Notes on Operations

Community Forward

Developing an Open and Free Cataloging Standard for Rare Materials

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Descriptive Cataloging of Rare Materials (RDA Edition) (DCRMR) is a rare materials cataloging standard aligned with the official RDA Toolkit. DCRMR is informed by core principles of community and sustainability while employing open-source publication models and infrastructure. The RBMS RDA Editorial Group, composed of rare materials catalogers actively working in the field, is responsible for developing and maintaining DCRMR. This article discusses predecessor rare materials cataloging standards that led to the development of DCRMR, the principles and constraints that shaped DCRMR from its initial inception to eventual release, the method and technical tools used to achieve the RBMS RDA Editorial Group's outcomes, and future directions for development.

Descriptive Cataloging of Rare Materials (RDA Edition) (DCRMR) is a rare materials cataloging standard that aligns with Resource Description and Access (RDA).[1] The initial DCRMR release in February 2022 rewrote and restructured *Descriptive Cataloging of Rare Materials (Books)* (DCRM(B)) instructions.[2] DCRMR, unlike DCRM(B), is an integrating resource, published as a website, with updates framed as releases instead of revisions. While the first iteration of DCRMR contains instructions for cataloging rare books only, future releases will incorporate instructions for other formats.

DCRMR centers community. It was created, and is maintained, by the rare materials cataloging community for the rare materials cataloging community. Volunteers from an array of institutions in multiple countries have contributed labor and knowledge to the standard and its growth, both by serving on the RBMS RDA Editorial Group and its predecessor groups and by providing feedback at different junctures in the editorial process. DCRMR is officially published by the Bibliographic Standards Committee (BSC) of the Rare Books and Manuscripts Section (RBMS) of the Association of College and Research Libraries (ACRL), a division of the American Library Association (ALA). However, it was created by the international rare materials cataloging community.

DCRMR also centers sustainability. The BSC decided to create a stand-alone, integrating manual for RDA-aligned rare materials cataloging during the 2019 ALA Annual Conference. The RBMS RDA Editorial Group chose to create it as a website using a GitHub repository at the 2020 ALA Midwinter Meeting. Less than two months later, the COVID-19 pandemic caused massive personal and professional disruption. As our institutions closed, many of us were forced into ad hoc work-from-home situations where home and the office collided and, at times, conflicted. Then, in May 2020, the murder of George Floyd sparked a global movement toward justice-oriented community building, which became part of the warp and weft of creating DCRMR, as much of the technical infrastructure of DCRMR was built by an Editorial Group member who resides in the Powderhorn Park neighborhood of Minneapolis. Over the past two years, it has become clear that to be sustainable, DCRMR must rely on communal efforts, not individuals, to allow

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for people to step back, step down, and maintain their own well-being. Toward that end, succession planning, open sharing of knowledge, and extensive documentation have been integrated into DCRMR's workflows and planning.

DCRMR centers open-source infrastructure. Built on a zero-dollar budget, it is available openly and freely on the web, aligning our cataloging standards with our professional values of transparency, accessibility, and equity. The Editorial Group utilized freely-available, well-established technical tools and software like Python, Ruby, GitHub, and Notepad++ to create DCRMR, and the text is published under a Creative Commons license that allows others to adapt the text to their own needs or use the code base to develop their own infrastructure. Choosing an open-source model allows people to use and build on the work of the Editorial Group, just as the Editorial Group has used and built on the work of others.

DCRMR is one contribution in the overarching history of rare materials cataloging standards development.

Background and Literature Review

Rare Materials Cataloging Standards

Rare materials have distinct cataloging needs, including describing individual issues and states and distinguishing individual copies of a manifestation. In an article on the development of rare book cataloging practices, Beth M. Russell highlights the "constant tension between descriptive bibliography and library cataloging."[3] Russell notes the fundamental differences between "mainstream" cataloging and rare materials cataloging, chiefly the artifactual nature of rare materials due to their method of construction.[4] She highlights the philosophical differences between various cataloging codes of the past while emphasizing the importance of transcription, transposition, format and collation, and the robust nature of rare materials notes, access points, and copy-specific information.[5] Similarly, Juliet McLaren and Jane Gillis compile a history and development of rare serials cataloging rules, emphasizing that rare serials "cannot be identified without careful transcription of their sometimes unique extended titles, their imprints (where present), and detailed notes."[6] Their analysis of the descriptive needs for rare serials walks through each area of description from International Standard Bibliographic Description (ISBD), detailing why previous rules were inadequate for identification and ending with a discussion of cataloging early reprints, republications, and access points.[7]

Throughout the history of rare materials cataloging, catalogers have sought to reconcile these needs with the strictures of cataloging codes. Russell's article discusses the reconciliation process between bibliography and G. Thomas Tanselle's argument for "mutual understanding between bibliographers and catalogers" in the 1970s and the nature of recording physical facts.[8] Russell then describes the evolution of rare materials cataloging through various past codes.[9] Mary Burns continues this discussion, detailing the evolution of rare materials cataloging standards by summarizing the development history of *Bibliographic Description of Rare Books* (BDRB), *Descriptive Cataloging of Rare Books* (DCRB), and the various task forces leading to the development of the RBMS Policy Statements (RBMS PS), previously slated for incorporation into the RDA Toolkit.[10] Burns, in her two-part article "RDA and Rare Books Cataloging," compares the cataloging outputs of three bibliographic records created for the same book following the stipulations of DCRM(B), the *BIBCO Standard Record (BSR) RDA Metadata Application Profile* with rare materials provisions, and the original RDA Toolkit (2013) with its exceptions for early printed resources.[11] Burns notes that, even with the provisions and expectations, "there are description and transcription issues that rare materials catalogers need to address that RDA, a general cataloging standard, does not," suggesting that the discrepancy between rare materials standards and general standards remains.[12]

In 2007, the BSC published DCRM(B) in collaboration with the Library of Congress.[13] DCRM(B) was the first in the suite of *Descriptive Cataloging of Rare Materials* (DCRM) manuals. Meanwhile, the RDA Steering Committee (RSC) (formerly the Joint Steering Committee for Development of RDA) began developing RDA to replace the second edition of AACR2 as part of its strategic plan (2005–2009).[14] The editors of DCRM(B) considered postponing work on the manual until the publication of RDA but elected to proceed, "given the progress already made on DCRM(B) and the considerable investment to date of time, labor, and money."[15] Subsequently, the BSC published five DCRM manuals covering additional formats: serials (2008), graphics (2013), cartographic (2016), manuscripts (2016), and music (2016).

