PNRA

Pacific Northwest Railroad Archive

Digital Archive Plan

June 16, 2016

Elizabeth Stiles Knight, Consulting Archivist

4 CULTURE

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1. EXECUTIVE SUMMARY

Aims and Accomplishments

This Digital Archive Plan is a component of the Pacific Northwest Railroad Archive's effort to assure the long-term preservation, management and discoverability of the PNRA and partner Railroad History Organization (RHO) collections. Specifically, this document provides a framework of operations, policies and practices covering both the technical and non-technical aspects the Archive. The following actions were accomplished in the first phase of this effort, between September 2015 and June 2016.

- A review of five platforms concluded with the selection of the AtoM platform for a trial. It most closely meets the needs of the PNRA in terms of functionality, low cost, backend and frontend ease of use, customization capabilities, and support options. AtoM provides modules for both collection information management and digital object management including an accession log, generation of descriptive records, filtered searching, thumbnail generation, and a customizable public interface.
- PNRA Board performed strategic planning
- PNRA commenced the development of a Financial Plan, Staffing and Succession Plans, and a Disaster Plan
- Fundamental standards for metadata, interoperability, description, preservation, long-term sustainability were incorporated into the Digital Archive Plan.
- PNRA staff and selected volunteers received education on digital archive terminology, principles, concepts, and standards
- A preliminary arrangement scheme was drafted for PNRA collections (excludes RHO collections)
- The drafting of collection-level findings aids/catalog records for PNRA collections was commenced. Excludes RHO collections.

Next Steps

Below is the list of projects and tasks recommended in this document. To start, PNRA can prioritize these items and develop a timeline for completion. This can be done during Phase 2 of the Digital Archive Plan.

- SECTION 3: MISSION, VISION AND GOALS: Continue strategic planning effort
- SECTION 4: BUSINESS/FINANCIAL PLAN: Complete plan
- SECTION 5: STAFFING PLAN: Complete plan
- SECTION 6: APPRAISAL AND ACQUISITION:
    - Update existing Donor Agreement form.
    - Incorporate elements provided below into existing collection development policy.
    - Complete collection-level descriptions for PNRA collections (non-RHO collections).
    - Complete and adopt revised collection development policy.

    - Apply minimum level metadata requirements to acquisition procedure.
    - Incorporate Section 6.5 below, Acquisition of digital materials, into existing PNRA acquisition policy.
- SECTION 7: CONTENT/DATA PLAN
    - Establish a collection-level numbering scheme for PNRA-owned collections. Can be based on Arrangement Scheme numbering system.
    - Finalize the draft Arrangement Scheme.
    - Incorporate digitization parameters provided here into existing procedures as needed.
    - Utilize Appendix H: Copyright Considerations in Digitizing Flowchart into digitization decision-making and prioritization.
    - Incorporate Appendix I: Sample Digital Preservation Decision Flowchart into digitization decision-making and prioritization.
    - Two or three copies of all digital objects and collection data, stored in separate locations, should be provided.
    - PNRA and the RHOs should eventually establish a mirror site or sites.
    - PNRA and RHOs should provide detailed and up-to-date documentation on software, hardware and systems used; changes and updates to hardware, software and systems; tests and evaluations of system functionalities
    - PNRA and RHOs should stay up-to-date and informed of current and emerging hardware, software and storage technologies.
    - Trial AtoM collection data management platform.
- SECTION 8: METADATA:
    - Adopt Dublin Core data elements to accession and cataloging procedures.
    - Map and convert PNRA data fields to Dublin Core schema for eventual upload to new platform.
    - Incorporate DACS cataloging standards into collection description practices.
    - Adopt section 8.4 Digital Image Minimum Metadata recommendations.
    - Create DACS-based collection level descriptions for all collections.
- SECTION 9: PRESERVATION PLAN:
    - Update and expand policy statements annually as the new digital archiving platform is implemented and procedures are developed.
- SECTION 10: TECHNICAL SYSTEMS:
    - Create schematic of proposed PNRA Digital Archive software and hardware components.
    - Trial and customize AtoM content and data management platform.
    - Establish timeline for migration from SharePoint
    - Evaluate the feasibility of the Archivematica preservation platform -- future task.
- SECTION 11: ACCESS:
    - Wikipedia: create pages for PNRA and RHOs.
    - Create online exhibits and timelines utilizing tools like Omeka and ViewShare.
- SECTION 12: SUCCESSION PLAN: Complete plan
- SECTION 13: DISASTER PREPAREDNESS:
    - Complete dPlan
    - Purchase and create emergency preparedness supplies kit

2. INTRODUCTION

2.1. Project

In 2014, the Pacific Northwest Railroad Archive was awarded a 4Culture Heritage Collection Care grant to develop a Sustainable Digital Archive Plan. The aim is to develop a framework of technical requirements and processes, based on best practices, for assuring the long-term preservation, management and discoverability of the PNRA's and its partner Railroad History Organization (RHO) digital collections. This document is the product of the first phase of this project. The following work was completed September 2015-June 2016.

- Draft a comprehensive digital archive plan that addresses the long-term operation and sustainability of a digital archive including the administrative, managerial, and technical aspects of such an effort.
- Review a selected number of digital content and information management platforms.
- Train selected PNRA staff on digital archiving terminology, principles and standards.

PNRA proposes a project to develop a Digital Archive Plan and associated processes to manage our digital data and improve the online finding aids at the Archive. This Plan will act as a roadmap to direct the improved handling and care of the digital assets in PNRA's collections and assure the preservation of this important King County heritage for future generations. The PNRA Digital Archive Plan will be made available to AKCHO members and others in the local cultural heritage community and can serve as an example and a model for building a digital archive at a small-sized organization with limited resources.

