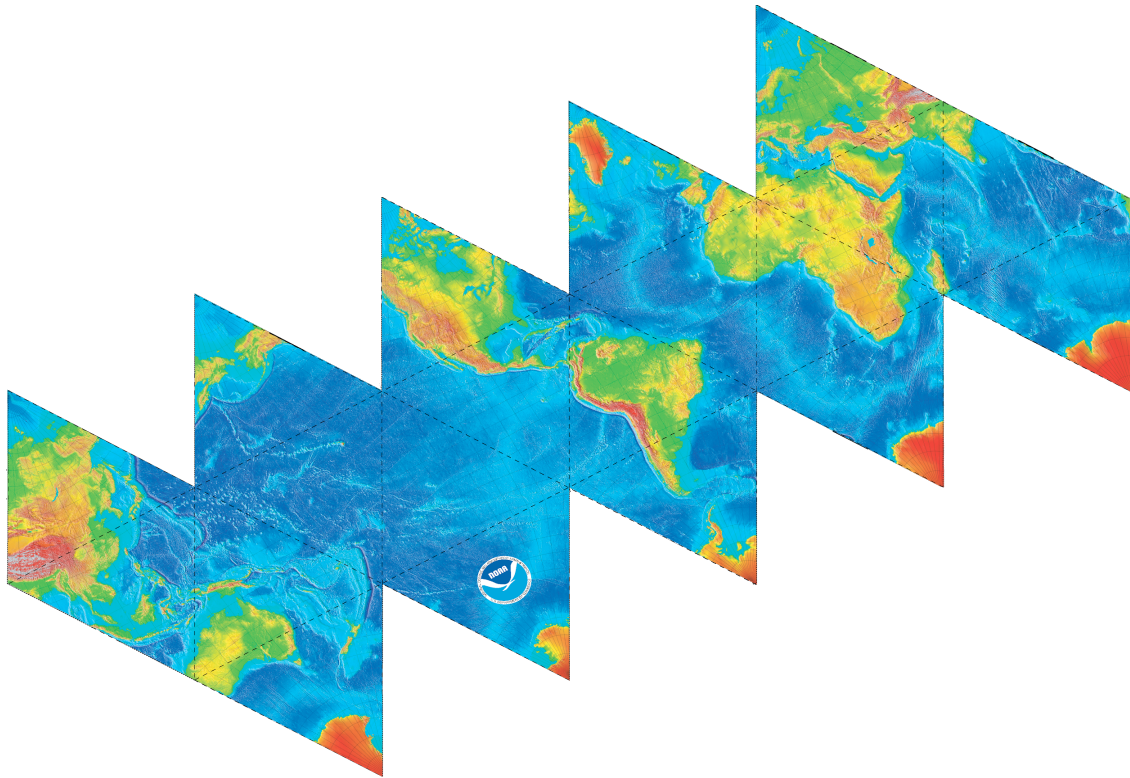# Core Competencies for Map, GIS and Cartographic Cataloging/Metadata Librarians

Prepared by the MAGIRT Core Competencies Task Force 2017

Icosohedron map image courtesy of NOAA https://www.ngdc.noaa.gov/mgg/fliers/04mgg02.html

Table of Contents

1. Introduction

1.A. Background

At the ALA Annual Conference in Washington, DC, in June 2007, three Subcommittees of the MAGERT Education Committee were formed to create a preliminary draft of Map, GIS and Cartographic Materials Cataloging Core Competencies and published their results in 2008. The document was revised in 2012 to comply with accessibility standards.

Effective June 28th, 2011, MAGERT changed its name from the Map and Geography Round Table to the Map and Geospatial Information Round Table and its corresponding acronym to MAGIRT.

In early 2016, the MAGIRT community was asked for volunteers to work on a task force with the charge of reviewing the 2008 document and to create a new edition of the "Map, GIS and Cataloging/Metadata Librarian Core Competencies" document with the intention of publishing the update in 2018.

1.B. Purpose

The charge of the MAGIRT Core Competencies Task Force is to create core competency standards for the map and Geographic information systems (GIS) professions. The resulting document identifies the fundamental knowledge, behaviors, and skills currently essential to most professional positions within the map/GIS information field. It is intended to be a flexible document that can be revised as the field evolves and changes.

1.C. Process

Subcommittees were created to address: 1) Map Librarianship, 2) GIS Librarianship, 3) Cartographic Cataloging and Metadata Creation, and 4) Education/Job Descriptions. Each subcommittee described their area of specialization, with the assumption that some overlap of duties between the four groups is expected as the tasks and responsibilities of each are at times interdependent. After preliminary drafts of core competencies were produced by each subcommittee, it was compiled and edited into this document for review by a larger MAGIRT audience.

Many core competency statements were reviewed to assist in the creation of this document,

including the ALA Statement. These typically consisted of a general statement of concept or discipline, followed by the application of that concept. This core competencies document follows four key areas based loosely on those written by the Special Libraries Association: Organizational Management, Resource Management, Information Services, and Technological Applications. Each specialization contains statements on those four conceptual areas.

Core Competencies Sub-Committee Members and Editors

Map Librarianship Section

Marcy Bidney (University of Wisconsin-Milwaukee)

GIS Librarianship Section

John H. Clark (Lafayette College); Ann Holstein (Case Western Reserve University); Eric O. Johnson (Miami University, Ohio)

Cataloging/Metadata Section

Paige Andrew (Pennsylvania State University); Susan Moore (University of Northern Iowa); Tim Kiser (Michigan State University); Catherine Hodge (University of Iowa).

Education -- Bradley Wade Bishop, Ph.D. (University of Tennessee, Knoxville)

Editorial

Eric Johnson (Miami University, Ohio); Leslie Wagner (University of Texas, Arlington); Kathy Weimer (Rice University); Cathy Hodge (University of Iowa); Maggie Long (Wesleyan University).

1.D. How to use the guidelines

·   Guidelines to develop staff position descriptions

·   Library and information science curricula

·   Staff training programs

·   Professional development

·   Continuing education

The intention is that this competencies document will be distributed widely, and in many forms, to assist in the professional development life cycle: from student/faculty curriculum development to new professional to mid-career professionals or others who are new to the specialization, as well as administrators or personnel officers to assist in job descriptions and hiring in this area.

- Librarians and information professionals, as a resource for articulating their own skills and competencies to employers and as a checklist for professional development

- Employers, as a source for understanding what librarians and information professionals bring to an organization and how they can contribute to organizational performance

- Students and prospective students, as a guide to the profession they are entering and a framework for choosing courses, programs, and careers

- Library and information science educators, as a framework for developing their curricula and for continuing education purposes.

Please note that the specific necessary skills listed in the following librarianship sections are weighted according to the levels above based on the definition provided for each. A level designation is provided at the end of each bulleted skill or experience item.

