THE NEW YORK BOTANICAL GARDEN
ABSTRACT

The New York Botanical Garden (NYBG), Harvard Ernst Mayr Library of the Museum of Comparative Zoology (MCZ), Missouri Botanical Garden (MBG), and Smithsonian Institution Libraries (SIL), as part of the Biodiversity Heritage Library (BHL), propose a National Digital Platform project: ***BHL Expanding Access to Biodiversity Literature***. (NYBG is a founding member of BHL, and volunteered to be the Lead Organization on this project, in close collaboration with MCZ, MBG, and SIL, which are all heavily involved in BHL's operations.) This two-year project (October 1, 2015-September 30, 2017) will increase online access significantly to biodiversity material by positioning BHL as an on-ramp for biodiversity content providers that would like to contribute to the national digital library infrastructure through the Digital Public Library of America (DPLA). ***BHL Expanding Access to Biodiversity Literature*** proposes to address challenges facing content providers—including, insufficient amounts of content, indexing of scientific names, and metadata creation—and make necessary digital infrastructure enhancements by creating an innovative model for open access to data and to support collaboration among these institutions. The project would meet the goals of the IMLS National Leadership Grants for Libraries Program by increasing access to digital services, expanding the range and types of digital content available, improving discoverability, and supporting open access.

The Project Team will interact with content providers to improve metadata through training and quality control, engage the community through outreach on a national level, pursue copyright permissions, and improve BHL's digital infrastructure through system enhancements. This project will address the challenges that many libraries, archives, and museums face in sharing their content by developing partnerships and providing the tools and services needed for future and ongoing participation in a shared and sustainable national digital platform.

The goals of the project are to: 1) Expand BHL's role as a subject-specific content provider for life sciences; 2) Serve as an aggregator to allow small natural history collections to present their content in DPLA via BHL and expand the community of content providers by working with new partners; 3) Preserve and provide access to small natural history and botanical collections and publications through outreach, assistance with scanning, and software tools to format and normalize data for ingest; and 4) Increase the quality of partner metadata through use of DPLA metadata best practices.

The Project Team has four intended outcomes and a means towards measuring the success of these outcomes: 1) Expand public access to biodiversity literature; 2) Increase in the number of new and first time content providers to both BHL and DPLA, ideally with at least 100 added by the second year; 3) Serve as a model for "subject-based" hubs; and 4) Develop processes that will ensure long-term biodiversity contributions to DPLA.

Success will also be measured by the increase in the number of new metadata records to BHL and DPLA (~300,000 new records added by the second year), and by the increase in the amount of biodiversity and cultural heritage materials discoverable in BHL and DPLA, as indicated by an increase in the number of contributed items and pages. Another measure of success will be an increased utilization of BHL's self-service ingest tool (Macaw) by the content providers over the next several years. Additionally, the project will add up to 50 titles that are still in copyright to the BHL portal and thus make current content accessible through DPLA.

By removing obstacles that obstruct content providers' participation and by developing tools to support and facilitate contribution to DPLA, this project will strengthen the holdings of BHL and DPLA and will benefit those institutions that lack the resources to make their collections widely accessible. Participating libraries, museums, and natural history societies will benefit by exposing their content more broadly, and researchers and the public will benefit from the increased access to biodiversity content. These often hidden collections will be made available to the public at large on a shared national platform. BHL will provide a repository/delivery system that allows natural history institutions that don't have the capacity to purchase or host their own system to share their digital content.

THE NEW YORK BOTANICAL GARDEN
PROPOSAL TO THE IMLS NATIONAL LEADERSHIP GRANTS FOR LIBRARIES
FOR
BHL EXPANDING ACCESS TO BIODIVERSITY LITERATURE

NARRATIVE

1. Statement of Need

The New York Botanical Garden (NYBG), Harvard Ernst Mayr Library of the Museum of Comparative Zoology (MCZ), Missouri Botanical Garden (MBG), and Smithsonian Institution Libraries (SIL), as part of the Biodiversity Heritage Library (BHL), request $846,073 for a National Digital Platform project: ***BHL Expanding Access to Biodiversity Literature***. NYBG is a founding member of BHL, and volunteered to be the Lead Organization on this project, in close collaboration with MCZ, MBG, and SIL, which are all heavily involved in BHL's operations. This two-year project (October 1, 2015-September 30, 2017) will increase online access significantly to biodiversity material by positioning BHL as an on-ramp for biodiversity content providers that would like to contribute to the national digital library infrastructure through the Digital Public Library of America (DPLA). ***BHL Expanding Access to Biodiversity Literature*** proposes to address challenges facing biodiversity content providers wishing to contribute to DPLA—including, insufficient amounts of content, loss of indexing of scientific names, and metadata creation—and make necessary digital infrastructure enhancements by creating an innovative model for open access to data and to support collaboration among biodiversity content providers. The project would meet the goals of the IMLS National Leadership Grants for Libraries Program by increasing access to digital services, expanding the range and types of digital content available, improving discoverability, and supporting open access.

Over the two years, the Project Team will interact with content providers to improve metadata through training and quality control, engage the community through outreach on a national level, pursue copyright permissions, and improve BHL's digital infrastructure through system enhancements. **This project will address the challenges that many libraries, archives, and museums face currently in content sharing by developing partnerships and providing the tools and services needed for future and ongoing participation in a shared and sustainable national digital platform.**

The proposed project will expand BHL's role as a DPLA content hub and advance the collaborative network within the life sciences, allowing it to assist the many libraries, archives, museums, natural history societies, and cultural heritage institutions that do not have the resources to contribute content to DPLA on their own. BHL has been a DPLA content hub since 2013. As a result, its content now reaches a much wider audience and has a significant impact beyond the traditional research community in the biological sciences. By increasing its role as a content hub, BHL would serve as the primary discipline-based hub for life sciences in the areas of natural history, systematic biology, and taxonomy. This project aligns with DPLA's efforts to expand its own networks, for which DPLA received funding from the IMLS in 2014.

The DPLA is a primary destination for researchers and the public to search for digital content. However, many biodiversity organizations, particularly smaller institutions, cannot contribute to DPLA individually because they do not have the minimum amount of content that DPLA requires for contributions and/or they lack the technical knowledge to prepare their content for ingest. Their only options are to contribute to DPLA through BHL or through a geographically-based service hub. Unfortunately, only 17 such service hubs currently exist and many potential contributors are based in parts of the United States that are not served by these few service hubs. As an aggregator, BHL offers a solution that enables more collections to reach the minimum size required to contribute to DPLA.

Biodiversity content providers also have specific needs that are not well-met by broad, regional hubs—particularly the identification and indexing of binomial names, which are invaluable to researchers and students. Geographically based DPLA service hubs do not offer the ability to mine ingested text for scientific names,

meaning that this important information would be lost if biodiversity content were ingested through generalist, regional hubs.