After the publication of RDA in 2010, rare materials catalogers quickly began to consider the future of DCRM in relation to RDA.[16] Dr. Robert Maxwell and John Attig investigated issues surrounding the future development of DCRM following the adoption of RDA, including the relationship between the standards, terminology used within the DCRM text, the organization (i.e., structure and arrangement) of the standard, descriptive aspects not traditionally covered by DCRM, DCRM's relationship to *International Standard Bibliographic Description for Older Monographic Publications (Antiquarian)* (ISBD(A)), and broader policy related to the application of DCRM(B).[17] Their discussion paper also outlined differences between *Anglo-American Cataloguing Rules*, 2nd ed. (AACR2) and the original RDA Toolkit that are relevant to the revisions of DCRM, including differences in terminology, sources of information and use of brackets,

transcription practices, use of abbreviations, categorization of resources using RDA elements (e.g., media type, carrier type, etc.), recording terms from controlled vocabularies, and the formulation of access points for manifestations and items.[18] In the years between Maxwell and Attig's discussion paper and the initial development of DCRMR, this report has served as a touchstone for the intervening task forces and editorial groups.

Todd Fell and Francis Lapka posed the possibility of an international standard for rare materials cataloging.[19] They outlined several requirements for this standard: an extension of a standard for general cataloging that acknowledges the needs of the specialist community, an international governing body with translations for use in diverse communities, embraces the prevailing international models for bibliographic description, is open and reusable, acknowledges the centrality of transcription in rare materials cataloging, integrates with the current data landscape, and is responsive to user needs.[20] Although this article did not address whether there should be a common standard for rare materials cataloging, it did offer one possible path forward for this work.[21]

The BSC formed the DCRM-RDA Task Force (2011–2012), which recommended revising DCRM(B) to align it with RDA.[22] In 2012, the BSC formed the DCRM(B) for RDA Revision Group to complete this work.[23] The Program for Cooperative Cataloging (PCC) released the first iteration of the BIBCO Standard Record (BSR) on January 1, 2013.[24] The BSR includes DCRM-aligned provisions for cataloging rare materials developed in collaboration with the PCC Task Force for BSR for Rare Materials Based on RDA.[25] On April 22, 2013, the BSC issued a statement on the relationship between DCRM and RDA, stating that the BSC is "neutral . . . neither encouraging nor discouraging agencies regarding implementation of RDA-acceptable DCRM records."[26] The statement provided interim guidance to catalogers using DCRM until an RDA-aligned version of DCRM could be published. For most rare materials formats, catalogers could choose either to follow the appropriate AACR2-based DCRM manual for description in conjunction with RDA for constructing access points or to create RDA records using the rare materials provisions in the BIBCO Standard Record.

At the 2013 ALA Annual Conference, the BSC expanded the charge of the DCRM(B) for RDA Revision Group to create RDA-aligned guidelines for all formats in the DCRM suite and renamed the group the DCRM for RDA Revision Group.[27] At the next ALA Annual Conference, in 2014, the Revision Group recommended authoring a set of policy statements for rare materials to accompany RDA instead of rewriting the DCRM suite. In response, the ACRL/RBMS Descriptive Cataloging of Rare Materials Task Force (2014–2017), an independent RBMS task force under the aegis of the BSC, was established to complete this project.[28] In 2016, the task force formally named its guidelines the RBMS Policy Statements (RBMS PS) in alignment with the naming conventions of other RDA policy statements.[29] In 2017, the Descriptive Cataloging of Rare Materials Task Force submitted an initial draft of the RBMS PS and disbanded.[30] The BSC absorbed the editorial work on the policy statements, but much of the work was put on hold while the RSC revised the RDA Toolkit in response to the RDA Restructure and Redesign (3R) Project.[31]

Uses, Benefits, and Workflows of Git and GitHub in Library Science

Even a cursory glance into library science literature will illuminate the many and varied uses, benefits, and workflows of GitHub. Robin Camille Davis lists examples of the use of GitHub in a library context, including developing and sharing code or datasets, digital archives, or writing entire books, highlighting that "GitHub has become a site for academic transparency" and calling Git a "librarian's dream tool."[32]

In addition to transparency, Davis discusses the following benefits of GitHub: version control, ease in creating documentation, and social networking.[33] Prayudi Utomo and Falahah describe the benefits of developing a serverless website hosted using GitHub Pages, including increased productivity, ease of website management and configuration, and reduced effort for code review while implementing new services.[34] In this instance, the authors chose GitHub Pages as their Content Delivery Network (CDN) because of its version tracking, robust collaboration support, and free static website hosting.[35] Yasset Perez-Riverol et al. remark that GitHub eases "sharing programming tasks between different remote contributors," while the version control system provides transparency in the development process and the inbuilt social features support "peer review, commenting, and discussion."[36]

Keith Engwall and Mitchell Roe outline a typical Git workflow describing a main branch and the creation and merging of development branches onto the main branch.[37] Their six-step workflow used in a web development model includes creating a discussion issue for a proposed change, creating a development branch for the proposed change, editing code and testing the development branch until the change is complete, undergoing a development code review process, merging the development branch into the main branch, and pushing the changes to a production web server.[38] Because of the numerous benefits of GitHub for collaborative workflows and projects, it is central to the development of DCRMR.