Core Competencies Summary

General Cartographic Competencies

Librarianship has changed over the years with the continual development of new information technologies. The world of map librarianship is no different. With the introduction of geographic information systems (GIS) and associated datasets in libraries in the early 1990's, the skills required of the map librarian expanded to include digital cartographic resources. The core functions of traditional print map librarianship (i.e., identify, collect, organize, preserve and make available) can also be applied to digital geospatial resources (McEathron, 2001). It is assumed that certain map reading skills and cartographic knowledge will be obtained prior to or early in an individual's job assignment. That knowledge will include scale, projection, grids, and geographic coordinates. It is also helpful to know the basics of the history of cartography; as well as local,

state, federal and international mapping agencies and private map publishers, map series and similar publication patterns, and gazetteers (print and online). These cartographic skills may be obtained by a degree in fields of study such as geography, anthropology, environmental sciences, urban planning and others. Job announcements often note a preference for job seekers who hold those, or similar degrees. The rapid expansion of online mapping technologies, many with simple interfaces popular among users, requires continually expanding skills that librarians obtain through reading, discussion and practice.

General Managerial, Training and Teaching Competencies

Most librarians find themselves serving as supervisor or manager, either officially or unofficially, or in a related leadership role as trainer or mentor. This assumes a basic understanding of typical human resources processes, such as hiring, evaluating, delegating, team building and motivating others. Each librarian also needs an understanding of their role in the larger context of the organization, how to establish partnerships and develop services to meet needs. They will often need to be capable of conveying information and skills to users. This ability and patience to provide patron training and guidance is essential for many librarians including map, GIS and metadata librarians. This document does not address those skills but assumes that all librarians will possess and build their competencies in those areas also.

Levels of Competency

As individuals begin their career in map librarianship and continue along their career journey they will gain new experiences and skills. In addition, they may also be required to, or volunteer to, take on new responsibilities to match an evolving organizational or technological infrastructure. Therefore, with change comes new levels of competency in one or more areas of his/her position. With this in mind we have identified four librarianship areas of competency in this document in order to further guide expectations along the continuum of experiences and skills needed to be successful in our profession. A specific individual or position may require competencies in one or more of the areas. Within each area, specific skills or understandings are listed. Each skill has an identified level of specialization or essentiality.

Level 1

(Basic) - everyone needs to know, and at the entry level needs to master in their first 1-2 years

Level 2

(Advanced) - most will need to know, but may depend on local circumstances

Level 3

(Expert) - advanced level of specialization: very dependent on local user needs, departmental staff and organizational structure

Please note that the specific necessary skills listed in the following librarianship sections are weighted according to the levels above based on the definition provided for each.

Section I.   CORE COMPETENCIES FOR MAP LIBRARIANSHIP

Map librarians must navigate the world of both print and digital cartographic resources as well as oversee all aspects of the map library, its collections, and services. Beyond that, they must have an awareness of the scope and projects of other map collections, particularly as they inform areas of overlap with the librarian's own collection as this may affect collection development decisions, reference referrals, and digitization decisions. The skills needed by the map librarian are extremely varied and overlap in many areas with both the GIS librarian and the cartographic cataloger but this is inescapable given the requirement of the map librarian to be involved in all aspects of the collection, which includes GIS and related digital resources and services, as well as the organization and classification of the materials.

"In this age of intense and sophisticated investigations of the environment, the map as a medium for information storage and as an analytical tool is of a great importance. How to prepare, search, order, catalog, store, preserve and retrieve them is a complicated task. Satisfactory service in these areas can be provided only by properly trained map librarians."
- Roman Drazniowsky, 1973

"Everything suggests that there will be a future for map libraries. The future that many of us envisage for our users is access to a healthy, growing and increasingly vital global information commons." - Carol Marley, 2001

I.A.   Organizational Management

I.A.1. Management

❖ Strategic Planning
- Development of short term and long-term goals **[Level 2]**
- Evaluate the outcomes of programs and projects to better plan for the future **[Level 3]**

❖ Project Management
- Prioritize projects and staffing to complete in a timely manner **[Level 1]**
- Ability to see a large project through from start to finish (such as large scale digitization projects of map library materials and overseeing the cataloging of a large uncataloged backlog according to a certain set of priorities) **[Level 2]**

❖ Fiscal Management
- Ability to manage multiple budgets such as those for collections, staffing, supplies and grant funded projects. **[Level 2]**

- ❖ Fundraising
  - ● Participation in fundraising and donor activities **[Level 2]**
  - ● Identify and apply for appropriate grants that would fund projects relevant to the discipline's ongoing work **[Level 3]**

I.A.2. Marketing and Outreach

- ❖ Intra-institutional marketing and inter-institutional marketing: ('Intra'- is marketing within your institution, while 'inter' is marketing outside of your institution or between libraries and other organizations.)
  - ● Ability to act as an advocate for the map library collections and programs **[Level 1]**
  - ● Knowledge of marketing strategies, in particular to different user groups **[Level 2]**
  - ● Development of innovative ideas to market map library collections and services **[Level 2]**
  - ● Development of exhibits and programs **[Level 2]**
  - ● Building partnerships or working collaboratively with colleagues within one's institution **[Level 2]**
  - ● Building relationships with other organizations to increase visibility of the map library outside of the institution **[Level 3]**

- ❖ Online Engagement
  - ● Knowledge of current web trends in spatial data **[Level 1]**
  - ● Oversees the development of a webpage for the collection **[Level 2]**
  - ● Ability to effectively use social media tools to promote library services, events and accomplishments **[Level 2]**

I.B. Resource Management

I.B.1. Collection Development

- ❖ Acquisitions
  - ● Knowledge of the strategies used to obtain different types of print cartographic materials, including an understanding of the kinds of resources available from map dealers, commercial publishers and aggregators and their avenues of distribution **[Level 1]**
  - ● Knowledge of the strategies used to obtain different types of spatial data and

imagery including an understanding of the kinds of resources available from commercial and nonprofit publishers, their avenues of distribution, and new trends in the production and delivery of spatial data **[Level 1]**

- Understanding of federal, state, and other governmental information, its sources, and the way it is distributed, particularly if the library is part of the Federal Depository Library Program (FDLP) **[Level 2]**
- Understanding copyright considerations and the ability to negotiate licensing agreements for databases and collections of spatial information **[Level 2]**

❖ Collection Management
- Ability to formulate and write a collection development and de-selection policy **[Level 1]**
  - Understands the needs of patrons so the policy directly correlates their needs to the development of the collection
  - Understands the strengths and specialties in the collection to be able to build on those strengths
- Knowledge of the rules governing the selection and deselection of federal and state government documents **[Level 1]**
- Knowledge of avenues to utilize when withdrawing cartographic materials (e.g., offering government documents to other depository libraries, sending lists of discarded materials out to other map librarians on list-servs, offering maps to local schools to serve as teaching aids, etc.) **[Level 2]**
- Identifying gaps in the collection, through analysis, so that a strategic selection plan can be developed. **[Level 2]**
- Manage ongoing changes to collection development and de-selection policy(ies) **[Level 2]**

