be used to practice data collection with the data collectors. Initial reliability tests may be performed on Day Three. Day Four will be used to perform the final reliability tests. Additionally, during this time s/he will administer a questionnaire developed by GBAG on management and husbandry techniques and obtain video footage of the group. The same individual will travel back to the institution every six-eight months for two days (total of 3 additional trips) to perform repeat reliability tests with all data collectors, obtain more video, and present the preliminary results of the study at that point in time.

Data collectors will consist of staff and volunteers at the various institutions. We will ask that the number of data collectors at an institution be limited to 3 or 4, each of whom should make a commitment of at least 6 months to ensure consistency in data collection. Keepers will be permitted to collect data as long as they do not affect the behavior of the animals.

Data Collection and Analysis

Data collection will consist of four 30-minute sessions a week per institution for a total of 100 hours of data on each group annually. Observations will be balanced across the day with two morning observations (taken within two hours of gorillas first occupying their exhibit for the day) and two afternoon sessions (within two hours of gorillas leaving their day exhibit for the day). Data will be collected using The Observer behavioral data collection software and hand-held computers (Psions). Two types of data will

be collected: group scans conducted every 5 minutes will record basic activity budget information and all occurrences of social interactions will record information on social dynamics (Appendix B). Behavioral data will be summarized by the individual institutions and sent to Zoo Atlanta for compiling and analysis. All analyses will be performed on such data using nonparametric statistics because of small sample sizes and because percentage and frequency data often do not meet the distribution assumptions necessary for parametric statistics (2).

Staff

Zoo Atlanta will serve as the fiscal agent for this project, with Dr. Stoinski, Coordinator of Primate Research, as Principal Investigator and project coordinator. In this role, Dr. Stoinski will train and reliability test the assistant, develop data collection protocol, set up databases for data entry, facilitate introductions between the individual institutions and research assistant, and conduct at least two on-site trainings and repeat interobserver reliability (IOR) tests. Additionally, Dr. Stoinski will oversee the research assistant, assist with some of the daily management and training at two institutions, and work on data analyses, publications and other dissemination of information (10% of time). Dr. Kristen Lukas, Curator of Primates at the Lincoln Park Zoo and a member of GBAG, will assist with the project, and will serve as the Co-Principal Investigator. A portion of Dr. Lukas's time (5%) will also be required to assist with data analysis and publication. Finally, a part-time research assistant (30% of time) will be responsible for traveling to four institutions for training and repeat IOR tests, data compiling and organization, and data collection at Zoo Atlanta. Additionally, the assistant will communicate with institutions and regularly update the web site.

Schedule and Dissemination of information

For the collection of the interview data, the interview instrument will be developed by February 2001 (no funds are requested for this portion of the project). Training for data collection will start in May 2001 with available funds and continue until April 2003.

Because information on all-male groups is of great importance to both captive managers and the Gorilla Species Survival Plan (SSP), our goal is to provide at least two peer-reviewed publications a year on these individuals. Copies of these publications will be made available to all participating institutions. Additionally, GBAG is designing a web site for institutions to log information on a weekly basis regarding the status of their groups. Monthly updates on the results of the proposed behavioral study will be made on this web site. Finally, updates will be made at all SSP meetings.

Papers at the end of the first year will describe: 1) the basic activity budgets and social dynamics of the groups; 2) the effect of physical environment by comparing indoor and outdoor behavior for groups that live in both types of environments; 3) the effect of rearing condition on behavior by comparing mother-reared and hand-reared males. At the end of the second year, we will publish additional papers looking at behavioral change over time and the effect of females on behavior. Using the most advance technology for collecting data and having the research assistant compile and organize the data throughout the year will ensure that this schedule can be met.

2. WHAT IS THE SPECIMEN THAT IS THE FOCUS OF THIS PROJECT?

This study focuses specifically on western lowland gorillas. The current trend of zoos is to house gorillas in family groups composed of a silverback male, adult females, and immatures to promote species-typical interactions and to provide opportunities for educating the public about the natural history and ecology of these animals. However, housing gorillas in social breeding units, with one adult male for several adult females, inevitably means that some males will not have access to female social partners since there are approximately equal numbers of male and female gorillas born in captivity (3). Three alternatives exist for these 'surplus' individuals: isolation (or partial isolation if the individual is rotated between groups), euthanasia, or integration into an all-male or bachelor group (4). The most acceptable solution to zoo professionals is the third, and as a result, the last decade has seen an increasing interest by zoos in all-male groups. Currently, 10 American Zoo and Aquarium (AZA) institutions house a total of 31 male gorillas in all-male groups. The present demographics of the captive gorilla population, a total of 168 males

with over one-third (60) at eight years or under (Wharton and Hekkala, personal communication), demonstrate that the number of individuals in all-male groups will increase in the near future (5). Indeed, the future growth of the captive gorilla population relies on the ability of zoos to effectively manage and house as many male as female gorillas.

While all-male groups can be a stable social structure for wild mountain gorillas (6, 7), the constraints imposed by captivity may prevent the successful maintenance of all-male groups of lowland gorillas in this setting. As a result, a solid knowledge of the physiological, behavioral and husbandry issues underlying the formation and maintenance of all-male groups is needed to assist zoos in determining whether such groups are a solution to the surplus male problem. Additionally, since Harcourt (6) reported that silverbacks have never been observed to join an all-male group in the wild, it is crucial that studies addressing these issues be undertaken while the captive population of male gorillas is still relatively young. Therefore, we need to be studying these groups now.

The gorilla population at Zoo Atlanta is the second largest in North America and we are committed to breeding our collection to maintain an age-diverse population consisting of several groups for exhibition and research. Additionally, in terms of the zoo community at large, there is a general agreement that gorilla collections draw tremendous interest and serve conservation in a unique way. Because of this pivotal role, there is a desire to enlarge the captive population. However, a major factor affecting further growth of the population is our collective ability to house as many males and females. Thus, addressing the issue of male gorillas is of primary importance to the future of gorillas in AZA institutions.