The Move toward DCRMR

In August 2018, the BSC formed a subgroup to finalize the draft of the RBMS PS for publication in the RDA Toolkit.[39]

In April 2019, the RSC completed the 3R Project and released a stable English-language version of the Toolkit. However, the substantial changes to the Toolkit meant that the RBMS PS could not be used in their current form.

Following discussions at the 2019 ALA Annual Conference, during which the rare materials cataloging community expressed a desire for a stand-alone manual, the RBMS Policy Statements Editorial Group decided to rewrite the DCRM suite as a single RDA-aligned integrating resource and write lightweight policy statements to link from the RDA Toolkit to the revised DCRM.[40] To reflect this change in scope, the group was renamed the RBMS RDA Editorial Group. In February 2020, the new manual was officially named Descriptive Cataloging of Rare Materials (RDA Edition) (DCRMR).[41]

The RBMS RDA Editorial Group consists of 10–14 members. One or two members serve as chief editors and are responsible for Editorial Group planning, finalizing editorial decisions, maintaining high-level consistency across the text, and liaising with external groups as appropriate. In addition, at least two members serve as keepers of the text (also called keepers), who are responsible for developing and maintaining the GitHub deployment and maintaining the canonical version of the text. All group members play an editorial role by participating in the drafting and revision of text and in the collaborative decision-making process.

Principles and Constraints

DCRMR was conceived and built to meet the need of the rare materials cataloging community for a stand-alone manual, using language that will be familiar to catalogers and clear cataloging instructions with citation numbers to assist in citing a particular instruction. To support practical applications of the DCRMR instructions, all examples represent real-world objects and descriptions to better reflect cataloging in practice.

While earlier DCRM manuals were published as monographs, DCRMR is an integrating resource, which allows the text to be responsive to changes in RDA. In addition, the manual is published online as an open-access resource, ensuring broad availability. DCRMR is available to all interested users for free, both via the internet and via a downloadable PDF, allowing users to print the document if they wish. DCRMR is licensed with a Creative Commons Attribution NonCommercial ShareAlike (CC BY-NC-SA) license, allowing others to adapt the text to their local needs.[42]

The Editorial Group has sought to maintain transparency throughout the process. Because the text is hosted on GitHub, users are able to submit issues (a discussion thread on problems encountered or future developments) and read discussions of those issues. GitHub is a version control system, allowing users to see how the text has changed over time. Finally, the Editorial Group retains earlier versions of the downloadable PDF for any users wishing to consult earlier versions of the text.

Material constraints have impacted publication. DCRMR is created and maintained by a volunteer committee. Editorial Group members receive no compensation and need to schedule around other personal and professional commitments. The Editorial Group prepared the first iteration of DCRMR between January 2020 and July 2021. During this time, many Editorial Group members worked remotely or on hybrid schedules, allowing for extra writing time. At the same time, the global events that occurred during 2020 and 2021 took a significant toll on group members. For past DCRM manuals, the Editorial Group met in person to discuss editorial decisions. The pandemic forced the RBMS RDA Editorial Group to collaborate virtually. The group met in person for the last time during the 2020 ALA Midwinter Meeting, about seven weeks before lockdowns began in the United States. Although the group met consistently throughout the pandemic, they never expected that work would be exclusively virtual. The inability to meet in person, combined with the significant stress posed by the events of 2020 and 2021, delayed the initial publication by a year from the original timeline.

In addition, the Editorial Group created DCRMR without any financial support. They rely instead on freely-available tools with no paid developer support. At times, this leads to problems, such as advertisements appearing as part of the Google Programmable Search Engine or minor technical difficulties.[43]

Method

The RBMS RDA Editorial Group needed to create and sustain an iterative, integrating resource that would incorporate additional DCRM manuals in the future, be responsive to changes in RDA (itself an integrating resource), and be maintained and updated by a succession of future group members. To do so, the group developed a cyclical workflow that oscillates between Google Docs and GitHub and that is buttressed by extensive documentation and facilitated by both Python scripts and human labor.

The Initial Text

In fall 2019, the Editorial Group began writing what would become DCRMR. To begin, they atomized the DCRM(B) text into multiple Google documents, one RDA element per document. The Editorial Group omitted examples, textual numbering, and text about prescribed punctuation at this time because they intended to holistically review and standardize their approach to these topics. The group edited the

text to bring it into alignment with RDA terminology and incorporate decisions made in the now-superseded RBMS PS. They raised smaller issues using the Google Docs comment feature and discussed larger questions through the Editorial Group listserv and during virtual meetings.

During this revision stage, the Editorial Group also made decisions on the structure of the text, which they later built into the website's architecture. To respond to the community's desire for a manual in workflow order, they decided to retain a chapter structure rooted in ISBD. Significant changes to the order of the text from DCRM(B) include the following:

- Restructured elements related to statements of responsibility as an independent chapter. In DCRM(B), instructions related to title and statement of responsibility are both in chapter 1, "Title and statement of responsibility area"; in DCRMR, instructions for statement of responsibility are in chapter 2, "Statement of responsibility."
- Incorporated notes into the relevant chapters. For example, in DCRM(B) all instructions for notes are found in chapter 7, "Note Area" (7B3–7B5); in DCRMR, instructions for the element Note on title are found in chapter 1, "Title" (1.29). DCRM(B)'s chapter 7, "Note Area," became DCRMR's chapter 9, "Additional notes."
- Added placeholder chapters to hold space for the integration of additional DCRM manuals in the future. Specifically, DCRMR includes chapter 4, "Mathematical details," for cartographic description and chapter 7, "Numbering of serials," for serials description.