I.B.2. Collection Maintenance and Organization

❖ Facilities and Equipment
- Basic knowledge of map library equipment such as map storage cabinets and drawers **[Level 1]**
- Knowledge of ADA and local fire codes and laws to keep traffic areas free in support of physical safety and collection accessibility, including a written disaster plan **[Level 1]**

❖ Preservation of resources (print and digital)
- Knowledge of proper materials handling, especially for rare and fragile materials **[Level 1]**
- Knowledge of basic preservation methods, such as encapsulation **[Level 1]**
- Knowledge of digitization, scanning standards and copyright limitations **[Level 2]**

- Knowledge and ability to manage large scale scanning projects **[Level 2]**
- Knowledge and ability to manage preservation projects **[Level 3]**

❖ Collection Access and Maintenance
  - Basic understanding of different classification and organization systems used in map collections **[Level 1]**
  - Knowledge of map security issues **[Level 1]**
  - Understanding special challenges which need to be considered when cataloging cartographic materials (e.g., decisions about describing map sets as a whole as compared to cataloging them at the sheet level, or, the impact of classification decisions on the physical organization and item discovery) **[Level 1]**
  - Ability to create a variety of finding aids for cartographic materials and data sets, including indexes **[Level 1]**
  - Knowledge of security issues in map/special collections **[Level 1]**
  - Ability to protect library materials from theft using available methods and resources **[Level 1]**
  - Knowledge of strategies to discover and distribute digital spatial data for use in GIS **[Level 2]**

I.C. Information Services

I.C.1. Reference and Instruction

❖ Reference
  - Understanding of how to conduct an effective reference interview within the specialized environment of the map library **[Level 1]**
  - Ability to effectively communicate in person, on the phone, through email, and in a virtual environment **[Level 1]**
  - Knowledge of how to use catalogs, indexes, finding aids and electronic reference tools **[Level 1]**
  - Knowledge of geographic and cartographic principles, including important details such as projections, coordinate systems and history **[Level 1]**
  - Knowledge of the creation and distribution systems for cartographic resources
    • Understand map production and reproduction processes and types **[Level 1]**
    • Understand the roles of map publishers, distributors, cartographers and other contributors, both as individuals and corporate bodies **[Level 1]**
  - Ability to effectively communicate with and work with other reference staff within the institution to better facilitate referrals to and from the map collection

[Level 1]
- Knowledge of how to use aerial photography and indexes as well as satellite imagery **[Level 2]**

❖ User Education
- Knowledge of information and geospatial literacy standards for appropriate disciplines **[Level 1]**
- Design information and geospatial literacy initiatives that will help users become more efficient and effective learners **[Level 1]**
- Ability to create and promote open education resources to support faculty teaching and student learning **[Level 2]**
- Ability to develop formalized curricula for use in an extended classroom situation or workshop **[Level 3]**

❖ Data Services
- Knowledge of strategies to discover and distribute digital spatial data for use in GIS **[Level 1]**
- Knowledge and understanding of a variety of GIS software programs **[Level 1]**
- Familiarity with the application of a variety of metadata schemas for spatial data **[Level 2]**
- Provide guidance on creating data management plans as appropriate **[Level 2]**
- Knowledge of data preservation standards **[Level 3]**
- Provide guidance to researchers on best practices of geospatial data management through workshops, videos and consultations **[Level 3]**

Section II. CORE COMPETENCIES FOR GIS LIBRARIANSHIP

Geographic information systems (GIS) offer a compelling and powerful approach to exploring our world. Applicable across a vast range of disciplines and in a variety of institutional settings, GIS simultaneously serves as an information management system, analysis tool, and visualization technique. It does so by utilizing the spatial aspects of information - "the where" component - thus enabling a user to ask and answer questions in an entirely new way.

Given that GIS as a tool is applicable in such a breadth of topics and scenarios, it follows that the core competencies of the GIS Librarian are equally broad and span the theoretical, technical and social. Explanation and instruction of GIS calls for a solid theoretical understanding of spatial information and databases, as well as the vision and imagination to apply GIS to a variety of disciplines. Proficiency in the use of GIS software and the ability to locate and manipulate GIS data is necessary to respond to patron inquiries. Since GIS is inherently technology based, the GIS Librarian is required to have the technical skills to be comfortable working with information technology (IT) systems.

Despite the fact that GIS has existed since the 1960s, with desktop software first commercially available by the 1980's, it is still perceived as a relatively new and complex technology. Thus, the GIS Librarian should be capable of planning and implementing outreach and advocacy of GIS tools. GIS Librarians should continually strive to advance spatial literacy throughout their user communities and advocate for use of geoinformatics. Outreach and advocacy for the GIS Librarian may well extend beyond the boundaries of any given institution.

"GIS and mapping technology is prevalent in many public and academic libraries. From simple workshops on Google Earth to geocaching events to educational instructional workshops on using GIS software, many libraries are educating the public and academics on current Web Mapping 2.0 technologies. Many libraries are supporting geospatial information literacy and are establishing related programs for both library users and library staff members."

--Dodsworth, 2012

"Every library's GIS service program will be designed with its unique institutional needs in mind; however, they each will incorporate some combination of hardware, software, data, and training opportunities provided by at least one knowledgeable staff member....Users with no or limited experience using geospatial technologies are enabled to analyze spatial data sets and create custom maps for coursework, projects, and research."

--Holstein, 2015

II. Organizational Management

II.A.1. Management

- ❖ Strategic Planning
  - Ability to develop short term and long-term goals for GIS services using outcome evaluation as a development tool **[Level 2]**
  - Ability to evaluate emerging GIS technologies and integrate same into current and future services **[Level 3]**

- ❖ Project Management
  - Serve as project manager (e.g., building a spatial data repository, leading a map digitization project) **[Level 2]**
  - Ability to prioritize and decide what needs to be done, when, and by whom **[Level 2]**
  - Ability to identify and evaluate other GIS projects and services provided in the organization to prevent duplication of services **[Level 2]**

- ❖ Fiscal Management
  - Ability to manage multiple GIS related budgets, such as those for hardware, software, data, staffing and supplies **[Level 2]**

- ❖ Fundraising
  - Participation in fundraising activities **[Level 2]**
  - Ability to apply for appropriate grants to fund worthwhile GIS projects **[Level 3]**

II.A.2. Marketing and Outreach

- ❖ Communications and Event Planning
  - Ability to plan and organize events (e.g., GIS day, open house, etc.) **[Level 1]**
  - Presentation skills for demonstrations of GIS **[Level 1]**
  - Ability to effectively use social media tools **[Level 2]**
  - Assessment skills to identify current and potential GIS users and partners **[Level 2]**
  - Collaboration skills for identifying potential internal and external partners **[Level 2]**

