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# Toward Common Nomenclature and Definitions for Natural Science Professional Collections- Related Positions


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# TOWARD COMMON NOMENCLATURE AND DEFINITIONS FOR NATURAL SCIENCE PROFESSIONAL COLLECTIONS-RELATED POSITIONS

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*Abstract.* - Analysis of recent literature and experience with professional positions in several institutions provided the basis for proposing a basic grouping of titles for positions relating to the natural sciences collections profession. Six groups are proposed with recommendations for education, experience, knowledge, and skills to support the key responsibilities of the positions. Discussions and critiques of these groupings are anticipated to refine and ultimately result in a standardized nomenclature for natural science collections-related positions.

## INTRODUCTION

One of the first steps toward professionalism for collections-related organizations and professionals will be agreement upon a common nomenclature and expectations for professional positions. This is important because it allows the position titles to convey a considerable amount of information, such as amount of education required, experience, and job responsibilities. Looking at a long established profession, such as medicine, gives a good analogy for the level of nomenclature that the collections care and management profession should be attempting to reach. When one hears the position titles of medical personnel, such as medical doctor, nurse, medical technologist, dentist, public health officer, physical therapist, occupational therapist, nutritionist, x-ray technician, physicians assistant, hygienist, and pharmacist to name a few, one has an instant image of the type of education that these people have had, their experience, and, in general, their job responsibilities. Even more information is conveyed, if one considers the more detailed position titles within these general titles, such as a medical doctor being a surgeon, internist, radiologist, urologist, proctologist, orthopedist, pathologist, anesthesiologist, obstetrician, plastic surgeon, neurologist, and family practitioner. Given an idea of what medical problem one experiences, the position title easily identifies with which of these medical doctors one should consult. The natural science collections-related professions will never reach the public understanding of its position titles that the medical profession has attained, but it is important that these titles are recognized by other museum and natural science professionals and the administrators of museums, universities, and organizations that employ them.

Since 1980, at least eight papers have appeared that give position titles and descriptions for museum personnel (American Association of Museums Museum Studies Committee 1980; Bates 1994; Danilov 1994; Dubberly 1994; Edson and Dean 1994; Glaser and Zenetou 1996; Hatchfield 1996; Thompson 1992); however, none of these papers have focused on the full range of collections-related positions specific to natural science collecting institutions. A study completed in 1991, demonstrated the broad range of titles and responsibilities of collection-management type positions in the natural sciences (Cato 1991), indicating the lack of standardization among museums. In response, this paper considers a more comprehensive range of natural science collections-related positions with a goal of stimulating discussion on this topic; the discussions undoubtedly will lead to additions, deletions, and modifications to the titles and position descriptions given here. This will be the only way in which the natural science collections community will achieve an ultimate goal of a common nomenclature and expectations for collections-related positions.

## BASIS FOR POSITION GROUPS

The collections-related positions are organized into six types of positions: administration-oriented, research-oriented, collection management-oriented, conservation-oriented, information management-oriented, and specimen/object-oriented (see Appendices A-F). The knowledge and skills for each position are organized into the three professional fields recognized by Cato et al. (1996) as essential components for the collection management function - museum studies, science, and management. The groupings according to type of position and essential knowledge and skills, reflect the priorities of the position's requirements for education, experience, knowledge, and skills. They also indicate priorities for the specific responsibilities the individual will undertake in the position.

Within these six groups, many of the positions provide progressive tracks, such as: Collection Manager I, II, III, Preparation Assistant I, II, III, and so forth. The full description is provided only for the terminal position in each category, for example, Collection Manager III, but the entry-level expectations for each can be seen in Figure 1 and Figure 2. This arrangement is important both for the individual and the institution. Individuals need to have an opportunity to advance in their profession through their own efforts. No one wants to feel that he or she is stuck in a dead end position from which there is no escape, regardless of effort expended. Movement upward from one ladder position to another depends primarily upon the individual gaining experience and education, which gives them new skills. As concluded by Cato et al. (1996), "For institutions to be assured that they will be able to meet their responsibilities for collection management and deliver collection-based products and services efficiently and effectively, it is essential that they plan specifically and strategically for training and continuous learning of staff involved in the collection management system." Cato et al. (1996) recommended that institutions "invest in staff by proceeding with a professional development plan that will benefit the institution." Certainly, the system of nomenclature that is recommended herein also will require institutions to make this investment, and will require members of the collections-related professions to participate in continuing education. Continuing education may come in the form of workshops, courses, attending conferences, apprenticeships, internships, and on-the-job learning.

The other recommendation made by Cato et al. (1996) was for the professional museum community to "develop standards for training individuals as collection management professionals." Because this also is such an integral part of developing a common nomenclature for natural science collections-related positions, standards are proposed for the positions under the headings of "Education and Experience", and "Knowledge and Skills." Included are indications of those areas in which a member of collections-related professions will need formal education, and areas in which continuing education will be needed. Formal educational needs will continue to

be filled by colleges and universities, but the challenge for the collections community will be developing the mechanisms and courses to fill the continuing education needs (Adams and Ritzenthaler 1999; Schwarzer 2001).

## DISCUSSION

The implementation of any agreeable system of position nomenclature will require time and dedicated work of members of the profession. There may be some variation in titles given national or regional differences in terminology and differences in size and focus of institutions, but the overall structure should remain consistent. Members of the collections community will need to work with their home institutions to gain acceptance of the system. Most, if not all, natural science museums and institutions will not have the size and complexity of staff required for the implementation of all titles; however, it is critical that institutions accept those positions that reflect the primary needs of their situations, and follow the overall concept of the system.

It is important to reiterate the point that most, if not all, natural science museums and institutions will not require the use of all these titles and positions. Most will implement only a small subset of these titles, or may combine responsibilities of several titles into one position. However, this will be effective and satisfactory to both the individual and the institution, only if the priorities for the responsibilities and knowledge/skill requirements are clearly defined in light of the full range of positions described herein. Consider a couple of examples.

One common situation is the small general museum with natural history collections and one position responsible for the collections, raising questions about where the priority for that responsibility resides. If it is primarily in the research and interpretation of the collections, then the knowledge and skills required for the position should emphasize the science base, and the position is most appropriately called "curator". If, on the other hand, the priority is on the management of the collections, the museum studies and management knowledge areas should be emphasized, and the position termed "collection manager". While the curator will have collection management responsibilities, and the collection manager will have interpretive responsibilities, the institution must recognize these as secondary level responsibilities, and consider options such as part-time and contract positions to assist with the secondary-level responsibilities. Similarly, reporting structures may be simplified in institutions with fewer staff, but they should still follow a logical balance of expertise.

Another common situation results from funding limitations and functional priorities. To address a museum's critical need to implement preventive conservation techniques, for example, a preventive conservation assistant might be hired and supervised by the collection manager. The priority for hiring someone in this position would be knowledge of preventive conservation principles and methodology. A natural science conservator would be hired on contract to provide expertise as needed to address more complex issues or treatments. A guest curator might be hired to provide content for a special exhibition. In recognizing and using the titles appropriately, the institution recognizes the distinct expectations for the responsibilities and knowledge for each position.

The complexity of responsibilities within an institution's collection management system has grown to such an extent that it is clear the titles for positions within this realm need clarification and standardization. This benefits both the individual and the institution, clarifying expectations of responsibilities for specific positions, for knowledge and skills required to fulfill those responsibilities, and for guidance of an individual's growth and development. The structuring of positions and the position descriptions in this paper provide a basis for discussion and improvement of a common nomenclature and set of expectations for professional positions.