Once the Editorial Group determined the order of the text, they crafted a citation scheme. Since DCRMR is an integrating resource which will both incorporate additional instructions and respond to changes in RDA, they decided to use a four-part decimal-based citation scheme to allow for greater flexibility and extensibility. The citation scheme is a mix of numbering that carries meaning (for example, the numbers in chapter 3, "Edition," start with "3") and numbering that is arbitrary (for example, most element numbers started with ".2" to allow space to insert elements earlier in the chapter).[44]

Migration into GitHub

With the order of the text in place, the keepers could build the initial website architecture, and the Editorial Group could start migrating the text from Google Docs into the GitHub repository. During summer 2020, keepers conducted training sessions for interested Editorial Group members, demonstrating how to format the text using Markdown, a lightweight markup language, and save the resulting Markdown files to the GitHub repository. Throughout the summer and into early fall, the keepers and group members migrated the text as it was completed and reviewed. Each of the atomized Google Documents, one RDA element per document, became the basis for the Markdown files. From this point, completed drafts of the Markdown files containing instruction text lived in the GitHub repository and could be viewed as a whole and in context on the website. Working copies were kept in Google Docs, where editing, revision, and review occurred.

Reviewing the newly migrated text also allowed the chief editors and keepers to see variations in writing style, textual formatting, and input conventions. To ensure uniformity across the text, the keepers developed a detailed style sheet that included instructions on how to mark up and input text.[45] Some guidelines are quite granular. (For example, "Alternative rules are introduced by 'Alternative rule,' formatted in bold and followed by a period. The period is not in bold.")[46] Others provided broader, more flexible instructions. (For example, "Alphabetized lists preferred. However, numbered lists are sometimes appropriate to the text or necessitated by the display.")[47] Chief editors and keepers discussed decisions about style. The chief editors brought some questions, like link formatting, to the whole Editorial Group for discussion. To minimize future variations in the style and formatting of the text, the Editorial Group centralized the editing of Markdown files in GitHub as part of the keeper role.

Developing Cyclical Workflows

Once the keepers migrated the text to GitHub, the Markdown files served as the canonical copy of DCRMR, and the Editorial Group members could read and review it holistically. The keepers export the entire text from GitHub Markdown files into Microsoft Word documents using a Python script that they developed for this purpose. This is usually done on a chapter level, although more targeted text selections are sometimes desired. The Word documents are then uploaded to Google Drive and converted to Google documents. Editorial Group members can then perform detailed, line-level textual markup on these working files and conduct associated paratextual conversations using familiar tools. Group members read, analyze, and suggest revisions to the text using the "Suggest" mode. The chief editors then review all suggested changes, rejecting undesired changes and leaving approved changes as suggestions.

This process allows the chief editors to maintain a high-level view across the text and ensure consistent decisions throughout. The keepers then implement the changes in the Markdown files in GitHub and correspond with the chief editors for clarification as necessary. For complicated edits (for example, reordering text, which affects both the text undergoing edits and any link to or citation of that text), the chief editors and keepers may utilize tracking spreadsheets

and other supplemental, ad-hoc documentation to complete all needed changes.

Once the text is ready for feedback by a community constituency, such as the RBMS BSC or the international rare materials cataloging community, the text is frozen. The reviewing community is directed to the website for the development fork, which is generated from the revised text in the GitHub repository, where they may read and navigate DCRMR as a hypertext document. This GitHub fork is an exact copy of the DCRMR repository; however, the fork's environment, which determines the content of its website, is set to the development branch of the repository, allowing the changes to the Markdown files to be reviewed in context while leaving the production website, which displays the canonical version of the text, unaltered during the review period. The Editorial Group uses Google Forms to collect feedback. During the review period, links to the forms are added to the DCRMR website, often on the chapter level. This has the advantage of gathering all feedback in a central location.

Following the review period, the chief editors review all feedback. The keepers make small bug fixes and correct minor issues, such as typos and broken links. More substantive issues may be addressed by the chief editors or through Editorial Group discussion and then incorporated into the text; some issues are flagged for future discussion. Once the Editorial Group completes post-review edits, the editorial cycle begins again. Figure 1 illustrates the cyclical editorial workflow and the tools involved in DCRMR revision.

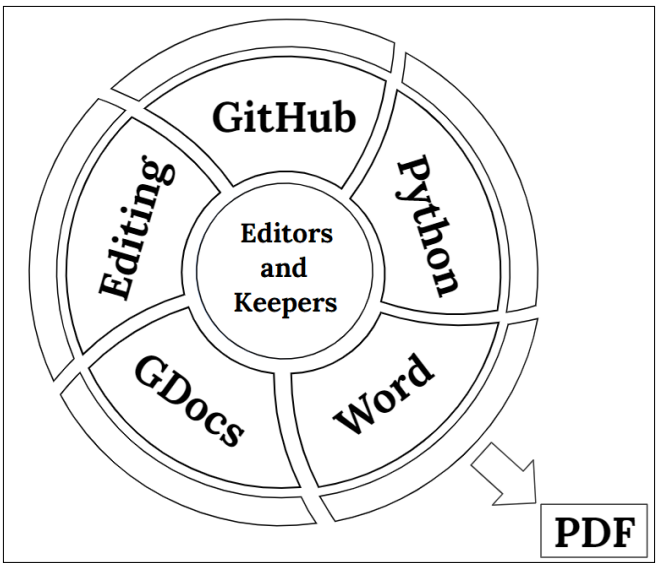

Figure 1. The cycle of tools used in DCRMR revision.