II.B. Resource Management

II.B.1. Data Discovery and Acquisition

- ❖ Knowledge of spatial data resources **[Level 1]**
  - Government resources, including local, state or provincial, national and

international
- Academic research institutions and Non-Governmental Organizations (NGOs)
- User-generated resources, including "volunteered geographic information" (VGI) (e.g., OpenStreetMap, Wikimapia)
- Commercial resources
  - Vendors: local, regional, global
- Offline data resources
  - Data CD/DVD-ROMs and other digital media
  - Data on library only accessible servers
- Ability to assist users as they search for, select and download or stream appropriate data

❖ Knowledge of copyright limitations, licensing issues and acquisition details peculiar to data **[Level 2]**

❖ Knowledge of datums, projections, and coordinate systems **[Level 2]**

❖ Knowledge of spatial metadata standards and issues **[Level 2]**
- Ability to promote metadata standards and educate users regarding metadata
- Ability to add detailed metadata to geospatial data as needed
- Working knowledge of principal geospatial metadata schemas - FGDC and ISO 19115

❖ Competence in building spatial data discovery tools (clearinghouse, etc.) appropriate to the organization **[Level 3]**

II.B.2. Data Creation and Transformation

❖ Knowledge of map digitization and georeferencing processes **[Level 1]**

❖ Knowledge and ability to transform acquired geospatial data to formats desired by researchers **[Level 1]**

❖ Ability to perform advanced spatial and geoprocessing activities **[Level 2]**

II.B.3. Data Management

❖ Ability to develop and organize a GIS data collection **[Level 1]**
- Knowledge of collection development and selection principles
- Ability to write a collection development policy
- Knowledge of data quality standards and assessment
- Knowledge of geospatial data models and formats

- Knowledge of geospatial data archiving practices
- Ability to make the data discoverable and accessible

❖ Ability to assess a GIS data collection **[Level 2]**
  - Knowledge of assessment techniques
  - Ability to compile usage statistics

❖ Ability to create a data portal to enable users to locate data in the collection **[Level 3]**

❖ Understanding of digital preservation methods and techniques **[Level 3]**

II.B.4. Information Technology

❖ Current knowledge of system requirements for GIS **[Level 1]**
  - Solid communication techniques coupled with understanding of computing environments
  - Knowledge of facility requirements for software and hardware
  - Competence in continually upgrading software and hardware technology
  - Knowledge of desktop and web technologies (client/server and networks)

II.B.5. Technological Infrastructure and Facilities

❖ Management
  - Competence in fiscal management and planning for needed space, hardware and related technological equipment, etc. **[Level 2]**
  - Ability to manage GIS workstations or laboratory facilities **[Level 3]**

❖ Hardware
  - Ability to perform basic hardware maintenance **[Level 1]**
  - Evaluate and provide access to GIS related tools such as GPS units **[Level 2]**
  - Replacement and upgrades of hardware **[Level 2]**
  - Plan server replacement and upgrades **[Level 3]**

❖ Software
  - Knowledge and understanding of a variety of GIS software programs **[Level 1]**
  - Ability to perform initial troubleshooting for software issues **[Level 1]**
  - Ability to perform upgrades to GIS software **[Level 1]**
  - Evaluate and install supporting software tools for GIS use (e.g., FME, Google

Earth, unzipping utilities) **[Level 2]**
- Ability to manage GIS software licenses **[Level 3]**

❖ Policy
- Implement and oversee policy changes as appropriate **[Level 1]**
- Develop and maintain GIS reference materials and tutorials **[Level 1]**
- Ability to develop operating policies for GIS laboratory facilities **[Level 2]**

II.B.6. Online Geospatial Technologies

❖ Understanding of Open Geospatial Consortium (OGC) compliant geospatial web services such as Web Map Service (WMS) and Web Feature Service (WFS) and their use as data sources for both online and desktop platforms **[Level 1]**

❖ Ability to teach people how to use cloud-based GIS tools (e.g.: OpenStreetMap, ArcGIS Online) **[Level 1]**

❖ Ability to manage organizational subscriptions and licensing (e.g., ArcGIS Online) **[Level 2]**

❖ Knowledge of GIS server technology **[Level 3]**

II.B.7. Related Technologies

❖ Operation of large format scanners and printers **[Level 1]**

❖ Ability to organize data in tabular format (e.g., Excel) **[Level 1]**

❖ Knowledge of GPS (global positioning systems) technologies **[Level 2]**
- Ability to assist patrons in collecting, downloading and utilizing GPS data in a GIS

❖ Knowledge of statistics & data visualization **[Level 3]**

❖ Knowledge of computer programming **[Level 3]**

❖ Ability to create scripts for batch processing, data ingestion, web services, digital library creation and integration, and other geo-processing applications **[Level 3]**

II.C.   Information Services

II.C.1. Reference

❖ Knowledge of resources for learning about GIS and using GIS software **[Level 1]**
- Knowledge of GIS tutorials and training courses specific to patron needs
- Knowledge of reference resources for geographic information science and cartography

❖ Working knowledge of multiple GIS technologies including open-source and commercial products **[Level 1]**

❖ Knowledge of GIS applications specific to an industry or discipline **[Level 3]**

II.C.2. Instruction

❖ Ability to develop and deliver formal introductory GIS instruction sessions and/or workshops **[Level 1]**

❖ Ability to build online guides and tutorials **[Level 1]**

❖ Ability to conduct one-on-one consultations **[Level 1]**

❖ Knowledge of instruction options and ability to manage and facilitate access to commercial options for instruction **[Level 1]**

II.C.3. Research Consultation

❖ Working knowledge of GIS project planning and implementation including data organization **[Level 1]**

❖ Working knowledge of data management planning and issues of long term data preservation **[Level 2]**

❖ Knowledge of data preservation standards **[Level 2]**

❖ Ability to provide guidance on creating data management plans as appropriate **[Level 2]**

❖ Ability to provide guidance to researchers on best practices of geospatial data management through workshops, videos and consultations **[Level 2]**

Section III.   CORE COMPETENCIES FOR CARTOGRAPHIC CATALOGING AND METADATA CREATION

The chief role and function of a cartographic resources cataloging librarian is to create and maintain bibliographic access to all cartographic resources, hardcopy and digital, of the collection(s) he/she works with. Activities include descriptive cataloging, classification of items, ensuring appropriate subject and form/genre access, maintaining and/or creating authorized headings, and keeping abreast of ever-changing national and international standards, which may include various metadata standards. In addition, depending on his/her local institution, activities may include participation in relevant cooperative cataloging programs.