George Daniels (1967) described the professionalization of American science during the 19<sup>th</sup> century. He believed that this professional development went through four stages - preemption, institutionalization, legitimation, and attainment of professional autonomy. Although the collections care profession, especially in

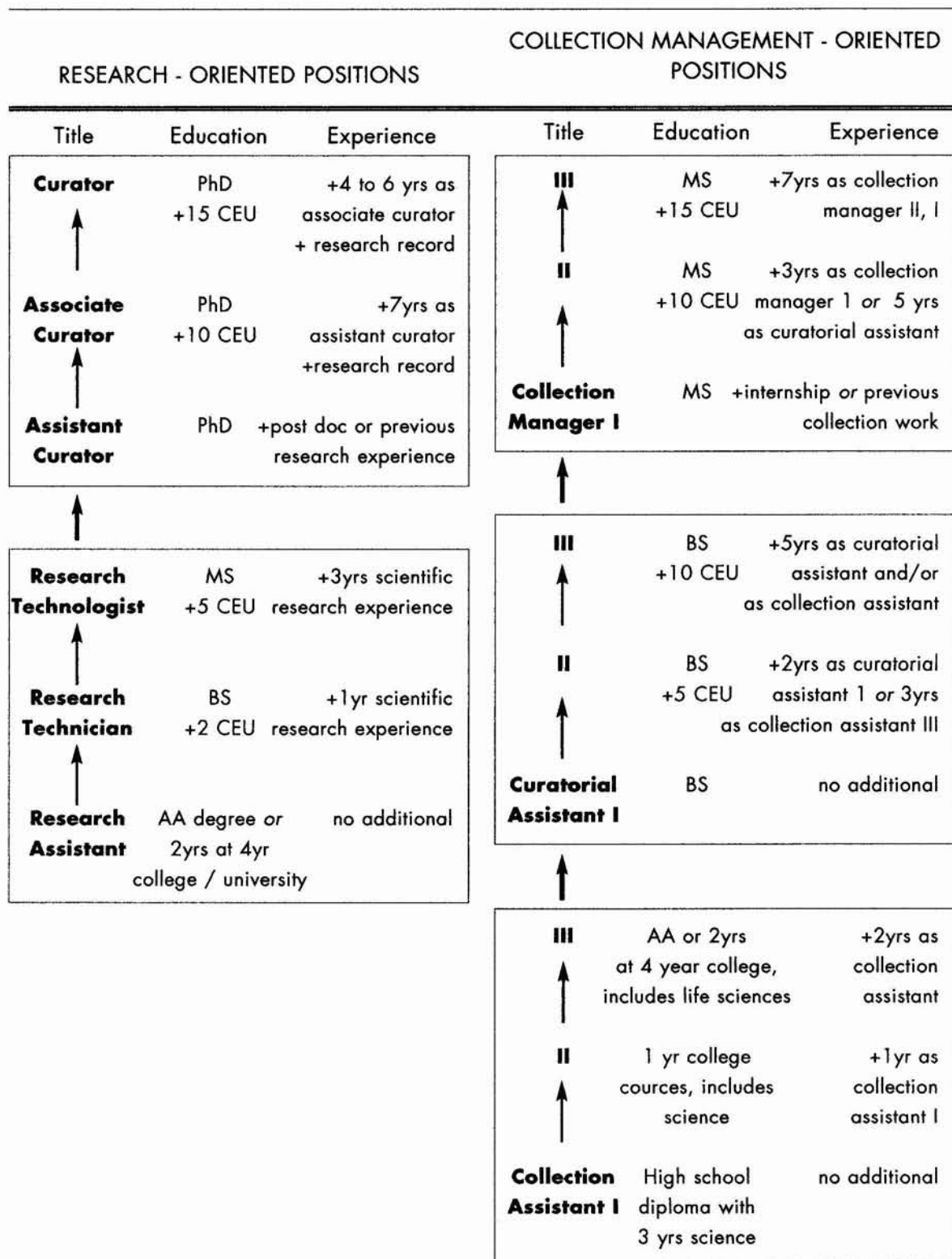


FIGURE 1. Relationship among research-oriented positions and collection management-oriented positions. Positions within the boxes form a track of expected professional development. Movement between the boxes is possible, but these represent major changes in job responsibilities that will require significantly more education and experience. Years of experience and CEU (continuing education units) are included to show relative levels among the positions.

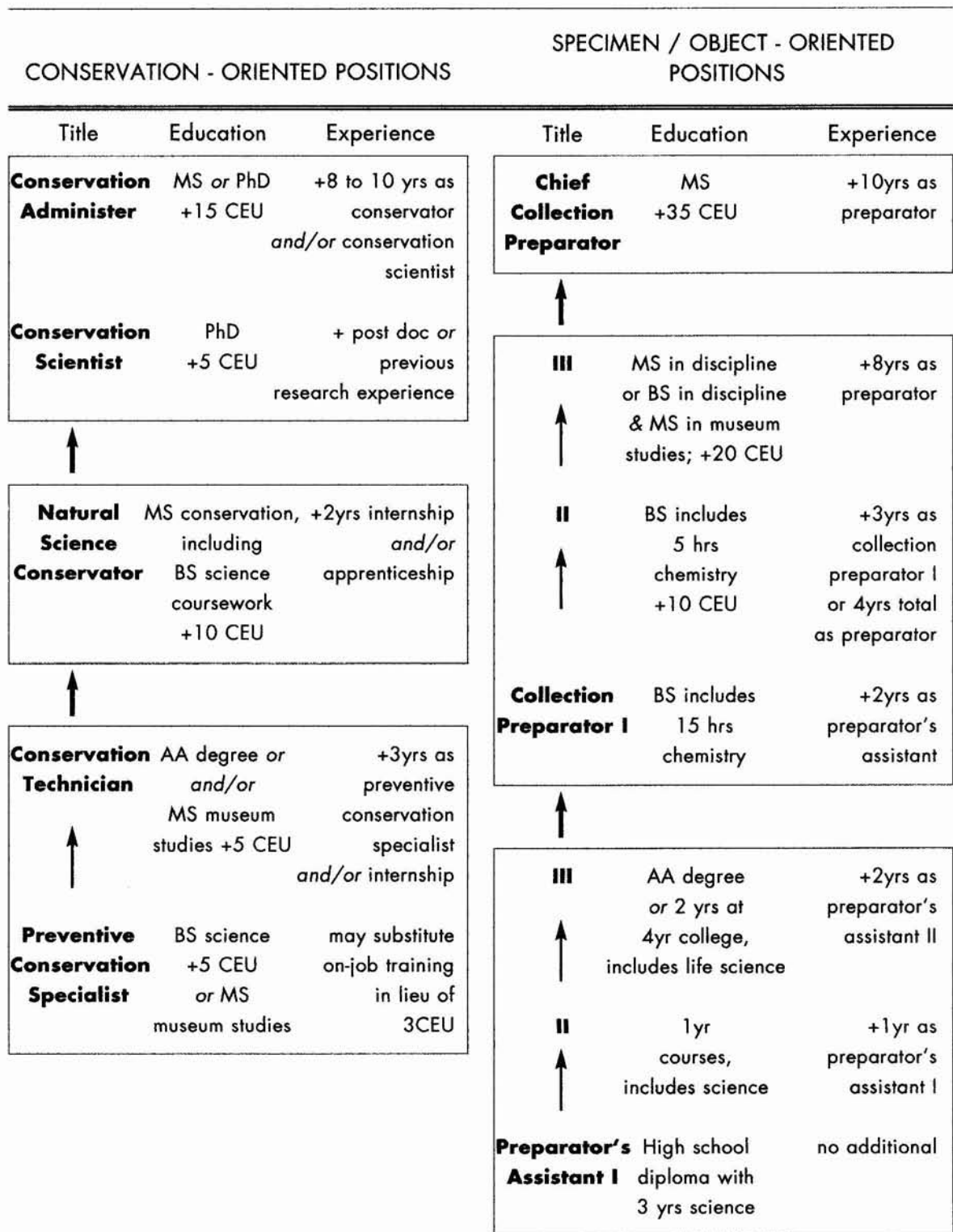


FIGURE 2. Relationship among conservation-oriented positions and specimen/object-oriented positions. Positions within the boxes form a track of expected professional development. Movement between the boxes is possible, but these represent major changes in job responsibilities that will require significantly more education and experience. Years of experience and CEU (continuing education units) are included to show relative levels among the positions.



natural science, has only been developing since the 1970s, it is showing some characteristics of the first two stages of professionalization. This proposed nomenclature relates to the preemption stage.