3. HOW DOES THE PROJECT RELATE TO YOUR MUSEUM'S ONGOING CONSERVATION ACTIVITIES?

The focus of Zoo Atlanta's exhibition and research program over the last 25 years has been great apes, and more specifically, gorillas. Zoo Atlanta's gorilla program has included excellent achievement in gorilla exhibition, breeding, behavioral and veterinary management, research, public education, and conservation. Zoo Atlanta has contributed to the reproductive success of individual great apes, as well as to the long-term propagation of the taxon. Additionally, the Zoo Atlanta program for gorilla management and conservation uses a multi-disciplinary approach to develop a strong scientific foundation on which to base our understanding and conservation of these compelling animals. In the past 23 years, Zoo Atlanta has published over 150 scientific articles on great apes, with 45 of these focusing on gorillas. Studies have focused on a variety of topics, including maternal behavior, infant development, socialization of isolates, exhibit design, social dynamics, all-male groups, visitor perspectives, and cognition. Individuals from Zoo Atlanta have served as Chairs of the Ape TAG, as management members on the Gorilla SSP, and as members of GBAG.

Zoo Atlanta's work with gorillas also extends to the field. Our senior conservation biologist, Dr. Thomas Butynski, is based in Africa and focuses on the conservation of forest primates and ecosystems. He has numerous publications on gorillas and has just completed an exhaustive description of African ape population numbers and distributions. Zoo Atlanta also works closely with the Dian Fossey Gorilla Fund, which is provided with office space by the zoo as well as a number of other amenities (8). The zoo director has served on the Board of Directors for the Fund for the last 10 years.

The American Zoo and Aquarium Association recognized Zoo Atlanta's leadership in the scientific management and conservation of gorillas by awarding a Bean Award Honorable Mention in 1998.

4. WHAT ARE THE ANTICIPATED BENEFITS OF THIS PROJECT?

Through the proposed study, we hope to provide the first in depth look at captive all-male groups. Potential benefits include:

1. A greater understanding of the behavior of male gorillas: We know very little about how males in all-male groups behave. Simply providing a basic description of their behavior will be beneficial. Additionally, we will compare the behavior of these captive groups to those of wild all-male groups. Although these comparisons will be limited because of differences in methodology, group composition, and

the effects of captivity, they will at least provide some data on whether males housed in all-male groups are showing species-typical behaviors. If all-male groups are going to be a standard in the management of this species, we need to show that this type of housing combined with the constraints of captivity does not have negative effects.

2. A greater understanding of the effect of group composition and rearing variables on the success of all male groups: We do not know if males that were hand-reared will be successful in all-male groups. Such information is very important, as approximately 40% of gorilla infants experience some type of hand rearing (9). Additionally, we do not know the group composition (i.e. silverback and multiple immature males versus several silverbacks versus a silverback with several blackbacks) that best facilitates living in an all-male group. By collecting data on multiple groups, we may be able to answer this question. For example, the current philosophy on all-male groups is to form a group and keep it together for as long as possible. However, it may be that groups are only stable when one adult male is present. If we find such results, we will suggest to the SSP that groups become more fluid, with males moving out as they mature and new, young males being added in their place.

3. An accurate picture of all-male groups to captive managers: Although captive all-male groups are perceived to be aggressive by many managers, little is actually known about their social dynamics. The study at Zoo Atlanta and Santa Barbara found that affiliative behaviors occurred approximately 15 times more frequently than aggressive behaviors. By providing captive managers with such statistics, hopefully we can remove the negative impression associated with all-male groups and encourage more institutions to become active participants in managing such groups.

4. A better understanding of the interaction between exhibits and all-male group behavior: Many all-male groups spend summer months in large, naturalistic outdoor habitats but are kept in more space-restricted indoor enclosures throughout the winter. Such changes in housing have led to the separation of some groups during the winter months (e.g. Knoxville). By collecting data on the same individuals in both habitats, we will scientifically document any behavioral changes that occur. Such data will hopefully then be used to make recommendations for the management of animals in different types of housing situations. Additionally, we hope to be able to provide advice to institutions that are designing exhibits for bachelor groups on the type of design that will be best suited for ensuring the success of their group.

5. An understanding of the effect of the larger social environment on all-male group behaviors: Some all-male groups are housed at institutions that also have females while others are not. At this time, we do not know what effect this might have on the behavior and welfare of individuals in all-male groups or on the longevity of these groups. By comparing within males across the estrous cycle, we hope to be able to make recommendations about the effect of social environment outside of the group on all-male group dynamics. For example, if rates of aggression between males are much higher when a female is in estrus, we would recommend to the SSP that all-male groups not be housed at institutions that also hold female gorillas.

6. An understanding of how the dynamics of all-male groups change over time as animals mature: While the above analyses can provide us with snapshots of the animals' behavior at particular periods of time, of primary importance to captive managers is the long-term maintenance of these groups. By following the behavior of multiple groups over time, we will obtain information on how social dynamics change with increasing age. Additionally, data on transition periods (when animals enter or leave groups) will be useful in advising zoos on what types of behavioral changes they should expect in transition periods and how different management techniques may help to manage aggression associated with these transitions. These data also may be useful in the future for predicting when a group is starting to disintegrate.

5. HOW WILL THE APPLICANT ENSURE THAT ONGOING MUSEUM FUNCTIONS ARE NOT INHIBITED BY THESE PROJECT ACTIVITIES?

Data Collection

As this is a purely observational study with the purpose of documenting the normal behavioral repertoires of the animals, no changes to their daily management will be required. Thus, zoos will continue

to be able to exhibit their all-male groups as normal. Additionally, all observations will be conducted during zoo hours from either the public viewing area or locations designated for researchers and thus will not require any exhibit or management modifications.

Financial and Human Resources

Because individuals collecting data will be doing so on a volunteer basis or as part of their job, none of the participating institution will encounter any additional financial or human resource responsibilities. Through hiring a research assistant, time above and beyond what the PIs can dedicate will be covered.

6a. WHAT ARE THE PROPOSED CONSERVATION METHODS AND WHY ARE THE CONSERVATIONALLY SOUND?