Furthermore, the creation of complete, normalized metadata can be especially problematic for biodiversity content providers. Current and potential providers of content to BHL fall into three basic categories based on their metadata needs: 1) those with metadata in a standard bibliographic format (MARC or MODS); 2) those with metadata in other formats that could be mapped to standard bibliographic formats; and 3) those with no existing metadata but who could, if provided with guidance and a form, create the necessary metadata from scratch. Frequently, content providers either do not have metadata available in standardized formats (such as a MARC record), or any metadata they do have requires analysis and normalization before it can be brought into the portal to interoperate with existing metadata. However, DPLA does not have the resources to work intensively with content providers to address these needs**.**

The ability to upload data and images with relative ease is critical to increasing content contributions to DPLA. BHL also has, and will provide, the necessary technical experience to assist these content providers in preparing their items for ingestion. However, importing content from non-BHL members into BHL requires significantly more staff time because it cannot be ingested via standard workflows. Therefore, to address each of the content providers' metadata needs, part of this project will involve further developing the BHL open source ingest tool, Macaw (available via github; https://github.com/cajunjoel), which allows for the upload of content and metadata to BHL via the Internet Archive. Staff at smaller organizations can then upload their own content independently into BHL with little or no intervention from central staff, freeing their time to support project workflows.

There is also a need to improve the BHL feed to DPLA, which includes adding additional metadata elements to the feed in order to provide richer and more complete metadata within DPLA for items harvested from BHL. DPLA currently harvests metadata from BHL using an OAI-PMH feed. BHL's short term plans call for enhancements to that feed while its long-term plans call for enhancements to its API to allow optimal harvesting by DPLA. Article level metadata is also being discussed. Some BHL contributors provide article level metadata and that information can easily be ingested, displayed, and searched from within the BHL portal. Currently, DPLA does not have the means to ingest this information but the Project Team is working with them in the hopes of making it available via the DPLA portal in the future.

BHL also has strong knowledge of the many formats that may be ingested into the DPLA through the project. The ingestion of article-level descriptions, conference papers and proceedings, theses, newsletters, field notebooks, and other types of gray literature require complex workflows. As is, BHL currently supports materials that are specifically formatted as "book-like objects" (i.e., objects with a series of sequential "pages" that can be interacted with through the BHL website book-viewer). Throughout this proposed project, BHL will also develop its infrastructure to support non-standard metadata and content files which will greatly increase the types of biodiversity content available through DPLA.

Additionally, born digital materials are the norm for new content, including biodiversity collections yet, those materials are currently excluded from BHL. BHL has achieved the means to load born-digital content, but transforming locally produced content into a globally accessible format requires manual review, normalization, and ingest of available data and files, as well as digitization "from scratch," where locally produced content is missing or does not meet quality standards. In order to fully incorporate born-digital content into the BHL repository, ***BHL Expanding Access to Biodiversity Literature*** will refine its existing workflows and enhance its toolkit. Toolkit enhancements will be informed by the work being done by the DPLA service hubs including the Empire State Digital Network (ESDN), a service hub located in close proximity to NYBG.

BHL Expanding Access to Biodiversity Literature is similar in structure to the *Artstor: Museum Hub for Open Content* project recently funded by IMLS, which supports the contributions of the nations' art and image collections to the DPLA. Similarly, the proposed project will also lower barriers to small organization's contributions to an international digital platform. Providing tools and building capacity can address gaps in the national digital infrastructure. It, too, will improve the discoverability of otherwise isolated collections and support an efficient network for open-access discoverability of content on DPLA. However, where the Artstor project focuses on museum collections, the BHL project focuses on biodiversity content and biodiversity content providers, and responds to their unique needs.

BHL is ideal for this type of project because it is an international consortium of the world's leading natural history and botanical collections and related libraries, all of whom collaborate to digitize the literature (both public domain and in-copyright with permission) documenting the world's biological diversity. BHL's collaboration has resulted in the single largest, open-licensed source of biodiversity literature made available through both a customized portal at http://www.biodiversitylibrary.org/ and the Internet Archive. BHL is also responsible to its community beyond basic requirements—for instance, expanding to include the role of repatriation of biodiversity literature to the countries and regions from which species have been collected and studied in other parts of the world. Further, the BHL libraries have experience in making biodiversity literature available for responsible use as a part of a global community—a "biodiversity commons." BHL now has a large corpus of digitized works available to an international community of users, and a proven track record of success through collaboration and shared investment. More than 46 million pages of digitized literature are served through the BHL portal and are contributed to other digital platforms, including DPLA, Europeana, Global Biodiversity Information Facility (GBIF), and the Encyclopedia of Life (EOL). (Please see *Supporting Document 1* for an infographic on BHL.)

BHL also has experience meeting the needs of partners and organizations of all sizes. In addition to the 16 dues paying members, BHL has an affiliate membership level, which is currently a non-dues paying level but includes institutions and organizations that have expressed a willingness to participate in BHL-related activities and contribute relevant content. As such, BHL provides services for its own affiliates that lack the infrastructure to make their content widely available.

BHL is also regularly contacted by individuals in small organizations who would like to have their content made available through the BHL portal but who may not even have the ability to contribute at an affiliate level or cannot meet BHL's and DPLA's ingestion requirements without assistance. For example, in January 2015, BHL received a request from a Board member of the Hawaii Botanical Society, which produced newsletters from 1962 until December 2001 (40 volumes). It has become less active in the past couple of years, but requests for copies of the newsletter arrive regularly indicating that the content is extremely useful to the botanical community. Because there are few entire sets of the newsletter—and even in Hawaii, it is difficult to access—the group has proposed placing scans of the newsletter on the Hawaii Botanical Society's website at: http://hibotsoc.org/newsletter.html. However, as the activities of the membership decline, they are looking for alternative, longer term mechanisms for making the publication freely available, before it becomes orphaned or lost. They hope that BHL will be the solution. Requests such as this have been put into a queue for future action because BHL does not have the staff resources nor advanced tools needed to ingest their content.

2. Impact

By removing obstacles that obstruct participation and by developing tools to support and facilitate contribution to DPLA, this project will strengthen the holdings of BHL and DPLA and will benefit those institutions that lack the resources to make their collections widely accessible. Participating libraries, museums, and natural history societies will benefit by exposing their content more broadly, and researchers and the public will benefit

from the increased access to biodiversity content. These often hidden collections will be made available to the public at large on a shared national platform. BHL will provide a repository/delivery system that allows natural history institutions that lack the capacity to purchase or host their own system to share their digital content.

Potential content providers can, and do come from across the nation, each with different needs and levels of resources. Organizations, such as the Denver Botanic Garden, the Natural History Museum of Los Angeles, Seed Savers Exchange in Decorah Iowa, The Wildlife Conservation Society, the Hunt Institute for Botanical Documentation, and the Pennsylvania Horticultural Society, all have content they wish to ingest into BHL and have expressed interest in participating in this project. Special collections like those at the University of Oklahoma History of Science Library and the Wangensteen Historical Library of Biology and Medicine at the University of Minnesota also do not have the capacity for getting their content into BHL and the DPLA. The project will work with these already identified partners to provide the support needed, and will also conduct outreach to ensure that all potential contributors are familiar with the project and are encouraged to participate. The outreach component will work specifically with members of various botanical and natural history societies such as the Council of Botanical and Horticultural Libraries (CBHL), SLA Natural History Caucus, International Association of Aquatic and Marine Science Libraries (IAMSLIC), and American Alliance of Museums (AAM), which have content that should be considered for inclusion in the DPLA. (Please see *Supporting Document 2* for letters of support.)