The preemption stage is when tasks, which were performed by people in general, become the exclusive possession of a particular group. This occurs when the knowledge to perform the task becomes "esoteric" (Daniels, 1967). Conflicts are common in this stage between those that entered the discipline during the pre-esoteric period and the newer members of the field. Many of these conflicts arise around the need for formal education in the developing profession to convey the esoteric knowledge. The controversy over the need of a degree in museum studies or a traditional disciplinary area is certainly a prime example of this type of conflict in the collections care profession. Daniels (1967) comments that "an inevitable conflict of generations arises at this point, quite frequently growing out of efforts to standardize nomenclature, one of the first details to be attended to in the development of a profession." The attempt in this paper is to begin the process of standardizing the nomenclature for positions relating to the care and management of natural science collections. While some controversy over this effort is expected, it is necessary in the larger context of a professionalization process.

## ACKNOWLEDGEMENTS

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## LITERATURE CITED

- Adams, R., and T. J. Ritzenthaler. 1999. *Museum Studies and Training in the United States 1999-2000*. Washington, D.C.: American Association of Museums Technical Information Service, D.C. 199 pp.
- American Association of Museums, Museum Studies Committee. 1980. Suggested qualifications for museum positions. *Museum News*, 59(2): 26-40.
- Bates, G. W. 1994. *Museum Jobs from A-Z*. Jacksonville, Florida: Batax Museum Publications, v+137 pp.
- Cato, P. S. 1991. Summary of a study to evaluate collection manager-type positions. *Collection Forum*, 7(2): 72-94.
- Cato, P. S., R. R. Waller, L. Sharp, J. Simmons, and S. L. Williams. 1996. Developing staff resources for managing collections. *Special Publication, Virginia Museum Natural History*, 4: 1-71.
- Daniels, G. H. 1967. The process of professionalization in American science: The emergent period, 1820-1860. *Isis*, 58: 150-166.
- Danilov, V. J. 1994. *Museum Careers and Training: A Professional Guide*. Westport, Connecticut: Greenwood Press, xi+546 pp.
- Dubberly, S. (ed.). 1994. *Careers in Museums: A Variety of Vocations*. Washington, D.C.: American Association of Museums, vi+68 pp.
- Edson, G., and D. Dean. 1994. *The Handbook for Museums*. London: Routledge, xvi+302 pp.
- Glaser, J. R., and A. A. Zenetou. 1996. *Museums: A Place to Work*. London: Routledge, xvii+302 pp.
- Hatchfield, P. 1996. AIC definitions of conservation terminology. *AIC News*, 21(3): 14-15.
- Schwarzer, M. 2001. *Graduate Training in Museum Studies: What Students Need to Know*. Washington, D.C.: American Association of Museums, 80 pp.
- Thompson, J. M. A. (ed.). 1992. *Manual of Curatorship: A Guide to Museum Practice*. Oxford: Butterworth-Heinemann Ltd., xv+756 pp.

## APPENDICES

### APPENDIX A. Descriptive information related to administration-oriented positions.

#### **Position Title: Director of Natural Science Museum**

The director position is generally considered to be the highest professional position within natural science museums. Advancement comes primarily in moving to a similar position in a larger and/or more prestigious museum.

*Education and Experience:* PhD in one of the scientific fields represented by museum, or in an area that supports the programs of the museum; at least ten years of experience working in a natural science, anthropology, or general museum; administrative experience of increasing responsibility.

*Knowledge and Skills:* *Museum studies-based* – knowledge of philosophy, history, policies, and practices of museums; knowledge of public policy affecting cultural organizations and scientific research; knowledge of legal responsibilities of museums; *Management-based* – interpersonal skills with diverse groups of people from board members to staff members to financial supporters to audience and non-audience members of the public; communication skills including ability to be the chief spokesperson for the museum; knowledge of strategic planning, fund-raising, public relations/marketing; knowledge of financial management with strong budgeting and budget management skills, and grant writing; knowledge of modern electronic communication; knowledge of facility management and security; *Science-based* – knowledge of natural science or anthropology research methods and publishing.

*Key Responsibilities:* provide the day-to-day leadership for the administration of the museum, its staff, and its programs; work with the Board of Trustees to develop and implement appropriate policies and procedures; work with staff to develop policies and procedures for the approval by the Board; develop and implement the museum's strategic plan; primary responsibility for implementation of the strategic plan through working with the Board and being certain that appropriate portions of the plan become the goals and objectives of staff, as well as the basis of their evaluations for the duration of the plan; set budgetary priorities and monitor budgetary expenditures; work with Board and appropriate staff to undertake fund raising and grant writing; act as the primary spokesperson for the museum; provide leadership for staff management and development.

#### **Position Title: Director (or Assistant Director) for Collections**

In those institutions where assistant director positions are not appropriate, a senior curator or collections manager may be appointed with many of these same duties. Advancement for an assistant director for collections would be moving to another institution with larger collections and collections-related staff, or to the position of director of a natural science museum.

*Education and Experience:* PhD in collections management, conservation, biology, geology, paleontology, or anthropology; MA or MS in conservation or museum studies; established publication record in collections-related research; eight to ten years of experience in curator, conservator, or collection manager positions; additional education units in strategic planning, management (human resources, financial, facility, project), collections management, preventive conservation, information systems.

*Knowledge and Skills:* *Museum studies-based* – knowledge of philosophy, history, policies, and practice of museums; knowledge of collection management, preventive conservation, and information management systems; knowledge of collections care and management research and publishing; knowledge of legal and ethical issues affecting acquisition and management of specimens; *Science-based* – knowledge of natural science or anthropology research methods; knowledge of subject matter in an area of biology, geology, paleontology, mineralogy, or anthropology; knowledge of organization, arrangement, and nomenclature of specimens in a relevant academic field; *Management-based* – knowledge of strategic planning, budgeting, grant writing, and financial management; knowledge of human resource management, including team and small group dynamics; knowledge of institutional systems, project management, facility management, and security; communication skills, including modern electronic communication.

*Key Responsibilities:* provide administrative leadership for institution-wide program for collections care and management; insure that the museum's collections care and management programs meet the highest professional standards; participate in museum strategic planning and its implementation; serve as the museum's spokesperson on behalf of the collections needs; supervision, development, and evaluation of collections staff; set budgetary priorities and monitor budgetary expenditures in collections care and management programs; write and promote the writing of collection care grants; work with



conservators and collections staff in developing and implementing strategic collections management plan, conservation plan, emergency management plan, collection care policies, integrated pest management plan, and health and safety policies; supervise projects associated with the physical tracking of specimens and associated documentation and management of information associated with the specimen; conduct collections-care research and publish results.

