

MAPping out the Future from the Past

Teresa K. Hebron

ABSTRACT

Mountain West Digital Library (MWDL) was founded in 2001 and offers a public search portal supporting discovery of over a million items from digitized historical collections throughout the US Mountain West. This aggregation work necessitates a metadata application profile (MAP) to ensure metadata consistency and interoperability from the regional member network of libraries, archives, and cultural heritage organizations. Unique issues arise in combining metadata from diverse local digital repository platforms and aggregation technology infrastructure introduces further constraints, challenges, and opportunities. Upstream aggregation of metadata in the Digital Public Library of America (DPLA) also influences local and regional metadata modeling decisions. This article traces the history of MWDL's MAPs, comparing and contrasting five published standards to date. In particular, it will focus primarily on decisions and changes made in the most recent version, published in early 2020.

INTRODUCTION

Mountain West Digital Library (MWDL) was founded in 2001 as an outgrowth of a collaborative digitization project between University of Utah's J. Willard Marriott Library and Utah State Historical Society. An initial group of four Utah universities proposed a statewide digitization initiative to Utah Academic Library Consortium (UALC) including these goals: "1) build a digital collection reflecting the history of the region; 2) include resources from regional cultural and educational institutions; 3) offer local control and low-cost digitization to partners; 4) standardize metadata for interoperability; and 5) make content accessible to all internet users."¹ From the beginning, MWDL members have necessarily sought to harmonize metadata for the benefit of public discoverability and offered a search tool for these collections via its website, mwdl.org.

MWDL expanded to include members in surrounding states such as Nevada, Idaho, Montana, Oregon, and Wyoming. Membership in the project has fluctuated over two decades as new regional digital libraries and collaborations have formed. Twelve repositories from a network of ten members in Utah, Nevada, and Oregon contribute metadata to MWDL through a harvesting process that aggregates their contributions into one public search index. The founding group of four institutions (Brigham Young University; University of Utah; Utah State University; Southern Utah University) still participate. MWDL's headquarters at University of Utah's J. Willard Marriott Library serves as a central office of support and program administration. The Digital Public Library of America (DPLA, <https://dpla.org>) is a national digital library that aggregates metadata and provides access to millions of digitized items from libraries, archives, and museums across the United States. MWDL is a founding hub in the DPLA and has participated continually since its launch in 2013. There are roughly 1.2 million items available via MWDL's centralized search index.

This article does not aim to be a how-to of metadata application profile (MAP) creation, but rather a historical overview of MAPs used through MWDL's history. It will explore changes to these

About the Author

Teresa K. Hebron (teresa.hebron@mwdl.org) is Program Director (Associate Librarian), Mountain West Digital Library, University of Utah. © 2025.

Submitted: 25 February 2025. Accepted for Publication: 14 May 2025. Published: 15 September 2025.

metadata standards over time, comparing and contrasting versions as requirements for, and understanding of, aggregated digital collections evolved. Aggregation technology changes over time have influenced MAP drafting decisions and vice versa.

LITERATURE REVIEW

Use of MAPs in large-scale library digitization projects and other disciplinary data-sharing efforts is not unique to MWDL and has developed in parallel through the project's history. Metadata aggregation refers to the process of collecting and normalizing metadata from multiple sources into a centralized system for unified discovery and access. In this article, "metadata aggregation technology" refers to the software systems used for this purpose. Sharing metadata necessitates "uniformity and interoperability" and, as noted by Shreeves et al., the "quality of the resulting services is limited when the metadata used is not interoperable."² The benefits and pitfalls of MAP usage by libraries are well explicated in Green.³

However, no comprehensive work has been written to date about metadata governance for MWDL. Metadata governance refers to the policies, standards, and processes that ensure metadata consistency, quality, and interoperability across systems. Generalized works describe the project's metadata strategies in the context of overall project histories.⁴ Further works address the process of drafting metadata governance documents as well as the importance of adherence to MAPs for metadata consistency in large-scale aggregation projects.⁵