Technical Tools

The technical tools chosen to build DCRMR are rooted in the same open-source and community-forward principles and limited by the same budgetary constraints that drove its initial creation. Many of the technical tools are available for free and support asynchronous web development. They facilitate the work of multiple contributors located in different geographic areas with varying levels of technical expertise. The keepers used the following tools heavily throughout the DCRMR development process.

GitHub

GitHub is the largest open-source community in the world; it contains millions of projects with a focus on growing skills and helping others by building healthy communities of contributors.[48] Discussions surrounding GitHub began when Liz Adams and Francis Lapka prepared an internal report on the various hosting options at the request of the DCRMR editors.[49] GitHub offered several advantages over other hosting options, including version control, issue tracking, public access to wiki documentation, pull requests, project planning tools for future releases, and a lightweight formatting syntax (i.e., Markdown). Finally, GitHub offered a range of scenarios for publication such as publishing as a single Markdown file (similar to the implementation of *Describing Archives: A Content Standard*) or as multiple files hosted within a repository using github.io or a custom domain.[50] Ultimately, the RBMS RDA Editorial Group decided to implement GitHub with multiple files hosted on a custom domain, publishing DCRMR on a subdomain of the RBMS website (https://bsc.rbms.info).

DCRMR's Repository

The GitHub repository contains the text of DCRMR and the codebase that powers the bsc.rbms.info website on GitHub Pages. The DCRMR repository also hosts various picture files, assets, and scripts used in creating and maintaining the website and text. The canonical, current, and approved version of the text is contained in the main branch of the repository. Revisions to DCRMR text are contained in branches and merged upon the chief editors' approval. Figure 2 illustrates GitHub branches as used in DCRMR revisions.

Although much emphasis has been placed on the reasoning behind choosing GitHub as a home for the development of DCRMR, the keepers rely on many other free and open-source tools to ease the upkeep and ongoing maintenance of the website. Keepers working in a Windows environment must download Git for Windows, which is a free and open-source BASH emulation allowing Windows users to run Git from the command line.[51]

In the deepest recesses of DCRMR's heart is Ruby, a free and open-source programming language with an emphasis

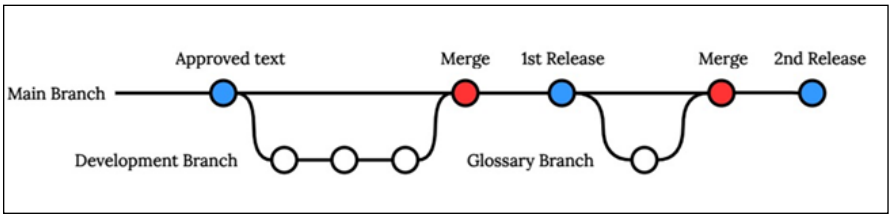

Figure 2. GitHub branches in DCRMR revisions.

on simplicity, productivity, and elegance.[52] Ruby utilizes a standard format for distributing programs and libraries in a "gem." Jekyll is a static site generator installed using Ruby. The Jekyll gem, along with several other Ruby gems, are installed using Git Bash. The Jekyll gem takes the Markdown files containing the DCRMR text and converts them into a complete, static website. Again, the premise of Jekyll is rooted in openness and configuration simplicity with an emphasis on content.[53] Because DCRMR is a tool created by and for catalogers, simplicity, ease of software maintenance, and freely available tools are paramount.

DCRMR uses Minimal Mistakes, a flexible two-column Jekyll theme, for creating and customizing the website's presentation. The Minimal Mistakes theme includes all the assets, HTML layouts, and cascading style sheets that give the website its overall look and feel.[54] The keepers carefully document customizations to DCRMR's implementation of Minimal Mistakes to ensure that users of the DCRMR website will continue to have a similar end-user experience as future Minimal Mistakes releases are tested and implemented.[55]

In addition to using all the development tools above, the keepers use Notepad++, an open-source code/text editor, to create and edit the Markdown files in the DCRMR GitHub repository.[56]

Jupyter Notebooks and Python

The keepers developed the Python script, which is used to compile the Markdown files into a Word file, in an environment that upholds the same basic principles and tenets as DCRMR itself. Anaconda Navigator is a desktop application that manages integrated applications, packages, and environments in an open-source, user-friendly, and community-centered development platform with open documentation, describing itself not as a company but rather as a movement.[57] This resonates strongly with the underlying principles of DCRMR, which are as much about a movement toward aligning our professional values with cataloging rules as they are about rare materials cataloging.

The keepers created the Python script in Anaconda Navigator's Jupyter Notebooks. The script is iterative in nature and evolves over time, enabling the cyclical editorial process between GitHub and Google Docs. The keepers test the script in a branch of the DCRMR GitHub repository and, once they have sufficiently tested the improvements, it is merged into the main repository.[58] Recent scripting improvements include preserving formatting and DCRMR's structure when converting from Markdown files to Word Documents utilizing pypandoc, a universal document converter, and docxcompose, a Python library for concatenating and appending Microsoft Word (.docx) files. The editable script allows for the structure of DCRMR text to change over time as sections of instructions are drafted and new Markdown files are added to the static GitHub Pages hosted website.

Google Docs

Through 2019, the Editorial Group primarily used Google Docs as a platform to craft the RBMS PS. As mentioned above, Google Docs remains an integral part of the group editing and revision process. Google documents are still utilized heavily in the DCRMR revision and review cycle, but solely as a way for the Editorial Group to collect feedback and to further refine the text for the next DCRMR GitHub release.

Succession Planning and Sustainability

The long-term sustainability of DCRMR depends on not relying on any single person's technical skills, availability, or institutional memory. It will be a multi-year project to incorporate all of the formats in extant DCRM manuals, and it will require a range of skills and contributions in cataloging knowledge and format specialties. Likewise, maintaining and updating the website for an indefinite period will also require the skills of many GitHub contributors. To facilitate sustainability, the Editorial Group is taking a multi-pronged approach: collaboration in key roles, active succession planning, and extensive documentation.