**Position Title: Director (or Assistant Director) for Research**

In those institutions where assistant director positions are not appropriate, a head curator may be appointed with many of these duties. With experience, advancement to director of a natural science museum would be appropriate.

*Education and Experience:* PhD in biology, geology, paleontology, or anthropology; established publication record in scientific research; eight to ten years of experience in Curator or natural science research positions; additional education units in strategic planning, management (human resources, financial, facility, project), and basic collections care and handling.

*Knowledge and Skills:* *Science-based* – subject matter expertise in an area of biology, geology, paleontology, mineralogy, or anthropology; knowledge of natural science or anthropology research methods and publishing. *Museum-studies based* – knowledge of philosophy, history, policies, and practice of museums; knowledge of legal and ethical issues affecting acquisition and use of specimens. *Management-based* – knowledge of strategic planning, budgeting and financial management, and grant writing; knowledge of human resource management, including team and small group dynamics; knowledge of public policy affecting cultural organizations; communication skills, including modern electronic communication.

*Key Responsibilities:* assure that the museum's scientific research programs meet the highest professional standards; provide day to day leadership for the museum's research programs; participate in museum strategic planning and its implementation; serve as the museum's spokesperson on behalf of the research program; supervision, development, and evaluation of research staff; set budgetary priorities and monitor budgetary expenditures in research programs; write and promote the writing of scientific research grants; conduct scientific research and publish results.

**Position Title: Director (or Assistant Director) for Research and Collections**

This position would be a combination of the education, knowledge, and skills of the two previous positions, with responsibilities also encompassing both of these areas.

**APPENDIX B. Descriptive information related to research-oriented positions**

**Position Title: Curator**

Many institutions will use a track of positions – Assistant Curator, Associate Curator, and Curator – which parallel academic professorial positions (Figure 1). Advancement for a curator can come in the form of moving to larger and/or more prestigious institutions or taking administrative positions such as Assistant Director or Director of a Natural Science Museum.

*Education and Experience:* PhD in biology, geology, paleontology, mineralogy, anthropology, or collections care; established research record in collections-based scientific or anthropological research; additional education units in museum administration, preventive conservation, collections care, personnel management, and budgeting.

*Knowledge and Skills:* *Science-based* – subject matter expertise in an area of biology, geology, paleontology, mineralogy, or anthropology; knowledge of biology, geology, paleontology, mineralogy, or anthropology collection-based research methods and publishing. *Museum studies-based* – knowledge of philosophy, history, policies, and practice of museums; knowledge of preventive conservation, collection management, and computerization of collection data; knowledge of legal and ethical issues affecting research and specimen collecting. *Management-based* – knowledge of strategic planning, budgeting and financial management, and grant writing; knowledge of human resource management, including team and small group dynamics; knowledge of project management, especially for major research projects, field parties, and research laboratory operations; knowledge of modern electronic communication.

*Key Responsibilities:* perform collection based scientific or anthropological research and publish the results; conduct field research that adds to the research collections in an ordered and planned manner; spokesperson for the museum in area of subject-matter expertise; provide identification for specimens or objects in subject matter area for new research materials, other professionals, or interested members of the public; obey all collecting, import/export, and CITES laws and regulations; provide educational opportunities and guidance to graduate students in research; work with conservators, collection

managers, and other collections-related staff to provide the necessary curatorial and preventive care for scientific or anthropological collections and associated data; participate in the development and implementation of museum documents such as collections policies, strategic museum plan, conservation plan, integrated pest management plan, emergency management plan, health and safety plan, and code of professional museum conduct; participate in projects to computerize collection data; provide administrative leadership, including budgeting and financial management, for research activities; write and administer grants to support research programs and collections care; supervise, evaluate, and plan the career development of assigned collections staff; participate in teams to plan and implement museum's exhibits and educational programs.

**Position title: Research Scientist**

This is a title often used for a senior research staff member who has established a particularly outstanding research record. This is a way to honor the person, ease the workload, and keep this person associated with the institution. In some institutions, where the functions of research and collection care are separately managed, this title is used for curators specializing in research as opposed to curators specializing in collection management.

*Education and Experience:* PhD in biology, geology, paleontology, mineralogy, anthropology or conservation science; established an outstanding research record in collections-based scientific or anthropological research; additional education units in basic collections care and handling.

*Knowledge and Skills:* *Museum studies-based* – knowledge of philosophy and functions of museums, including museum policies, code of professional museum conduct, and museum procedures; knowledge of legal and ethical issues affecting research and specimen collecting. *Science-based* – subject-matter expertise; knowledge of biological, geological, paleontological, mineralogical, or anthropological collection based research methods and publishing; knowledge of analysis of research data from molecular studies or other specialized systematic, evolutionary, or anthropological studies. *Management-based* – knowledge of grant writing and administration, human resource management, management for major research projects, and modern electronic communication.

*Key Responsibilities:* perform collection based scientific or anthropological research and publish the results; conduct field research that adds to the research collections in an ordered and planned manner and forms the basis of ongoing research projects; provide administrative leadership for research projects and/or research laboratory; write and administer grants to support research programs; provide expertise as appropriate to assist the museum's staff and programs and to direct research programs for undergraduate and graduate students; obey all collecting, import/export, and CITES laws and regulations and preserve all appropriate documentation.

**Position title: Research Associate**

This title can be used for appointing a staff member who is not on a permanent appointment, but is funded from an outside source such as a grant or contract. This title also can be used as a courtesy appointment for someone who is contributing to a research division, but has a permanent appointment at another institution. If advancement from this position were desired, it most likely would come in the form of a move to a permanently funded position.

*Education and Experience:* PhD or MS/MA in biology, geology, paleontology, mineralogy, anthropology, or conservation science; showing evidence of establishing a collection based research program.

*Knowledge and Skills:* *Museum studies-based* – knowledge of philosophy and functions of museums, including museum policies, code of professional museum conduct, and museum procedures; knowledge of legal and ethical issues affecting research and specimen collecting. *Science-based* – subject-matter expertise; knowledge of biological, geological, paleontological, mineralogical, or anthropological collection based research methods and publishing. *Management-based* – knowledge of grant writing and administration; knowledge of modern electronic communication.

*Key Responsibilities:* perform collection based scientific or anthropological research and publish the results; conduct field research that adds to the research collections in an ordered and planned manner; write and administer grants and contracts to support research programs; obey all collecting, import/export, and CITES laws and regulations and preserve all appropriate documentation.

**Position Title: Research Technician**

This is the top of the research support staff positions. Position track up to this level would be Research Assistant to Research Technician. Advancement beyond this position would require significantly more education and a decision as to the alternate career path to follow.

*Education and Experience:* MS in biology, geology, mineralogy, paleontology, anthropology, or conservation science; three years experience in performing scientific or anthropological research; additional education units in personnel management, budget management, and basic collections care and handling.

*Knowledge and Skills:* *Museum studies-based* - knowledge of philosophy and functions of museums; knowledge of documentation requirements and basic collections care for scientific collections; knowledge of legal and ethical issues affecting specimen collecting. *Science-based* - appropriate subject area knowledge in natural science or anthropology; knowledge of field and/or laboratory research techniques; knowledge of specimen-based research techniques and procedures; knowledge of field and/or laboratory equipment and its maintenance. *Management-based* - knowledge of laboratory management; knowledge of human resource management, including supervision and evaluation of assistants, students, and volunteers; knowledge of modern electronic communication.

*Key Responsibilities:* perform a wide variety of research procedures and collect appropriate data with no supervision; learn new research procedures with a minimum of supervision; perform research in field and/or laboratory situations; perform at least preliminary analyses of research data from specific procedures; monitor laboratory or research project budgets; maintain field and/or laboratory research equipment; supervise and evaluate other research support staff.