Various conference presentations, reports, and webinars by MWDL staff and community have also explained and advised on MAPs and metadata usage through the years. These range from meetings of CONTENTdm's Western Users Group to Open Language Archives Community (OLAC) panels to MWDL-hosted webinars for member organizations.⁶ Task force reports gave recommendations on geospatial metadata and recommended revisions to existing MAPs.⁷

Finally, a presentation at the Fall 2024 Bibliographic Concept Modeling Interest Group (BCMIG) Meeting led to a concerted effort to collect all the MAPs, digitizing and placing them in a public digital collection for preservation and access.⁸ As 2026 will mark MWDL's 25th anniversary, it seems appropriate to take a step back and look at the metadata governance comprehensively.

A BRIEF HISTORY OF MWDL METADATA GOVERNANCE

MWDL has followed five metadata governance documents since its inception:

1. Western States Dublin Core Metadata Best Practices, Version 1.2, 2001–2006
2. Metadata Guidelines for MWDL, 2006 with Collaborative Digitization Program Dublin Core Metadata Best Practices Version 2.1.1, 2006–2010
3. MWDL Dublin Core Application Profile Version 1, 2010–11
4. MWDL Dublin Core Application Profile Version 2, 2011–19
5. MWDL Metadata Application Profile Version 3, 2020–present

To date, MWDL has used three aggregation technologies to build the central index underpinning its search tool:

1. CONTENTdm Multi-Site Server (MSS), 2002–2007
2. Public Knowledge Project's Open Archives Harvester, 2007–2010
3. Ex Libris Primo Discovery Service [Primo Classic], 2011–present

Figure 1 shows the overlap between systems and metadata standards used.

As it turned out, a technology infrastructure change drove the next era of MWDL metadata guidelines. After a relatively brief time using Public Knowledge Project's Open Archives Harvester as its metadata aggregation tool, MWDL's index outgrew that tool's capacity, and the central index was migrated to Ex Libris's Primo discovery tool in 2011.¹⁵ The Mountain West Digital Library Dublin Core Application Profile, Version 1 was published in June 2010, followed quickly by a revised Version 2 in July 2011. While Ex Libris Primo is not named in these profiles, a presentation at the 2010 CONTENTdm Western Users Group Meeting details how Primo offered MWDL more fields, better results faceting capabilities, and the ability to use Qualified Dublin Core elements and refinements.¹⁶ This led to a complete overhaul of the 2006 Guidelines, integrating best practices and guidance into a single document, and extensive clarifications being added to certain tricky elements (e.g., date). MWDL and University of Utah adapted a default set of metadata ingestion rules (called "normalization rulesets" in Primo) against the MWDL MAP to develop customized aggregation routines that are iterative and take advantage of additional features to provide a more robust user search experience.¹⁷ Version 1 also added a section to address archival digital master files, the Parsed Preservation Elements section. Two further sections addressed naming for controlled vocabularies (Vocabulary Encoding Schemes) and formatting conventions (Syntax Encoding Schemes).¹⁸

MAP Version 2 was largely the same, but introduced a new Dublin Core element, genre, as well as updates to elements primarily in the Parsed Preserved Elements section. This version remained in effect until late 2019.

2019 V3 MAP

MWDL convened the Metadata Application Profile Task Force in mid-2018 to begin reviewing MAP Version 2 with the intent to revise. MAP Version 3 ultimately represented a significant update to the profile, driven by numerous factors.

First, the profile of digital asset management systems (DAMS) used by MWDL members shifted from exclusively CONTENTdm to a plethora of systems in the intervening years. As of this writing, members use ArchivesSpace, CONTENTdm, Islandora, Knowvation/PTFS, Preservica, Samvera-Hyrax, and Solphal (a system developed by University of Utah's J. Willard Marriott Library). As such, the task force worked to rewrite the MAP as system-agnostically as possible and address metadata only as it pertains to harvesting via OAI-PMH by MWDL.