Gorillas are an important part of the conservation message told by zoos and are in high-demand by AZA institutions, as shown by the Ape TAG Regional Collection Plan (10). However, plans for the future growth of the gorilla population should be based on a scientific understanding of the management of the population and not simply on the demand by zoos for more gorillas. Continuing to manage gorillas without a scientific understanding of their behavior is not conservationally sound as we may end up with a population of males whose physical and psychological needs cannot be adequately met. Thus, research on the behavior of gorillas in all-male groups is needed to help achieve this understanding and ensure the conservationally sound management of this species in the future. Additionally, because the proposed study is purely observational, it should not in any way compromise the welfare of the animals. Finally, because we are proposing to conduct IORs at the beginning of the study and then again every six months, we will ensure that the data will be reliable between institutions and over time.

7. HOW DOES THE PROJECT BUDGET SUPPORT THE PROJECT GOALS/OBJECTIVES?

This project requires personnel time, supplies, and travel costs. In terms of personnel time, the travel and monthly compiling of data will require a part-time research assistant. Additionally, a portion of Dr. Stoinski's time will be required for the general oversight of the project while a portion of Dr. Lukas's time will be required to assist with data analysis and publication. Finally, volunteer time will be required to help with data collection at 6 of the 7 institutions. Project supplies include behavioral data collection software (Observer), portable data collection units (Psions), and computers for storing and analyzing data. Using such state-of-the-art technology will facilitate easy and timely analyses. The final requirement is for travel expenses to cover on-site training and multiple IOR tests to ensure that the data are reliable and remain reliable over the course of the study. A total of 4 visits to each site over the two-year period are requested.

Of the above, we have requested \$42,670 (48% of project costs) in funds: 1) to underwrite the salary of the part-time research assistant for two years at a rate that is commensurate with what we pay graduate students conducting similar types of work; 2) to underwrite a portion of Dr. Stoinski's salary; 3) for the Observer software and Psions, which represent the most advanced technology available for data collection; and 4) for travel expenses (calculated at rates slightly lower than those listed as the maximum per diem rates determined by the government). Zoo matching funds include in-kind contributions of staff time, computers and communications, and volunteer time.

8. WHAT ARE THE QUALIFICATIONS AND RESPONSIBILITIES OF THE PERSONNEL?

Three individuals will manage the project: Dr. Tara Stoinski, Dr. Kristen Lukas, and Mr. Christopher Kuhar. Experimental design, project supervision, and training of the research assistant and some on-site training will be conducted by the PIs. The research assistant will conduct on-site training and daily management of the study. All three individuals have worked extensively with primates, including gorillas, and have studied all-male gorilla groups.

Tara S. Stoinski, Ph.D., Coordinator of Primate Research, Zoo Atlanta, Co-PI

Dr. Stoinski earned a Master's in Biology from Oxford University and a Ph.D. in Psychology (Animal Behavior) from the Georgia Institute of Technology with a focus on primates. As Coordinator of Primate

Research, Dr. Stoinski conducts her own research on primates and helps oversee graduate students studying primates at the zoo. Since 1995, she has conducted various studies on the 22 gorillas housed at Zoo Atlanta, and, in particular, has been studying the all-male group. In addition to working with the bachelor group at her own institution, Dr. Stoinski has also conducted several multi-institutional, multi-disciplinary studies, examining behavior, physiology, and personality in males housed in all-male and heterosexual male groups (1, 12). Dr. Stoinski is a member of the Gorilla Behavioral Advisory Group. As project coordinator, Dr. Stoinski will train and conduct IOR tests with the assistant, develop data collection sheets, set up databases for data entry, facilitate introductions between the individual institutions and research assistant, and conduct at least two on-site trainings and repeat IOR tests. Additionally, Dr. Stoinski will oversee the research assistant, assist with some of the daily management, and work on data analyses, publications and other dissemination of information. 10% effort across the year.

Kristen E. Lukas, Ph.D., Curator of Primates, Lincoln Park Zoo, Co-PI

Dr. Lukas received her Master's and Ph.D. in Psychology (Animal Behavior) at the Georgia Institute of Technology and Zoo Atlanta. Her Master's thesis looked at relationships between exhibit design, novelty, and gorilla behavior while her dissertation focused on examining factors associated with regurgitation and reingestion in gorillas. While at Zoo Atlanta, Dr. Lukas initiated the first study of the zoo's bachelor group and is currently analyzing the changes that occurred during the group's formation. Upon finishing at Georgia Tech, Dr. Lukas became Curator of Primates at the Lincoln Park Zoo in Chicago. Her responsibilities include the scientific management of their primate collection, which includes 15 gorillas, conducting research on the primate collection, designing a new facility for their ape collection, and continuing her research involving all-male groups. Dr. Lukas is a member of the Gorilla Behavioral Advisory Group. Dr. Lukas's role primary role will be in data analyses and dissemination of information. 3% effort across the year.

Christopher Kuhar, M.S., Georgia Institute of Technology, Research assistant

Mr. Kuhar received a Master's degree from Oklahoma State University in Zoology and is now enrolled at Georgia Tech in the doctorate program in Psychology. Mr. Kuhar conducted his Master's thesis on primates in a zoo setting and has substantial experience working at both a zoo and a primate sanctuary. He helped initiate behavioral observations of Cleveland Metropark Zoo's bachelor gorilla group, trained staff to collect data, and reliability tested data collectors. Mr. Kuhar's responsibilities will include travel to five of the seven institutions for training and repeat IOR tests, data entry, and data collection at Zoo Atlanta. Additionally, Mr. Kuhar will continue data collection at Zoo Atlanta plus enter data, communicate with institutions, and make web site updates. Mr. Kuhar's current involvement at Zoo Atlanta is as a graduate student conducting research, which involves 33% of his time. His involvement in this project as a technician will be beyond his normal scope of studies. 30% effort across the year.

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Project Budget Form

SECTION 3: SUMMARY BUDGET - CP AND EDUCATION COMPONENT

Name of Applicant Zoo Atlanta

IMPORTANT! READ INSTRUCTIONS IN PART 4 BEFORE PROCEEDING.