Membership in the RBMS RDA Editorial Group will shift over time. To facilitate changes in membership, the Editorial Group established a model of assigning co-chief editors and co-keepers. This distributes responsibility across multiple individuals; if one person is busy, the other person can usually step in to make sure the project continues to move forward and deadlines are met. Deadlines can and have been moved, as well.

Additionally, the Editorial Group established shared accounts for activities in GitHub so that access is not tied to a single individual but rather to member roles. The DCRMR repository is owned by the RBMS Bibliographic Standards

Table 1. Number of DCRMR Users from the Top Twenty Countries as of May 25, 2022.

Number of users	Country
2,256	United States
323	United Kingdom
175	Canada
74	Australia
52	Germany
42	Netherlands
36	Finland
33	Philippines
31	China
26	South Africa
24	Japan
19	Austria
18	France
15	Spain
15	Italy
15	New Zealand
14	India
12	Ireland
10	Hong Kong
10	Sweden

Committee GitHub account, rbms-bsc, which provides access to current maintainers and contributors. The Editorial Group's GitHub account, dcrmr-development, owns the forked development repository, and the chief editors use it to close issues after the resolution of an editorial discussion. Keepers of the text generally complete revisions to DCRMR text, website code, and scripts by using personal GitHub accounts with commit access to the repository.

To ensure continuity, the Editorial Group has established staggered terms for the chief editors. Terms change July 1, following the annual volunteer cycle of ACRL; the incoming chief editor is selected by the previous spring. The keepers are working to establish a similar staggered succession model, following a three-year cycle of incoming, established, and emerita positions.

The DCRMR repository contains a wiki with official documentation both for internal and external audiences.[59] The Editorial Group uses the wiki to host internal documentation on DCRMR's editorial and style guidelines, and citation scheme; instructions on website maintenance, running scripts, and setting up computers to perform DCRMR editing via GitHub Desktop and a local environment; and templates for new DCRMR text. Other documentation for both the Editorial Group and the general public includes a DCRMR FAQ page, current and historical RBMS RDA Editorial Group membership, reported errata, and resources on succession planning and leadership transitions. In alignment with DCRMR's principles on succession planning, the wiki documentation on the Python script evolves over time as new keepers take on roles within the organization of the Editorial Group. As many catalogers are just starting to actively build skills in Python and GitHub, the documentation helps to build confidence in successive keepers, guiding them through the steps of downloading Anaconda Navigator, installing Python packages, placing Markdown files, and running the script or creating a Ruby/Jekyll environment on their local machines for website development and testing.

Outcomes

The BSC officially published DCRMR on February 2, 2022, following a vote from the RBMS Executive Committee. At the time of this writing, DCRMR has been used to create or edit 450 records in OCLC. DCRMR has generated global interest. One hundred and fifty participants from eight countries spanning three continents attended the public hearing sessions on DCRMR in December 2021. As of May 25, 2022, Google Analytics shows access from 3,361 users from seventy-four countries, representing six continents (see table 1).

In addition, because the manual is published in GitHub, other communities can easily adapt DCRMR. By cloning the repository, other groups can use DCRMR's code to build and develop new texts. The chief editors and keepers of the text have already begun meeting with other cataloging groups to discuss possibilities for adapting the repository for their own uses.

Future Directions and Development

DCRMR is currently a minimum viable product incorporating instructions for rare book cataloging only. The RBMS RDA Editorial Group will complete the glossary for DCRMR later this year. In the longer term, the Editorial Group plans to incorporate instructions for the remaining five formats covered in the original DCRM suite, starting with graphics. The group expects to complete the graphics instructions in 2023. The Editorial Group documents ongoing maintenance and future work in the DCRMR GitHub repository.[60] These tasks include updating the early letterforms and brevigraphs tables in DCRMR, incorporating additional examples, and drafting sections on pre-cataloging decisions and other topics.

Like RDA, DCRMR is an integrating resource that will be updated over time, and editorial work on the standard follows an iterative process. The RSC generally releases updates of the RDA Toolkit four times a year.[61] The Editorial Group will review the release notes after each update and make any

necessary changes to DCRMR so that it remains aligned with RDA. Major changes to RDA that will require revisions to DCRMR include revisions to RDA element names or definitions and the deprecation, or phasing out, of elements over time. The Editorial Group will also respond to changes in best practices for rare materials cataloging. Before any major updates to DCRMR, particularly before the integration of instructions for additional formats, the Editorial Group will solicit and carefully consider community feedback.

Along with future release cycles for revised and new sections of DCRMR instructions, the freely hosted infrastructure will be updated and rigorously tested as developers release new versions and patches for the various software and tools that power the website, such as Git, GitHub, Ruby, Jekyll, and Minimal Mistakes. Future technical developments also include minting a Digital Object Identifier (DOI) for future GitHub releases of the DCRMR text.

By the end of 2023, the Editorial Group expects to complete the first iteration of lightweight policy statements for rare materials cataloging. The policy statements will accompany the RDA Toolkit and will link to relevant instructions in DCRMR. The first iteration will cover rare books only; the Editorial Group will add statements covering additional formats to the Toolkit as instructions for the remaining formats are incorporated into DCRMR. In conjunction with the policy statements, the Editorial Group will also develop a rare materials metadata application profile for use with RDA, which will outline elements that are mandatory or recommended.

Conclusion

DCRMR is a standard made by the rare materials cataloging community for the rare materials cataloging community. The RBMS RDA Editorial Group followed the guiding principles of accessibility, openness, and sustainability throughout the development of the standard. Because DCRMR is hosted and built with free, open-source tools, such as GitHub and Jekyll, any cataloger may access and use the standard at no subscription cost. Under the provisions of DCRMR's Creative Commons license, catalogers, individual institutions, and other organizations can adapt the text to their needs or use the base code in GitHub to develop other open cataloging standards.