## APPENDIX C. Descriptive information related to collection management-oriented positions.

### **Position Title: Collection Manager III**

This position represents the top of the collection-management-oriented positions so advancement can come only in the form of moving to larger and/or more prestigious collections, of taking responsibility for greater number of collections, or taking administrative positions such as Assistant Director or Director of a natural science museum (see Figure 1). Advancement to this position most likely will come through holding collection manager positions II and I.

*Education and Experience:* MS or MA in biology, geology, paleontology, mineralogy, or anthropology, with museum studies minor; or MS or MA in conservation science or museum studies with minor in area of natural science or anthropology; additional education units in management (human resources, financial, facility, project), preventive conservation, and information systems.

*Knowledge and Skills:* *Museum studies-based* - knowledge of philosophy, history, and practice of museums, including museums as functioning organizations, museum policies, code of professional museum conduct, museum procedures, collection management and preventive conservation; knowledge of information management systems used in collection management, museum registration, and scientific research; knowledge of collections-care research and publishing; knowledge of legal and ethical issues affecting acquisition, management, and use of specimens. *Science-based* - knowledge of natural science or anthropology research methods, including techniques specific to the acquisition and preparation of specimens; knowledge of organization, arrangement, and nomenclature of specimens in relevant academic field; knowledge of subject matter in an area of natural science or anthropology. *Management-based* - knowledge of strategic planning, budgeting, and budget management; grant writing skills; knowledge of human resource management; including team and small group dynamics, volunteer management; knowledge of institutional systems and project management; knowledge of facility management and security; communication skills; knowledge of modern electronic communication.

*Key Responsibilities:* administer collections care and management program for one or a few discipline-related collections; work with collections staff, conservators, and researchers to develop and implement short and long-range programmatic goals and objectives to improve and administer daily operations; participate in the development and implementation of museum documents such as collections policies, strategic museum plan, collection management plan, conservation plan, integrated pest management plan, emergency management plan, health and safety plan, loan policies, accession/deaccession policies, code of professional museum conduct, and acquisition policies; develop and implement procedures associated with documentation and management of information associated with the specimen; work with collection staff, conservators, researchers, and public programming staff to develop and implement preventive conservation procedures to insure appropriate methods for handling, storing, and using specimens and associated data; set budget priorities and monitor budget expenditures for collection of responsibility; participate in writing and administering grants to support collection care and management; supervise, evaluate, and plan career development of assigned collection staff; work with conservators and facilities maintenance staff to insure facility security for collections; provide identification for specimens or objects for collection registration; conduct collections-care research and publish results.

**Position Title: Curatorial Assistant III**

Advancement to this position would be through Curatorial Assistant II and I positions with increasing experience and continuing education. With additional education, promotion to Collection Manager I would be appropriate (see Figure 1).

*Education and Experience:* BS in biology, geology, paleontology, mineralogy, or anthropology; five years of experience; additional education units in museum studies, natural science or anthropology content, project management, preventive conservation, information systems, and facility management.

*Knowledge and Skills:* *Museum studies-based* – basic knowledge of philosophy, history and practice of museums; working knowledge of collection management, preventive conservation, and information management systems used in collection management; basic understanding of legal and ethical issues affecting acquisition, management, and use of specimens. *Science-based* – knowledge of subject matter in an area of natural science or anthropology; knowledge of techniques specific to the acquisition and preparation of specimens in an area of natural science or anthropology; working understanding of organization, arrangement, and nomenclature of specimens in relevant academic field. *Management-based* – basic understanding of project management, facility management, and security; communication skills, both oral and written; knowledge of modern electronic communication.

*Key Responsibilities:* implement established procedures associated with physical tracking of specimens, associated with documentation, and management of information associated with specimens; under supervision work with conservators, researchers, and public programming staff to implement established preventive conservation procedures related to handling, storing, and using specimens; participate as directed in the development and implementation of museum and collection policies and procedures; research materials, equipment, and supplies for purchasing and complete necessary paperwork and documentation to complete purchases; supervise collection care staff, volunteers, and students; implement established procedures to insure facility security for collections; provide specimen identifications for common species or objects; assist with collections-care research as directed.

**Position Title: Collection Assistant III**

This group of position titles is used for the least trained and experienced members of the collection-care staff. Often these titles are used for students in training or volunteers moving to paid positions. Advancement from Collection Assistant II and I depends primarily on gaining experience. With additional education and experience, promotion to Curatorial Assistant I or ultimately Collection Manager I would be appropriate (see Figure 1).

*Education and Experience:* AA degree or two years of courses at a four-year college or university; must have a course in general or introductory biology, geology, paleontology, mineralogy, or anthropology; two years of experience in Collection Assistant II and I positions; additional education units in basic collections care and handling.

*Knowledge and Skills:* *Museum studies-based* – introductory level knowledge of museums; introductory level knowledge of collection management and care. *Science-based* – introduction to natural sciences or anthropology; introduction to preparation techniques for specimens in an area of natural science or anthropology. *Management-based* – communication skills, both oral and written; knowledge of modern electronic communication. *General* – manual dexterity; patience; able to follow instructions; commitment to accuracy.

*Key Responsibilities:* perform, as directed, manual procedures associated with physical tracking of specimens and associated documentation (e.g., labeling skeletal parts with catalog numbers, collection inventories); perform, as directed, manual procedures associated with documentation and management of information associated with specimens (e.g., data entry); maintain inventory of departmental materials, equipment, and supplies; supervise assigned volunteers and students; implement established procedures to insure facility security for collections.

**Position Title: Registrar**

Persons holding this job title can expect to first serve as an Assistant Registrar. Advancement from this position can come with additional education and experience and take the form of moving to larger and/or more prestigious collections, of taking responsibility for greater number of collections, or taking administrative positions such as Collections Manager or Assistant Director of a natural science museum.

*Education and Experience:* MS/MA in natural science discipline or anthropology, with museum studies minor, or MS/MA in museum studies with minor in area of natural science or anthropology; three years of experience in collection management and/or registration positions; additional education units in project management, preventive conservation, information systems, and legal issues.



*Knowledge and Skills: Museum studies-based* – knowledge of philosophy, history and practice of museums, including museums as functioning organizations, museum policies, code of professional museum conduct, museum procedures; knowledge of information management systems used in collection management, museum registration, and scientific research; knowledge of collection management and documentation procedures, including digital photography; knowledge of preventive conservation; knowledge of legal and ethical issues affecting registration and use of specimens, information, and documentation. *Science-based* – broad knowledge of natural science and anthropology, particularly with respect to information characteristics; knowledge of nomenclature of specimens in relevant academic fields. *Management-based* – knowledge of budgeting and financial management; knowledge of human resource management, including team and small group dynamics, volunteer management; knowledge of institutional systems and project management; communication skills, written and oral; knowledge of modern electronic communication and data management.

*Key Responsibilities:* create, compile, and maintain documents relevant to the ownership, history of use, and physical history of specimens owned and used by the institution; participate in the development and implementation of procedures and projects to manage information, whether in computerized format or manual; participate in the development and implementation of museum documents such as collection management plan, conservation plan, integrated pest management plan, emergency management plan, loan policies, accession/deaccession policies, and acquisition policies; work with other collection care staff, conservators, researchers, and public programming staff to develop and implement preventive conservation procedures to insure appropriate methods for handling, storing, and using specimens and associated data; implement procedures associated with the physical movement and tracking of specimens and documentation; develop and implement inventory projects; supervise specimen photography for documentation purposes; inventory, perform condition reporting, and monitor status of incoming and outgoing loans, traveling exhibits, and other material received for temporary exhibits; set budget priorities and monitor budget expenditures for documentation functions; work with administrative and exhibition staff to develop and negotiate contracts affecting use and movement of specimens/objects; supervise and evaluate assigned collection care staff and volunteers.