Along with museums and societies, smaller publishers also have important content to add to the BHL collection but have little means to reconfigure their data and files to fit within BHL's established workflows. For example, Amphibian and Reptile Conservation (ARC) currently provides PDFs of species descriptions to the Ernst Mayr Library, and they are deposited in Harvard's preservation repository service. ARC staff members have expressed interest in providing their content to BHL but neither BHL nor ARC has the resources that are required to prepare the data for ingest. Other examples of society publications that might be ingested are the American Ornithologists Union's Check-list of North American Birds, the Journal of the American Mosquito Control Association, The Mantis Study Group Newsletter, and the Lepidopterists Society publications.

BHL enables scholarship of national significance that is otherwise impossible with printed materials alone. By pulling these digital materials together through an integrated portal, BHL presents an unparalleled open and expansive digital library for scholars that cannot be replicated in a physical setting. Planned improvements of the BHL portal include full-text searching of the content that will allow for deeper use of the content. The descriptive metadata for the digitized books are aggregated from library catalogs, with administrative and technical metadata added at the time of scanning and during post-production. The BHL portal then allows scholars to search across these metadata fields and retrieve works by a specific title, volume, or edition; browse works by author, subject or year; and through built-in taxonomic intelligence tools, even search for a scientific name such as "Zea mays" (corn) or "Loxodonta africana" (African Elephant) in order to return a list of all of the pages in BHL where that name occurs. Users can then view the digitized works in their entirety, or they can export the results to a variety of common reference management software formats including, EndNote and BibTeX, for inclusion in applications such as EndNote, Zotero, and Mendeley for their research purposes.

By increasing the opportunities for smaller institutions to contribute biodiversity content, BHL will also support DPLA's outreach activities for STEM (science, technology, engineering, and mathematics) education and provide support for secondary education in the areas of the environment, life sciences, and related fields. In addition to text, BHL provides access to millions of natural history illustrations with a broad appeal beyond the sciences. Scholars and educators who rely on visual resources will find a wealth of illustrations with which to make interdisciplinary connections between science, art, culture, and history. The content to be aggregated

would not otherwise be available to DPLA because the smaller organizations do not meet the minimum content levels for ingestion by DPLA.

The goals of the project are to:

1) Expand BHL's role as a subject-specific content provider for life sciences;
2) Serve as an aggregator to allow small natural history collections to present their content in DPLA via BHL and expand the community of content providers by working with new partners;
3) Preserve and provide access to small natural history and botanical collections and publications through outreach, assistance with scanning, and software tools to format and normalize data for ingest; and
4) Increase the quality of partner metadata through use of DPLA metadata best practices.

The Project Team has four intended outcomes and a means towards measuring the success of these outcomes:

1) Expand public access to biodiversity literature;
2) Increase in the number of new and first time content providers to both BHL and DPLA, ideally with at least 100 added by the second year
3) Serve as a model for "subject-based" hubs; and
4) Develop processes that will ensure long-term biodiversity contributions to DPLA.

Success will also first be measured by the increase in the number of new metadata records to BHL and DPLA with at least 300,000 new records added by the second year, and then in the amount of biodiversity and cultural heritage materials discoverable in BHL and DPLA, as indicated by an increase in the number of contributed items and pages, estimated to be in the tens of thousands. Another measure of success will be an increased utilization of the self-service ingest tool (Macaw) by the BHL content providers over the next several years. Additionally, we expect to add up to 50 titles that are still in copyright to the BHL portal and thus make current content accessible through DPLA. (BHL will only accept materials into its collection that fall under open access principles and thus encourages the digitization of public domain materials, materials free of any known copyright restriction and in-copyright content for which express permission to digitize has been received from the copyright holder. BHL copyright metadata conforms to standards that allow it to fulfill its responsibility to the licensors for which BHL signs agreements to include in-copyright content in its collection.)

Over the past eight years, BHL has demonstrated successfully that a large collaborative alliance of libraries, archives, and museums can mobilize to digitize collections and provide content through a single open access portal. Through an existing network of contacts, tools, and added resources that will ease content aggregation and metadata normalization for potential content providers, BHL will bring significant amounts of biodiversity content into a larger national and international platform via DPLA. This model of collaboration expands beyond BHL. By developing a community of content providers within the life sciences, the project can provide a model that can be replicated in other disciplines or groupings and provide an opportunity to present richer results than otherwise would be available to the DPLA community.

3. Project Design

The expertise and connections that BHL has already developed in working closely with its members, affiliates, and other organizations will be leveraged to help design the project to assist small biodiversity institutions, scholarly societies, and publishers with similar limitations and needs effectively. In order to provide the support needed to create workflows and tool-kits to facilitate content ingest for those content providers, the Project Team will provide outreach and consultation on content recommendation, selection criteria, quality control, and technical issues, such as data formatting and ingest. Interviews with a select group of partners will be

conducted at the end of the initial engagement with them and the results will inform the structure of a feedback form which will be created and used as an ongoing tool to measure how the project benefits the participating organization and how well the workflows put in place are operating.

The project will have three components:

1) Data Management, overseen by NYBG's LuEsther T. Mertz Library. NYBG will work with contributors who have already digitized content in order to develop a toolkit that will enable participants to ingest their resources to BHL, for harvest by the DPLA, in ways that respect the budgets, staff constraints, and technological capabilities of participants. A Data Manager (Susan Lynch, Systems Librarian) and a Metadata Specialist (to be hired with grant funds) will facilitate metadata improvement across all providers, coordinate activities, and will interface with new contributors and teach them about Macaw as well as improve content provider metadata through training and quality control. The Metadata Specialist will work with each contributor on a one-on-one basis to assure compliance with DPLA specifications and will provide guidance and instruction on using Macaw. The Data Manager and Metadata Specialist will work with those providers who do not have the expertise to create their own metadata and will conduct workshops and create screencasts to facilitate training and improve workflows. Training providers to create their own metadata is preferred to creating metadata for them, and that approach will be taken whenever possible. The staff at NYBG will take the lead on the ingestion of born-digital content into BHL and subsequently into DPLA with assistance from the other project partners. Don Wheeler, Collection Development Librarian, will assist in making recommendations for content, and Andrew Tschinkel, Digital Imaging Technician, will assist with scanning. The NYBG project staff will document opportunities to improve the usability and functionality of the Macaw ingest tool. This information will be shared with the application developer in order to ensure the continuous improvement of the tool.

2) Community Outreach, managed by Harvard's Museum of Comparative Zoology (MCZ). Constance Rinaldo, Community Coordinator, and the Community Manager (to be hired with grant funds) will coordinate communication and outreach to new contributors, manage institutional relationships, pursue copyright permissions, and coordinate with the BHL Collections Committee and Membership Committee. The Community Manager will perform due diligence to assure copyright compliance and identify and negotiate with interested publishers.

