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THE MONTANA MEMORY PROJECT

The Montana Memory Project is a statewide project whose purpose is to provide access to digital collections of items relating to Montana’s cultural heritage and government. All Montana libraries, museums, archives and schools are potentially able to participate in the Montana Memory Project.

The Montana Memory Project (MMP) is a joint project of the Montana State Library and the Montana Historical Society. These institutions share the responsibility of providing technical and cataloging support, and training and consultations for current and potential participants in the MMP.

The MMP utilizes the OCLC CONTENTdm license held by the Montana State Library. The project makes use of the CONTENTdm software and the Montana State Library’s digital hosted environment at OCLC for its digital repository.

The MMP is intended as a tool for accessibility. The images submitted to the MMP should be for access purposes. The CONTENTdm software used to host and present the digital images are intended to provide access to digital images; it is not intended to be a storage and preservation solution for master images.

For information on joining the MMP, contact Sarah McHugh at the Montana State Library at mmp@mt.gov. Institutions wishing to add materials to the MMP will be asked to complete a Project Planning Document. These guidelines are meant as a tool to assist institutions in completing this document. A sample is provided in the appendixes.

Context
This is the second version of the Montana Memory Project’s Guidelines. These guidelines were prepared by the Montana Memory Project’s Digitization Working Group during the winter of 2008. Periodic updates are made as new documentation and other relevant information helps to better inform these guidelines.

Scope
This document provides specifications for digital image files submitted to the Montana Memory Project (MMP) by project participants as well as providing information on submitting a project to the MMP.

These guidelines are not intended to address all of the administrative and technical issues surrounding the creation of digital image collections. They do not describe operational procedures for digitization (such as imaging workflow, storage of master images, etc.).

This document primarily defines approaches for creating digital files appropriate for display in the MMP.
Montana State Library Copyright Statement for the MMP

All items available through or included in the Montana Memory Project may be protected by the U.S. Copyright Law (Title 17, U.S.C.). Use of some items may also be subject to additional restrictions imposed by the copyright owner and/or the contributing institution. Transmission, reproduction, or other use of protected items beyond that allowed by fair use under the copyright laws generally requires written permission of the copyright owners. Users must make their own assessments of rights in light of their intended use.

Contributing institutions are those who make digital content available through the Montana Memory Project. These institutions may or may not own the digital and/or original materials and may or may not own the copyright to the materials. Users have an obligation to determine and satisfy any copyright or other use restrictions when copying, publishing, or otherwise distributing or using materials available through or included in the Montana Memory Project.

Please contact the contributing institution [http://msl.mt.gov/For_Librarians/For_All_Librarians/Digitization/Montana_Memory_Project/MMPcontributors.asp] for available information regarding copyright status of a particular digital item.

The nature of historical archival and manuscript collections often makes it difficult to determine the copyright status of an item. Whenever possible, the contributing institutions provide available information about copyright owners and other restrictions. The contributing institutions provide this information as a service to aid users in determining the copyright status of an item. Ultimately, however, as noted above, it is the user's responsibility to use an item according to the terms governing that use.

The contributing institutions are eager to hear from any copyright owners who are not properly identified so that appropriate information may be provided to users.

Defense, Indemnification, and Hold Harmless

Contributing institutions will be solely responsible for all institution content. Contributing institutions and users agree that as a condition of contributing or using materials available through or included in the Montana Memory Project, they will defend, indemnify and hold harmless the Montana State Library from and against any and all claims, suits, actions, demands or proceedings (whether threatened, asserted or filed) and all related damages, losses, liabilities, costs and expenses (including but not limited to reasonable attorney fees) arising out of or relating to: (a) contributing institutions’ and users’ unlawful or improper use of the services, (including, but not limited to, copyright violation), and (b) any actual or alleged violation of any proprietary or nonproprietary rights (including, but not limited to, defamation, libel, and rights of privacy or publicity) by any contributing institution content.

Privacy and Publicity Rights

Privacy and publicity rights reflect interests separate and distinct from copyright interests. Users of materials available through the Montana Memory Project bear the responsibility to make
individualized determinations as to whether privacy and/or publicity rights are implicated by the nature of the materials and how they use such materials.

**Conditions of Use**

By their use of these digital items, users agree to follow these conditions of use:

- all users have an obligation to determine whether their use of copyright protected material may be prohibited or restricted, or may be available for “fair use” under the copyright laws. (See WARNING below)
- If users determine that materials are available for “fair use” under the copyright laws and that use is not otherwise prohibited or restricted, users should give proper credit to the contributing institution using the following credit line: “[Title and date of image], courtesy [name of contributing institution].”
- all users have an obligation to determine whether their use of material may implicate privacy and/or publicity rights (see WARNING below)
- materials may not be used for any commercial purpose without prior written permission from the contributing institution and the copyright owner (if not the contributor)
- materials may not be re-published in print or electronic form without prior written permission from the contributing institution and the copyright owner (if not the contributor)
- materials may not be mounted on an additional server for public use, or for use by a set of subscribers without prior written permission from the contributing institution and the copyright owner (if not the contributor)

**WARNING:** Users should be aware that materials made available through this website may be subject to additional restrictions including but not limited to copyright and the rights of privacy and publicity, of parties other than the contributing institutions. Users are solely responsible for determining the existence of such rights and for obtaining any permissions that may be necessary for the proposed use. If the copyright owner is not identified by the contributing institution, the contributing institution should be contacted for additional information.
PROJECT PLANNING

SELECTING ITEMS FOR DIGITIZATION
How does one choose the best materials to digitize? Below are the central elements that should be considered in selection, with some questions to help you assess the materials. These elements focus on areas that should form the framework for your selection criteria. Each section provides questions that should help you to think through defining your selection criteria.

Audience
- Who are the expected users? Who is the intended audience?
- Will the material be of interest to a large public?
- Will the original materials be appropriate for multiple levels of users or a specific audience?
- Will the project make materials available to a population that otherwise would be unable to use the collection, (e.g., disabled population, home-bound, or international users)?

Intellectual control
- Will digitization provide better indexing and better bibliographic control of the material?
- Will digital capture enhance use through a contextual presentation?
- Will the project raise the knowledge base of staff about the materials within the institution?

Preservation
- Will digitization aid in the preservation of deteriorating materials by diverting resources to their conservation or decreasing the wear and tear on originals by providing a digital surrogate?
- Will the materials hold up under the handling and processing required by digitization? Will special handling of the material to prevent damaging it be necessary? Will that special handling be costly? Do the materials require special technology considerations in order to digitize them without damaging them?

Value
- Does the project duplicate materials available at another repository or are they unique to your collection?
- Will the resulting digital collection have enduring value?
- Will the project make the content more broadly available?
- Will digitization give the collection "added value"?
- Will digitization improve legibility of originals?
- Will the project provide educational material that can be used in resource-based learning?
- Will the digitized collection have the potential to attract funding, either through external grants (i.e., it meets the criteria of funding agencies) or in terms of raising revenue (i.e., is it marketable)?
- Will the project be in keeping with policies at the institutional level?

Document Attributes
- Does the material lend itself to digitization?
• Can the informational content be adequately captured in digital form?
• Do the physical formats and condition of the material represent major impediments?
• Are intermediates, such as microfilm or slides, available and in good condition?
• How large and complex in terms of document variety is the collection?

Please note that at this time, the Montana Memory Project does not support digitized newspapers. If you wish to make digitized newspapers available online please let us know; we are reviewing options to support this format so your feedback would be very valuable.

Organization and Available Documentation
• Is the material in a coherent, logically structured order? Is it paginated or is the arrangement suggested by some other means? Is it complete?
• Is there adequate descriptive, navigational, or structural information about the material, such as bibliographic records or a detailed finding aid?

Documenting Your Selection Criteria
As part of the selection process, you should record the criteria that you are using to choose materials for digitization. This documentation process serves several purposes. First, it allows you to revisit the original materials to ensure you have consistently applied the selection criteria. Once the digitization project is underway, you may decide to change individual items selected. A set of well-documented selection criteria will guide any changes you make in your selection and remind you of the decisions made during this process. In addition, your documentation allows for more productive teamwork because all members of the team will follow the same protocol. Finally, documentation will provide a framework for the next digitization project, allowing for consistency across digitization projects.

Additional Resources on Selection
• North Carolina Exploring Cultural Heritage Online (ECHO) - Selection Guidelines: http://www.ncecho.org/guide/selection.htm
• Cornell University’s “Moving Theory Into Practice: Digital Imaging Tutorial,” Section 2 - Selection: http://www.library.cornell.edu/preservation/tutorial/contents.html

NAMING YOUR DIGITAL COLLECTION
When naming your collection of digital images, there are several criteria to consider. The name of your collection will serve as one of the primary means that patrons use to access your digital materials. When considering a name for your collection, choose a name that is both distinctive and descriptive. The name for your collection should be distinct from the names of other collections in the MMP, so as to avoid confusion between collections. The name should also be descriptive; that is, it should be explanatory enough to allow patrons to understand what topic or types of materials are covered within your collection of digital images. A generic name can cause confusion for patrons. In general, remember that the name of your digital collection should attract patrons and succinctly describe the contents.
COPYRIGHT
Federal law determines copyrights, trademark and patents, which protect original, creative works done by individuals and corporations. Copyright relates to the distribution, creation of derivatives, performances, display and exhibition and the reproduction of original works. Copyright applies the moment a creative work is published in any physical form. Works protected under copyright include literary work, artwork, multimedia works, music, photographs, and correspondence, in any format, among others. As appropriate, projects must be careful to obtain copyright permissions from repositories or copyright holders prior to distribution.