DIRECT COSTS	IMLS	1	TOTAL
SALARIES AND WAGES (PERMANENT STAFF)	\$8,000 + 800		
SALARIES AND WAGES (TEMPORARY STAFF HIRED FOR PROJECT)	\$13,200		
FRINGE BENEFITS	\$0	\$4,272 +	\$4,272
CONSULTANT FEES	\$0 9/68	\$0	\$0
TRAVEL: DOMESTIC	\$10,920	\$2,900	\$13,820
FOREIGN			
SUPPLIES & MATERIALS	\$8,800	\$6,000 + 5288	\$14,800
SERVICES			
OTHER	\$1,750	\$1,400	\$3,190
TOTAL DIRECT COSTS	\$42,670 52,638	\$37,612 50,485	\$80,482
INDIRECT COSTS*	\$	\$ 7,562	\$ 7,562
TOTAL PROJECT COSTS			\$ 88,041
AMOUNT OF CASH—MATCH		\$0	
AMOUNT OF IN-KIND CONTRIBUTIONS—MATCH		\$45,374	58,047
TOTAL AMOUNT OF MATCH (CASH AND IN-KIND CONTRIBUTIONS)			\$ 45,374
AMOUNT REQUESTED FROM IMLS			\$ 42,670 52,638
PERCENTAGE OF TOTAL PROJECT COSTS REQUESTED FROM IMLS (MAY NOT EXCEED 50%)		48	%

Have you received or requested funds for any of these project activities from another Federal agency? (please check one) Yes No

If yes, name of agency _____ Date _____

Amount requested \$ _____

Education Components

Application Narrative--Education Component
Nebraska State Historical Society, Archeology Division
Archeological Records Collection Project

1. What is the design of the education component?

- *project activities in detail, goals and objectives of component and how they will be met*

The education component for this project will involve the writing and publication of a booklet on the importance and care of archeological records collections. The booklet will provide the basic information pertaining to archeological document handling and storage. It will be written in a reader-friendly format. We envision utilizing illustrations to contrast good and bad storage environments and to illustrate examples of archeological documents.

The topics to be covered in the booklet can be broken into the following chapters and appendices:

- Chapter 1 Why are archeological records important?
 - Chapter 2 What are the types of archeological records?
 - Chapter 3 How should I prepare and care for these records?
 - Sources for additional information
 - Tear-out response card
-
- *amount of time staff and consultants will spend on the project*
- The project staff include the Archeology Registrar (20% time), and the Chief Conservator from the Ford Conservation Center (15%), an Exhibits and Design Services graphic artist (25%), and the Associate Director of Research/Publications (1%). We will be using the Nebraska State Historical Society's artist for layout and the Associate Director of Research/Publications for editing.
- *why your schedule of completion is appropriate*
- A published booklet can be completed in five months. The Registrar will spend 12 days over three months to write the booklet with contributions from the conservator on the conservation section for records care. One month of time is allotted for editing, design, and layout. Publishing will be done through the State Printing Office. Prior booklets printed by the State Printing Office for the Archeology Division have been completed within this time frame.
- *any intended products*
- A booklet on the importance and care of archeological records collections that is integrated into an existing series of education outreach publications. The Division publishes booklets when funding is available on a variety of topics (see supporting document, *The Cheyenne Outbreak Barracks*).
- *how your education component relates to your conservation component*
- The booklet will discuss the importance of archeological documentation and its preservation.

2. What are the anticipated benefits of this educational project?

- *relevance to the museum's audience*

Hopefully, the booklet will inform those responsible for archeological collections of the importance of documentation and the methods to care for the invaluable archeological records.

- *the outcomes of this project for your museum's general audience*

The booklet will serve as a reference for amateur and professional archeologists, students, and archaeological collection managers.

- *how the benefits will be used by your museum and disseminated to your audiences*

The booklet will be the next installment of the preexisting archeology publication outreach series published by the Nebraska State Historical Society. It will be disseminated to patrons who use our records and collections, to students, and the interested public. The booklet will be mailed to individuals requesting information on the care of archeological documents via the phone and Internet. We plan to mail copies to local museums, colleges and universities where archeology is taught, and known amateur collectors in Nebraska. Currently, we are unaware of any existing records on the preservation of archeological records collections (see supporting document).

- *potential for continuing the project after the planning period or after the initial implementation stage*

The booklets will become part of the Archeology Division education outreach series.

3. How does the project budget support the education component goals and objectives?

The costs for writing, editing, and design were determined from current salary figures. The publication and printing cost was determined from our last publication in the education outreach booklet series that was published in 1999.

4. What are the qualifications and responsibilities of the project personnel?

Jeannette Blackmar has graduate degrees in museum studies and in anthropology. She has worked for nearly two years at the Nebraska State Historical Society Archeology Division as the Archeology Registrar. Courses taken include archaeological collection management, conservation, museum management, and research administration. She has given lectures on the handling of archeological material, the care of artifacts in the field to both undergraduate and graduate students. She has written a summer fieldschool manual and archeological papers in peer-reviewed journals. Since 1995 she has presented papers at local and national conferences. She will be responsible for writing the booklet, selecting illustrations, and assisting with questions regarding layout.

Julie Reilly is the Associate Director and Chief Curator at the Ford Conservation Center in Omaha, Nebraska. Her responsibilities for this project include writing and planning illustrations.

Deb Brownson is employed by the Nebraska State Historical Society as a graphic artist and will provide layout and design. She will make arrangements with the State Printing Office for printing.

Jim Potter is currently the Associate Director of Research/Publications for the Nebraska State Historical Society. He will provide editing and assistance with copyright procedures.

Riverside Municipal Museum
California
Education Component

1. What is the design of the education component?

In 1988, the RMM received IMS funds [grant IC-80398-88] which brought three conservators on site to conduct limited surveys on the Museum's textiles and costumes, archival papers and furniture collections. In conjunction with this project an exhibition on object conservation and a conservation workshop were held. At the public workshop, specialist conservators presented information on object conservation. The public also brought in personal objects for individual assessments. The exhibition featured storage materials and methods to use in preserving family heritage objects. During the 1990s, programs such as the 1988 conservation workshop and exhibition were requested by members of the local community. In response (and in conjunction with the proposed conservation project), **the RMM is requesting IMLS support to hold a series of public conservation clinic/workshops and supporting exhibitions.**

Project Objectives:

1. Specialized contract conservators will conduct **five clinics/workshops on conservation** of archaeological and geological objects [Tamsen Fuller], paintings [Carolyn Tallent], objects made of paper [Gloria Free], textiles, costumes and baskets [Irena Calinescu and Cara Varnell] and three-dimensional objects [Robert McGiffin].