Next, MWDL's participation in DPLA began in 2013. DPLA's first MAP was published in 2012, and Version 5.0 had recently been published in December 2017. While the only required descriptive metadata element is a title (dpla:SourceResource - Title), this alone would provide little benefit in an aggregated search environment of more than fifty million items. The task force wanted to take changes into account and ensure regional compliance with DPLA's MAP. Analysis of MWDL's web traffic and systems use show DPLA (and other digital library projects that reuse metadata via DPLA's API, such as Digital Pasifik and Omnia Search) as consistently among the top referrers to MWDL.

Two other sources of feedback were task force reports, one focused on geospatial metadata best practices and the other on archival description practices and their implications for item-level descriptions.¹⁹ Many members of these task forces served on the subsequent MAP Task Force and provided valuable input.

The MAP Task Force formed in August 2018 and quickly decided to conduct a survey to assess current member metadata creation practices and gather feedback on MAP V2. Fall 2018 was spent developing a 16-question survey instrument (appendix A) and clearing the survey with Utah State University and University of Utah's Institutional Review Boards. (Both universities' IRBs deemed the study exempt.) The survey was open in the early months of 2019, administered via Utah State University's Qualtrics instance, and the task force received responses from 12 of 17 institutional members.

The survey produced a number of recommendations. Respondents agreed MAP V2 required too many elements, with subject and description both identified as elements that should be recommended rather than required. This was consistent with earlier task force recommendations as it pertained to reusing archival description (finding aid) metadata in digital collections. In particular, respondents noted that free-text fields like dc:description were troublesome to map to and from other schemas. Date fields were also identified as needing better interoperability. As 91 percent of respondents indicated that they reuse metadata, the task force needed to consider these workflows and general reusability. Respondents were asked to rank all existing elements as Extremely Important, Important, or Not Important, and this revealed a number of elements that held little or no importance in their current descriptive practices. They suggested removing Section IV, Parsed Preservation Elements, from the profile altogether, as those elements were not harvested by MWDL. Unsurprisingly, respondents expressed confusion at the myriad free-standing guidelines, best practices, and recommendations documents that had sprung up since 2011 and recommended integrating them directly into the revised MAP. With the advent of standardized rights statements in 2015 (rightsstatements.org), the member network also sought guidance and clarification on implementing these in metadata. Finally, the network asked the task force to consider other schemas besides Dublin Core and MARC, especially Metadata Object Description Schema (MODS).

These findings led to several major updates in the latest MAP. The levels of obligation in MAP V2 were Required, Required if Applicable, and Optional. The task force shifted this to Required, Recommended, and Optional. The number of required elements was reduced to six (title, date, format, type, identifier, and rights), and selected elements were removed altogether due to low use (abstract, alternativeTitle, conversionSpecifications, coverage, isPartOf, tableOfContents, and transcription).

In response to the need to shift away from a Dublin Core-focused profile, the task force also made numerous updates to the content and layout of the element tables. The Element Name and Element Label fields were consolidated into a single field titled Element Label. The DC Definition field was renamed Definition in the effort to involve more schemas, and some of the definitions were rewritten to reflect elements' specific usage in MWDL. A Describes field was added to illustrate whether the element described an original resource, a digital resource, or both. MODS mappings were added to all element tables. Changes were made throughout to remove references to specific DAMS and update directions on element use in MWDL vs. locally. Finally, the task force changed the name of the profile itself: V3 is the first to use "metadata" instead of Dublin Core in the title.

MAP COMPARISON AND DISCUSSION

One common point of comparison across all these documents is the elements required (minimum viable metadata) for MWDL aggregation.

Table 1. Comparison of required metadata elements in MWDL metadata governance objects

2003	2006	2010	2011	2019
Title	Title	Title	Title	Title
Subject	Subject	Subject	Subject	[recommended]
Description	Description	Description	Description	[recommended]
Identifier	Identifier	Identifier	Identifier	Identifier
Rights	Rights	Rights	Rights	Rights
Creator (if available)	Creator (if available)	Creator (if applicable)	Creator (mandatory if applicable)	[recommended]
N/A	N/A	Type	Type	Type
Date.Original (if applicable)	Date Original (required if applicable)	Date [original]	Date	Date
Date.Digital	Date Digital	N/A	N/A	N/A
Format.Use	Format	Format	Format	Format
Format.Creation	Digitization Specifications	conversionSpecification (mandatory if applicable)	conversionSpecification (mandatory if applicable)	N/A
Holding Institution	Contributing Institution	[system-generated]	[system-generated]	[system-generated]

It is revealing to compare the Holding/Contributing Institution element through time, which provides a good example of evolution in understanding of shared digital collections as well as systems influence on these documents.