#### **Positions Title: Archivist**

Advancement to this position most likely will come through holding successively the positions of Associate Archivist and Assistant Archivist. Advancement beyond this position would come primarily through moving to a larger/more prestigious archive.

*Education and Experience:* MLS in archival management or MA in Museum Studies with emphasis in archival management; additional education units in the appropriate following areas depending upon training received in degree program – museum management and operations, preventive conservation, basics of paper conservation, and museum policies and procedures; internship, apprenticeship, or work experience in archival management equivalent to five years; ultimate goal would be to receive certification from the Academy of Certified Archivists established by the Society of American Archivists.

*Knowledge and Skills: Museum studies-based* – knowledge of museum policies and procedures, especially those that will result in archival/permanent records; knowledge of natural science museums as functioning organizations; knowledge of archival management principles and ethics; knowledge of archival media including paper, written, printed, visual, and electronic; knowledge of creating logical arrangements within large amounts of documentation; knowledge of creation of files and user guides within collections of documents; knowledge of legal issues related to donors, copyright, artist rights, freedom of information, locality site protection, and institutional rights; basic knowledge of preventive and paper conservation, care and handling of collections. *Management-based* – knowledge of electronic communication and relational databases; communication skills; skill in working with staff and researchers; project management skills.

*Key Responsibilities:* organize and maintain the museum's archival and permanent records including field catalogs, collection records, photographs, films, videotapes, CDs, audiotapes, and administrative records; create and maintain an electronic database for archival records; implementation of preventive conservation for archival collection, and basic conservation treatment of archive items in consultation with conservator; assisting the staff and researchers in the use of the archives and permanent records; advising museum staff on records and documentation that should be entered into the archives, and on accepting donated archival materials; advising the museum administration on any legal issues involved in copyright and maintaining and using archives; supervise assistants or volunteers working in archives.

## APPENDIX C. Descriptive information related to conservation-oriented positions.

### **Position title: Conservation Administrator**

People assuming this administrative position would probably come from the ranks of Conservation Scientists or Natural Science Conservators. Advancement from this position would involve moving upward in the administration of museum or moving to a larger and/or more prestigious museum or conservation laboratory (see Figure 2).

*Education and Experience:* MS or MA in conservation science or PhD in an appropriate field for conservation science; eight to ten years of experience as Natural Science Conservator or Conservation Scientist; additional education units in project management, personnel management, museum and or/conservation laboratory management, and strategic planning; where available (e.g., Canada, UK), professional accreditation.

*Knowledge and Skills:* *Museum studies-based* – knowledge of philosophy, history, and practices of museums and conservation; knowledge of museums and/or conservation laboratories as functioning organizations; knowledge of conservation techniques and profession; knowledge of relevant code of ethics and guidelines for practice (e.g., AIC, CAPC/CAC, UKIC). *Science-based* – knowledge of research protocols for conservation and conservation science; knowledge of conservation techniques and materials; knowledge of health and safety protocols. *Management-based* – knowledge of strategic planning, budgeting and budget management, and grant writing; knowledge and experience with personnel management; knowledge of modern electronic communication

*Key Responsibilities:* in collaboration with other collections staff, develop and implement a strategic vision for collections preservation and long-term conservation plan; develop and implement conservation related policies and procedures for collections care, including preventive conservation, exhibitions, loans, and acquisitions; provide day-to-day administrative leadership for conservation department or laboratory; develop policies and create an atmosphere that make the AIC Code of Ethics and Guidelines for Practice standard daily operating procedures; develop budget requests and contracts; implement departmental and project budgets; provide for staff development and advancement; provide project management and concepts for major conservation tasks; provide quality control for conservation projects conducted in department or laboratory; provide preventive conservation and collections care training to collections related staff.

### **Position Title: Conservation Scientist**

Advancement would come in the form of movement into more responsible management positions, such as Conservation Administrator or a museum administrative position, or moving to a similar position in a larger and/or more prestigious museum or conservation laboratory (see Figure 2).

*Education and Experience:* PhD in conservation science, material science, chemistry, physics, biochemistry, or related discipline; additional education units in project management, philosophy of museums, and collection-based research; where available (e.g., Canada, UK) professional accreditation.

*Knowledge and Skills:* *Museum studies-based* – knowledge of AIC Code of Ethics and Guidelines for Practice; knowledge of museum objects and materials; knowledge of basic collections care and handling. *Science-based* – knowledge of research protocols for conservation science; knowledge of wide range of scientific instruments used in testing natural science based materials; knowledge of conservation techniques and materials; knowledge of health and safety protocols. *Management-based* – knowledge of project management and human resource management; knowledge and skill in grant writing; knowledge of modern electronic communication.

*Key Responsibilities:* perform research into problems whose solution will aid conservators, curators, and collection managers in identifying structure and composition of objects; perform tests and analyses to identify sources of deterioration of objects and aid conservators in determining appropriate treatment for objects; perform research into improving methods of preventive conservation; work with conservators, curators and collection managers in the transfer of technology resulting from research; publish results of research.

### **Position Title: Natural Science Conservator**

Advancement to this position would most likely be from an assistant or associate conservation position following a formal graduate degree. Advancement from this position might be possible with appropriate experience and additional education to a Conservation Administrator, Collections Manager, or Conservation Scientist. Natural Science Conservators also can advance their careers by accepting a position at a larger museum or conservation center (see Figure 2). Many conservators are in private practice and do contract work for museums.



*Education and Experience:* MS or MA in objects, ethnographic, archaeological or natural science conservation from a recognized graduate program in conservation; additional experience in graduate, post-graduate, or assistant conservator positions with specialization in natural science collections under supervision of a qualified Natural Science Conservator; undergraduate education should include courses in chemistry, physics, biology, geology, mineralogy, material sciences, and anthropology; additional education units in project management, personnel management, museum studies, and strategic planning.

*Knowledge and Skills:* *Museum studies-based* – knowledge of philosophy, history, practice and policies of museums; knowledge of relevant code of ethics and guidelines for practice (e.g., AIC, CAPC/CAC, UKIC); knowledge of the conservation treatments of natural science and anthropological objects; knowledge of preventive conservation principles, procedures, and techniques, including collection area housekeeping and integrated pest management, building environment and materials; knowledge of sources and analysis of deterioration of natural science and anthropological objects; knowledge of conservation assessments, treatment reports, condition reports. *Science-based* – knowledge of research and treatment protocols for conservation, conservation science, natural sciences and anthropology; knowledge of material composition and sources of deterioration process of natural science and anthropological objects; knowledge of conservation instruments, materials and techniques; knowledge of chemistry and chemical reactions; knowledge of research techniques in natural sciences and anthropology; knowledge of conservation instruments; knowledge of digital photography. *Management-based* – knowledge of strategic planning, grant writing, financial management, emergency management, and risk management; ability to work with curators, collection managers, and exhibits staff; knowledge of project management; knowledge of research laboratory operations; knowledge of modern electronic communication and documentation.

*Key Responsibilities:* perform conservation assessments of collections and their environments; work with museum staff to develop and implement conservation long range-plans, emergency management plan, integrated pest management plan, health and safety plan, and preventive conservation procedures for museum collections, loans, exhibitions, and acquisitions; ensure ongoing monitoring of condition of objects and environments; prepare condition and treatment documentation; design treatment proposals and performs stabilization and conservation treatments; manages division and/or project budgets and writes grants; supervise and evaluate designated collection care staff.