3) Data Analysis, Ingest, and Software Tool Development, managed by staff at the Missouri Botanical Garden (MBG) and BHL. Trish Rose-Sandler, Data Analyst, will write functional specifications for any enhancements needed to accommodate new types of content and metadata and will provide normalization and data clean up. She will also handle any issues related to the harvest of BHL data by DPLA. William Ulate, Technical Director, will implement new BHL system functionality and coordinate with BHL's Technical Committee and the Project Team on programming issues.

In order to achieve the projected number of newly ingested records, BHL needs to adopt best-of-breed tools for the assessment, scrubbing, cross-walking and transformation of metadata. These tools will be coupled with Macaw to create an integrated workflow. Because all DPLA hubs that serve as aggregators share similar challenges when it comes to ensuring metadata quality, the Project Team intends to actively engage in conversations with other DPLA hubs on how to re-use or collaborate on building open source tools that ensure metadata quality across collections and leverage BHL's work across the national digital platform.

The Project Team has invited several institutions to participate based on their expressed interest and support of this project. The Wildlife Conservation Society; The Natural History Museum, Los Angeles; The Denver

Botanic Garden; The Hawaiian Botanical Society; the Pennsylvania Horticultural Society; and Seed Savers Exchange will be the first participants in the project. Their input and content will be used to improve the project continuously as it progresses to an even wider audience. While full deployment is not anticipated until the end of the grant period, self-serve elements of the system will be ready to be utilized one year after the awarding of the grant, in response to growing museum interest in sharing their content via an open national platform.

4. Diversity Plan

Since large museums, libraries, and natural history organizations generally have stronger technical capacities than smaller museums with little or no capacity to make digital versions of their collections discoverable, this project proposes to offer free-of-charge service with some supporting tools to lower the barriers that inhibit contribution of content to national digital platforms. BHL will continue to serve a broad diversity of U.S. collecting institutions. As the project develops, we will work to ensure that the diversity of participating institutions represent ethnically and economically diverse communities as well and that this content is included in ongoing outreach activities.

5. Project Resources: Personnel, Time, Budget

The estimated total budget is $1,840,464 over the two year period, of which $846,073 will be requested from IMLS; a cost-share of $994,391 will be provided by the institutions participating in the grant and other BHL Members.

The project will be managed by Susan Fraser, Director of the LuEsther T. Mertz Library. She will develop a communication strategy to keep participants, partners and stakeholders informed and engaged. She will work with key project staff from MCZ, MBG, and BHL as well as the Smithsonian Institution Libraries (SIL) to coordinate and determine system requirements, review specifications, monitor outreach efforts, and test the contribution ingest service. Quarterly conference calls will be convened to keep all project staff informed of the progress of the project and frequent ongoing chat sessions will keep all parties communicating throughout the project. Brief quarterly reports on project activities will be required of participating organizations. This project builds upon years of investment and is a top strategic initiative for BHL and for the specific member libraries participating in this project (NYBG, MCZ, MBG, and SIL). As such, each participating institution has agreed to dedicate significant amounts of staff time to all phases of the project.

Key personnel include:

The New York Botanical Garden

- *Susan Fraser, Director of the LuEsther T. Mertz Library*, will be the Project Director. Ms. Fraser will provide administrative oversight, organize and participate in team meetings, and manage the project budget. She holds an MLS from Columbia University. She is an active member of the Council of Botanical and Horticultural Libraries (CBHL), has served on the Council of the Torrey Botanical Society as the Society's Historian, is a founding member of the Biodiversity Heritage Library (BHL), served on the BHL Executive Committee as BHL Secretary from 2012-2015, and is a former chair of the BHL Membership Committee. Ms. Fraser has more than 25 years of experience in collaborative and digitization projects, and in managing private and federal grants, including several IMLS grants.

- *Susan Lynch, NYBG Systems Librarian at the Mertz Library*, will be the Data Manager for the project. Ms. Lynch worked as a software engineer at IBM for decades before entering librarianship as a second career. She holds a BA in Biology, an MS in Computer Science and an MLS. She has extensive practical experience with digitization and data management. She worked on the DSpace institutional

repository and the Omeka image repository at the American Museum of Natural History and a scrapbook digitization project for The Wildlife Conservation Society. In her current position as Systems Librarian at the Mertz Library, Ms. Lynch supervises the digital lab. She coordinates the digitization, metadata formatting, and uploading of book-like content into BHL and Internet Archive.

Ernst Mayr Library of the Museum of Comparative Zoology/Harvard University

- *Constance Rinaldo, Librarian of the Ernst Mayr Library of the MCZ/Harvard University*, will be the Community Coordinator for the project, overseeing the work of the Community Manager on collections and digitization support as well as participating in team meetings. With a BA in Biology and Anthropology, an MSc in Zoology, and an MLS, Ms. Rinaldo has been Librarian of the MCZ since 1999. She is a founding member (2005) and Vice-Chair of the BHL Members Executive group, coordinating global partners, and part of the Membership & Collection Committees working with organizations that are interested in contributing content to BHL. Ms. Rinaldo brings 25 years of experience in collection management, collaboration, and digital library projects.

- *Joe DeVeer, Project Manager and Museum Liaison for the Ernst Mayr Library of the MCZ/Harvard University,* has a BS in Biology, and an MLA in Museum Studies. He has worked in the Ernst Mayr Library since 2006, and previously in the MBLWHOI Library at the Marine Biological Laboratory in Woods Hole, MA. Mr. DeVeer has been involved with the design, implementation, and management of library and museum digitization projects since 2001. He currently manages library and museum digitization projects, including developing specifications, coordination, supervision, building online exhibits, and management of the Ernst Mayr Library's contributions to the Biodiversity Heritage Library. Mr. DeVeer will supervise digitization and outreach within the MCZ, collaborate on technical issues and solutions, develop exhibits for the project, and participate in team meetings.

Missouri Botanical Garden and Biodiversity Heritage Library

- *Trish Rose-Sandler, Digital Projects Coordinator, Center for Biodiversity Informatics, Missouri Botanical Garden and Data Analyst for BHL*, has an MA in Art History and an MLS. She has served as the data analyst for BHL since 2010 and as the principal investigator for several BHL-related projects, including most recently the IMLS-funded *Purposeful Gaming and BHL*. For this project, she will write functional specifications needed to accommodate new types of content, provide normalization, data clean up, and will identify improved workflows for moving content from BHL to DPLA.

- *William Ulate Rodriguez, Senior Project Coordinator, Center for Biodiversity Informatics, Missouri Botanical Garden and Technical Director for BHL*, has a BS in Computer Science and Informatics. Mr. Ulate is an integral part of BHL, helping coordinate project management activities across its partner institutions and funded initiatives and overseeing the technical development of the BHL portal. Mr. Ulate will strengthen the project through his domain knowledge of scientific data and his strong background in custom software development projects. For this project, Mr. Ulate will implement new BHL system functionality identified by the Data Analyst and coordinate all technical activities between BHL's Technical Advisory Group and the Project Team.