The 2003 WSDCMBP's Holding.Institution element, which "... records information on ownership of the digital object," was an additional, mandatory, non-Dublin Core element added "for collaborative projects where records from multiple institutions are combined in a shared database."²⁰ This element provides disambiguation between similar items as well as important context about where digitized items originate.

The 2006 Guidelines do not strictly require this element but broaden the description of Contributing Institution to a "[l]ist of entities responsible for creation, hosting, or ownership of digital resource. May add an appropriate role if desired when multiple institutions are listed."²¹ The Guidelines' examples contain numerous variants that include university names, library names, department names, and even geographic locations, e.g.:

- University of Nevada, Reno
- Special Collections Dept., University of Nevada, Reno Library
- Utah State University, Merrill-Cazier Library
- Sherratt Library, Southern Utah University, Cedar City, Utah

Beginning in 2011 with MWDL's use of Primo as its aggregation technology, the incoming metadata has its contributor added to the central index's record (the Primo Normalized XML, or PNX record) via normalization rules and mapping tables at the point of aggregation. A four-part collection identification number is assigned to each incoming collection that allows the normalization rules to write in digital repository names, collection partner names, and collection titles. For example, byu-25-128-2821 is the identifier for Brigham Young University (byu)'s ArchivesSpace repository (25) collection of Brigham Young University–Hawaii (128)'s Finding Aids (2821). These standardized values are used in pre-search filtering, post-search faceting, search result browse screens, full record displays in Primo, and in outbound metadata contributed to DPLA. Many MWDL members host digital collections for their own Special Collections and Archives departments and campus partners, as well as external regional partners. This structure allows all of these relationships to be expressed, but this metadata doesn't necessarily have to be added to local DAM records and explicitly shared with MWDL. This leaves the `dcterms:publisher` element available for other metadata. Some members use the publisher field to express the complicated, collaborative nature of bringing digital collections online with statements like "Published by Utah State History; digitized by Gerald R. Sherratt Library, Southern Utah University; hosted by J. Willard Marriott Library, University of Utah."²² It also means that Holding/Contributing Institution and Collection Title are not addressed in MAPs from 2010 onwards.

Another interesting case is the evolution of the `Format.Use` and `Format.Creation` elements from the WSDCMBP document onwards. The non-Dublin Core, mandatory `Format.Creation` element was free-text and meant to hold "[t]echnical information about the hardware, software and processes used to create a digital resource, including specifics such as scanner model, scan resolution, color profiles, compression schemes, file sizes, etc. Primary intended use is at local level, though FILE SIZE should be contributed in a shared metadata environment."²³ This was replaced by the required `Digitization Specifications` element in the subsequent CDP Dublin Core Metadata Best Practices (2006). Meanwhile, `Format.Use` was closely aligned with the Dublin Core `format` element from the outset, renamed `Format` in the 2006 CDP document, and always recommended following Internet Media Type formatting. `Format.Creation`, `Digitization Specifications`, `conversionSpecifications`, and Section IV: `Parsed Preserved Elements` all demonstrate a need to store digital preservation information but a lack of digital preservation systems as we know them today. Instead, metadata practitioners turned to descriptive metadata elements to hold this information.

CONCLUSIONS AND FUTURE DIRECTIONS

MWDL members have long collaborated regionally to standardize and improve digital collections metadata for the purpose of interoperability. MWDL moved from adopting externally authored metadata governance objects to creating these within its member network. Through time, several required elements have remained consistent but ever fewer elements have been required for metadata to be minimally viable for aggregation. Meanwhile, the need for repurposing existing metadata for digital collections has only grown. Members have also come to rely on aggregation technology to add metadata at the regional aggregation level (e.g., Holding Institution, collection titles).