Before beginning a digitization project, establish which objects are in the public domain and which objects will require permission from the copyright holder. Items in the public domain may in fact drive the selection of digital images for a digitization project because the issues of copyright are already resolved. If a collection has been chosen for digitization and copyright is not yet cleared, locating the copyright holder and obtaining permission can be a lengthy and costly process. It is important to allot staff time and to document the procedures followed, along with any results in order to demonstrate due diligence.

There are few rules that apply to everything where copyright is concerned. However, the following can be used as a general guide when trying to determine copyright.

- If a published item (ie a book) was published before 1923, it is in the public domain.
- Unpublished items (ie a letter, diary, photograph) with a known author are covered by copyright until 70 years following the death of the author (as of 2008, items written by someone who passed away prior to 1938 are in the public domain).
- Unpublished items (ie a letter, diary, photograph) without a known author are covered by copyright until 120 years following the date of creation (as of 2008, items written in 1888 are in the public domain).

There are several online tools that can be helpful in determining if copyright may be an issue for the materials you plan to digitize. A few websites with information about copyright include:

- American Library Association’s Library Copyright site:
  - http://librarycopyright.net/digitalslider/
- Cornell University – Copyright Term and the Public Domain in the United States
  - http://www.copyright.cornell.edu/public_domain/
- Library of Congress, U.S. Copyright Office:
  - http://www.copyright.gov/
- Stanford University’s Copyright and Fair Use
  - http://fairuse.stanford.edu/

The Montana Memory Project adopted the following best practices to help inform contributing institutions about how to manage copyright concerns and to document due diligence for orphaned works and unpublished materials:


All participants in the MMP agree to respect copyright and individual privacy rights. An assessment of copyright and privacy issues is part of the planning process for any project submitted to the MMP. Materials should not be digitized without an understanding that all created digital images will be within the legal restrictions of copyright and privacy laws.

If you have questions concerning copyright and privacy within the MMP, please contact the Montana Historical Society at mmp@mt.gov.

FILE FORMATS RECOMMENDED BY THE MMP
The MMP recommends the creation of both a Master and an Access version of each digital file to be placed on the MMP. The Access, or Derivative, file will be the file made available through the CONTENTdm software.

Master Files
Digital imaging projects should create a high-quality master or archival image and then derive any additional versions in smaller sizes or alternative formats for a variety of uses. There are compelling preservation, access and economic reasons for creating an archival-quality digital master image: it provides an information-rich, research-quality surrogate. A high-quality master image will make the investment in the image capture process worthwhile. Since user expectations and technologies change over time, a digital master should be rich enough to accommodate future needs and applications. The master image should be the highest quality you can afford; it should not be edited or processed for any specific output; and it should be uncompressed.

Master digital images should be stored in a file format that supports the fidelity and long term preservation of the image. The master image file format should be:
- Nonproprietary / open source
- Uncompressed

The recommended format most frequently used for master digital images is the Tagged Image File Format (TIFF). Another format currently being considered for master digital images is the Joint Photographic Experts Group File Interchange Format (JPEG 2000).

Access or Derivative Files
Derivative files are created from the master file and are used for general access. Derivative files typically include an access image which is sized to fit within the screen of an average monitor or other delivery mechanism and/or a thumbnail image. With the proper image editing software, it is not necessary to subject source materials to multiple scans.
File formats using lossy compression are commonly used when creating derivative files. Derivatives are also generally optimized for computer monitor viewing so that visual details may be viewed as clearly as possible.

MMP recommends the use of the JPEG file format for Access files for all types of materials and the JPEG or PDF file format for Access files for text documents. The creation of a thumbnail file is not necessary, as CONTENTdm creates the thumbnail file automatically.

**LONG-TERM STORAGE OF DIGITAL OBJECTS**

Longevity of a digital medium depends on many factors - the type of media (CD, DVD, tape, etc.), how often and the way in which the media is handled, and how the media is stored. It is important to keep in mind that even with proper maintenance and great luck, no digital format can be considered permanent. The very best result that cultural institutions can hope to accomplish is long-term sustainability of digital material through good preservation planning and vigilant management. The storage media is an essential part of that process.

There are two types of digital storage media - portable and non-portable. Each has advantages and disadvantages for long-term storage.

**Portable Media**

- **CD (CD-R and CD-RW)**
  - CD-R (Compact Disk Recordable) is a format that requires a CD-ROM drive to read and to write. The CD-R format is an inexpensive way to store digital object masters. These disks are susceptible to scratches, to fingerprints and to extremes in temperature and light. They should be handled and stored with great care. If writing on the disk, only a water-based felt-tip pen should be used. An alcohol-based felt-tip pen can migrate through the protective layer and possibly affect the integrity of the data.

- **DVD (DVD-R and DVD-RW)**
  - DVD technology (Digital Video Disk or Digital Versatile Disk) is a format that requires a DVD-ROM drive to read. A DVD-R disk will hold approximately 4.7 gigabytes. Gold standard DVDs have been developed to meet archival standards.

- **DAT Tape, DLT Tape, ZIP® and JAZ® drives**
  - Tape, ZIP® and JAZ® drives are all magnetic media, and magnetic media is NOT recommended for long-term storage. Tape is, however, an excellent intermediate medium, particularly for transport of data and for backup.

**Tips for Improving the lifespan of CD's and DVD's**

- **Always:**
  - Store media in controlled archival environment
  - Store media in a jewel case or protective sleeve when not in use
  - If using sleeves, use those that are of low-lint and acid-free archival quality
  - Wear gloves when handling the master disks

- **Avoid:**
  - Damage to the upper and lower surfaces and edges of the disk
o Scratching and contact with surfaces that might result in grease deposits (e.g. human hands)
o Exposing disks to direct sunlight

- Never:
o Attach or fix anything to the surface of a disk
o Write on any part of the disk other than the plastic area of the spindle

Tips for Improving the lifespan of DLT’s
- Always:
o Keep tape in its protective case when not in use
o Move tapes in their cases
o Store the tapes in appropriate archival environment
o Store the tapes vertically
- Avoid:
o Placing the tapes near magnetic fields
o Moving the tapes about
o Exposing disks to direct sunlight
- Never:
o Stack the tapes horizontally
o Put adhesive labels on the cartridge
o Touch the surface of the tape
o Put a tape that has been dropped in a drive without first visually inspecting it to make certain that the tape has not been dislodged or moved

(The above information, modified from tables in the NINCH Guide (available at http://www.nyu.edu/its/humanities/ninchguide/XIV), can assist in making sure digital storage media lasts as long as possible.)

Non-portable Media
- Network Servers (drives):
o If a server is required for your project, it should be purchased to be adequate for the first two years of the project.
- Hard Drives:
o It is recommended that institutions purchase the largest hard drive they can afford. If it is possible to purchase two hard drives, this will provide a more flexible storage system. If managers of digital projects use hard drives for image storage, they should defragment them on a regular basis to maintain optimum performance. Hard drives are not recommended for long-term storage.

Recommended storage standards:
- Master file storage:
o Minimum recommendation: Gold CR-R
o Best practice recommendation: Redundant Hard Disk storage and/or Hard Disk with Tape Backup

Resources for Digital Image Storage and Preservation:
- Cornell University, Digital Preservation Tutorial: http://www.icpsr.umich.edu/dpm/
EQUIPMENT RECOMMENDATIONS

The following equipment specifications are recommendations for minimum specifications for equipment used to capture images to be placed on the MMP

FLATBED SCANNER
Flatbed scanners are recommended for most digitization projects. Most flatbed scanners can be used for materials in sizes up to approximately 11”x17”, depending upon the size of the bed. Scanners may be able to support transmitted light (for transparencies or negatives) depending on current and projected future collection holdings. A slide scanner may be a desired addition if your collection includes large numbers of slides or 35mm/small format negatives.

Flatbed scanner: minimum resolution 1200 dpi with 32 bit depth
Optional Slide scanner: minimum resolution 2400 dpi with 32 bit depth

DIGITAL CAMERA

Point and Shoot — Consumer-oriented “point and shoot” cameras are generally not suitable for digitization projects. The file size is generally insufficient; the lens quality is limited, and there is no studio flash synchronization.

35 mm Digital Single Lens Reflex — For many digitization projects, a 35mm digital single lens reflex (DSLR) type camera may be the best capture device. The digital DSLR is ideal for making high-quality images and is a simple, cost effective solution. The advantages of this type of camera include: high image quality; appropriate image resolution; ease of use; flexibility in shooting situations; option for tethered shooting; flash synchronization for quick capture; and modest price range. Tethered shooting is when the camera is connected directly to the computer via Firewire or USB cable. The image appears on the computer screen seconds after it is captured allowing for technical and aesthetic decisions to be made immediately.