#### **Position Title: Conservation Technician**

With experience and a conservation internship, a Preventive Conservation Assistant would be prepared for promotion to a Conservation Technician position. With additional education, experience, and apprenticeship, a Conservation Technician can advance to be a Natural Science Conservator. Glaser and Zenetou (1996) used the title "Conservation Aide" for this position, but the title used by the conservation profession is used in this paper (Hatchfield 1996) (see Figure 2).

*Education and Experience:* BS in biology, chemistry, physics, studio art, design, and/or MS/MA in museum studies; three years of experience as a Preventive Conservation Assistant and/or Conservation Intern; additional education units in preventive conservation, conservation, project management, and museum studies.

*Knowledge and Skills:* *Museum studies-based* – knowledge of philosophy, history, policies, and practices of museums; knowledge of conservation principles, specific conservation materials and methods, and preventive conservation activities; knowledge of appropriate code of ethics and guidelines for practice (e.g., AIC, CAPC/CAC, UKIC); health and safety protocols. *Science-based* – knowledge of basic materials compositions commonly used for collections care and conservation; knowledge of basic chemistry.

*Key Responsibilities:* perform specific conservation treatments, such as routine cleaning of objects, in conjunction with or under the supervision of a Conservator; perform specific preventive conservation activities; works with exhibit and education staff in preventive conservation for objects in their care; perform routine portions of simple conservation assessments and documentation; maintain conservation equipment.

#### **Position Title: Preventive Conservation Assistant**

With additional education and experience, promotion to Conservation Technician or Curatorial Assistant II could be expected in three or more years. Hatchfield (1996) used the position title Collections Care Specialist for this position, but the above title is proposed because it more closely describes the actual functions of this position and it is less confusing with other position titles in the collection-management oriented positions (see Figure 2).

*Education and Experience:* BS in biology, chemistry, or physics and/or MS/MA in museum studies; additional education units in preventive conservation, museum studies, or a combination of academic and on the job training in preventive conservation.

*Knowledge and Skills: Museum studies-based* - knowledge of philosophy, history, policies, and practice of museums; knowledge of specific preventive conservation activities; knowledge of appropriate code of ethics and guidelines for practice (e.g., AIC, CAPC/CAC, UKIC); knowledge of the use and care of instruments used in preventive conservation. *Science-based* - knowledge of basic chemistry; knowledge of materials commonly used in preventive conservation; knowledge of basic monitoring equipment and tools used with collections preparations.

*Key Responsibilities:* perform specific preventive conservation activities working in conjunction with or under the supervision of a Conservator or Collection Manager; perform environmental monitoring of objects in collections, exhibits, educational facilities; maintain preventive conservation equipment and supplies.

## APPENDIX E. Descriptive information related to information management-oriented positions.

The number of positions in this field has been increasing exponentially, as has the number of titles given for this area. This complexity is not necessary for collection-related information management positions, thus four basic levels are emphasized to reflect the following major distinctions: (1) positions that are primarily clerical in nature, providing data entry and verification skills; (2) positions that focus primarily on programming, software support, and/or hardware support; these positions require a strong computer science background, and are technical in orientation; (3) positions that focus on the analysis of needs and resources from a museum perspective, as well as planning and management of a department or division level operation; although this requires a background in computer systems and applications, it requires a substantially greater understanding of museum data and programmatic requirements than positions in the first and second levels; (4) positions that focus on the breadth and complexity of institution-wide needs; this includes analysis and planning as well as implementation and management, but also requires a greater knowledge of network systems and greater range of disciplinary and programmatic requirements.

### **Position Title: Bioinformatics Manager**

With experience, promotion to this position can come from Bioinformatics Specialist. With increased education and experience, a Bioinformatics Manager may advance to institution's Director of Information Services or moving to a larger and/or more prestigious institution.

*Education and Experience:* MS in information systems with additional education units in museum studies, natural science, or anthropology; or MS/MA in natural science, anthropology, museum studies, or library science with additional education units in information systems; five years experience working with automated systems management; additional education units in information systems, management (human resources, financial, project), strategic planning.

*Knowledge and Skills: Museum studies-based* - knowledge of museums as functioning organizations; knowledge of collection management and research data parameters and uses; knowledge of legal and ethical issues affecting acquisition, management, and use of information in electronic and traditional formats. *Information-based* - knowledge of systems analysis and design, and system development strategies; knowledge of database programming languages; knowledge of operating systems for personal computer systems as well as high-performance workstations; knowledge of technical requirements for installation, maintenance and upgrading of hardware and software components, including networked workstations; knowledge of programming languages and software for internet access, creating and maintaining web sites and interfaces. *Management-based* - skills in troubleshooting and problem solving; excellent communication skills and ability to work with varied personalities and abilities; project management skills; knowledge of human resource management; ability to learn new software as needed.

*Key Responsibilities:* provide vision and oversight of the institution-wide automated information system that supports all aspects of collection care and research, including library and archival functions; provide systems analysis, systems design, development and support of new applications to enhance efficacy of system for users; supervise development of and adherence to data standards; monitor system use and performance, and supervise backup and maintenance of system; work with collection care staff to develop policies for use of and access to data; recommend policies to institution administration regarding automation and technology; supervise, evaluate, and plan career development for designated information management staff; set budget priorities and monitor budget expenditures for institutional technology resources; write and administer grants to support information technology program; serve as liaison with institution's Network Manager; maintain strong awareness of current technology and evaluate applicability for collection care and research functions.

**Position Title: Bioinformatics Specialist**

Advancement can come in the form of moving to larger and complex collections, taking responsibility for automation of a greater number of collections, or with increased experience and education, as well as moving to a Bioinformatics Manager position.

**Education and Experience:** MS in natural science or anthropology with additional education units in museum studies and information systems, or MS in museum studies with additional education units in information systems, or MS in computer science or library science with additional education units in museum studies, natural science, and anthropology; three years experience working with collection management database programs; additional education units in information systems, computer applications, and project management.

**Knowledge and Skills:** *Museum studies-based* - knowledge of museums as functioning organizations; knowledge of collection management and research data parameters and uses; knowledge of legal and ethical issues affecting acquisition, management and use of information in electronic and traditional formats. *Science-based* - knowledge of subject matter in an area of natural science or anthropology with understanding of how information is used. *Information-based* - knowledge of database programming languages; knowledge of operating systems for IBM-compatible and Macintosh microcomputers; knowledge of technical requirements for installation, maintenance and upgrading of hardware and software components; knowledge of programming languages and software for internet access, creating and maintaining web sites and interfaces. *Management-based* - skills in troubleshooting and problem solving; excellent communication skills and ability to work with varied personalities and abilities; project management skills; knowledge of human resource management; ability to learn new software as needed; strong writing skills.

**Key Responsibilities:** provide daily management of automated information system for one or a few closely related collections; work with information providers and users to analyze information sources and uses and to develop requirements for an effective system; participate in teams to develop policies for use of and access to data and data standards for collection care and research needs; develop, document, and implement procedures to obtain, capture, and verify data and procedures to provide data in various formats, such as paper, disk, and microfiche; work with computer specialist to develop, document, and implement procedures for data backup and security; provide staff training for use of system; supervise and evaluate designated information management staff; set budget priorities and monitor budget expenditures; write and administer grants to support automation of information.

**Position Title: Collection Computer Specialist**

With additional experience and education, promotion to Bioinformatics Specialist would be appropriate for a Collection Computer Specialist.

**Education and Experience:** BS in computer science or related field with minor in computer science; additional education units in programming, computer applications, and museum registration.