The 2019 MWDL MAP Task Force's work reconfirmed how regional members find value in MWDL and regional aggregation, despite increasingly varied local DAMS and metadata management practices. For this value to continue, future metadata governance objects must continue to

emphasize consistency, quality, and interoperability to best contextualize digitized historical content outside of local environments. The process of drafting and publishing MAP V3 reconfirmed the long trend of MWDL members agreeing on common regional standards while retaining local control through institutional metadata policies and profiles.

Following the rollout of MAP V3 in January 2020, the landscape of MWDL members' needs and systems has continued to evolve and diversify. More members have expressed interest in migrating DAMS, while others are actively in the process of doing so. This introduces ever more complexity into the harvesting setup, especially when considering DAMS selected outside the traditional GLAM space. Likewise, MWDL's central search index in Primo is due for an upgrade, and this may further challenge or enable harvesting workflows. Legacy metadata in the central index is an ongoing issue, as new metadata application profiles apply to future collections added, rather than retroactively to existing ones. Major metadata remediations by members usually occur at the point of local DAMS migrations, but this still presents an ever-shifting target.

Recent studies of user search behavior in digital collections, meta-analyses of MAP usage, white papers and toolkits about metadata quality will likely inform MWDL's next MAP revision.²⁴ Trends of addressing harmful metadata and reparative metadata work have arisen since MAP V3's completion, including a metadata auditing tool developed at J. Willard Marriott Library for this purpose.²⁵ Linked data remains in the picture, but its promise for authority control in digital collections has yet to be broadly realized. Generative AI is already influencing user search behaviors, and its application in metadata creation and remediation remains largely unknown.²⁶ As in the past, metadata creation practices and the documents that inform them continue to change, necessitating continual, iterative review and revision cycles.

ACKNOWLEDGEMENTS

The author would like to thank all the task forces, working groups, and committees who have drafted and maintained MWDL metadata documentation since the beginning!

APPENDIX A: 2019 MWDL METADATA APPLICATION PROFILE TASKFORCE SURVEY – QUESTIONS

Question 1: Do you work at an MWDL Hub or Partner Institution?

Question 1a: Which MWDL Hub are you affiliated with?

Question 1b: Which MWDL Partner institution are you affiliated with?

Question 2: How many full-time equivalent (FTE) do you have working on metadata at your institution? (Round to the nearest whole value.)

Question 3: What standard(s) do you use locally for description of digital collections? (Check all that apply.)

Question 4: If you have plans to switch to a new schema in the near future, which one will your institution be switching to? (Check all that apply.)

Question 5: Are you reusing metadata from an existing source (EAD, MARC, etc.) to create digital collection or digital object metadata?

Question 6: From what sources do you reuse metadata?

Question 7: Are the required metadata fields from the MWDL Metadata Application Profile present in your institutions' existing metadata?

Question 8: Which of the following required metadata elements in the MWDL Metadata Application Profile pose an unnecessary barrier to being harvested into MWDL? (Select all that apply.)

Question 9: Which of the following required metadata fields from the current application profile do you feel should be changed from "Required" to "Recommended"? (Select all that apply.)

Question 10: How important are these fields for you? Consider multiple uses such as patron access, long-term digital object management, preservation, etc.

Question 11: Are there fields in the current application profile that your institution does not routinely use in describing digital collections? (Select all that apply.)

Question 12: Are there any fields in the current application profile that you would like to see discontinued? (Select all that apply.)

Question 13: What fields are you using locally that are missing from the current application profile?

Question 14: Are you using a set number of fields for each collection or do you vary the number of fields per collections?

Question 15: In what ways does the current application profile not meet your needs? (Select all that apply.)

Question 16: Do you have any other feedback about the application profile that you would like to share?