- *The Metadata Specialist* (to be hired by NYBG), will work closely with content providers—typically small museums, cultural heritage institutions, and publishers—to ensure that they understand project requirements, workflows, and the use of existing tools. S/he will work with new partners to normalize the metadata for new content and will train new content providers on the use of the Macaw ingest tool. S/he will work closely with the Data Manager to ensure conformity to set standards and best practices.

- *The Community Manager* (to be hired by MCZ), will be responsible for the identification of potential content providers and perform outreach services to potential content providers, such as society publishers and small natural history libraries. S/he will perform due diligence in determining copyright status of new content, will work with the BHL Collections Coordinator to process license agreements for copyright, and will solicit requests for permission to ingest in-copyright born digital material.

6. Communications Plan

The project's communication plan is aimed at reaching a diverse array of institutions, organizations, and individuals. The project will take advantage of the comprehensive BHL Outreach and Communications Plan that outlines BHL's communication objectives, audiences, platforms, strategies, and evaluation (please see *Supporting Document 3* for an excerpt). The resources contained within BHL's digital library currently serve a wide variety of audiences spanning multiple disciplines, including taxonomists, ecologists, artists, historians, biologists, illustrators, graphic designers/publishers, archivists, educators, students, environmentalists, and citizen scientists. The Project Team believes there is also a large untapped audience of potential or prospective users of the DPLA who may not consider science-based repositories as sources for historical documents and other humanities-based content, such as natural history illustrations, photographs, diaries, and correspondences. BHL uses a variety of publishing channels, including traditional print media, conference presentations, and emerging social media, to promote its content, services, and program activities, in conjunction with its portal for the delivery of digitized literature.

The project will be promoted through press releases that are published through BHL Member and Affiliate news outlets as needed, and are recorded at http://biodivlib.wikispaces.com/Press+Releases; Quarterly Reports, at http://biodivlib.wikispaces.com/Reports; and Newsletters, at http://biodivlib.wikispaces.com/Newsletters. The project will also be promoted at professional conferences and Annual Meetings, such as those of the American Library Association (ALA), American Association for the Advancement of Science (AAAS), American Alliance of Museums (AAM), Council of Botanical and Horticultural Libraries (CBHL), Special Library Association (SLA) Natural History Caucus, National Association of Biology Teachers, and the International Association of Aquatic and Marine Science Libraries (IAMSLIC). These existing and well-supported channels will be used to disseminate project results to the BHL community of enthusiasts, as well as the broader communities of humanities scholars and biodiversity scientists.

BHL has an active social media presence and uses the following technologies in support of promoting program deliverables and achievements:

- **BHL Blog** http://blog.biodiversitylibrary.org
  The BHL Blog is used to report preliminary results from new initiatives, or historical background on a given book, author, illustrator, organism or theme. More than 2,200 visitors per month consult the BHL Blog.

- **Twitter** http://twitter.com/BioDivLibrary
  BHL's Twitter feed is used to highlight interesting content within BHL; provide factoids about authors, publications, illustrations, or species featured within BHL; share biodiversity news stories; spotlight events and news at and contributions from BHL Member and Affiliate institutions; and keep users updated about BHL project developments. These tweets are shared with the over 6,300 people who follow BHL on Twitter, and on average BHL tweets reach over 2.9 million total people on Twitter each month.

- **Facebook** https://www.facebook.com/BioDivLibrary

BHL's Facebook page, which has been liked by more than 10,900 people, is used to highlight books in BHL's collection, providing information, factoids, and illustrations within each post; share biodiversity news stories; celebrate BHL Member and Affiliate contributions; and keep users informed about BHL news and developments. BHL Facebook posts reach an average of over 30,500 people each month.

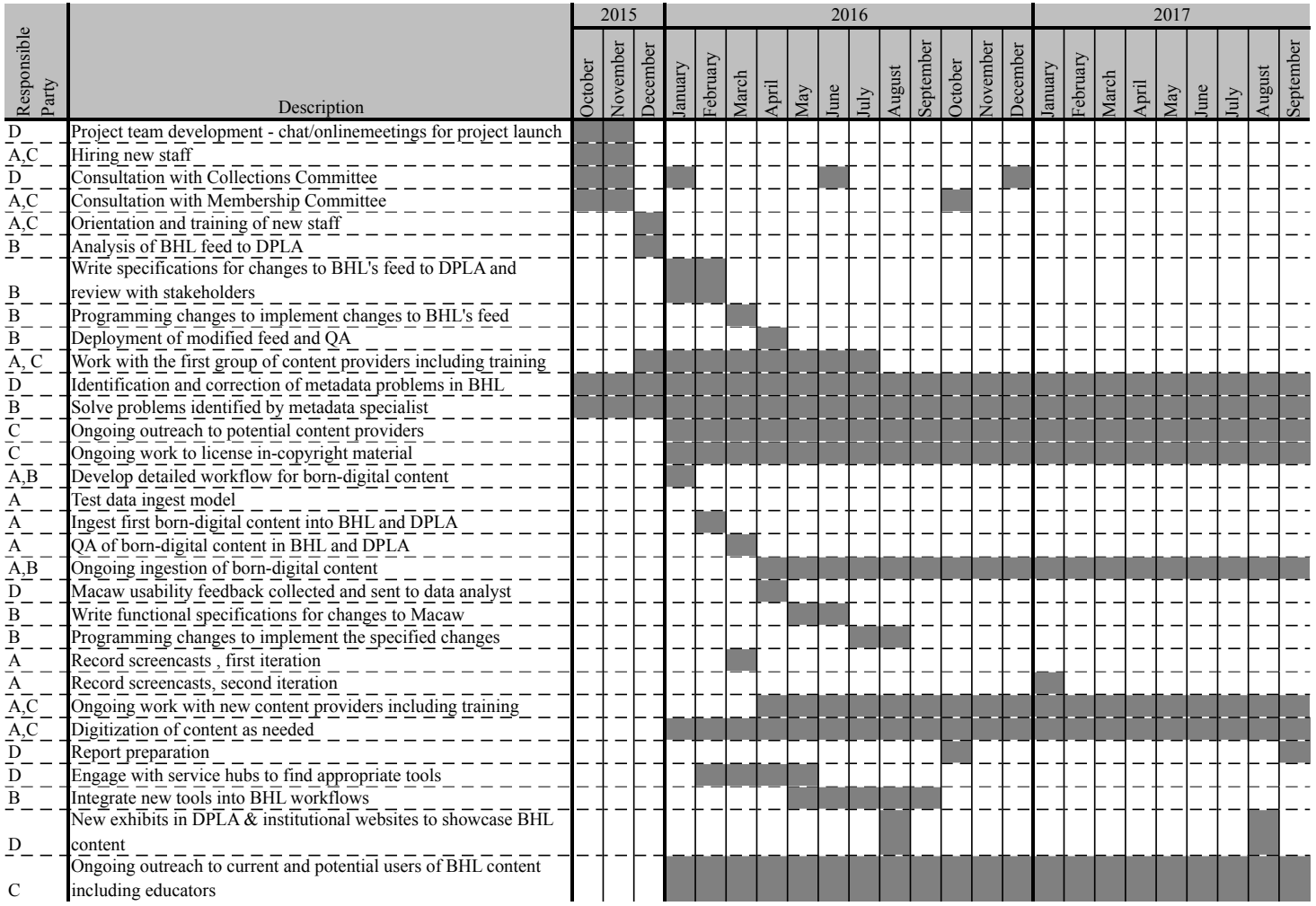
BHL has created several online exhibitions at http://www.biodiversityexhibition.com/ and proposes to do the same for the DPLA exhibitions' pages as a means for raising awareness of and providing information about the project.