**Knowledge and Skills:** *Museum studies-based* - introductory level knowledge of functions of museums, especially accessioning and cataloging specimens. *Information-based* - knowledge of database programming languages; knowledge of operating systems for personal computers; knowledge of technical requirements for installation, maintenance, and upgrading of hardware and software components; knowledge of programming languages and software for internet access, creating and maintaining web sites and interfaces. *Management-based* - skills in troubleshooting and problem solving; excellent communication skills and ability to work with varied personalities and abilities; project management skills; ability to learn new software as needed.

**Key Responsibilities:** provides daily support for hardware components and software applications; with direction, modifies or develops applications to support collection care and research; responds to software and hardware problems by testing, diagnosing, and servicing components; develops and implements routine backup protocol; may serve as webmaster, with input from collection care and information management staff; participates with collection care and information management staff in projects to improve information capture, use, and access; research potential purchases of hardware and software for compatibility, pricing, and technical requirements.

**Position Title: Collection Data Entry Technician**

With additional education and experience, advancement to other collection care entry-level positions or more advanced positions in information management

**Education and Experience:** AA degree (a two-year degree in basic studies) or two years of courses at a four-year college or university; including a course in general biology, geology, paleontology, mineralogy, or anthropology; two years experience working with word-processing, spreadsheet, and/or database software.

*Knowledge and Skills: Management-based* – keyboarding skills; skills using word-processing, spreadsheet, and/or database software.

*Personal* - attention to detail and accuracy; patience; capable of working independently, but willing to ask questions.

*Key Responsibilities:* perform data entry and verification under supervision of Bioinformatics Specialist; assist with typing and updating documentation as requested; create simple reports of captured data.

## APPENDIX F. Descriptive information related to specimen / object-oriented positions.

### **Position Title: Chief (or Senior) Collection Preparator**

Movement to a new institution or into more administrative duties would offer the primary opportunities for advancement for a Chief Collection Preparator. Advancement to this position will come with experience from among the ranks of the Collection Preparator III. Danilov (1994) used the term Preparator for the position of someone that plans and produces exhibits that contain objects or specimens; however, this is a very restrictive use of the position title Preparator, which has long been used for those professionals, who prepare and do the initial stabilization of specimens and objects, and as such are the first collection-care professionals to contact the specimens and objects; therefore, the position title of Collection Preparator is introduced to more precisely designate preparators involved in collections care (see Figure 2).

*Education and Experience:* MS in discipline of work or museum studies; additional education units in museum administration, advanced project management, budgeting and budget management, personnel management, and strategic planning; ten years of work as a preparator.

*Knowledge and Skills: Museum studies-based* – knowledge of philosophy and practice of museums, including museum policies, code of professional museum conduct, museum procedures; knowledge of all disciplinary preparation methods relative to museum requirements and functions; knowledge of preventive conservation methods; knowledge of health and safety issues and regulations. *Science-based* – knowledge of all disciplinary preparation methods and materials; knowledge of disciplinary field collecting methods. *Management-based* – knowledge of personnel supervision, evaluation, and development, budgeting and budget management, project management, and strategic planning; knowledge of modern electronic communication.

*Key Responsibilities:* supervise or perform preparation tasks within appropriate discipline; direct the preparation and installation, including making mounts, for specimens and objects on display; in cooperation with Conservator and Collections Managers, insure that preventive conservation practices exist in all areas of the museum containing specimens and/or objects; develop and implement, in consultation with conservator, new preparation and stabilization methods for specimens and/or objects in all divisions supervised; lead field parties in which preparation and stabilization of specimens and/or objects may be necessary in the field; supervision of museum's preparation staff or manager of major preparation laboratory; arrange development opportunities for preparation staff; manage budget for preparation needs for museum or large division laboratory; participate in the museum's strategic planning.

### **Position Title: Collection Preparator III**

In many institutions, this will be the most advanced preparation position so that advancement would come in moving to another institution or into administration; a few of the larger natural science museums will have one Chief Collections Preparator for the museum or larger divisions so that in these institutions advancement could be to Chief Collection Preparator (see Figure 2).

*Education and Experience:* MS in field of discipline of work, or BS in field of discipline of work with additional education units in chemistry and an MS in museum studies; additional education units in advanced preparation materials and stabilization, advanced preparation and conservation methods, and health and safety; eight years of experience as a preparation assistant.

*Knowledge and Skills: Museum studies-based* – knowledge of philosophy and practice of museums; including museum policies, code of professional museum conduct, museum procedures; knowledge of preventive conservation methods and needs of disciplinary area; knowledge of a broad range of museum preparation methods; knowledge of health and safety issues and regulations. *Science-based* – knowledge of disciplinary preparation materials and stabilization methods; knowledge of disciplinary field collecting methods. *Management-based* – knowledge of personnel management and project and laboratory management; knowledge of modern electronic communication.

*Key Responsibilities:* perform discipline-based preparation tasks; work with exhibition preparators and conservators in the preparation and installation, including design of mounts, specimens, or objects for exhibits; implement as directed, appropriate preventive conservation measures for divisional specimens and/or objects destined for collections or exhibitions;



develop and implement, in consultation with conservator, new preparation methods to prepare and stabilization of specimens or objects; lead field parties in collecting and stabilization of specimens or objects; plan development for preparation staff.

**Position Title: Preparation Assistant III**

With additional experience and education, a Preparation Assistant III can move to Collection Preparator I or other collection-care positions (see Figure 2). Position title also can be used for students or volunteers moving to paid positions.

*Education and Experience:* AA degree or two years at a four-year institution, with natural science or anthropology disciplinary course work; two years of experience as preparation assistant II, I; or BS in discipline of work, but no experience.

*Knowledge and Skills: Museum studies-based* - knowledge of museum functions; knowledge of health and safety issues. *Science-based* - knowledge of a natural science or anthropological discipline; knowledge of some basic preparation techniques. *Personal* - good manual skills; strong oral and written communication skills.

*Key Responsibilities:* perform selected basic preparation tasks with limited supervision; perform other basic preparation tasks after extensive training and supervision; perform laboratory housekeeping tasks; move prepared and unprepared specimens or objects.

**Position Title: Taxidermist**

In the past many natural science museums had taxidermists on staff, but this is far more unusual at present; however, taxidermists still may be hired under contracts for specific exhibition projects, restoration of mounted specimens, or tanning of large mammal hides. A museum-level taxidermist has achieved the highest level of the profession.

*Education and Experience:* graduation from a taxidermy training program; apprenticeship of at least three years with a master taxidermist; training in tanning of skins, which can be gained through apprenticeship work or from training programs; education concerning plants and animals and anatomy of animals, such knowledge could be gained in certain AA degrees; five to ten years of experience as a taxidermist; additional education units in basic business practices.

*Knowledge and Skills: Museum studies-based* - knowledge of museum functions and policies; knowledge of taxidermy materials and tools and all necessary safety precautions in their use. *Profession-based* - master of the craft of taxidermy; this will result from a combination of training and innate skill; museums will want taxidermists, whose skills exceed those normally practicing as commercial taxidermists; their skills must be such as to be able to recreate plants and animals in life-like detail; knowledge of sculpting and model making. *Science-based* - knowledge of plants and animals and anatomy of animals. *Management-based* - basic knowledge of budget management; skills to supervise assistants.

*Key Responsibilities:* work with exhibition staff and research staff to create exhibits of plants and animals; create taxidermy mounts of animals in life-like poses and detail; create plant and other foreground materials in life-like detail; tan the hide of large specimens for the research collections; in consultation with a conservator, clean and restore older taxidermy mounts; maintain project budgets; supervise and evaluate assistants.