ENDNOTES

- ¹ Kenning Arlitsch and Jeff Jonssen, "Aggregating Distributed Digital Collections in the Mountain West Digital Library with the CONTENTdm™ Multi-Site Server," *Library Hi Tech* 23, no. 2 (2005): 220–32.
- ² Arlitsch and Jonssen, "Aggregating Distributed Digital Collections"; Sarah L. Shreeves, Jenn Riley, and Liz Milewicz, "Moving towards Shareable Metadata," *First Monday*, August 7, 2006, <https://doi.org/10.5210/fm.v11i8.1386>.
- ³ Ashlea M. Green, "Metadata Application Profiles in US Academic Libraries: A Document Analysis," *Journal of Library Metadata* 21, no. 3–4 (March 10, 2022): 105–43, <https://doi.org/10.1080/19386389.2022.2030172>.
- ⁴ Arlitsch and Jonssen, "Aggregating Distributed Digital Collections"; Anna Neatrou, Rebekah Cummings, and Sandra McIntyre, "Regional Aggregation and Discovery of Digital Collections: The Mountain West Digital Library," in *Exploring Discovery: The Front Door to Your Library's Licensed and Digitized Content*, ed. Kenneth J. Varnum (American Library Association, 2016), <https://collections.lib.utah.edu/ark:/87278/s6ms72z2>.
- ⁵ Vicki Toy-Smith, "UALC Best Practices Metadata Guidelines: A Consortial Approach," *Journal of Library Metadata* 10, no. 1 (February 12, 2010): 1–12, <https://doi.org/10.1080/19386380903543734>; Teresa K. Hebron, "Extending and Adapting Metadata Audit Tools for Mountain West Digital Library Members," *Code4Lib Journal*, no. 41 (August 9, 2018), <https://journal.code4lib.org/articles/13632>.
- ⁶ Vicki Toy-Smith, "Metadata Guidelines for the Mountain West Digital Library: Who, What, Where, When, Why?," presentation at CONTENTdm Users Group Meeting, Portland, OR, July 23, 2007, <https://slideplayer.com/slide/5328614/>; Sandra McIntyre and Cheryl Walters, "Reaping a Rich Harvest from CONTENTdm: Using Primo and a Dublin Core Application Profile," presentation at CONTENTdm Western Users Group Conference, Salt Lake City, UT, June 1, 2010, https://digitalcommons.usu.edu/lib_present/25; Jeremy Myntti and Anna Neatrou, "Western Name Authority File: Preparing Charles Savage for Linked Data," presentation at 2017 OLAC Conference, Linked Data Initiatives Panel, Richmond, VA, October 28, 2017, <https://collections.lib.utah.edu/details?id=1283561>; Teresa Hebron and Liz Woolcott, "Intro to New Metadata Application Profile V3," virtual presentation, March 12, 2020, https://mediaspace.utah.edu/media/t/0_gnb20eq9/147059642.
- ⁷ Mountain West Digital Library Geospatial Discovery Task Force, "Best Practices for Geospatial Metadata Creation for MWDL Cultural Heritage Digital Repositories," July 2015, https://mwdl.org/wp-content/uploads/sites/58/2023/05/MWDL_Geospatial_Discovery_TF_Final_Report_SUBMITT_ED.pdf; UALC Bulk Digitization Task Force Group 1, "MWDL Application Profile Review," July 10, 2018, https://mwdl.org/wp-content/uploads/sites/58/2025/08/UALC_BulkDigTF_MWDL_MAP_Review2018.pdf.
- ⁸ Teresa K. Hebron, "Round Pegs in Square Holes: Metadata Application Profiles in Large-Scale Aggregation," virtual presentation at Bibliographic Concept Models Interest Group Fall Meeting, September 20, 2024, <https://collections.lib.utah.edu/ark:/87278/s6z3e3sg>; "UALC