DIGITAL RECORDER
If you are conducting an oral history project and anticipate mounting either portions of or entire interviews on the MMP site, the MMP recommends using a digital recorder. Your digital recorder should have sufficient memory, an external microphone, and the ability to record the interviews as WAV files. The MMP recommends the Marantz Professional Model PMD620 Handheld Solid State Recorder with an external microphone. This is a digital recorder which stores the interview on a 2 GB card which provides more than six hours of recording time. A
digital recorder should be able to meet the Digital Audio specifications outlined in these guidelines.
SCANNING SPECIFICATIONS
These scanning specifications should be used for the majority of the items that are scanned for a MMP digitization project.

TEXT DOCUMENTS

<table>
<thead>
<tr>
<th>Features of Original Object</th>
<th>Digital Master File</th>
<th>Access File</th>
</tr>
</thead>
</table>
| Clean, high-contrast documents with printed type (e.g. laser printed or typeset) | File format:  
• TIFF or JPEG2000  
Pixel array:  
• 6000 pixels across the long dimension for 1-bit bitonal mode.  
• 4000 pixels across long dimension for 8-bit grayscale.  
Resolution and bit depth:  
• 1-bit bitonal mode: 600 PPI. The 600 PPI 1-bit files can be produced via scanning or created/derived from 400 PPI, 8-bit grayscale images.  
-or-  
• 8-bit grayscale mode: 400 PPI  
Spatial Dimensions:  
• 100% of original | Image file format:  
• JPEG  
Pixel array:  
• 600 pixels across the long dimension  
Resolution and bit depth:  
• 8-bit grayscale, 150 – 200 PPI  
Other file formats:  
• PDF |
| Documents with poor legibility or diffuse characters (e.g. carbon copies, Thermofax/Verifax), handwritten annotations or other markings, low inherent contrast, staining, fading, halftone illustrations, or photographs | File format:  
• TIFF or JPEG2000  
Pixel array:  
• 4000 pixels across long dimension.  
Resolution and bit depth:  
• 8-bit grayscale mode: 400 PPI  
Spatial Dimensions:  
• 100% of original | File format:  
• JPEG  
Pixel array:  
• 600 pixels across the long dimension  
Resolution and bit depth:  
• 8-bit grayscale or 24-bit color, 150 – 200 PPI  
Other file formats:  
• PDF  
• |
| Documents as described for grayscale scanning and/or | File format:  
TIFF or JPEG2000 | File format:  
• JPEG |
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<th>Features of Original Object</th>
<th>Digital Master File</th>
<th>Access File</th>
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<td>where color is important to the interpretation of the information or content, or desire to produce the most accurate representation</td>
<td>Pixel array: 4000 pixels across long dimension. Resolution and bit depth: • 24-bit RGB mode - 400 PPI Spatial Dimensions: • 100% of original</td>
<td>Pixel array: • 600 pixels across the long dimension Resolution and bit depth: • 24-bit color ,150 – 200 PPI Other file formats: • PDF</td>
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### YEARBOOKS

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<tr>
<th>Features of Original Object</th>
<th>Digital Master File</th>
<th>Access File</th>
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<tbody>
<tr>
<td>School yearbook (Generally, clean, high-contrast documents with printed type and photographs)</td>
<td>File format: • TIFF or JPEG2000 Pixel array: • 6000 pixels across the long dimension for 1-bit bitonal mode. • 4000 pixels across long dimension for 8-bit grayscale. Resolution and bit depth: • 8-bit grayscale mode: 300 PPI OR • 24-bit color, 300 PPI Spatial Dimensions: • 100% of original</td>
<td>Image file format: • JPEG Pixel array: • 600 pixels across the long dimension Resolution and bit depth: • 8-bit grayscale ,150 – 200 PPI Other file formats: • PDF</td>
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### GRAPHIC ILLUSTRATIONS / ARTWORK

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<tr>
<th>Features of Original Object</th>
<th>Digital Master File</th>
<th>Access File</th>
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<tbody>
<tr>
<td>Clean, high-contrast documents with printed type (e.g. laser printed or typeset)</td>
<td>File format: • TIFF or JPEG2000 Pixel array: • 6000 pixels across the long dimension for 1-bit bitonal mode. • 4000 pixels across long dimension for 8-grayscale.</td>
<td>File format: • JPEG Pixel array: • 600 pixels across the long dimension Resolution and bit depth: • 1-bit bitonal or 8-bit grayscale, 200 PPI</td>
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<tr>
<td>Features of Original Object</td>
<td>Digital Master File</td>
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<tr>
<td>Resolution and bit depth:</td>
<td>1-bit bitonal mode: 600 PPI. The 600 PPI 1-bit files can be produced via scanning or created/derived from 400 PPI, 8-bit grayscale images. -or- 8-bit grayscale mode: 400 PPI</td>
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<td>Spatial Dimensions:</td>
<td>100% of original</td>
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<td>Documents with poor legibility or diffuse characters (e.g. carbon copies, Thermofax/Verifax), handwritten annotations or other markings, low inherent contrast, staining, fading, halftone illustrations, or photographs</td>
<td>File format: TIFF or JPEG2000 Pixel array: 4000 pixels across long dimension. Resolution and bit depth: 8-bit grayscale mode: 400 PPI Spatial Dimensions: 100% of original</td>
<td>File format: JPEG Pixel array: 600 pixels across the long dimension Resolution and bit depth: 8-bit grayscale, 200 PPI</td>
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<tr>
<td>Documents as described for grayscale scanning and/or where color is important to the interpretation of the information or content, or desire to produce the most accurate representation</td>
<td>File format: TIFF or JPEG2000 Pixel array: 4000 pixels across long dimension. Resolution and bit depth: 24-bit color mode - 400 PPI Spatial Dimensions: 100% of original</td>
<td>File format: JPEG Pixel array: 600 pixels across the long dimension Resolution and bit depth: 24-bit color, 200 PPI</td>
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**MAPS AND PLANS**

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<tr>
<th>Features of Original Object</th>
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<tr>
<td>Clean, high-contrast documents with printed type (e.g. laser printed or typeset)</td>
<td>File format: TIFF or JPEG2000 Pixel array: 6000 pixels across the long dimension for 1-bit</td>
<td>File format: JPEG Pixel array: 1078 pixels across the long dimension</td>
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<td>Features of Original Object</td>
<td>Digital Master File</td>
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<td>• 4000 pixels across long dimension for 8-grayscale.</td>
<td>• 1-bit bitonal or 8-bit grayscale, 150-200 PPI</td>
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<tr>
<td>Resolution and bit depth:</td>
<td>• 1-bit bitonal mode: 600 PPI The 600 PPI 1-bit files can be produced via scanning or created/derived from 400 PPI, 8-bit grayscale images. -or-</td>
<td>Other file formats:</td>
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<tr>
<td></td>
<td>• 8-bit grayscale mode: 400 PPI</td>
<td>• PDF</td>
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<tr>
<td>Spatial Dimensions:</td>
<td>• 100% of original</td>
<td></td>
</tr>
<tr>
<td>Documents with poor legibility or diffuse characters (e.g. carbon copies, Thermofax/Verifax), handwritten annotations or other markings, low inherent contrast, staining, fading, halftone illustrations, or photographs</td>
<td>File format:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• TIFF or JPEG2000</td>
<td>File format:</td>
</tr>
<tr>
<td>Pixel array:</td>
<td>• 4000 pixels across long dimension.</td>
<td>File format:</td>
</tr>
<tr>
<td>Resolution and bit depth:</td>
<td>• 8-bit grayscale mode: 400</td>
<td>File format:</td>
</tr>
<tr>
<td>Spatial Dimensions:</td>
<td>• 100% of original</td>
<td>File format:</td>
</tr>
<tr>
<td></td>
<td>• 1078 pixels across the long dimension</td>
<td>File format:</td>
</tr>
<tr>
<td></td>
<td>Resolution and bit depth:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• 8-bit grayscale, 150-200 PPI</td>
<td>Resolution and bit depth:</td>
</tr>
<tr>
<td>Documents as described for grayscale scanning and/or where color is important to the interpretation of the information or content, or desire to produce the most accurate representation</td>
<td>File format:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• TIFF or JPEG2000</td>
<td>File format:</td>
</tr>
<tr>
<td>Pixel array:</td>
<td>• 4000 pixels across long dimension.</td>
<td>File format:</td>
</tr>
<tr>
<td>Resolution and bit depth:</td>
<td>• 24-bit color mode - 400 PPI</td>
<td>File format:</td>
</tr>
<tr>
<td>Spatial Dimensions:</td>
<td>• 100% of original</td>
<td>File format:</td>
</tr>
<tr>
<td></td>
<td>• 1078 pixels across the long dimension</td>
<td>Resolution and bit depth:</td>
</tr>
<tr>
<td></td>
<td>Resolution and bit depth:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• 24-bit color, 150-200 PPI</td>
<td>Resolution and bit depth:</td>
</tr>
</tbody>
</table>
### PHOTOGRAPHS - TRANSMISSIVE ORIGINALS (FILM, SLIDES AND NEGATIVES)*