The Editorial Group is committed to transparency and open collaboration. Anyone interested in the development of DCRMR may read and comment on the issue threads in DCRMR's GitHub repository or consult the extensive documentation posted in the Editorial Group's wiki. The use of open, collaborative, and familiar tools such as Google Docs ensures that group members with varying levels of technical expertise can participate equally in the editorial process.

Finally, the Editorial Group selected open tools and developed an editorial process with sustainability in mind. GitHub and Python, for example, are well established; thriving communities of users across many domains continue to implement these tools in a variety of applications. The use of Python scripts, in particular, automates many of the routine maintenance tasks for DCRMR, freeing time for editorial work and the ongoing development of the website. The Editorial Group's model of staggered terms for co-chief editors and co-keepers, as well as wiki documentation on succession planning and onboarding new group members, bolsters the long-term sustainability of DCRMR.

The RBMS RDA Editorial Group, a dedicated group of volunteers who work in the field, is committed to developing and supporting a standard that is broadly useful to the rare materials cataloging community. It takes a village to raise a cataloging standard, but it takes a community to make it thrive. Feedback from and dialogue with peers working in rare materials cataloging are essential to the ongoing relevance and utility of DCRMR.

References

1. Descriptive Cataloging of Rare Materials (RDA Edition), ed. RBMS RDA Editorial Group, Bibliographic Standards Committee, Rare Books and Manuscripts Section, Association of College and Research Libraries, accessed May 27, 2022, https://bsc.rbms.info/DCRMR; RDA Steering Committee, "RDA Toolkit," accessed May 27, 2022, https://access.rdatoolkit.org.
2. *Descriptive Cataloging of Rare Materials (Books)*, ed. Bibliographic Standards Committee, Rare Books and Manuscripts Section, Association of College and Research Libraries (Washington, DC: Cataloging Distribution Service, Library of Congress, 2011), https://rbms.info/files/dcrm/dcrmb/DCRMB3.pdf.
3. Beth M. Russell, "Description and Access in Rare Books Cataloging: A Historical Survey," *Cataloging & Classification Quarterly* 35, nos. 3–4 (2003): 492, https://doi.org/10.1300/J104v35n03_10.
4. Russell, "Description and Access in Rare Books Cataloging," 493.
5. Russell, "Description and Access in Rare Books Cataloging," 494–96.
6. Juliet McLaren and Jane M. Gillis, "Is This Rule Necessary? A Discussion of New Rules for Rare Serials," *Cataloging and Classification Quarterly* 43, no. 1 (2006): 41, https://doi.org/10.1300/J104v43n01_04.
7. McLaren and Gillis, "Is This Rule Necessary?," 43–51.