2. RMM curatorial, design and construction staff will mount **five small, temporary exhibits to coordinate with the conservator clinic/workshop areas of specialization.** These exhibits will present Museum objects that show the result of damage from water, pests, light and chemicals.

The series of five public clinics/workshops and corresponding changing exhibits will be scheduled during Phase I of the proposed conservation project (over a period of eight months from September 2001 - April 2002). The public clinic/workshops will be one-day seminars open to a general audience, free of charge, featuring presentations on the care and stabilization of objects. The workshop presentations will be made by conservators who specialize in the appropriate subjects. Each conservator will work with the relevant RMM curator on program content development (see Program Development below). Each program's audience will be encouraged to bring in items from their own collections [e.g. family heirlooms] in order to have the conservators make recommendations for their storage, use and/or stabilization.

The first two workshops on objects of paper and three-dimensional objects in October and November will be conducted by conservators who participated in the 1988 conservation project. In February 2002, a textiles, costume and baskets conservation workshop will be held; since it is expected that a large number of objects will be brought by the audience, this workshop will have two conservators. The workshop on conservation of paintings will be held in March, to be followed by workshop on archaeological and geological objects in April. These will be presented by conservators who would be conducting surveys of Museum collections under the proposed conservation project.

The RMM curatorial staff will work closely with design and production staff on the preparation and installation of the five small exhibits (see Program Development below). These exhibits will be coordinated with a specific conservator's presentation. The exhibit will display objects from RMM collections which illustrate different conservation issues. The impact of physical damage through light, water and insect pests will be presented for a variety of materials. Some of the content of the workshops will be illustrated by the RMM exhibitions. Museum objects will be exhibited that are relevant to each workshop topic. For example, paper artifacts that have been damaged by excess light and poor framing materials and other paper artifacts damaged by insects and rodents will be on exhibit at the time of the workshop on conservation of paper objects. In addition, an on-line version of each exhibit's content will be created for the Museum's web site (www.ci.riverside.ca.us/museum). The on-line exhibit will also feature information on other objects in the RMM collections, along with conservator's findings and recommendations for creating a proper environment for RMM holdings.

The six conservators will each be on site one day for their respective workshops. [Conservators Fuller and Tallent, who will conduct assessment surveys, will also participate in the workshops the Saturday following their survey of the Museum collections.] The estimated distribution of staff time for this education component: Curator of Education [24 days], Senior Curator of History [6 days], Curator of Anthropology [6 days], Curator of Natural History [6 days], Curator of Collections [6 days] Exhibits Designer [24 days] and Exhibits Carpenter [5 days].

2. What are the anticipated benefits of this educational project?

It is the mission of the RMM to serve as a community "center for learning". Thus the museum is well-placed to provide the general public with a demonstration of conservation techniques. Collaboration between the RMM and the conservators on these programs will likely result in roughly 50,000 people being served during the project period, as participants in the workshops or as visitors to the exhibits or the Museum web site. During calendar year 1999, more than 80,000 people visited the downtown museum and Heritage House, or took part in RMM programs, much of that total coming from the Fall and Winter months (the time frame for the proposed project). The RMM also has a strong track record in successful adult programming, with over 100 people attending an afternoon symposium on mountain lions (1999) and over 130 attending a day of antique appraisals (May, 2000) carried out by volunteer experts from the Butterfields auction house. Riverside is a community with a strong sense of history and is home to several National Register historic properties as well as the National Historic Landmark hotel in the heart of downtown, the Mission Inn. No doubt the workshops and exhibits on object conservation will benefit staff members from the numerous small museums and historic

societies in the region. The RMM's success in the professional development area includes a recent workshop on collections management software (jointly hosted by the RMM and two other downtown Riverside museums), with over 30 professionals in attendance from throughout California.

This project will directly benefit RMM audiences, as conservators will give public presentations on preserving personal objects - a topic that has been requested by Museum audiences. One component of the Museum's Mission and the proposed LRCP is educational outreach: the series of workshops and exhibits held in conjunction with the conservation project would further the Museum's educational outreach for its collections as well as provide direct application for individuals. The educational project proposed by the RMM provides an opportunity for the public to learn about conservation and its important role in Museum collections as well as how they can apply conservation methods to their own objects. This workshop series would be a precursor for more in-depth workshops by professionally trained conservators on object conservation, for the benefit of the public as well as RMM staff.

The precise content and interpretive outline for the proposed exhibits and workshops will be developed as part of a schedule of design and planning meetings, following the RMM's Public Programs Development policies and procedures. The project's Program Development Team will include representatives of all the Museum's public service areas (Collections, Exhibits, Education and volunteers). As part of the development process, it is the responsibility RMM Curator of Education to ensure that programs are both appropriate to the Museum's audience and that they are evaluated with regard to their educational outcomes.

3. How does the project budget support the education component goals and objectives?

The RMM is requesting from IMLS \$4,579 for a six month period to support the cost of services from the conservators for their roles in the education component. The Museum will match this with \$14,196 from salaries and fringe benefits of project staff. The RMM total project budget is estimated to be \$18,775. This sum includes conservator's fees, expenses, RMM staff time and benefits, plus the cost of supplies to be used in demonstration of proper methods in storage/stabilization of paper, textile and three-dimensional objects.

8. What are the qualifications and responsibilities of the project personnel?

RIVERSIDE MUNICIPAL MUSEUM STAFF

James Bryant, Curator of Natural History; B. A., Austin College; M.A.T., Univ. Texas-Dallas; will be natural history collection liaison; time commitment: 6 days.

Dasia Bytnerowicz, Exhibits Designer; M.S. Polish Agricultural University; Polish Stagecraft School; exhibits to accompany programs of the education component; time commitment: 24 days.

Brenda Buller Focht, Curator of Collections and Project Director; B. H. E., Univ. British Columbia; M. S., Iowa State Univ.; M. A., Ph. D., Univ. Cal. Riverside; will direct conservation project, coordinate activities and be responsible for development of Museum long-range conservation plan; time commitment: 6 days.

Gary Ecker, Exhibits Carpenter & Restoration Specialist; B. A., Cal. State Fullerton; will work with designer to create education exhibits; time commitment: 5 days.