Ongoing changes in the nature of cartographic and geospatial information require that cartographic cataloging and metadata librarians be familiar with a wide array of metadata schemas and descriptive practices:

"The purpose of cataloging spatial data, like that of book cataloging, is to make items available for use in an efficient, effective way. It is done by creating a surrogate for the actual item, describing that item, distinguishing it from all others, and making a single, complete record of it, in the form of a unit record, nowadays with very few exceptions in a digital catalog database. In ensuring that the resources of the collection are cataloged, several tasks are accomplished. First and most importantly, cataloging enables the user (who is, after all, the reason for our contortions) to discover that the item exists and by what collection it is held."

--**Larsgaard, 1998**

"[Geospatial metadata] is best defined as a formally structured and documented collection of information about geospatial data that represents who produced the geospatial data, what is in them, when they were produced and modified, where the geospatial data originated from, why they were produced, and how the geospatial data can be obtained. The foremost aim of the geospatial metadata standards is to facilitate the ability to describe, manage, query, exchange, transmit, share and integrate geospatial data and information."

--**Yang, 2012**

Cartographic resources cataloging librarians should also familiarize themselves with the broader aims of cataloging presented in the current version of the *Core Competencies for Cataloging and Metadata Professional Librarians* or its equivalent, as endorsed by the Association for Library Collections & Technical Services (ALCTS). As noted in the most recent (2017) version of that document, "While a baseline of knowledge, skills, and behaviors for cataloging and metadata professional librarians is defined in this document, competence in cataloging and metadata is obtained over the course of an individual's career."

During the course of a career in cartographic resources cataloging, one should expect to maintain skills in the following areas:

III.A. Organizational Management

III.A.1. Administrative Awareness

❖ Determine how the cataloging and metadata department fits into the larger organizational structure and its priorities **[Level 1]**

III.A.2. Communication and Workflow Issues

❖ Communicate with upper management and other units to best support the flow of cartographic materials from acquisitions to the public **[Level 1]**

❖ Develop appropriate workflow(s) **[Level 1]**

❖ Monitor workflow(s), and revise as necessary **[Level 1]**

❖ Communicate with the head map librarian or curator, other units, and upper management to apply priorities and best support the management of cartographic materials **[Level 1]**

III.A.3. Training and Documentation

❖ Support unit procedures by training others where needed and appropriate **[Level 1]**

❖ Create, review and update local documents about cartographic materials cataloging policies and procedures **[Level 1]**

III.B. Resource Management

III.B.1. Cataloging Standards

❖ Stay abreast of national and international standards such as RDA guidelines, BIBFRAME, MARC, AACR2, DCRM(C), and DACS and apply them consistently **[Level 1]**

❖ Develop local practices based on system requirements and be able to adjust to

locally-needed changes or situations **[Level 2]**

III.B.2. Cataloging Resources

❖ Learn, understand, and appropriately apply cataloging rules, rule interpretations and subject analysis techniques **[Level 1]**

❖ Identify and use appropriate hardcopy and online resources for cartographic materials cataloging in all formats **[Level 1]**

❖ Apply classification schedules or schemas and create call numbers **[Level 1]**

❖ Apply accurate subject headings using *Library of Congress Subject Headings* and/or other thesauri **[Level 1]**

❖ Apply accurate genre/form terms using *Library of Congress Genre/Form Terms for Library and Archival Materials* and/or other thesauri **[Level 1]**

❖ Document local cataloging practices for cartographic materials by creating cataloging guides, project-level documents, etc., where needed **[Level 2]**

III.B.3. Knowledge of the Creation and Distribution Systems for Cartographic Resources

❖ Understand map production and reproduction processes and types **[Level 1]**

❖ Understand the roles of map publishers, distributors, cartographers and other contributors, both as individuals and corporate bodies **[Level 1]**

III.B.4. Cataloging with Existing Bibliographic Metadata ("copy cataloging")

❖ Search for and identify matching resource descriptions such as bibliographic records from external databases, download and import record(s), and edit record(s) for local use **[Level 1]**

❖ Search for and identify matching existing resource descriptions such as bibliographic records, from internal databases and edit and update them for completeness and accuracy **[Level 1]**

III.B.5. Creation of Resource Descriptions such as Bibliographic Records and/or Bibliographic Metadata ("original cataloging")

- ❖ Understand theory and practice of descriptive cataloging as it applies to cartographic materials **[Level 1]**

- ❖ Correctly identify the title proper when more than one title exists, or when a single title can be read in multiple ways **[Level 1]**

- ❖ Correctly provide for second, alternative and/or variant titles **[Level 1]**

- ❖ Understand scale and how it functions, know the different methods of communicating and calculating scale, and supply scale statements in the correct format(s) when required **[Level 1]**

- ❖ Understand map projections and correctly apply projection information when needed **[Level 1]**

- ❖ Understand the coordinate system and apply correct latitude and longitude values and formats when given on the map **[Level 1]**

- ❖ Understand the coordinate system and apply correct latitude and longitude values and formats when supplying coordinates **[Level 2]**

- ❖ Interpret and then provide correct and accurate information about the physical characteristics of cartographic items **[Level 1]**

- ❖ Know and apply the correct techniques for measuring cartographic resources, and correctly recording those measurements **[Level 1]**

- ❖ Determine the correct form of heading for personal and corporate names and/or uniform titles and create correct forms of headings when needed **[Level 1]**

- ❖ Train for, and actively participate in, cooperative cataloging programs such as one or all of the Library of Congress's Program for Cooperative Cataloging programs (NACO, SACO, and/or BIBCO) and/or OCLC's Enhance Program for the maps format, as a means of "contributing to the greater good" and maintaining one's skills **[Level 3]**

III.B.6. Metadata Standards and Metadata Creation

Refer to the section *Core Competencies for GIS Librarianship* for more details on GIS librarianship.

- ❖ Maintain familiarity with emerging evolutions in cataloging and metadata, including Linked Open Data **[Level 1]**

- ❖ Understand the theory and practice of metadata schemes used in geospatial environments, chiefly U.S. Federal Geographic Data Committee (FGDC), ISO 19115, and Dublin Core (DC) **[Level 2]**

- ❖ Create geospatial metadata, and other metadata as needed **[Level 2]**

- ❖ Provide metadata for institutional repositories and digital libraries **[Level 2]**

- ❖ Create or prepare metadata for use in Linked Data environments **[Level 2]**

III.C.   Information Services

III.C.1.   Internal Cataloging and Metadata Information Needs

- ❖ Measure quality and quantity of cataloging output **[Level 1]**

- ❖ Produce reports and recommendations to support organizational needs **[Level 1]**

III.D.   Technological Applications

III.D.1.   Cataloging-specific Technologies

- ❖ Learn and apply supportive technologies including macros and similar time-saving techniques, local integrated library system (ILS) cataloging features and functions, MarcEdit, and other special technologies as needed **[Level 1]**

- ❖ Participate in the selection and testing of new ILS **[Level 1]**

III.D.2.   Metadata-specific Technologies

- ❖ Stay abreast of metadata applications and uses **[Level 1]**

- ❖ Understand the relationship of interoperability or crosswalks among metadata standards **[Level 2]**

Section IV. Education

Education for librarians and all information professionals is a lifelong pursuit. A variety of modes and means exist to facilitate education. A formal example occurs in the Institute of Museum and Library Services (IMLS) funded the Geographic Information Librarianship Project (2012–2014) through the Laura Bush 21st Century Librarian Program with the goal to bolster the data curation education of librarians and improve their abilities to deal with the varied resources generated by geospatial tools. This was a collaborative effort between Drexel University (Tony H. Grubesic, PI) and the University of Tennessee (Bradley Wade Bishop, PI). The grant funded the research activities that led to the creation of one elective that fills the curricular gap presented in the 2006 Weimer and Reehling article.