- Archives,” University of Utah: Marriott Digital Library, n.d., https://collections.lib.utah.edu/search?facet_setname_s=ualc_archives.
- ⁹ Western States Digital Standards Group Metadata Working Group, “Western States Dublin Core Metadata Best Practices Version 1.2,” Western States Digital Standards Group, 2003, <https://collections.lib.utah.edu/ark:/87278/s6ad147a>.
- ¹⁰ Western States Digital Standards Group Metadata Working Group, “Western States Dublin Core Metadata Best Practices Version 1.2,” 7.
- ¹¹ Collaborative Digitization Program (CDP) Metadata Working Group, “CDP Dublin Core Metadata Best Practices,” Collaborative Digitization Program, 2006, <https://sustainableheritagenetwork.org/digital-heritage/cdp-dublin-core-metadata-best-practices-version-21>.; Toy-Smith, “UALC Best Practices,” 2.
- ¹² Toy-Smith, “UALC Best Practices,” 5.
- ¹³ Utah Academic Library Consortium Digitization & Cataloging Committees, “Metadata Guidelines for Mountain West Digital Library,” MWDL, 2006, Introduction, <https://collections.lib.utah.edu/ark:/87278/s624m0kv>.
- ¹⁴ Toy-Smith, “UALC Best Practices,” 4.
- ¹⁵ Neatrou, Cummings, and McIntyre, “Regional Aggregation and Discovery.”
- ¹⁶ McIntyre and Walters, “Reaping a Rich Harvest,” 8.
- ¹⁷ McIntyre and Walters, “Reaping a Rich Harvest,” 38.
- ¹⁸ McIntyre and Walters, “Reaping a Rich Harvest,” 27.
- ¹⁹ Mountain West Digital Library Geospatial Discovery Task Force, “Best Practices for Geospatial Metadata Creation”; UALC Bulk Digitization Task Force Group 1, “MWDL Application Profile Review.”
- ²⁰ Western States Digital Standards Group Metadata Working Group, “Western States Dublin Core Metadata Best Practices Version 1.2,” 10.
- ²¹ Utah Academic Library Consortium Digitization & Cataloging Committees, “Metadata Guidelines”, 6.
- ²² Alton Watkins Morton, *Southern View of Utah State Capitol*, 1940s, photograph, Utah Department of Cultural & Community Engagement, Al W. Morton Collection, 1930s–1950s, <https://collections.lib.utah.edu/details?id=484647>.
- ²³ Western States Digital Standards Group Metadata Working Group, “Western States Dublin Core Metadata Best Practices Version 1.2,” 39.
- ²⁴ Andrea Payant, Liz Woolcott, Paul Daybell, Becky Skeen, and Anna-Maria Arnljots, “The Path of Least Resistance: Optimizing Metadata Practices through User Assessment,” *Journal of Library Metadata* 24, no. 2 (April 2, 2024): 87–110,

<https://doi.org/10.1080/19386389.2024.2303872>; Green, “Metadata Application Profiles”; Steven Gentry, Meredith L. Hale, Andrea Payant, Hannah Tarver, Rachel White, and Rachel Wittmann, “Survey of Benchmarks in Metadata Quality: Initial Findings,” white paper, Digital Library Federation, May 2020, <https://dlfmetadataassessment.github.io/assets/pdf/2020-dlf-mawg-mqb-white-paper.pdf>; Inclusive Metadata Task Force and DLF Cultural Assessment Working Group, “Inclusive Metadata Toolkit Resources Directory V1,” Digital Library Federation, October 22, 2024, https://docs.google.com/spreadsheets/d/1pdyZz6t2TFj9sHamWSSPxcf7lFkfyV_Zb7_ygC8AbHc/edit?usp=sharing.

- ²⁵ Kaylee Alexander, Rachel Jane Wittmann, and Anna Neatrour, *Marriott Reparative Metadata Assessment Tool (MaRMAT)*, Python application, released 2024, <http://www.marmatproject.org/>.
- ²⁶ Ruwan Gamage and Priyanwada Wanigasooriya, “Using Generative AI for Bibliographic Description: A Study with ChatGPT 4,” *Journal of the University Librarians Association of Sri Lanka* 27, no. 2 (October 16, 2024), <https://doi.org/10.4038/jula.v27i2.8083>.