<table>
<thead>
<tr>
<th>Features of Original Object</th>
<th>Digital Master File</th>
<th>Access File</th>
</tr>
</thead>
</table>
| 35 mm and medium format, up to 4x5 in. | File format:  
- TIFF or JPEG2000  
Pixel array:  
- 4000 pixels across long dimension of image area, excluding mounts and borders.  
Resolution and bit depth:  
- Adjust the scan resolution to meet pixel array specifications, based on the format of the original object – approximately 2800 PPI for 35mm originals and ranging down to approximately 800 PPI for originals approaching 4x5 in.  
- 8-bit grayscale mode for black-and-white, can be produced from a 16-bit grayscale file. -or-  
- 24-bit color mode for color and monochrome (e.g. collodion wet-plate negative, pyro developed negatives, stained negatives, etc.), can be produced from a 48-bit RGB file.  
Dimensions:  
- Sized to match original, no magnification or reduction. | File format:  
- JPEG  
Pixel array:  
- 600 pixels across the long dimension  
Resolution and bit depth:  
- 8-bit grayscale or 24-bit color, 150-200 PPI |
| Equal to or larger than 4x5” and up to 8x10 in. | File format:  
- TIFF or JPEG2000  
Pixel array:  
- 6000 pixels across long dimension of image area, |
|                | File format:  
- JPEG  
Pixel array:  
- 600 pixels across the long dimension |
<table>
<thead>
<tr>
<th>Features of Original Object</th>
<th>Digital Master File</th>
<th>Access File</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>excluding mounts and borders.</td>
<td>Resolution and bit depth:</td>
</tr>
<tr>
<td></td>
<td>Resolution and bit depth:</td>
<td>• 8-bit grayscale or 24-bit color, 150-200 PPI</td>
</tr>
<tr>
<td>Resolution and bit depth:</td>
<td>• Adjust the scan resolution to meet pixel array specifications, based on the format of the original object – approximately 1200 PPI for 4x5 in. originals and ranging down to approximately 600 PPI for 8x10 in. originals.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• 8-bit grayscale mode for black-and-white, can be produced from a 16-bit grayscale file.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• 24-bit RGB mode for color and monochrome (e.g. collodian wet-plate negative, pyro developed negatives, stained negatives, etc.), can be produced from a 48-bit RGB file.</td>
<td></td>
</tr>
<tr>
<td>Dimensions:</td>
<td>• Sized to match original, no magnification or reduction.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equal to or larger than 8x10 in.</td>
<td>File format:</td>
<td>File format:</td>
</tr>
<tr>
<td></td>
<td>• TIFF or JPEG2000</td>
<td>• JPEG</td>
</tr>
<tr>
<td></td>
<td>Pixel array:</td>
<td>Pixel array:</td>
</tr>
<tr>
<td></td>
<td>• 8000 pixels across long dimension of image area, excluding mounts and borders.</td>
<td>• 600 pixels across the long dimension</td>
</tr>
<tr>
<td></td>
<td>Resolution and bit depth:</td>
<td>Resolution and bit depth:</td>
</tr>
<tr>
<td></td>
<td>• Adjust the scan resolution to meet pixel array specifications, based on the format of the original object –</td>
<td>• 8-bit grayscale or 24-bit color, 150-200 PPI</td>
</tr>
</tbody>
</table>
Features of Original Object | Digital Master File | Access File
---|---|---
| approximately 800 PPI for originals and approximately 8x10 in. and ranging down to the appropriate resolution to produce the desired size file from larger originals. | 8-bit grayscale mode for black-and-white, can be produced from a 16-bit grayscale file. | -or-
| • 8-bit grayscale mode for black-and-white, can be produced from a 16-bit grayscale file. | • 24-bit RGB mode for color and monochrome (e.g. collodion wet-plate negative, pyro developed negatives, stained negatives, etc.), can be produced from a 48-bit RGB file. | • 24-bit RGB mode for color and monochrome (e.g. collodion wet-plate negative, pyro developed negatives, stained negatives, etc.), can be produced from a 48-bit RGB file. |
| Dimensions: Sized to match original, no magnification or reduction. | Dimensions: Sized to match original, no magnification or reduction. |  |

*Duplicate negatives and copy negatives can introduce problems in recommending scanning specifications, particularly if there is no indication of the size of the source object that was photographed. For copy negatives or transparencies of prints, use the specifications for that print size. For duplicates (negatives, slides, transparencies) match the size of the original object used to derive the duplicate. However, if the original size is not known, follow these recommendations:

- For a copy negative or transparency, scan at a resolution to achieve 4000 pixels across the long dimension.
- For duplicates, follow the scanning recommendations for the size that matches the actual physical dimensions of the duplicate.

For scanning negatives with multiple images on a single negative, see the section on scanning stereographs below.

Any reduction or enlargement in size must also be taken into account, if possible. If a ruler has been included in the scan, use it to verify that the image has not been reduced or enlarged before calculating appropriate resolution.

Often photographic negatives are the most difficult originals to scan. Unlike scanning positives, reflection prints, and transparencies or slides, there are no reference images to which to compare...
scans. Scanning negatives is very much like printing in the darkroom – it is up to the photographer/technician to adjust brightness and contrast to get a good image. Also, most scanners are not as well calibrated for scanning negatives compared to scanning positives.

Be aware that during digital capture, pixels with histogram values of less than 9 or higher than 247 will be problematic for long-term viability of the digital master. Pixels of less than nine will have no detail in shadow areas and when printed will be “blocked.” Pixels with a value of higher than 247 will be without detail in the highlights and when printed, no ink will be used in those areas resulting in no detail/information.

To minimize the loss of detail, it is often necessary to scan negatives as positives (the image on the screen is negative), to invert the images in Photoshop, and then to adjust the images.

If black-and-white negatives are stained or discolored, we recommend making color RGB scans of the negatives and using the channel that minimizes the appearance of the staining / discoloration when viewed as a positive. The image can then be converted to a grayscale image.

The goal of the digital master is to create as exact a replica of the original as possible. To do this all stains, tears, fading, and any marks of deterioration must be captured in the master file.
## PHOTOGRAPHS - REFLECTIVE ORIGINALS (PRINTS)

<table>
<thead>
<tr>
<th>Features of Original Object</th>
<th>Digital Master File</th>
<th>Access File</th>
</tr>
</thead>
<tbody>
<tr>
<td>8x10 in. or smaller</td>
<td>File format:</td>
<td>File format:</td>
</tr>
<tr>
<td></td>
<td>• TIFF or JPEG2000</td>
<td>• JPEG</td>
</tr>
<tr>
<td></td>
<td>Pixel array:</td>
<td>Pixel array:</td>
</tr>
<tr>
<td></td>
<td>• 4000 pixels across long dimension of image area, excluding mounts and borders.</td>
<td>• 600 pixels across the long dimension</td>
</tr>
<tr>
<td>Resolution and bit depth:</td>
<td>• Adjust the scan resolution to meet pixel array specifications, based on the format of the original object – approximately 400 PPI for 8x10 in. originals and ranging up to the appropriate resolution to produce the desired size file from smaller originals, approximately 570 PPI for 5x7 in. and 800 PPI for 4x5 in. or 3.5x5 in. originals.</td>
<td>Resolution and bit depth:</td>
</tr>
<tr>
<td></td>
<td>• 8-bit grayscale mode for black-and-white, can be produced from a 16-bit grayscale file.</td>
<td>• 8-bit grayscale or 24-bit color, 150-200 PPI</td>
</tr>
<tr>
<td></td>
<td>-or-</td>
<td>-or-</td>
</tr>
<tr>
<td></td>
<td>• 24-bit RGB mode for color and monochrome (e.g. albumen prints or other historic print processes), can be produced from a 48-bit RGB file.</td>
<td></td>
</tr>
<tr>
<td>Dimensions:</td>
<td>• Sized to match original, no magnification or reduction.</td>
<td></td>
</tr>
<tr>
<td>8x10 in. or smaller</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Features of Original Object</td>
<td>Digital Master File</td>
<td>Access File</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>---------------------</td>
<td>-------------</td>
</tr>
</tbody>
</table>
| Equal to or larger than 8x10 in. and up to 11x14 in. | **File format:**  
- TIFF or JPEG2000  
**Pixel array:**  
- 6000 pixels across long dimension of image area, excluding mounts and borders.  
**Resolution and bit depth:**  
- Adjust the scan resolution to meet pixel array specifications, based on the format of the original object – approximately 600 PPI for originals approximately 8x10 in. and ranging down to approximately 430 PPI for 11x14 in. originals.  
- 8-bit grayscale mode for black-and-white, can be produced from a 16-bit grayscale file.  
- 24-bit RGB mode for color and monochrome (e.g. albumen prints or other historic print processes), can be produced from a 48-bit RGB file.  
**Dimensions:**  
Sized to match original, no magnification or reduction. | **File format:**  
- JPEG  
**Pixel array:**  
- 600 pixels across the long dimension  
**Resolution and bit depth:**  
- 8-bit grayscale or 24-bit color, 150-200 PPI |
<table>
<thead>
<tr>
<th><strong>Features of Original Object</strong></th>
<th><strong>Digital Master File</strong></th>
<th><strong>Access File</strong></th>
</tr>
</thead>
</table>
| Equal to or larger than 11x14 in. | **File format:**  
- TIFF or JPEG2000  
**Pixel array:**  
- 8000 pixels across long dimension of image area, excluding mounts and borders.  
- Adjust the scan resolution to meet pixel array specifications, based on the format of the original object – approximately 570 PPI for originals approximately 11x14 in. and ranging down to the appropriate resolution to produce the desired size file from larger originals.  
- 8-bit grayscale mode for black-and-white, can be produced from a 16-bit grayscale file.  
- or-  
- 24-bit RGB mode for color and monochrome (e.g. albumen prints or other historic print processes), can be produced from a 48-bit RGB file.  
**Dimensions:**  
- Sized to match original, no magnification or reduction. | **File format:**  
- JPEG  
**Pixel array:**  
- 600 pixels across the long dimension  
**Resolution and bit depth:**  
- 8-bit grayscale or 24-bit color, 150-200 PPI |