8. Russell, "Description and Access in Rare Books Cataloging," 497.
9. Russell, "Description and Access in Rare Books Cataloging," 499–514.
10. Mary Burns, "RDA and Rare Books Cataloging, Part 1," *Library Resources & Technical Services* 62, no. 4 (2018): 160–62, https://doi.org/10.5860/lrts.62n4.160.
11. Burns, "RDA and Rare Books Cataloging, Part 1," 160.
12. Mary Burns, "RDA and Rare Books Cataloging, Part 2," *Library Resources & Technical Services* 63, no. 1 (2019): 25, https://doi.org/10.5860/lrts.63n1.4.
13. *Descriptive Cataloging of Rare Materials (Books)*.
14. RDA Steering Committee, "About RDA," accessed May 27, 2022, http://www.rda-rsc.org/content/about-rda.
15. *Descriptive Cataloging of Rare Materials (Books)*.
16. RDA Steering Committee, "RDA Frequently Asked Questions," accessed May 27, 2022, http://rda-rsc.org/content/rda_faq#8.
17. Robert Maxwell and John Attig, "Reconsidering DCRM in the Light of RDA: A Discussion Paper," accessed May 27, 2022, https://rbms.info/files/committees/bibliographic_standards/committee-docs/DCRM_RDA-DP-20101214.pdf.
18. Maxwell and Attig, "Reconsidering DCRM in the Light of RDA," 6–8.
19. Todd Fell and Francis Lapka, "ISBD and DCRM into RDA: An Opportunity for Convergence?" *Cataloging and Classification Quarterly* 54, nos. 5–6 (2016): 282–90, https://doi.org/10.1080/01639374.2016.1190436.
20. Fell and Lapka, "ISBD and DCRM into RDA," 286–89.
21. Fell and Lapka, "ISBD and DCRM into RDA," 290.
22. "Final Report of DCRM-RDA Task Force," October 10, 2012, 3, https://rbms.info/files/dcrm/rda/FinalDCRMRDAReport_20121010.pdf.
23. Meeting minutes of RBMS Bibliographic Standards Committee at ALA Midwinter Conference, January 26, 2013, 7–8, https://rbms.info/files/committees/minutes/2013/bibstandminutes13m.pdf.
24. *BIBCO Standard Record (BSR) RDA Metadata Application Profile* (Washington, DC: Program for Cooperative Cataloging, 2020), 4, www.loc.gov/aba/pcc/bibco/documents/PCC-RDA-BSR.pdf.
25. Meeting minutes of RBMS Bibliographic Standards Committee, January 26, 2013, 12.
26. Francis Lapka, email message to DCRM Users' Group mailing list, April 18, 2013, https://listserver.lib.byu.edu/pipermail/dcrm-l/2013-April/003138.html.
27. Meeting minutes of RBMS Bibliographic Standards Committee at ALA Annual Conference, June 29, 2013, 5–6, https://rbms.info/files/committees/minutes/2013/bibstandminutes13a.pdf; Meeting minutes of RBMS Bibliographic Standards Committee at ALA Midwinter Conference, January 25, 2014, 5, https://rbms.info/files/committees/minutes/2014/bibstandminutes14m.pdf.
28. "ACRL/RBMS Descriptive Cataloging of Rare Materials Task Force," Rare Books and Manuscripts Section, Association of College and Research Libraries, accessed May 27, 2022, https://rbms.info/acrl-rbms-descriptive-cataloging-of-rare-materials-task-force/.
29. "ACRL/RBMS Descriptive Cataloging of Rare Materials Task Force."
30. "ACRL/RBMS Descriptive Cataloging of Rare Materials Task Force."
31. Meeting minutes of RBMS Bibliographic Standards Committee at ALA Annual Conference, June 24, 2017, 6, https://rbms.info/files/committees/minutes/2017/bibstandminutes17a.pdf; Meeting minutes of RBMS Bibliographic Standards Committee at ALA Midwinter Conference, February 10, 2018, 7–8, https://rbms.info/files/committees/minutes/2018/bibstandminutes18m.pdf.
32. Robin Camille Davis, "Git and GitHub for Librarians," *Behavioral & Social Sciences Librarian* 34, no. 3 (2015): 163–64, https://doi.org/10.1080/01639269.2015.1062586.
33. Davis, "Git and GitHub for Librarians," 158.
34. Prayudi Utomo and Falahah, "Building Serverless Website on GitHub Pages," *IOP Conference Series: Materials Science and Engineering* 879 (2020): 4, https://doi.org/10.1088/1757-899X/879/1/012077.
35. Utomo and Falahah, "Building Serverless Website on GitHub Pages," 1.
36. Yasset Perez-Riverol et al., "Ten Simple Rules for Taking Advantage of Git and GitHub," *PLoS Computational Biology* 12, no. 7 (2016): 1, https://doi.org/10.1371/journal.pcbi.1004947.
37. Keith Engwall and Mitchell Roe, "Git and GitLab in Library Website Change Management Workflows," *code4lib Journal* 48 (2020), https://journal.code4lib.org/articles/15250.
38. Engwall and Roe, "Git and GitLab in Library Website Change Management Workflows."
39. Meeting minutes of RBMS Bibliographic Standards Committee at ALA Midwinter Conference, January 26, 2019, 10, https://rbms.info/files/committees/minutes/2019/bibstandminutes19m.pdf.
40. Report of RBMS RDA Editorial Group, April 27, 2020, 1, https://rbms.info/files/committees/bibliographic_standards/committee-docs/RBMS%20RDA%20Editorial%20Group%20Report-200423.pdf.
41. Report of RBMS RDA Editorial Group, April 27, 2020, 1.
42. Creative Commons, Attribution-NonCommercial-ShareAlike 4.0 International (CC BY-NC-SA 4.0), accessed May 26, 2022, https://creativecommons.org/licenses/by-nc-sa/4.0/.
43. Google, "What is Programmable Search Engine?" accessed May 9, 2022, https://developers.google.com/custom-search/.
44. RBMS RDA Editorial Group, "Citation Numbers," revision 8, last modified December 1, 2021, https://github.com/rbms-bsc/DCRMR/wiki/Citation-numbers.

45. RBMS RDA Editorial Group, "Style Sheet (full)," revision 28, last modified March 7, 2022, https://github.com/rbms-bsc/DCRMR/wiki/Style-sheet-(full).
46. RBMS RDA Editorial Group, "Style Sheet (full)."
47. RBMS RDA Editorial Group, "Style Sheet (full)."
48. GitHub, "The Largest Open Source Community in the World," accessed April 29, 2022, https://github.com/open-source.
49. Liz Adams and Francis Lapka, "Hosting Options for DCRM2," report presented at the 2019 ALA Midwinter Conference, https://docs.google.com/document/d/1J150DeeDxdFSK_ohC8pfCHWy32D_-iImgFt8cw1-e4g/edit.
50. Society of American Archivists' Technical Subcommittee on Describing Archives: A Content Standard (TS-DACS), "Describing Archives: A Content Standard," version 2021.0.0.2, last modified May 28, 2021, https://github.com/saa-ts-dacs/dacs/blob/master/dacs.md.
51. Git for Windows, revision 2.36.0, accessed April 29, 2022, https://gitforwindows.org/.
52. Ruby, revision 3.1.2, accessed April 29, 2022, www.ruby-lang.org/en/.
53. Jekyll, revision 4.2.2, accessed April 29, 2022, https://github.com/jekyll/jekyll.
54. Minimal Mistakes, revision 4.24.0, accessed May 27, 2022, https://github.com/mmistakes/minimal-mistakes.
55. RBMS RDA Editorial Group. "Updating the Jekyll Theme & Customizations," last modified January 26, 2022, https://github.com/rbms-bsc/DCRMR/wiki/Updating-the-Jekyll-theme-&-customizations.
56. Don Ho, "Notepad++," revision 8.4, accessed May 27, 2022, https://notepad-plus-plus.org/.
57. Anaconda, "Who is Anaconda?" revision 3.9, accessed April 29, 2022, www.anaconda.com/about-us.
58. RBMS RDA Editorial Group, "rbms-bsc/DCRMR GitHub Repository," last modified February 16, 2022, https://github.com/rbms-bsc/DCRMR/.
59. RBMS RDA Editorial Group, "Welcome to the DCRMR Editorial Guidelines Wiki," last modified March 14, 2022, https://github.com/rbms-bsc/DCRMR/wiki/.
60. RBMS RDA Editorial Group, "Issues," last modified October 12, 2021, https://github.com/rbms-bsc/DCRMR/issues.
61. RDA Steering Committee, "Frequently Asked Questions."