Marjorie Mitchell, Curator of Education; B. A., Cal. State San Bernardino; will direct the educational component of project; time commitment: 24 days.

Chris Moser, Curator of Anthropology; B.A., M. A., Ph. D., Univ. Cal. Los Angeles; will be anthropology collection liaison; time commitment: 6 days.

Vince Moses, Senior Curator of History; B. A., M. A., Baylor Univ.; Ph. D., Univ. Cal. Riverside; will be history collection liaison; time commitment: 6 days.

CONSERVATORS

Irena Calinescu, B. A. Indiana University, M. A. SUNY-Buffalo; Professional location: Private practice; will conduct workshop on textiles & baskets; time commitment: 1 day.

Tamsen Fuller, A. B., Bryn Mawr College; Conservation of Archaeological Materials Diploma, The Institute of Archaeology, London; Professional Location: Private practice; will conduct workshop on archeological/geological objects; time commitment: 1 day.

Gloria Freel, B. A., University of Connecticut; M. A., Univ. Cal. Riverside; New England Document Conservation Center; Professional Location: Corona Public Library, Heritage Room Senior Librarian; will conduct workshop on paper objects; time commitment: 1 day.

Robert McGiffin, B. A. Syracuse University; M. A. Cooperstown Graduate Program, Art Conservation Center; Professional location: Private practice; will conduct workshop on on 3-dimensional objects; time commitment: 1 day.

Carolyn Tallent, B. A., Rice University; M. A. Art Conservation, University of Delaware/Winterthur Museum; Professional Location: Private practice; will conduct workshop on paintings; time commitment: 1 day.

Cara Varnell, B. A., University of South Florida; Certificate in Textile Conservation, Hampton Court Palace, Surrey, U. K.; M. A., New York University; Professional location: Private practice; will conduct workshop on textiles & baskets; time commitment: 1 day.

Science Museum of Minnesota
Minnesota
Education Component

EDUCATION COMPONENT NARRATIVE

1. What is the design of the educational component

We request funding from IMLS to develop additional conservation programs for in the Collections Hall Visible Lab relating to the bryophyte collection. The programming will include the production of 2-3 small tabletop exhibits relating factors of deterioration to the new moss collection, supporting videos and a web page.

In December 1999, the Science Museum of Minnesota (SMM) opened a new facility with five long-term exhibitions. One of these, the Collections Gallery, is a 6,000 square foot exhibit, displaying a changing sample of the museum's collections in a framework designed to stimulate visitors to think critically about the nature of collecting and collections, the cultural assumptions that underlie museum practices, and the process of constructing of scientific knowledge. Within this exhibit is a 275 square-foot Visible Lab dedicated to the preparation and care of collections and provides a space for the museum public to talk one on one with scientists and staff normally behind locked doors.

In 1982, SMM opened its first visible lab where museum science staff demonstrated preparation techniques on actual specimens, and discussed scientific research and collections with museum visitors. This approach was so successful that an extensive renovation of exhibition halls from 1989–1991 included construction of a visible lab in each hall. Collections conservation has been involved in programming from the beginning.

While we have found the visible labs to be highly popular public programs, they present several logistical challenges:

- The availability —and expense— of staffing them;
- Only a small group at a time has a good view of the activities;
- Key elements of many preparation activities and factors of deterioration can only be seen through a microscope;
- Many activities take longer than the public can view in at one sitting.

One solution to all of these challenges is to produce edited video reenactments of conservation activities that can be shown whether or not a staff member or volunteer is available. A scope can be used that can utilize a scope to project an enlarged image on a large screen visible to more people, and that can be edited to show activities that in reality take too long to be seen in their entirety in one viewing. For this grant we will focus on conservation issues.

GOALS AND OBJECTIVES

The primary goal of this project is to expand and enhance an already successful public program, making the best use of our strengths, talent and equipment. The lab is primarily a demonstration space where the public can get a taste of "behind the scenes" activities and come away with a better understanding of what caring for a collection entails. These are based on our long-range plan for informal science.

INTENDED PRODUCTS

- **Two table-top exhibits and related demonstrations** centered in the Visible Conservation Lab that help museum visitors to understand factors of deterioration ;
- **Two 3-5 minute videos** on factors of deterioration relating to herbarium collections (possibly on light deterioration, and on mechanical damage to be displayed at the visible lab as support for program.
- **Web page**, possibly interactive, relating to preservation of collections, particularly herbarium material, with links to other SMM web pages.
- **Training material** to be used for current and future volunteer training.

The tabletop exhibits that conservation has begun to develop are designed to be set on the counter top in the visible lab behind the window (6 feet long x 2 feet deep). (see Appendix). The general subject matter is the factors of deterioration as they relate to the museum's collections. The exhibits will rotate so that different exhibits will be out for public view at different times. They can be set in place at Conservation demonstrations will be conducted by trained volunteers in conjunction with the exhibit. The videos will be used when no staff are available to work in the lab.

The exhibits we propose to develop will focus on factors of deterioration directly relating to the bryophyte collection and other herbarium materials. Possible subjects include light deterioration, mechanical damage, infestation or the importance of using archival materials for storage. Equipment purchased with IMLS CP Grant IC-90020-99 will be used to create the three-video clips to be shown in the lab. For example, the video might show a time-lapse of light deterioration, or a macroscopic image of the structure of a moss specimen in pristine condition and after it has been crushed or abraded. The videos will also be used on the museum's Web Site. Training for staff and volunteer interpreters will focus on the primary topics.

PROJECT ACTIVITIES/WORK PLAN

May – August 2001	Planning and idea development
	Production of materials and program
October 2001	Volunteer and staff training (2 sessions, 3 hours each)
September – December 2001	Installation of the exhibits
January 2002 – April 2003	Analysis, review and refine programming

The schedule was developed in consultation with staff from other relevant sections of the museum including volunteer programs, exhibition and program development, and the video/web production team. The schedule also reflects time commitments of the conservator, manager for the visible lab, and collections manager.