*For stereograph images and other multiple image prints, modified recommended scanning specifications are to scan to original size (length of both photos and mount) and to add 2000 pixels to the long dimension, in the event that only one of the photographs is requested for high-quality reproduction. For example, if the stereograph is 8 in. on the long dimension, a resolution of 500 ppi would be required to achieve 4000 pixels across the long dimension for that size format. In this case, adding 2000 pixels to the long dimension would require that the stereograph be scanned at 750 ppi to achieve the desired 6000 pixels across the long dimension.*
For photographic prints, size measurements for determining appropriate resolution are based on the size of the image area only, excluding any borders, frames or mounts. However, in order to show that the entire record has been captured, it is good practice to capture the border area in the master scan file. In cases where a small image is mounted on a large board (particularly where large files sizes may be an issue) it may be desirable to scan the image area only at the appropriate resolution for its size, and then scan the entire mount at a resolution that achieves 4000 pixels across the long dimension.

**AUDIO FILES**

<table>
<thead>
<tr>
<th>Features of Original Object</th>
<th>Digital Master File (also Production Master)</th>
<th>Access File (as applicable)</th>
</tr>
</thead>
</table>
| Analog recording—cassette, reel-to-reel | File format:  
  • Wav  
  Compression:  
  • lossless  
  Bit rate:  
  • 24-bit  
  Sample rate:  
  • 44.1 kHz  
  Volume:  
  • Best possible without distortion | File format:  
  • Wma, mp3  
  Compression:  
  • High quality  
  Bit rate:  
  • 16-bit  
  Sample rate:  
  • 44.1 kHz  
  Volume:  
  • Best possible without distortion |
DESCRIPTIVE METADATA BEST PRACTICES

INTRODUCTION

The intent of the Descriptive Metadata Best Practices section of these guidelines is to provide direction for creating metadata records for digitized materials that have been reformatted from an existing physical resource, such as photographs, text, audio, video, three-dimensional artifacts, etc. The Descriptive Metadata Best Practices define commonly used Dublin Core elements used in CONTENTdm.

Application of these best practices will result in standardized records that:

- provide detailed descriptions to inform and educate users
- enhance online search and retrieval accuracy
- improve resource discovery capabilities
- improve quality control of metadata records
- facilitate inter-institutional interoperability for multiple partnership opportunities

This document seeks to accommodate the different cataloging needs of the diverse collections held within the Montana Memory Project. Currently the Montana Memory Project uses Dublin Core to catalog collections in CONTENTdm.

All digitized items will have a descriptive metadata record. This record will be the Dublin Core record stored in CONTENTdm.

For additional information on Dublin Core, please visit the following website: http://dublincore.org/documents/usageguide/elements.shtml
USING THE DESCRIPTIVE METADATA BEST PRACTICES

Controlled vocabularies
Employing terminology from controlled vocabularies can improve the quality of search results and increases consistency when more than one individual creates records.

Controlled vocabularies recommended by the Montana Memory Project include:
- Library of Congress Subject Headings for all broad subjects, events and places
- Library of Congress Name Authority for all personal, corporate and conference names
- Getty Art and Architecture for works of art
- Library of Congress Thesaurus for Graphic Materials I: Subject Terms (TGM I)
- Library of Congress Thesaurus for Graphic Materials II: Genre and Physical Characteristic Terms (TGM II)

Keywords vs. Subject terms
Best practice recommends that subject terms be taken from a controlled vocabulary whenever possible for more accurate retrieval of resources. However, other non-controlled terms or keywords that identify the resource with some precision can be added to a record to enhance resource retrieval and discovery, especially in cases where such terms are too new to be included in controlled vocabularies.

Grammar and Punctuation
Metadata creators should follow the general grammatical rules of the language involved when entering descriptive information about resources.

Abbreviations
In general, the following abbreviations are allowed: common or accepted abbreviations (such as "St." for "Saint"); designations of function (such as "ed." for "Editor"); terms used with dates (b. or d.); and distinguishing terms added to names of persons, if they are abbreviated on the item (such as "Mrs."). In case of doubt, spell out the abbreviation.

Capitalization
In general, capitalize the first word (of a title, for example) and proper names (place, personal and organization names). Capitalize content in the description element according to normal rules of writing. Acronyms should be entered in capital letters.

Character Encoding
Have a clear understanding of how the database handles non-standard characters and/or diacritics (such as ü, é, ñ, etc.) and input them so that they display and retrieve effectively.

Exceptions
The Montana Memory Project recognizes that not all institutions, due to internal cataloging procedures for creating metadata records, will be able to meet the following recommendations for creating a Dublin Core record. While the MMP encourages all institutions to strive to meet these criteria, exceptions can be made. For any such issues or concerns, please contact the MMP staff at mmp@mt.gov.
**DUBLIN CORE RECORD FOR MONTANA MEMORY PROJECT (MMP)**

**Mandatory Elements**

Each record includes nineteen repeatable elements. To assure success in a collaborative environment where consistent description of digital resources is critical for interoperability, the MMP Metadata Working Group has designated the following seven elements as mandatory:

<table>
<thead>
<tr>
<th>Dublin Core Element</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description</strong></td>
<td>The name given to the resource by the creator or publisher; may also be an identifying phrase or name of the object supplied by the contributing institution. Use [ ] around a title that you have provided, if no title is available.</td>
</tr>
</tbody>
</table>
| **Examples**        | Title="Progressive Men of Montana"  
                      Title="The Sun Also Rises"  
                      Title="The Corrections" |
| **Maps to**         | **Dublin Core:** Title **MARC:** 245 |
| **Mandatory**       | ☒  Recommended ☐ |

<table>
<thead>
<tr>
<th>Dublin Core Element</th>
<th>Creator</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description</strong></td>
<td>A person or entity primarily responsible for creating the intellectual content of the resource. Examples of creators include authors of written documents, artists, photographers, collectors of natural specimens or artifacts, organizations that generate archival collections, etc.</td>
</tr>
</tbody>
</table>
| **Examples**        | Creator="Shakespeare, William"  
                      Creator="Bridger Canyon Planning and Zoning Commission"  
                      Creator="Internal Revenue Service. Customer Complaints Unit" |
| **Maps to**         | **Dublin Core:** Creator **MARC:** 110 |
| **Mandatory**       | ☒ (if available)  Recommended ☐ |

<table>
<thead>
<tr>
<th>Dublin Core Element</th>
<th>Subject</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description</strong></td>
<td>What the content of the resource is about or what it is, expressed by headings, keywords, phrases, names, or other terms for significant people, places, and events, etc. A classification code also may be assigned. Recommended best practice is to select a value from a controlled vocabulary or formal classification scheme. ***Use Library of Congress Subject Headings (LCSH) for controlled vocabulary available in ContentDM Acquisition Station</td>
</tr>
</tbody>
</table>
| **Examples**        | Subject="Montana--History"  
                      Subject="Dogs"  
                      Subject="Olympic skiing" |
<p>| <strong>Maps to</strong>         | <strong>Dublin Core:</strong> Subject <strong>MARC:</strong> 600, 610, 650 |
| <strong>Mandatory</strong>       | ☒  Recommended ☐ |</p>
<table>
<thead>
<tr>
<th>Dublin Core Element</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description</strong></td>
<td>An account of the content of the resource. Description may include but is not limited to: an abstract, a table of contents, reference to a graphical representation of content, or a free-text account of the content.</td>
</tr>
</tbody>
</table>

**Examples**

Description="Illustrated guide to airport markings and lighting signals, with particular reference to SMGCS (Surface Movement Guidance and Control System) for airports with low visibility conditions."