7. Sustainability

This project will result in a set of guidelines and instructions for institutions to follow for future and ongoing participation in this program beyond the term of the grant. These products will be created and maintained within the same stringent standards of the BHL workflow. For scans, BHL follows *The Technical Guidelines for Digitizing Cultural Heritage Materials: Creation of Raster Image Master Files* established by FADGI in 2010. Metadata is encoded in appropriate standards for descriptive (MARCXML, MODS), technical (PREMIS), and structural data (METS). BHL maintains complete mirror copies of all scanned content at the Smithsonian Institution and the Bibliotheca Alexandrina. Additionally, a partial archive is maintained at the Natural History Museum (London). These mirrors serve as a redundant store of all the materials made available through BHL. In this way, BHL can benefit from the free storage and bandwidth provided by Internet Archive in delivering its content to users, while also maintaining a synchronized collection of that same content under BHL's own control and management.

To properly safeguard the digital files over time, consideration is made via the following means: metadata exists and is freely available about each book and all of the digital files representing that book at Internet Archive. These metadata can be used to build transfer manifests, critical for checking that all files have been successfully copied between systems (such as from Internet Archive to the BHL mirrors in Washington, Alexandria, and London. It is also important to mention when discussing sustainability of project results that all of the content within BHL is published freely online and can be viewed and downloaded by anyone without restriction or fee, thereby furthering BHL's strong commitment to public domain literature having broad, unfettered use. BHL already contributes its metadata records to OCLC in order to increase findability.

THE NEW YORK BOTANICAL GARDEN
SCHEDULE OF COMPLETION



Key
A- NYBG
B - MBG
C - Harvard MCZ
D - All

DIGITAL STEWARDSHIP SUPPLEMENTARY INFORMATION FORM

Introduction:
IMLS is committed to expanding public access to IMLS-funded research, data and other digital products: the assets you create with IMLS funding require careful stewardship to protect and enhance their value. They should be freely and readily available for use and re-use by libraries, archives, museums and the public. Applying these principles to the development of digital products is not straightforward; because technology is dynamic and because we do not want to inhibit innovation, IMLS does not want to prescribe set standards and best practices that would certainly become quickly outdated. Instead, IMLS defines the outcomes your projects should achieve in a series of questions; your answers are used by IMLS staff and by expert peer reviewers to evaluate your proposal; and they will play a critical role in determining whether your grant will be funded. Together, your answers will comprise the basis for a work plan for your project, as they will address all the major components of the development process.

Instructions:
If you propose to create any type of digital product as part of your proposal, you must complete this form. IMLS defines digital products very broadly. If you are developing anything through the use of information technology – e.g., digital collections, web resources, metadata, software, data– you should assume that you need to complete this form.

Please indicate which of the following digital products you will create or collect during your project.
Check all that apply:

	Every proposal creating a digital product should complete …	Part I
	If your project will create or collect …	**Then you should complete …**
☑	Digital content	Part II
☐	New software tools or applications	Part III
☐	A digital research dataset	Part IV

PART I.

A. Copyright and Intellectual Property Rights

We expect applicants to make federally funded work products widely available and usable through strategies such as publishing in open-access journals, depositing works in institutional or discipline-based repositories, and using non-restrictive licenses such as a Creative Commons license.

A.1 What will be the copyright or intellectual property status of the content you intend to create? Will you assign a Creative Commons license to the content? If so, which license will it be? http://us.creativecommons.org/

BHL only accepts content that is either considered to be in the public domain (published prior to 1923) or the publisher is willing to provide it under a Creative Commons CC-BY-NC-SA license. BHL actively seeks permissions from rights holders for in-copyright materials. Currently, over 300 titles from 150 rights holders have provided a “moving wall” of permissions for this type of content. All this content is explicitly licensed as CC-BY-NC-SA and the metadata is CC0.

A.2 What ownership rights will your organization assert over the new digital content, and what conditions will you impose on access and use? Explain any terms of access and conditions of use, why they are justifiable, and how you will notify potential users of the digital resources.

BHL will not assert any ownership rights over the content or impose conditions on access and reuse other than those that fall under the Creative Commons CC-BY-NC-SA license for rights controlled content that is not in the public domain.

A.3 Will you create any content or products which may involve privacy concerns, require obtaining permissions or rights, or raise any cultural sensitivities? If so, please describe the issues and how you plan to address them.

No

Part II: Projects Creating Digital Content

A. Creating New Digital Content

A.1 Describe the digital content you will create and the quantities of each type and format you will use.

Newly ingested content will consist of small journal publications, conference papers and proceedings, theses, newsletters, field notebooks, and other types of gray literature. BHL will target a minimum of 300,000 metadata records at the item and/or article level encoded in MODS. BHL will receive content files from data providers when possible or create content files where necessary. When BHL creates content files they will be generated as JPEG2000 (JP2).

A.2 List the equipment and software that you will use to create the content or the name of the service provider who will perform the work.

Many of our content providers will provide BHL with both metadata and digital content files. There will be some providers who have metadata but need help with digitization of their print publications. In those cases, Harvard will provide digitization services if the provider is willing to ship their materials to them. Harvard uses the Internet Archive's Table Top Scribe (https://archive.org/details/tabletopscribespecs). The grant proposal also includes some funds for digitization at regional Internet Archive scanning centers.

A.3 List all the digital file formats (e.g., XML, TIFF, MPEG) you plan to create, along with the relevant information on the appropriate quality standards (e.g., resolution, sampling rate, pixel dimensions).

For digital content files, BHL follows the FADGI still image guidelines (http://www.digitizationguidelines.gov/guidelines/FADGI_Still_Image-Tech_Guidelines_2010-08-24.pdf).

For instance, for formats and technical specs we recommend:
- TIFF (preferred file format), uncompressed, 300 ppi or better, 24 bit color
- JPEG2000, 300 ppi or better, 24 bit color
- PDF (not preferred), originally scanned at 450 ppi or better, color or greyscale

B. Digital Workflow and Asset Maintenance/Preservation

B.1 Describe your quality control plan (i.e., how you will monitor and evaluate your workflow and products).

These products will be created and maintained within the same stringent standards of the BHL workflow. BHL metadata ingest is monitored in both an automated manner and through human monitoring. Digital content is reviewed regularly in a batch/bin process and the BHL portal has an active user feedback mechanism (using the Gemini issue tracking software) to report problems with metadata or content, which is then queued for correction.