2. What are the anticipated benefits of this educational project

Relevance to the museum audience

The exhibition and video production will:

- Raise awareness of museum collection issues by relating the collection, even something as seemingly specialized as the bryophyte collection, to audience day to day experiences.
- Show and demonstrate how moss has been used in various cultures, from current use of sphagnum in gardening to use as diaper materials in many native cultures. Use of lichen as dye will relate to one of our most popular and long running programs: fibers and dyes. This can lead to an examination of the chemistry of moss.
- Demonstrate factors of deterioration that affect this collection and relate it how to properly prepare and preserve personal dried plant collection. The ethics of collecting can be discussed.

The outcomes of this project for your museum's general audience

The proposed exhibits, demonstrations, and videos will enhance the audiences understanding of:

- collecting practices and collections care
- museum practices
- the factors of deterioration

How the benefits will be used by your museum and disseminated to your audiences

- Develop a more integrated training program for volunteer training – relating the new collection to already existing programming
- Expand the video library for the visible lab – more programming
- Add new temp exhibit and "quick response" exhibits to provide greater turn over, public exposure to more collections
- Disseminate through visible lab (programming, exhibit, video) and web

Discuss the potential for continuing the project after the planning period or after the initial implementation stage

All products described in this proposal are designed to be modular and reusable. The tabletop exhibits are modular and meant to be installed for a short period of time. They can be rotated out and stored for a time, then brought back to the exhibit floor when the subject matter is focused on again. They will be kept intact so that they can be reinstalled with a minimum of effort.

A video library on various subjects (conservation, factors of deterioration, collecting, interviews with scientists, relevance to science, bio diversity etc) is being built. These can be run at any time as an enhancement to the programming (static exhibits or active demonstrations) or when the lab is unoccupied.

The web page(s) will become a permanent link to the conservation page on SMM's web site.

3. How does the project budget support the educational component goals and objectives?

Cost factors involved in selection personnel, materials, equipment or scheduling

The project costs were determined in consultation with the Head of the museum's Exhibit Division and the Creative Director of the museum's Print Graphics Department, the two areas that will be most involved with the project. All costs

are for materials and for labor provided by project funded personnel. Cost for materials were estimated from catalog price lists and cost for labor and services are based on the salary rates for the appropriate museum personnel. All materials are standard for the type of products that we are producing.

The match will come from salaries of salaries of permanent staff working on the project.

4. What are the qualifications and responsibilities of the project personnel?

Gretchen E. Anderson, Objects Conservator, established SMM's Conservation Department in 1989. Her full bio can be found in question # 8 of the conservation project proposal. Anderson began her conservation training by working in SMM's first visible lab. In 1996 she had a lab built in the Anthropology Hall of the old facility and was responsible for programming it. She spearheaded the drive to have a visible lab to be used by the research and collections division in the new facility, which opened in December 1999 and was responsible for acquiring the video equipment and other enhancements to the program

Anderson will devote five percent of her time to providing photography for the exhibits and will be the primary liaison with exhibits staff.

Catherine Hintz has held the position of Collections Gallery Program Manager since the new gallery opened in December 1999. She is responsible for training staff and volunteers in the Collections Gallery and in the gallery's Visible Lab. All training includes background information from content experts and activities to encourage interaction with museum visitors. Hintz worked for nine years in the museum's education division and designed and wrote numerous grant-funded activity-based science curricula on topics including anatomy and physiology of the cardiopulmonary systems, the science of sound and music, and hot wheel physics. In her years in the education division, she worked with diverse groups including under-served youth, as well as gifted and talented.

She holds a BS in Technical Writing and Geology from Michigan Technological University and a teaching license from the University of Wisconsin. She is also a member of the National Science Teacher Association.

Hintz will devote five percent of her time to creating the educational components including volunteer training.

Zoo Atlanta
Georgia
Education Component

1. WHAT IS THE DESIGN OF THE EDUCATION COMPONENT?

The departments of education, research, and technology will develop a companion education program designed to inform visitors about issues facing gorillas in captivity and the wild and the role that zoos play in these issues. The education program will be located in a video kiosk located in the Willie B. Gorilla Conservation Center (the location of Zoo Atlanta's interpretive materials on gorillas). This education program will engage visitors in a learning experience about gorillas through the use of technology. The goals of the education project include: 1) developing a state-of-the-art video presentation to educate the public about gorillas in general; 2) developing video interactives that allow the public to act as scientists studying gorillas; 3) developing general educational materials about the IMLS conservation project on all-male groups that can be distributed with the interactive to zoos participating in the study for use at their institution.

Using an interactive kiosk, the visitor will select from topics about gorillas. These video vignettes will include: 1) situations facing gorillas in the wild, including habitat loss and commercial hunting; 2) situations facing gorillas in captivity, including the question of all-male groups; and 3) the scientific program at Zoo Atlanta and how it has contributed to improved management and knowledge of our animals and gorillas in general. Specifically, the kiosk will present the issue of all-male groups as a case study of captive management challenges, focusing on: 1) the switch in zoos from importing animals from the wild to developing a self-sustaining captive population; 2) the demographic changes which have followed this switch and have led to a more equal sex ratio and thus the need to intensively manage males; 3) the current situation with respect to all-male groups (numbers and predicted numbers for the future); 4) what data from wild gorillas tells us about all-male groups; 5) why scientific studies on all-male groups are needed and these studies are being undertaken through the IMLS Conservation Project.

The visitor may also participate in an interactive activity in the kiosk. Visitors will be walked through the basics of genetic management in captivity (i.e. studbook, mean kinship, family trees, founders etc). They will then be presented with the genetic information on several male gorillas (actual males represented in the captive population) and be asked to place them in either a breeding group or a non-breeding, all-male group based on their genetic information. Finally, visitors will be informed if their decisions were the best choice for the animals based on the current housing situations for these males. The second component of the interactive will allow visitors to access some of the data that are being collected through the Conservation Project. Visitors will be told how these data have been collected, how they are being compiled and analyzed, and how we hope to use the information. Visitors will compare data from several institutions that have varying social groupings (i.e. one zoo may have a group with a silverback while another does not) so that they start to see how these data might provide us with insights on managing male gorillas.

General education activities will be developed to incorporate into Zoo Atlanta's existing education programs. These activities and games will not require technology and will be geared towards grades four through twelve. These activities will be appropriate and available for the other zoos participating in the conservation study.