**Maps to**

<table>
<thead>
<tr>
<th>Dublin Core:</th>
<th>Description</th>
<th>MARC:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mandatory</td>
<td>☒</td>
<td>Recommended</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dublin Core Element</th>
<th>Date Original</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description</strong></td>
<td>Date of creation of the resource. Creation or modification dates for the original resource from which the digital object was derived or created.</td>
</tr>
</tbody>
</table>

**Examples**

Date="1998-02-16"
Date="1998-02"
Date="1998"

**Maps to**

<table>
<thead>
<tr>
<th>Dublin Core:</th>
<th>Date</th>
<th>MARC:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mandatory</td>
<td>☒ (if applicable)</td>
<td>Recommended</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dublin Core Element</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description</strong></td>
<td>The nature or genre of the content of the resource. Type includes terms describing general categories, functions, genres, or aggregation levels for content. Recommended best practice is to select a value from a controlled vocabulary (for example, the DCMI Type Vocabulary [DCMIETYPE]).</td>
</tr>
</tbody>
</table>

**Examples**

Type="Image"
Type="Sound"
Type="Text"

**Maps to MARC**

<table>
<thead>
<tr>
<th>Dublin Core:</th>
<th>Type</th>
<th>MARC:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mandatory</td>
<td>☒</td>
<td>Recommended</td>
</tr>
</tbody>
</table>

**Note:**

Use DCMI Type Vocabulary:
- Collection - Group of things, could be a mixture of these examples
- Dataset - Statistical data file, CD-ROM of data, database
- Event - Gallery opening, symposium, parade
- Image - Map, stereograph, photograph, painting, engraving
- Still Image - photograph, painting, drawing, graphic design, plan, and map
- Moving Image - animation, movie, television program, video
- Interactive Resource - video game, virtual exhibit
- Service - System that provides function for the end user, such as e-commerce order fulfillment
- Software - Application software such as presentation viewer, word processor
- Sound - Sound recording
- Text - Scrapbook, diary, poem, home page, manuscript, music score; Note that page images are text
- Physical Object - Museum piece, architectural structure, monument

<table>
<thead>
<tr>
<th>Dublin Core Element</th>
<th>Contributing Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description</strong></td>
<td>A consistent reference to the institutions or administrative units that contributed to the creation, management, description, and/or dissemination of the digital resource. For example, one institution may physically hold the original resource, another may perform the digital imaging, and another may create metadata.</td>
</tr>
</tbody>
</table>
| **Examples**        | Contributing Institution="University of Montana"  
|                     | Contributing Institution ="Museum of the Rockies"  
|                     | Contributing Institution ="Parmly Billings Library" |
| **Maps to MARC**    | **Dublin Core:** Publisher **MARC:** |
| **Mandatory**       | ☒ | **Recommended**  | ☒ |

**Recommended Elements**
The remaining elements are optional, but are **recommended** as applicable to each item or collection. Richer, more complete records increase the likelihood that users will locate the desired digital resource.

<table>
<thead>
<tr>
<th>Dublin Core Element</th>
<th>Contributor</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description</strong></td>
<td>An entity responsible for making contributions to the content of the resource. The person(s) or organization(s) who made significant intellectual contributions to the resource but whose contribution is secondary to any person(s) or organization(s) already specified in a Creator element. Examples: editor, transcriber, illustrator, etc.</td>
</tr>
</tbody>
</table>
| **Examples**        | Contributor="Shakespeare, William"  
|                     | Contributor="Bridger Canyon Planning and Zoning Commission"  
|                     | Contributor="Internal Revenue Service. Customer Complaints Unit" |
| **Maps to MARC**    | **Dublin Core:** Contributor **MARC:** |
| **Mandatory**       | ☐ | **Recommended**  | ☒ |
### Dublin Core Element: Coverage

**Description**

*Coverage* describes the spatial or temporal characteristics of the intellectual content of the resource. Spatial refers to the location(s) covered by the intellectual content of the resource (i.e., place names, longitude and latitude, celestial sector, etc.) not the place of publication. Temporal coverage refers to the time period covered by the intellectual content of the resource (e.g., Jurassic, 1900-1920), not the publication date. For artifacts or art objects, the spatial characteristics usually refer to the place where the artifact/object originated while the temporal characteristics refer to the date or time period during which the artifact/object was made.

**Examples**

Coverage="1995-1996"
Coverage="17th century"
Coverage="Gallatin Valley, Montana"

**Maps to MARC**

<table>
<thead>
<tr>
<th>Dublin Core:</th>
<th>Coverage</th>
<th>MARC:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mandatory</td>
<td>□</td>
<td>⊗</td>
</tr>
</tbody>
</table>

### Dublin Core Element: Date Digital

**Description**

Date of creation or availability of the digital resource. The contributing institution may approximate the date a resource was digitized.

**Examples**

Date="1998-02-16"
Date="1998-02"
Date="1998"

**Maps to MARC**

<table>
<thead>
<tr>
<th>Dublin Core:</th>
<th>Date</th>
<th>MARC:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mandatory</td>
<td>□</td>
<td>⊗</td>
</tr>
</tbody>
</table>

### Dublin Core Element: Digitization Specifications

**Description**

Use the *Digitization Specifications* element to record technical information about the digitization of the resource: the hardware, software, and processes used to create the digitized resource. Include such information as scanner model, scan resolution, color profiles, compression schemes, size of *master* file (sometimes referred to as archival file), etc. This element is primarily intended for use at the local level.

**Examples**

Digitization Specifications="3,000,000 bytes file size for master file format"
Digitization Specifications="24 bits bit depth of master file format"
Digitization Specifications="Epson 1640XL Scanner hardware"
Digitization Specifications="PhotoshopCS Creation software"

**Maps to MARC**

<table>
<thead>
<tr>
<th>Dublin Core:</th>
<th>Description</th>
<th>MARC:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mandatory</td>
<td>□</td>
<td>⊗</td>
</tr>
<tr>
<td>Dublin Core Element</td>
<td>Format</td>
<td></td>
</tr>
<tr>
<td>---------------------</td>
<td>--------</td>
<td></td>
</tr>
<tr>
<td><strong>Description</strong></td>
<td>The physical or digital manifestation of the resource. Typically, <em>Format</em> may include the media type or the dimensions of the resource. <em>Format</em> may be used to describe the software, hardware, or other equipment needed to display or operate the resource. Examples of dimensions include size and duration. Recommended best practice is to select a value from a controlled vocabulary (for example, the list of Internet Media Types [MIME] defining computer media formats).</td>
<td></td>
</tr>
</tbody>
</table>
| **Examples**        | Format="image/gif"  
Format="4 kB"  
Format="image/jpeg"  
Format="40 x 512 pixels"  
Other popular MIME types: “application/pdf” OR “audio/mp3” OR “text/html” |

**Maps to MARC**  
<table>
<thead>
<tr>
<th>Dublin Core:</th>
<th>MARC:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Format</strong></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dublin Core Element</th>
<th>Language</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description</strong></td>
<td>Indicates the language(s) of the intellectual content of the resource. This implies the language(s) in which a text is written or the spoken language(s) of an audio or video resource. Visual images do not usually have a language unless there is significant text in a caption or in the image itself.</td>
</tr>
</tbody>
</table>
| **Examples**        | Language="en"  
Language="Primarily English, with some abstracts also in French." |

**Maps to MARC**  
<table>
<thead>
<tr>
<th>Dublin Core:</th>
<th>MARC:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Language</strong></td>
<td>(Fixed Field)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dublin Core Element</th>
<th>Provenance</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description</strong></td>
<td>A statement of any changes in ownership and custody of the resource since its creation that are significant for its authenticity, integrity and interpretation. The statement may include a description of any changes successive custodians made to the resource. It could also be used to identify and/or acknowledge donors, original owners, etc.</td>
</tr>
</tbody>
</table>
| **Examples**        | Provenance="This copy once owned by Benjamin Spock."  
Provenance="Estate of Hunter Thompson."  
Provenance="Stolen in 1999; recovered by the Museum in 2003." |

**Maps to MARC**  
<table>
<thead>
<tr>
<th>Dublin Core:</th>
<th>MARC:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Provenance</strong></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dublin Core Element</th>
<th>Publisher</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description</strong></td>
<td></td>
</tr>
</tbody>
</table>

32
| Description | An entity that made the resource available. For digital objects, Publisher is the entity that created the digital resource. Publishers can be a corporate body, publishing house, museum, historical society, university, project, repository, etc. |
| Examples | Publisher="University of South Where" Publisher="Amazon.com, Inc." Publisher="Carmen Miranda" |
| Maps to MARC | **Dublin Core:** Publisher | **MARC:** 561 |
| Mandatory |  | Recommended |
| Dublin Core Element | Relation |
| Description | A reference to a related resource. The element contains information necessary to show a relationship with another resource. A relationship may be multidirectional (i.e., a record may reference one or more other related resources). There may also be a one-directional relationship, even though a refinement may exist to show reciprocity (e.g., the use of Relation [Requires] does not necessitate the use of Relation [Is Required By] in another record). The relationship may be one of intellectual content variation (Is Version Of/Has Version), part-to-whole (Is Part Of/Has Part), citation/reference (References/Is Referenced By, Conforms To), substitution (Replaces/Is Replaced By), format variation (Has Format/Is Format Of), or dependency (Requires/Is Required By). |
| Examples | Title="Acher, Charles" Relation="Progressive Men of Montana" [Resource is book, entry in book is "Acher, Charles"] [Relationship described is IsPartOf.] |
| Maps to MARC | **Dublin Core:** Relation | **MARC:** |
| Mandatory |  | Recommended |
| Dublin Core Element | Resource Identifier |
| Description | An unambiguous reference to the resource within a given context. A character string or record number that clearly and uniquely identifies a digital object or resource. The Identifier element ensures that individual digital objects can be accessed, managed, stored, recalled, and used reliably. Input the ISSN, ISBN, other international standard numbers, and local naming conventions that describe the original in Source. Create resource identifier by adding institution code (in lowercase) followed by seven digits which auto-increment |
| Examples | Here are some Montana Memory Project examples:  
• University of Montana, Mansfield Library = mtg0000001, mtg0000002, … mtg0000010 …  
• Museum of the Rockies = mtmor0000001, mtmor0000002, … |
<table>
<thead>
<tr>
<th>Maps to MARC</th>
<th>Dublin Core:</th>
<th>MARC:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mandatory</td>
<td>Identifier</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Recommended</td>
<td></td>
</tr>
</tbody>
</table>

**Dublin Core Element: Rights Management**

**Description:** Information about rights held in and over the resource. Typically, a Rights Management element will contain a rights management statement for the resource, or reference a service providing such information. Rights information often encompasses intellectual property rights (IPR), copyright, and various property rights.