To streamline the number of topics for a single class, the MAGERT core competencies were validated through the use of a survey by current job incumbents to rank the most important items for workers to know (Bishop, Cadle, and Grubesic 2015). This allowed feedback from information professionals beyond the MAGIRT Education Committee members to rank the most important core competencies from their everyday, real-world information agency experience.

The survey validation process was geared toward creating both a timely and relevant curriculum. One-hundred and fifty-seven information professionals responded to the survey and of the 75 core competencies, 23 were rated above 2.3, and nearly all respondents ranked those core competencies as "important" or "very important" to doing their work based on a five point scale. Therefore, those 23 were rewritten as thirteen student learning outcomes for the GI courses. A similar process could occur to result in updated SLOs, but since these are the most important (~Level 1 equivalent) there should be considerable overlap.

Although the 2017 core competencies are written by job types, most training and all formal education will reach audiences with various backgrounds. In fact, many will not have duties related to geographic information (e.g., cartographic resources, geospatial data, and so forth) alone.

1. Geography and Cartography	1.1. Students will demonstrate geographic and cartographic principles, including geographic and cartographic scale, projection, grids, and geographic coordinate systems

2. Collection Development/Records Appraisal/Collection Maintenance	2.1. Students will demonstrate knowledge of local, state/provincial, federal and international mapping agencies and private map publishers, map series and similar publication patterns, and gazetteers, data portals, volunteered geographic information, and aspects of the Federal Depository Library Program 2.2. Students will select strategies to obtain different types of maps, imagery, and other geospatial data 2.3. Students will describe copyright considerations and the ability to negotiate licensing agreements for databases and collections of geographic information 2.4. Students will explain how to assess the strengths and specialties in a collection and the needs of users to inform collection development 2.5. Students will describe proper materials handling, especially for rare and fragile materials
3. Reference and Instruction	3.1. Students will demonstrate the ability to locate geospatial data and software support 3.2. Students will gain awareness of GIS tutorials and training 3.3. Students will develop and deliver geographic information consultations
4. Metadata/Cataloging	4.1. Students will explain metadata standards, schemas, and issues 4.2. Students will understand and interpret existing metadata in geospatial records 4.3. Students will define projections, coordinate systems, and other physical characteristics of cartographic items to create metadata records 4.4. Students will interpret and calculate cartographic scale

As is often true of these types of specialized skills sets, on-the-job training outside of formal academic programs is often regarded as being the most effective means of learning about cartographic resources cataloging and the other duties outline above. Therefore, most information professionals will need much more than their required courses in the typical MLS/MLIS program

to master even Level 1 core competencies. The information professional will need to seek out specialized training through internships, employment, and professional organizations beyond formal educational programs, and is encouraged to seek out training opportunities in cartographic resources cataloging and geospatial metadata creation, such as online courses, workshops, etc.

Luckily, MAGIRT has saved several and continues to offer more training in these areas: http://magirt.ala.libguides.com/resources/trainingsandpresentations Still, the best source is networking with the expert MAGIRT and WAML members and via the listserv MAPS-L (https://listserv.uga.edu/archives/maps-l.html).

Section V.

Section VI. BIBLIOGRAPHY / WEBLIOGRAPHY

Abels, E., Jones, R., Latham, J., Magnoni, D., & Marshall, J. G. (2003). Competencies for

Information Professionals of the 21st Century. INFORMATION OUTLOOK, 7, 11–23.

Aber, S. E. W., & Aber, J. (2016). Map Librarianship: A Guide to Geoliteracy, Map and GIS

Resources and Services. Chandos Publishing. Amazon.com Link. (n.d.). Retrieved from

https://www.amazon.com/Maps-Related-Cartographic-Materials-

Classification/dp/0789008130/ref=sr_1_1?ie=UTF8&qid=1493821917&sr=8-

1&keywords=Maps+and+related+cartographic+materials%3A+Cataloging%2C+classificatio

n%2C+and+bibliographic+control.

American Library Association. (2009). *ALA's Core Competences of Librarianship*. American

Library Association. Retrieved from

http://www.ala.org/educationcareers/sites/ala.org.educationcareers/files/content/careers/cor

ecomp/corecompetences/finalcorecompstat09.pdf

Andrew, P. G. (2003). *Cataloging Sheet Maps: The Basics*. New York: Routledge.

Andrew, P. G., & Larsgaard, M. L. (2000). *Maps and Related Cartographic Materials:

Cataloging, Classification, and Bibliographic Control*. New York: Routledge.

Andrew, P. G., Moore, S. M., & Larsgaard, M. (2014). *RDA and Cartographic Resources*.

Chicago: ALA Editions.

Bishop, B. W., Cadle, A. W., & Grubesic, T. H. (2015). Job Analyses of Emerging

Information Professions: A Survey Validation of Core Competencies to Inform Curricula.

The Library Quarterly, *85*(1), 64–84. https://doi.org/10.1086/679026

Bishop, B. W., Grubesic, T. H., & Prasertong, S. (2013). Digital Curation and the GeoWeb:

An Emerging Role for Geographic Information Librarians. *Journal of Map & Geography Libraries*, *9*(3), 296–312. https://doi.org/10.1080/15420353.2013.817367

Boissé, J. A., & Larsgaard, M. (1995). GIS in academic libraries: A managerial perspective. *Journal of Academic Librarianship*, *21*(4), 288.

Boxal, J. (1999). Developing a geomatics alliance and community: Increasing map library association status, cooperation and effectiveness. *Association of Canadian Map Libraries and Archives Bulletin*, *106*, 32–36.

Bugayevskiy, L. M., & Snyder, J. P. (1995). *Map Projections: A Reference Manual*. London; Bristol, PA: CRC Press.

Cataloging Policy and Support Office, Network Development and MARC Standards Office, Geography and Map Division, and Special Materials Cataloging Division, Library of Congress. (2001). Guidelines for Distinguishing Cartographic Materials on Computer File Carriers. Retrieved from http://www.loc.gov/marc/cfmap.html

Clark, S. M. (1992). *Cartographic Citations: A Style Guide*. Chicago: Univ of Washington, Suzzallo Library.