B.2 Describe your plan for preserving and maintaining digital assets during and after the grant period (e.g., storage systems, shared repositories, technical documentation, migration planning, commitment of organizational funding for these purposes). Please note: Storage and publication after the end of the grant period may be an allowable cost.

BHL maintains complete mirror copies of all scanned content at the Smithsonian Institution and the Bibliotheca Alexandrina. Additionally, a partial archive is maintained at the Natural History Museum (London). These mirrors serve as a redundant store of all the materials made available through BHL. In this way, BHL can benefit from the free storage and bandwidth provided by Internet Archive in delivering its content to users, while also maintaining a synchronized collection of that same content under BHL's own control and management. To properly safeguard the digital files over time, consideration is made via the following means: Metadata exists and is freely available about each book and all of the digital files representing that book at Internet Archive. These metadata can be used to build transfer manifests, critical for checking that all files have been successfully copied between systems (such as from Internet Archive to the BHL mirrors in Washington, Alexandria, and London.

C. Metadata

C.1 Describe how you will produce metadata (e.g., technical, descriptive, administrative, preservation). Specify which standards you will use for the metadata structure (e.g., MARC, Dublin Core, Encoded Archival Description, PBCore, PREMIS) and metadata content (e.g., thesauri).

Metadata is encoded in appropriate standards for descriptive (MARCXML, MODS), technical (PREMIS), and structural data (METS).

C.2 Explain your strategy for preserving and maintaining metadata created and/or collected during your project and after the grant period.

Our strategy for preserving metadata is same as that for preserving content files - See response to B2. Additionally, the BHL metadata is stored within the BHL portal software in a parsed database structure (MS SQL). Modifications and additions to the BHL metadata (e.g. taxonomic name finding, METS files, etc.) are written back to the Internet Archive and then synchronized across the other BHL repositories.

C.3 Explain what metadata sharing and/or other strategies you will use to facilitate widespread discovery and use of the digital content created during your project (e.g., an Advanced Programming Interface, contributions to the DPLA or other support to allow batch queries and retrieval of metadata).

All BHL metadata is licensed as CC0 for the most open access. Metadata and content files are freely available from BHL via Application Programming Interfaces (APIs), OpenURL, OAI-PMH, and data exports. We have detailed information on how to utilize these services on our developer page (http://biodivlib.wikispaces.com/Developer+Tools+and+API).

As a content hub for DPLA since 2013, our metadata is being harvested from them via OAI-PMH. Additionally, through BHL's partnership with the EU funded BHL Europe project, BHL metadata is available via Europeana.

BHL is currently working with library discovery layer service providers (OCLC, ProQuest, Ex Libris) to aggregate BHL metadata into those tools as free datasets for libraries that subscribe to those tools (BHL receives no funds from this service).

D. Access and Use

D.1 Describe how you will make the digital content available to the public. Include details such as the delivery strategy (e.g., openly available online, available to specified audiences) and underlying hardware/software platforms and infrastructure (e.g., specific digital repository software or leased services, accessibility via standard web browsers, requirements for special software tools in order to use the content).

All content created for this project will be made openly available online via the existing BHL portal (http://www.biodiversitylibrary.org/). BHL is built on a platform that includes multiple servers and a heterogeneous mix of software technologies. Servers include: web, database, file, application, and development, and backup servers. In addition, the BHL platform leverages several services provided by Internet Archive, including image storage and serving. (A BHL Architecture diagram can be found in Supporting Document 4). See also above for distribution of BHL meta to national/pan-national aggregators and commercial discovery tools.

D.2 Provide URL(s) for any examples of previous digital collections or content your organization has created.

Biodiversity Heritage Library portal: http://www.biodiversitylibrary.org/
Ernst Mayr Library of the MCZ, Harvard University: http://www.biodiversitylibrary.org/browse/collection/24

New York Botanical Garden: http://www.biodiversitylibrary.org/browse/collection/45

Missouri Botanical Garden: http://www.biodiversitylibrary.org/browse/contributor/MO#/titles

Part III. Projects Creating New Software Tools or Applications

A. General Information

A.1 Describe the software tool or electronic system you intend to create, including a summary of the major functions it will perform and the intended primary audience(s) the system or tool will serve.

A.2 List other existing digital tools that wholly or partially perform the same functions, and explain how the tool or system you will create is different.

B. Technical Information

B.1 List the programming languages, platforms, software, or other applications you will use to create your new digital content.

B.2 Describe how the intended software or system will extend or interoperate with other existing software applications or systems.

B.3 Describe any underlying additional software or system dependencies necessary to run the new software or system you will create.

B.4 Describe the processes you will use for development documentation and for maintaining and updating technical documentation for users of the software or system.

B.5 Provide URL(s) for examples of any previous software tools or systems your organization has created.

C. Access and Use

C.1 We expect applicants seeking federal funds for software or system development to develop and release these products as open source software. What ownership rights will your organization assert over the new software or system, and what conditions will you impose on the access and use of this product? Explain any terms of access and conditions of use, why these terms or conditions are justifiable, and how you will notify potential users of the software or system.

C.2 Describe how you will make the software or system available to the public and/or its intended users.

Part IV. Projects Creating Research Data

1. Summarize the intended purpose of the research, the type of data to be collected or generated, the method for collection or generation, the approximate dates or frequency when the data will be generated or collected, and the intended use of the data collected.

2. Does the proposed research activity require approval by any internal review panel or institutional review board (IRB)? If so, has the proposed research activity already been approved? If not, what is your plan for securing approval?

3. Will you collect any personally identifiable information (PII) about individuals or proprietary information about organizations? If so, detail the specific steps you will take to protect such information while you prepare the research data files for public release (e.g. data anonymization, suppression of personally identifiable information, synthetic data).

4. If you will collect additional documentation such as consent agreements along with the data, describe plans for preserving the documentation and ensuring that its relationship to the collected data is maintained.

5. What will you use to collect or generate the data? Provide details about any technical requirements or dependencies that would be necessary for understanding, retrieving, displaying, or processing the dataset(s).

6. What documentation will you capture or create along with the dataset(s)? What standards or schema will you use? Where will the documentation be stored, and in what format(s)? How will you permanently associate and manage the documentation with the dataset(s) it describes?

7. What is the plan for archiving, managing, and disseminating data after the completion of research activity?

8. Identify where you will be publicly depositing dataset(s):

Name of repository: _____

URL: _____

9. When and how frequently will you review this data management plan? How will the implementation be monitored?

Original Preliminary Proposal

THE NEW YORK BOTANICAL GARDEN

BHL EXPANDING ACCESS TO BIODIVERSITY LITERATURE

The New York Botanical Garden (NYBG), Harvard Ernst Mayr Library of the Museum of Comparative Zoology (MCZ), the Missouri Botanical Garden (MBG), and the Biodiversity Heritage Library (BHL) propose a two-year project (October 1, 2015-September 30, 2017) to significantly increase online access to biodiversity material by transitioning BHL's role from a content hub to a service hub for the Digital Public Library of America (DPLA).[1] BHL is a consortium of natural history and botanical libraries that cooperate to digitize the legacy literature of biodiversity and to make that literature available for open access and responsible use as a part of a global "biodiversity commons." More than 45 million pages of digitized literature are served through the BHL portal (http://www.biodiversitylibrary.org/) and are contributed to other digital platforms, including DPLA, Europeana, and the Encyclopedia of Life.