**Examples**
- Rights="Access limited to Montana Memory Project members"
- Rights="http://cs-tr.cs.cornell.edu/Dienst/Repository/2.0/Terms/

**Maps to MARC**

<table>
<thead>
<tr>
<th>Dublin Core:</th>
<th>MARC:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rights</td>
<td>540, 506</td>
</tr>
</tbody>
</table>

**Mandatory**

**Recommended**

(if applicable)

**Dublin Core Element: Source**

**Description:** A reference to a resource from which the present resource is derived. When applicable, use the Source element to cite any other resource from which the digital resource was derived, either in whole or in part. Some digital resources are “born digital” and derive from no pre-existing resource; in these cases, the Source element is not used.

**Examples**
- Source="Image from page 54 of the 1922 edition of Romeo and Juliet"
- Source="RC607.A26W574 1996" [where "RC607.A26W574 1996" is the call number of the print version of the resource, from which the present version was scanned]
- Source="Manuscript Collection 35 Box 22 Folder 16"
- Source="Small Collection 35"

**Maps to MARC**

<table>
<thead>
<tr>
<th>Dublin Core:</th>
<th>MARC:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Source</td>
<td>786</td>
</tr>
</tbody>
</table>

**Mandatory**

**Recommended**


APPENDIX A: GLOSSARY

Bit Depth - Bit depth quantifies how many unique colors are available in an image’s color palette in terms of the number of 0’s and 1’s, or “bits.” See also: Dynamic Range

Compression - The reduction of image file size for processing, storage, and transmission. The quality of the image may be affected by the compression techniques used and the level of compression applied.

There are two types of compression:
- **Lossless compression** is a process that reduces the storage space needed for an image file without loss of data. If an image has undergone lossless compression, it will be identical to the image before it was compressed.
- **Lossy compression** is another process that reduces the storage space needed for an image file, but it discards information. If an image that has undergone lossy compression is decompressed, it will differ from the image before it was compressed, even though the difference may be difficult for the human eye to detect.

There are both standard and nonstandard compression techniques available. In general, it is better to employ a compression technique that is supported by standards, is nonproprietary, and maintained over time. In selecting a compression technique, it is necessary to consider the attributes of the original. Some compression techniques are designed to compress text, others are designed to compress pictures.

Derivative, Surrogate or Access Images - Digital images created from another digital image through some kind of automated process, usually involving a loss of information. Techniques used to create derived images include sampling to a lower resolution, using lossy compression techniques, or altering an image using image processing techniques.

Digital Image - An electronic photograph, made up of a set of picture elements ("pixels"). Each pixel is assigned a tonal value (black, white, a shade of gray, or color) and is represented digitally in binary code (zeros and ones). The term "image" does not imply solely visual materials as source material; rather, a digital image is simply a representation of whatever is being captured, whether it be manuscripts, text, photographs, maps, drawings, blueprints, halftones, musical scores, 3-D objects, etc.

Dots Per Inch or DPI - A measure of resolution used for printed text or images and monitor display.

Dynamic Range (Bit Depth) - The number of colors or shades of gray that can be represented by a pixel. The smallest unit of data stored in a computer is called a bit. Dynamic range is a measurement of the number of bits used to represent each pixel in a digital image. 1 bit or bitonal means that a pixel can either be black or white. Bitonal imaging is good for black and white images, such as line drawings and text. However, scanning in grayscale rather than bitonal may produce a better looking image. 8 bit color or 8 bit grayscale means that each pixel can be one of
256 shades of color or one of 256 shades of gray. 24 bit color means that each pixel can be one of 16.8 million colors. When moving to 48 bit color the available colors in the display will number 2800 times one trillion. This is an enormous number of colors. Plus a higher bit resolution can display more shades of gray. With 30 bit color depth, four times more gray can be represented in the display. Eight times more gray, or even higher, can be represented by a 36 or 48 color bit-depth display.

**File Size** - The file size of a digital image is proportional to its resolution. The higher the resolution, the bigger the file size — file size is different from image size.

**Grayscale** - A range of shades of gray in an image or the values represented between black and white.

**Image Manipulation or Alteration** - Making changes (such as tonal adjustments, cropping, etc.) to a digital image using image editing and processing software such as Adobe Photoshop.

**Image size** - Describes the actual physical dimensions of an image, not the size it appears on a given display device.

**JPEG** - Joint Photographic Experts Group. A compression algorithm for condensing the size of image files. JPEGs are helpful in allowing access to full screen image files online because they require less storage and are therefore quicker to download into a web page.

**JPEG-2000** - At its core, JPEG 2000 is an international standard for the compression of still digital images. JPEG 2000 improves on the compression performance of previous methods while offering significant new features and capabilities. The format is multi-resolution, which allows an application to access and decode only the amount of image needed. This allows the user to quickly view an extremely large JPEG 2000 image almost instantly by retrieving and decompressing a low resolution, display sized portion of the file. In addition, the format allows for new access opportunities such as zoom, pan and rotate. JPEG 2000 is still a lossy, compression technique but may have potential for becoming the file format of choice for archival master images in the near future.

**Master Image** - A digital image that is uncompressed and high-quality, retaining the best possible color information. It is meant to have lasting utility. Master images are usually saved in a nonproprietary format and kept off-line in a secure environment. Master images are of a higher resolution and quality than the digital image delivered to the user on-screen. An archival master accurately represents the original analog item and has an associated metadata record which provides descriptive, administrative, and technical information concerning the original and digital items.

**Metadata** - Data about data, or information provided about a digital object in order to provide access to that image. Usually includes information about the original object, intellectual content of the image, digital representation data, the creation of the digital files, and security or rights management information.
**Optical Resolution** - The number of pixels (in both height and width) making up an image, the more pixels in an image, the higher the resolution, and the higher the resolution of an image, the greater its clarity and definition (and the larger the file size). Resolution can also refer to the output device, such as a computer monitor or printer, used to display the image. Image file resolution is often expressed as a ratio (such as 640x480 pixels), as is monitor resolution; however, resolution is also expressed in terms of PPI. The assumed universal monitor resolution for web users is 144 DPI. Image file resolution and output (print or display) resolution combine to influence the clarity of a digital image when it is viewed.

**Pixel** - Pixel is short for picture elements, which make up an image, similar to grains in a photograph or dots in a half-tone. Each pixel can represent a number of different shades or colors, depending on how much storage space is allocated for it. Pixels per inch refers to the number of pixels captured in a given inch. When referring to digital capture pixels per inch (PPI) is the preferred term, as it more accurately describes the digital image.

**TIFF** - Tagged Image/Interchange File Format a file storage format implemented on a wide variety of computer systems, usually used for archival or master digital capture.
APPENDIX B: CONTENTdm CONFIGURATION

APPENDIX C: SAMPLE OF A COMPLETED PROJECT PLANNING DOCUMENT
APPENDIX D — DIGITIZING NEWSPAPERS FOR MMP

Introduction
Part I: Digitization method
Part II: Sample metadata record for one newspaper issue
Part III: Vendors that offer microfilm scanning
Part IV: References

INTRODUCTION
This appendix assumes the reader has the following CONTENTdm experience:

(1) creating compound objects in Project Client
(2) using OCR in Project Client
(3) implementing the technical standards in the Montana Memory Project Guidelines

PART I: DIGITIZATION METHOD

A. Scan the microfilm (Recommended)

The majority of all newspapers ever published in Montana are available on microfilm. The fastest and most consistent way to digitize a newspaper is to have the microfilm scanned. To make digitization and online display feasible, the original microfilm (the “master”) needs to meet minimum standards. Generally, microfilm produced according to the United States Newspaper Program Guidelines (mid-1980s) and the RLG preservation microfilm guidelines (early 1990s) meets these standards and can be successfully digitized.

The table below tells how to locate Montana newspapers on microfilm held by the Montana Historical Society, ProQuest, and Heritage. Start with MHS, which offers the most affordable duplication services. If they do not own the master, move on to ProQuest and Heritage.