Cobb, D. A., 1945-. (1995). Developing GIS relationships. *Journal of Academic Librarianship*, *21*, 275–277. https://doi.org/10.1016/0099-1333(95)90007-1

Dodsworth, E. (2012). *Getting Started with GIS: A LITA Guide*. New York: Neal-Schuman Publishers, Inc.

Farrell, B., Desbarats, A., & Association of Canadian Map Libraries. (1984). *Guide for a small map collection*. Ottawa: Association of Canadian Map Libraries.

Geological Survey (U.S.). (2005). *USGS maps* (USGS Unnumbered Series). Reston, VA: U.S. Geological Survey. Retrieved from http://pubs.er.usgs.gov/publication/70037962

Gillispie, J. (1990). Exploiting cartographic resources. In *Parry, R. B., Perkins, C. R., (Eds.)*

Exploiting cartographic resources (Vols. 1–6, pp. 295–308). London; New York: Bowker-

Saur.

Gluck, M., & Yu, L. (1999). Geographic Information Systems. In *Elizabeth A. Chapman*

(ed.) Advances in Librarianship (Vol. 23, pp. 1–38). Emerald Group Publishing Limited.

https://doi.org/10.1108/S0065-2830(1999)0000023003

Gorr, W. L., & Kurland, K. S. (2016). *GIS Tutorial 1: Basic Workbook, 10.3 Edition* (6

edition). Redlands, California: Esri Press.

Harvey, F. (2015). *A Primer of GIS, Second Edition: Fundamental Geographic and*

Cartographic Concepts (2nd edition). New York: The Guilford Press.

Holstein, A. L. (2015). Geographic Information and Technologies in Academic Research

Libraries: An ARL Survey of Services and Support. *Information Technology and Libraries*,

34(1), 38–51. https://doi.org/10.6017/ital.v34i1.5699

Kollen, C., Shawa, W., & Larsgaard, M. L. (2010). *Cartographic Citations: A Style Guide,*

Second Edition. ALA Publishing. Retrieved from

http://www.alastore.ala.org/detail.aspx?ID=3554

Kong, N. N. (2015). Exploring Best Management Practices for Geospatial Data in Academic

Libraries. *Journal of Map & Geography Libraries*, *11*(2), 207–225.

https://doi.org/10.1080/15420353.2015.1043170

Lamont, M. (1997). Managing geospatial data and services. *The Journal of Academic*

Librarianship, *23*(6), 469–473. https://doi.org/10.1016/S0099-1333(97)90171-3

Larsgaard, M. L. (1998). *Map Librarianship: An Introduction* (3rd ed. edition). Englewood,

Colo: Libraries Unlimited.

Library of Congress. (2012). *Classification, Class G: maps, G 3160-9999*. University of California Libraries [The content is available also, by subscription, at LC's online site, Classification Web http://classweb.loc.gov/Menu/].

Library of Congress, Geography and Map Division. (1991). *Map Cataloging Manual* (Lslf edition). Washington, D.C: Library of Congress [Also available in Cataloger's Desktop on the Web <http://desktop.loc.gov>].

Longstreth, K. (1995). GIS collection development, staffing, and training. *Journal of Academic Librarianship*, *21*(4), 267.

Mangan, E. U. (Ed.). (2003). *Cartographic Materials: A Manual of Interpretation for AACR2, 2002 Revision* (2 Pck edition). Chicago: Amer. Library Assn Editions.

March, G. H. (2011). Surveying Campus GIS and GPS Users to Determine Role and Level of Library Services. *Journal of Map & Geography Libraries*, *7*(2), 154–183. https://doi.org/10.1080/15420353.2011.566838

Martindale, J. (2004). Geographic information systems librarianship: Suggestions for entry-level academic professionals. *Journal of Academic Librarianship*, *30*(1), 67–72. https://doi.org/10.1016/j.jal.2003.11.008

McEathron, S. R. (2001). The Future Is Now: a Map Librarian's Response to "The Map Library's Future." *Cartographic Perspectives*, *0*(40), 4–8. https://doi.org/10.14714/CP40.574

National Research Council, Division on Earth and Life Studies, Board on Earth Sciences and Resources, Geographical Sciences Committee, & Committee on Support for Thinking Spatially: The Incorporation of Geographic Information Science Across the K.-12 Curriculum. (2005). *Learning to Think Spatially* (1 edition). Washington, D.C: National Academies Press. Retrieved from https://www.nap.edu/read/11019/chapter/1

OCLC. (2016). Bibliographic Formats and Standards. Retrieved May 3, 2017, from

http://www.oclc.org/bibformats/en.html

Parry, R.B., C. R. Perkins (Eds.). (2001). *The Map Library in the New Millennium*. Chicago:

London: American Library Association.

Robinson, A. H., Morrison, J. L., Muehrcke, P. C., Kimerling, A. J., & Guptill, S. C. (2009).

Elements of Cartography. Wiley India.

Salem, Jr., J. A. (2005). *SPEC Kit 291: Spatial Data Collections and Services*. Washington,

DC: Association of Research Libraries.

Tenner, E., & Weimer, K. H. (1998). Reference Service for Maps: Access and the Catalog

Record. *Reference & User Services Quarterly*, (2), 181.

Theobald, R., & Vrbancic, E. (2016). Nodes of Knowledge: Librarians as Navigators for

Geospatial Technology Users. *Journal of Map & Geography Libraries Journal of Map &

Geography Libraries*, *12*(3), 318–344. https://doi.org/10.1080/15420353.2016.1224794

Thiry, C. J. J., Cobb, D. A., & Map & Geography Round Table (American Library

Association). (2006). *Guide to U.S. map resources*. Lanham, Md.: Scarecrow Press.

U.S. Dept. of Labor, Bureau of Labor Statistics. (n.d.-a). Occupational Outlook Handbook:

Cartographers and Photogrammetrists. Retrieved May 4, 2017, from

https://www.bls.gov/ooh/architecture-and-engineering/cartographers-and-

photogrammetrists.htm

U.S. Dept. of Labor, Bureau of Labor Statistics. (n.d.-b). Occupational Outlook Handbook:

Surveying and Mapping Technicians. Retrieved May 4, 2017, from

https://www.bls.gov/ooh/architecture-and-engineering/surveying-and-mapping-

technicians.htm

Weimer, K. H., & Reehling, P. (2006). A New Model of Geographic Information Librarianship: Description, Curriculum and Program Proposal. *Journal of Education for Library and Information Science*, *47*(4), 291–302. https://doi.org/10.2307/40323822

Yang, H., & Feng, G. (2012). Automatic Creation of Crosswalk for Geospatial Metadata Standard Interoperability. *Lecture Notes in Computer Science.*, (7478), 311–324.

Youngblood, D. (2006). Map Use Across the Disciplines. *Journal of Map & Geography Libraries*, *2*(2), 33–66.