BHL has been a DPLA content hub since 2013. As a result, its content now reaches a much wider audience and has a significant impact beyond the traditional research community in the biological sciences. In 2014, BHL contributed 0.56% of DPLA event traffic based on approximately 136,000 items in DPLA. As a service hub, BHL would be the primary discipline-based hub for life sciences in the areas of natural history, systematic biology, and taxonomy. **This project will address the Institute of Museum and Library Services' National Leadership Grants for Libraries National Digital Platform project category by positioning BHL as an on-ramp for biodiversity content providers that would like to contribute to the national digital library infrastructure through DPLA.** It aligns with DPLA's efforts to expand its service hubs networks, for which DPLA received funding from the IMLS in 2014. This will be achieved by: 1) expanding the range and types of content BHL currently aggregates; 2) providing outreach services to smaller, poorly funded, and first-time content providers; and 3) making life science content readily discoverable on DPLA, a national digital platform. Most DPLA service hubs are geographically-based, so the lessons learned in creating a biodiversity service hub would also inform future discipline-based service hubs.

NEED AND IMPACT. DPLA is a key endpoint and a primary location for researchers and the public to search for digital content. However, many biodiversity organizations cannot contribute to DPLA on their own because they do not have the minimum amount of content DPLA requires for individual contributions, nor do they have the technical knowledge to prepare that content for ingest. The proposed project will lower those barriers and increase access to DPLA for all biodiversity organizations. As an aggregator, BHL enables more collections to reach the minimum size required to contribute to DPLA. BHL also has, and will provide, the necessary technical experience to assist these content providers in preparing their items for ingestion.

BHL currently does this for its own affiliates that lack the infrastructure to make their content widely available and discoverable on their own servers, or cannot meet BHL's and DPLA's ingestion requirements without assistance. The creation of complete, normalized metadata can be especially problematic for these types of organizations. Transforming locally produced content into a globally accessible format requires manual review and normalization. Material that is born digital is currently excluded from BHL. The ingestion of article-level descriptions, conference papers and proceedings, theses, newsletters, and other types of gray literature also require complex workflows. However, the expertise that BHL has developed in working with its affiliates can be leveraged to help small biodiversity institutions and scholarly societies with similar limitations and needs. Further, BHL is developing support for non-book materials, such as maps and specimens. BHL currently supports materials that are specifically formatted as "book-like objects" (i.e., objects with a series of sequential "pages" that can be interacted with through the BHL website book-viewer). BHL's new non-book infrastructure will be available for this project, increasing the types of biodiversity content available through DPLA.

By increasing the opportunities for smaller institutions to contribute biodiversity content, BHL will also support DPLA's outreach activities for STEM (science, technology, engineering, and mathematics) education and provide support for secondary education in the areas of the environment, life sciences, and related fields. In

[1] BHL has applied to transition from Content Hub to Service Hub with DPLA as of 15 January 2015.

addition to text, BHL provides access to millions of natural history illustrations with a broad appeal beyond the sciences. Scholars and educators who rely on visual resources will find a wealth of illustrations with which to make interdisciplinary connections between science, art, culture, and history.

This project, through an existing network of contacts, tools, and added resources that will ease content aggregation and metadata normalization for BHL affiliates, will bring significant amounts of biodiversity content into a larger national and international platform via DPLA. Over the past eight years, BHL has successfully demonstrated that a large collaborative alliance of libraries, archives, and museums can mobilize to digitize collections and provide content through a single open access portal. This project will leverage the global network of existing BHL partnerships to identify new content providers and expand online life sciences content.

BHL CONTENT SELECTION PROCESS. BHL has multiple approaches to content selection, including systematic, discipline-specific selection; user requests; standard scholarly bibliographies; permissions granted by rights-holders; and ingestion of non-BHL partner institution content found in the Internet Archive. Materials in the BHL collection are subject to U.S. copyright restrictions and must fall within the public domain or be included with the express agreement of the copyright holder.

PROJECT MANAGEMENT AND WORK PLAN. Susan Fraser, Director of the LuEsther T. Mertz Library, will manage the project. She brings 25 years of experience in collaborative and digitization projects, and in managing private and federal grants. A Project Team comprised of staff from MCZ, MBG, and BHL as well as the Smithsonian Institution Libraries will assist her. Together, this team will consult on affiliate development, collections (e.g., content recommendation, selection criteria, quality control), and technical issues (e.g., data formatting and ingest). The project will have three components: 1) Data Management, overseen by NYBG. A Data Manager (to be hired) will interface with new contributors and teach them about Macaw (the ingest tools) as well as improve metadata through training and outreach. A Project Manager/Metadata Specialist (to be hired) will facilitate metadata improvement across all providers, coordinate activities, and ensure timely execution and reporting. 2) Community Outreach, managed by MCZ. MCZ's Community Coordinator and Community Manager will coordinate outreach to new contributors, manage institutional relationships, pursue copyright permissions, and coordinate with the BHL Collections Committee and Membership Committee. 3) Data Analysis and Ingest, which will be the responsibility of MBG and BHL. MBG's Data Analyst will provide normalization, data clean up, and ingest management, and will handle any issues related to DPLA harvest of BHL data. BHL's Technical Director will coordinate with its Technical Committee, and the Project Team on programming issues.

OUTCOMES AND PERFORMANCE GOALS. The Project Team has identified four intended outcomes: 1) the project will increase public access to biodiversity literature; 2) the project will add 300,000 new metadata records to BHL and DPLA over two years; 3) the project will serve as a model for "subject based" service hubs; and 4) the project will develop processes that will ensure long-term biodiversity contributions to DPLA. The following performance goals will measure the progress and success in achieving these outcomes: 1) fully implement BHL as a subject/discipline DPLA service hub for life sciences; 2) serve as an aggregator to allow small natural history collections to contribute to BHL/DPLA; 3) preserve and provide access to small natural history and botanical collections and publications through outreach, assistance with scanning, and software tools to format and normalize data for ingest; 4) increase the quality of partner metadata through use of DPLA metadata best practices; 5) offer assistance with scanning and provide software tools to format and normalize data for ingest; and 6) expand the community of content providers by working with new partners associated with the Council of Botanical and Horticultural Libraries (CBHL), SLA Natural History Caucus, International Association of Aquatic and Marine Science Libraries (IAMSLIC), American Alliance of Museums (AAM), small publishers, and scholarly societies for current content in the biodiversity domain

BUDGET. The estimated total budget is $1,813,677 over the 2 year period, of which $846,073 is requested from the IMLS. The partners will provide $967,604 in cost share.