1 In good condition, high resolution camera used, polyester film stock used, reduction ratio of 16x-20x, quality index of 8.0+, densities of 0.8-1.2, and variation of densities 0.2 or less.
### WHERE TO LOCATE MASTER REELS FOR MONTANA NEWSPAPERS

<table>
<thead>
<tr>
<th>Organization</th>
<th>Contact info</th>
<th>List of available titles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Montana Historical Society</td>
<td>406-444-4702/rgebhardt@mt.gov</td>
<td><a href="http://montanahistorywiki.pbworks.com/w/page/21639720/Montana-Newspapers-List">http://montanahistorywiki.pbworks.com/w/page/21639720/Montana-Newspapers-List</a> [Not every listing is a master reel; please inquire.]</td>
</tr>
<tr>
<td>Heritage Microfilm</td>
<td>1-888-870-0484 X31</td>
<td><a href="http://www.heritagemicrofilm.com/VaultInformation.aspx">http://www.heritagemicrofilm.com/VaultInformation.aspx</a> [Click Montana on the map, then click Open.]</td>
</tr>
</tbody>
</table>

### How microfilm scanning works
Microfilm is digitized using special scanners designed for this purpose. Typically, the scanner creates a single, long digital image of the entire reel and saves it as a TIF. Needless to say, this is an extremely large file. The scanner software then identifies the gaps between each frame (page) on the reel and slices this large TIF into separate images, saving each of them as a TIF. The vendor then returns the reel of film and these individual page TIFs to you. These are the images you will upload to your collection in CONTENTdm.

The number of issues one microfilm reel can hold varies. If the newspaper was published weekly, a reel may include a full year of issues. If the paper was published daily, one reel may cover only 1/3 or 1/2 year. Newspapers with more pages per issue, of course, take up more room on a reel than those with fewer pages.

All microfilm master copies are photographic negatives (white text on a black background). During scanning, software converts the negative image to a positive image. Thus, your digital images will look exactly like the original printed newspaper—black text on a white background.

Whenever a reel of microfilm is run through a microfilm scanner, wear and tear occurs. You do not want to risk damaging a master, so you should never send a master to a vendor. Always send a clean, first-generation duplicate. If you do not own clean duplicates, you can purchase them. Depending on the source, the cost will be $65-$120 per reel.

Similarly, digitizing a “use copy” from your collection will produce poor results because scratches and other wear and tear already exist on the film. The digital image will never be any better than the microfilmed image. So, always digitize clean, undamaged microfilm.

A number of vendors provide microfilm digitization services. Your responsibility is to choose a vendor and provide them with copies of the microfilm to be scanned. You can expect the cost of scanning to be $0.55-1.00 per page. You will need to draw up a contract and provide technical specifications for the vendor to follow.

### REQUIREMENTS OF THE MMP CONTRIBUTING INSTITUTION
- Select only pre-1922 issues OR ensure that you have written permission to both digitize and post online.
Plan your Montana Memory Project collection. Typically, you will want one collection to comprise one publication or one region. A collection will be made up of many compound objects. Each issue will comprise one compound object.

- Submit a project proposal to the MMP Exec Committee.
- Obtain the best possible duplicate of the master microfilm.
- Review a representative sample of pages on the duplicate microfilm to be sure it is readable.
- Obtain funding and draw up a contract for microfilm digitization.
- Review the quality of TIFs received from the vendor and obtain rescans if needed.
- Delete duplicate-page TIFs if needed.
- Organize the TIFs so that each issue comprises one compound object.
- Create metadata for the collection, i.e. one unique metadata record per issue.

**Note:** Do not create page-level metadata; do not use article segmentation.

- Contact Mike Price (miprice@mt.gov) for an OCR license prior to uploading.
- Use Project Client to upload the TIFs to MMP, ensuring that CONTENTdm creates JPGs that it OCRs the full text of each TIF.²
- Arrange for long-term storage of the TIF images via the OCLC Digital Archive or some other means.

**Requirements of the Vendor**

- Scan the film at 300 ppi.
- Deliver one uncompressed TIF file per newspaper page.
- Name the TIFs consistent with an agreed-upon pattern. For example, the files for the pages in the December 31, 1919, issue of *The Gardiner Wonderland*, could be named *GW12311919_001.tif*, *GW12311919_002.tif*, *GW12311919_003.tif*, and so on.
- Conduct an internal quality review of scanned images to verify that the number of images is correct and image quality meets standards. Rescan as needed.
- Retain backup copies of TIFs as specified in the contract (e.g. 1 year).

In this scenario, your digital collection in MMP will be nearly an exact reproduction of the microfilm. For example, if a page was skipped during microfilming, it will be missing from the digital collection as well. There will be no placeholder pages in the digital collection. If the publisher printed the wrong page # on the newspaper, this will not be noted in metadata; the navigation for that issue will remain Page 1, Page 2, for all pages, in the order in which they appear on the film. This is also true for pages on which no page number or a wrong page number was printed. If a page was microfilmed twice, the Contributing Institution will delete the duplicate TIF prior to uploading.

**B. Scan the hardcopy (Alternative)**

An MMP Contributing Institution may choose to scan the original physical newspapers. If the page size is small enough to fit on your flatbed scanner, scan one page at a time (do not scan two-page spreads) following the specifications for text (books, pamphlets, etc.) in the MMP Guidelines. This method is time-consuming, so be sure you have staff or volunteers who can

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² OCLC has developed a tool called the FlexLoader for uploading a particular type of newspaper content and metadata into ContentDM. As development of the FlexLoader evolves, the tool may become appropriate for all newspaper content. At that time, these guidelines will be revised accordingly.
spend the necessary hours at the scanner.

**Note:** The Montana State Library has two scanner/laptop units available for borrowing, free of charge. This scanner can handle flat pages up to 12 X 17 inches. For more information about borrowing this scanner/laptop set, please contact Jo Flick (jflick@mt.gov).

If the newspaper pages do not fit on your flatbed scanner, you have two choices:

- a. scan the microfilm as noted above, or
- b. use an overhead scanning method (see below)

Overhead scanning requires the use of a digital camera mounted above the newspaper page as it lies on a flat surface. This method also requires adequate lighting to ensure a readable image. Please research the specifications required for this type of photography before purchasing a camera. You may also want to consider hiring a vendor to scan the hard copy for you. This would require shipping the newspapers to the vendor, so consider carefully whether the hardcopy is too fragile to be sent offsite, and also consider shipping costs.

**Important:** If you digitize in-house (as opposed to using a vendor), you are responsible for all technical requirements listed above.
### PART II: SAMPLE METADATA FOR ONE ISSUE

This metadata record describes one digital object in MMP. That object equates to one issue (Jan 3, 1975) of this newspaper. Note that the **Title** field includes the issue date.

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Title</strong></td>
<td>The Poplar Shopper 1975-01-03</td>
</tr>
<tr>
<td><strong>Contributing Institution</strong></td>
<td>Fort Peck Tribal Library</td>
</tr>
<tr>
<td><strong>Other contributors</strong></td>
<td>Montana Historical Society, Helena, Montana</td>
</tr>
<tr>
<td><strong>Subject</strong></td>
<td>Indians of North America--Montana—Newspapers; Fort Peck Indian Reservation (Mont.)--Newspapers; Siouan Indians--Newspapers; Assiniboine Indians—Newspapers</td>
</tr>
<tr>
<td><strong>Geographic Coverage</strong></td>
<td>Poplar, Montana; Roosevelt County, Montana</td>
</tr>
<tr>
<td><strong>Date Original</strong></td>
<td>1975-01-03</td>
</tr>
<tr>
<td><strong>Date Digital</strong></td>
<td>2010</td>
</tr>
<tr>
<td><strong>Type</strong></td>
<td>text</td>
</tr>
<tr>
<td><strong>Format</strong></td>
<td>image/jpg</td>
</tr>
<tr>
<td><strong>Rights Management</strong></td>
<td>Copyright to this collection is held by The Poplar Shopper, Poplar, MT. Permission may be required for use and/or reproductions.</td>
</tr>
<tr>
<td><strong>Source</strong></td>
<td>Newsp P-700</td>
</tr>
<tr>
<td><strong>Language</strong></td>
<td>en</td>
</tr>
<tr>
<td><strong>Digitization Specifications</strong></td>
<td>Microfilm scanned by The Crowley Company and saved as TIFF files at 300 PPI, 8 bit grayscale using a Mekel Mark V. Derivative images created using PhotoShop CS4. Optical character recognition by Abbyy FineReader 10 corporate edition. JPG display images generated by ContentDM 6.0.</td>
</tr>
</tbody>
</table>

**Note:** A statement on copyright is mandatory. Only newspapers published prior to 1923 are in the public domain; all others require you to obtain written permission to digitize and written permission to publish the digital images online.

**Source:** [Fort Peck Reservation Newspapers](#)
PART III: VENDORS THAT OFFER MICROFILM SCANNING

Please refer to the Montana Digital Newspaper Project wiki for an up-to-date list of vendors: http://montanandnp.pbworks.com/w/page/11577474/Vendors-Offering-Microfilm-Scanning.

PART IV: REFERENCES