Staff time

- 1) Education staff: 28 hours per month during development
- 2) Technology staff: 50 hours per month during development
- 3) Research staff: 8 hours per month during development; 3 hours per month to keep behavioral information updated

- 4 Consultants: Research Engineer 64 hours, Research Associate 80 hours, Student assistant 160 hours.

Time Line

The project will require four months to develop and will start in May of 2001

Products

Products from the education component include: 1) a series of video vignettes displayed in Zoo Atlanta's interpretive center which will include general information on gorillas and Zoo Atlanta's role in gorilla research and conservation; 2) the above video and the accompanying text will be available to all zoos participating in the IMLS Conservation Project study; 3) an interactive activity which allows the public to learn about demographic management and behavioral research; 4) a publication assessing the use of video and the associated cognitive and affective gains; 5) general education activities related to the gorilla conservation project.

2. WHAT ARE THE ANTICIPATED BENEFITS OF THIS EDUCATION PROJECT?

Gorillas represent the largest population at Zoo Atlanta are a favorite among zoo visitors. Additionally, the gorillas are a focal point for much of Zoo Atlanta's educational programs. Traditionally, Zoo Atlanta has relied on graphical displays to provide the visitors with information on gorillas. However, research has demonstrated that zoo visitors spend very little time reading graphics (1). Instead, we believe that given the pervasiveness of technology in our society, that state-of-art technology should be a major component of our educational process. We recently refurbished our gorilla interpretive area with traditional graphics as well as videos and video-based interactives and informal evaluations show that these are among the most popular with zoo visitors.

In addition with providing visitors with state-of-the-art educational opportunities, Zoo Atlanta believes it is important to educate visitors about the high level of care that our animals receive, the amount of detail that goes into the daily management of our animals and the population as a whole, the situations faced by gorillas in the wild and captivity, and how zoos are working together to solve these problems (1). By developing a video that highlights these topics, Zoo Atlanta will be contributing to the public's understanding of gorillas, captive management, and conservation. Additionally, by using on the question of all-male groups as a case study of captive management issues, Zoo Atlanta can highlight the role that science and inter-institutional cooperation is playing in furthering our understanding of these groups and securing the future management and growth of the gorilla population. Finally, developing an interactive that allows visitors to use demographic data to make breeding decisions and analyze raw data from the all-male gorilla study will provide further learning opportunities about gorillas and the role of science in captive-management. By making the case study and interactive parts of the video available to zoos collaborating on the all-male study, we can help ensure that the public at large has these educational opportunities. The interactive will be a part of the on-going interpretative information about gorillas, and the data will be updateable and will allow visitors to learn about the current situations of gorillas. With additional funding, more video vignettes would be produced.

3. HOW DOES THE PROJECT BUDGET SUPPORT THE PROJECT GOALS AND OBJECTIVES?

The budget will support developing the content and programming of an interactive kiosk. In addition the budget will support staff time to produce education materials related to the conservation project. The computer consultants have an established relationship with Zoo Atlanta and have developed two

other kiosks for the zoo. Their salary information is current and is below market rates for their field. The equipment costs were determined from the bids received from technology vendors. Three of the Zoo Atlanta staff members successfully developed another interactive kiosk. Based on the development of that kiosk, the time estimates for Zoo Atlanta staff are reasonable and accurate. The salaries for Zoo Atlanta staff members are based on current information. Zoo Atlanta will match funds by contributing staff time and providing all computer equipment for the kiosk, including the touch screen, computer, sound dome, and kiosk stand. Zoo Atlanta will also provide the video editing equipment to produce the videos.

4. WHAT ARE THE QUALIFICATIONS AND RESPONSIBILITIES OF THE PROJECT PERSONNEL?

Beth Hoos, Manager of Fee Programs, supervises the development and implementation of Zoo Atlanta's revenue-generating programs in the education department. Beth's previous experience includes extensive behavior research on free-ranging monkeys. For the last two years, Beth has taught the animal behavior research programs at Zoo Atlanta. In addition, Beth coordinated the development of the vocalization kiosk and contributed to the content and design of the graphics in the Willie B. Gorilla Conservation Center (WBGCC). Beth will assist in the development of the content of the kiosk. She will supervise the development of the additional education activities and will implement these activities into Zoo Atlanta's education programs. 12.5% effort for 4 months.

Richard Hezlep, Productions Coordinator, oversees the audio and video technology and productions at Zoo Atlanta. Richard led the video production of the vocalization kiosk in the WBGCC. He will oversee the video production and technology design of the kiosk. Richard will advise the consultants of Zoo Atlanta's requirements. 31% effort for 4 months.

Tara Stoinski, Ph.D., Coordinator of Primate Research, conducts her own research on primates and helps oversee graduate students studying primates at the zoo. Since 1995, she has conducted various studies on the 22 gorillas housed at Zoo Atlanta, and, in particular, has been studying the all-male group. Tara will direct the research for the conservation project. Tara will assist in the initial content development of the kiosk and will provide updated behavior information about the conservation project for the kiosk. Tara will assist in the evaluation of the kiosk and produce the related publication. Tara will coordinate the distribution of the video and educational materials to the other zoos participating in the conservation project. 3% effort across the year.

Shelly Lakly, Ph.D., Director of Education, will be responsible for the overall leadership of the project including coordinating the efforts of the three departments involved in the project, development, delivery and evaluation of the kiosk, educational activities and conservation messages. Dr. Lakly has extensive experience in development, design, execution and evaluation of research and science projects. Before joining Zoo Atlanta, Dr. Lakly was a research scientist and educator with experience in curriculum development and science education in addition to a background in conservation issues, ecology, and limnology. She holds a M.S. in Conservation Ecology and a Ph.D. in Ecology from the University of Georgia's Institute of Ecology. 5% effort for 4 months.

Consultants from the Georgia Institute of Technology's Interactive Media Technology Center will develop the kiosk design. Their responsibilities will include creating graphics content, editing audio and video, and installing the program. Brian Jones, Research Engineer II, will supervise Tiffany O'Quinn, Research Associate I, and an undergraduate student assistant. Mr. Jones and Ms. O'Quinn have an established relationship with Zoo Atlanta and have developed two other kiosks for the zoo.