Web Pages of Interest

General Sites:

Allen, D. (2007, June 25). Helpful Hints for the Paperless Map Librarian [Text]. Retrieved May 22, 2017, from http://www.ala.org/magirt/publicationsab/electronicpubs/allen

American Library Association, & Map & Geospatial Information Round Table. (2007, June 25). Map Imaging Service Providers [Text]. Retrieved May 4, 2017, from http://www.ala.org/magirt/publicationsab/electronicpubs/service

American Library Association, & Map & Geospatial Information Round Table. (n.d.). Map & Geospatial Information Round Table (MAGIRT) [Text]. Retrieved May 4, 2017, from http://www.ala.org/magirt/

Federal Depository Library. (n.d.). Federal Depository Library Manual & Supplements. Retrieved May 4, 2017, from https://www.fdlp.gov/file-repository/historical-publications/federal-depository-library-manual-a-supplements

Larsgaard, M., Rankin, K., & Rogers, S. (2007, June 25). Helpful Hints for Small Map Collections [Text]. Retrieved May 22, 2017, from http://www.ala.org/magirt/publicationsab/electronicpubs/larsg

Shular, M. D. (2006). *A Guide to the Cartographic Products of the Federal Depository Library Program*. Retrieved from http://www.ala.org/magirt/publicationsab/electronicpubs/fdlpguide

U.S. Geological Survey. (n.d.). USGS Store | USGS Store. Retrieved May 22, 2017, from https://store.usgs.gov/

Western Association of Map Libraries. (n.d.). WAML Map Librarian's Tool Box. Retrieved May 22, 2017, from http://www.waml.org/maptools.html

Cartographic Cataloging Sites:

American Library Association, Association of College and Research Libraries, & Rare Books and Manuscripts Section. (2014, September 25). DCRM(C): Descriptive Cataloging of Rare Materials (Cartographic). Retrieved May 4, 2017, from http://rbms.info/dcrm/dcrmc/

American Library Association, Association of College and Research Libraries, & Rare Books and Manuscripts Section Bibliographic Standards Committee. (n.d.). Resources for the Rare Materials Cataloger. Retrieved May 4, 2017, from http://lib.nmsu.edu/rarecat/

Bertuca, D. (n.d.). Map Cataloger's Tool Box -- David Bertuca. Retrieved May 4, 2017, from http://www.acsu.buffalo.edu/~dbertuca/maps/cat/map-cat-toolbox.html

Library of Congress. (n.d.-a). Map Cataloging Manual: [Also in LC's Catalogers Desktop].

Retrieved May 4, 2017, from

http://www.itsmarc.com/crs/mergedProjects/mapcat/mapcat/Contents.htm

Library of Congress, P. for C. C. (n.d.-b). CARTOGRAPHIC MATERIALS: BIBCO Core

Record Standards. Retrieved May 4, 2017, from

https://www.loc.gov/aba/pcc/bibco/coremaps.html

McCorkle, B. B. (2009). *A carto-bibliography of the maps in Eighteenth-Century British and*

American geography books. Lawrence, Kan.: Digital Publishing Services, University of

Kansas Libraries. Retrieved from

http://kuscholarworks.ku.edu/dspace/bitstream/1808/5564/3/CARTO-BIBLIOGRAPHY.PDF

Official Online Gazetteers:

Getty Research Institute, The. (n.d.). Getty Thesaurus of Geographic Names. Retrieved

May 4, 2017, from http://www.getty.edu/research/tools/vocabularies/tgn/

National Geospatial Intelligence Agency. (n.d.). NGA GEOnet Names Server (GNS)

(the primary source for international place names). Retrieved May 4, 2017, from

http://geonames.nga.mil/gns/html/

United States Geological Survey. (n.d.). Geographic Names Information Service (GNIS)

Feature Search. Retrieved May 4, 2017, from

https://geonames.usgs.gov/apex/f?p=138:1:0:

GIS and Related Sites:

American Library Association, & Map & Geospatial Information Round Table. (2007, June

25). Metadata Primer for Map Librarians [Text]. Retrieved May 4, 2017, from

http://www.ala.org/magirt/publicationsab/electronicpubs/metaprime

Esri. (n.d.). What is GIS? | The Power of Mapping - Esri. Retrieved May 4, 2017, from

http://www.esri.com/what-is-gis/

Moulder, C. (2012, February 4). Current Literature on Geographic Information Systems and

Libraries. Retrieved May 4, 2017, from http://library.mcmaster.ca/maps/current-literature-

gis-and-libraries

Map and Geospatial Professional Organizations

American Library Association, & Map & Geospatial Information Round Table. (n.d.). Map &

Geospatial Information Round Table (MAGIRT) [Text]. Retrieved May 4, 2017, from

http://www.ala.org/magirt/

Association of Canadian Map Libraries and Archives. (n.d.). Association of Canadian Map

Libraries and Archives (ACMLA). Retrieved May 4, 2017, from https://acmla-acacc.ca/

International Cartographic Association. (n.d.). International Cartographic Association.

Retrieved July 25, 2017, from http://icaci.org/

International Cartographic Association Commission on Cartographic Heritage into the

Digital. (n.d.-a). Commission on Cartographic Heritage into the Digital. Retrieved July 25,

2017, from http://cartography.web.auth.gr/ICA-Heritage/

International Cartographic Association Commission on Cartographic Heritage into the

Digital. (n.d.-b). ICA Commission on the History of Cartography. Retrieved July 25, 2017,

from http://history.icaci.org/

International Cartographic Association Commission on Cartographic Heritage into the

Digital. (n.d.-c). Map & Geoinformation Curators Group. Retrieved July 25, 2017, from

http://cartography.web.auth.gr/ICA-Heritage/2015-2019/pg/MAGIC.html

International Map Collectors' Society. (n.d.). International Map Collectors' Society.

Retrieved July 25, 2017, from https://www.imcos.org/

NACIS.ORG. (n.d.). NACIS.ORG. Retrieved May 22, 2017, from http://nacis.org

NEMO. (n.d.). The North East Map Organization. Retrieved May 4, 2017, from

http://northeastmap.org/

Society for the History of Discoveries. (n.d.). History of Discoveries geographical discovery,

voyages of exploration, cartography, mapping, European expansion, colonial settlement.

Retrieved July 25, 2017, from http://www.sochistdisc.org/

Special Libraries Association. (n.d.). SLA Social Science Division | serving as a vital forum

for the exchange of information and knowledge. Retrieved May 4, 2017, from

http://socialscience.sla.org/

The Brussels Map Circle. (n.d.). The Brussels Map Circle. Retrieved July 25, 2017, from

http://www.bimcc.org/

The International Society for the History of the Map. (n.d.). Home | ISHMap. Retrieved July

25, 2017, from http://ishm.elte.hu/

Western Association of Map Libraries. (n.d.-a). Western Association of Map Libraries.

Retrieved May 4, 2017, from http://www.waml.org/index.html