2.2. Standards, Best Practices and Guidelines Utilized

Details and links to most of these items are provided in Section 14: Resources.

- *Describing Archives: A Content Standard, Second Edition* (DACS) cataloging standards
- Digital Preservation Coalition
- *Digital Preservation Europe Repository Planning Checklist and Guidance* (PLATTER planning template)
- Dublin Core, PREMIS and METS metadata standards
- *A Framework of Guidance for Building Good Digital Collections.* National Information Standards Organization (NISO).
- Library of Congress, digital preservation guidelines
- Minnesota Historical Society digitization guidelines
- Northeast Document Conservation Center (NEDCC) Preservation Leaflets
- Open Archival Information Systems Reference Model
- Preserving Digital Objects with Restricted Resources (POWRR)
- Society of American Archivists standards and best practices

- Trustworthy Repositories Audit and Certification: Criteria and Checklist (TRAC) audit guidelines

2.3. Guiding Principles

- Recommended solutions are appropriate for PNRA resource and staffing levels
- RHO priorities and practices are recognized
- Implementation of digital archiving standards and best practices
- Recommendations are sustainable.
- Digital archives are a relatively immature concept and exist in a rapidly changing technology environment.
- The best approach is a holistic one that addresses administration, management, policy and other non-technical aspects of the digital archive.
- A phased, modular implementation of digital archiving solutions is efficient, wise and prudent in the dynamic technology environment.
- The OAIS Reference Model is the foundation upon which the PNRA digital archive will be built.
- Doing something is better than doing nothing.
- The perfect is the enemy of the good.

Elizabeth Stiles Knight is a librarian and freelance consulting archivist in Seattle who works with historical societies, colleges, non-profit organizations and families to improve the organization, preservation and access to archival collections. She holds a Master of Library and Information Science degree from the University of Washington, is a Certified Archivist, and a Digital Archives Specialist. She is a member of Northwest Archivists and the Society of American Archivists, and a past chair of Seattle Area Archivists.

3. MISSION, VISION AND GOALS

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Tasks

Continue strategic planning

Appendices

Appendix A: Organizational Chart

3.1. Organization Context and Purpose

Railroads are a major part of Pacific Northwest heritage and helped shape the region; its towns, communications and its economic life. Today railroads continue to play a central role in the emergence of the Pacific Northwest as a significant region of the United States, but their significance and value is not generally apparent to the public. Fostering public understanding of the value, influence and history of railroads is the mission of the nonprofit Railroad History Organizations (RHOs). This is particularly important to the future of the RHOs associated to the major railroads of the Pacific Northwest region of the United States and railroad-related museums in the region with document collections. These organizations lack facilities to preserve the photos, drawings, documents and small artifacts which contain important elements of the histories of their railroads.

The purpose of Pacific Northwest Railroad Archive (PNRA or Archive) is to be a service organization providing affordable space and services for the benefit of nonprofit RHOs and thereby the public at large. These benefits are intended to strengthen the RHOs by making their railroad history collections much more accessible to the general public, promoting their collections' public use, preserving the collections physically and digitally, encouraging RHO memberships, and ultimately enabling RHOs to continue their missions to preserve and interpret railroad history for current and future generations.

PNRA is organized exclusively for charitable, educational, and scientific purposes, including, for such purposes, the making of distributions to organizations that qualify as exempt organizations under section 501(c)(3) of the Internal Revenue Code, or the corresponding section of any future federal tax code. --*Source: PNRA By-laws, 2012*

Audience

PNRA and RHO collections are of interest to local and national historians, rail fans, and the advertising and publishing industries.

3.2. Organizational Infrastructure

Governance and Organizational Structure

The PNRA is governed by a Board of Directors whose members are drawn from the Railroad History Organizations whose collections comprise the bulk of materials held by the PNRA.

Board President
Vice President
Treasurer
Secretary
Executive Director
Standing Committees:

- Finance Committee
- Facility Committee
- Services Committee
- Community Outreach
- Membership Committee
- Nominating Committee
- Fulfillment Committee
- Information Technology Committee

Friends/Members
Volunteers

Purpose

Source: PNRA By-laws, 2012.

The purpose of Pacific Northwest Railroad Archive (PNRA or Archive) is to be a service organization providing affordable space and services for the benefit of nonprofit RHOs and thereby the public at large.

Scope

The Pacific Northwest Railroad Archive is comprised of the collections held by four of five-member Railroad History Organizations (RHOs), as well as collections owned specifically by PNRA. RHO collections cover historically significant collections for Washington, Oregon, Idaho and Montana. The RHOs are:

- Boeing Employee Model Railroad Club
- Cascade Rail Foundation representing the Milwaukee Road in Washington State
- Great Northern Railway Historical Society
- Northern Pacific Railway Historical Association
- Spokane, Portland & Seattle Railway Historical Society

Policies and Documentation

- Archive Services
- Digital Systems
- Mission, Vision and Goals
- By-Laws
- Collection Digitization
- Operating Plan
- Organizational Chart (Appendix A)
- Accession and Deaccession Policies
- Collections Policy
- Membership Policies
- Periodicals Management Policy
- Permission to Publish
- Personnel Policies
- Request Fulfillment Policy
- Staff Training
- Supplies Policy

Funding System

PNRA is funded from RHO assessments, operating revenues, individual contributions and grants. Additional funding comes from campaigns, memberships, sale of image rights, paid research services, traveling exhibits

3.3. Mission

Provide a permanent institution for the preservation of railroad records from the greater Pacific Northwest area and make them accessible over the Internet.

3.4. Vision

Promote world-wide access to Pacific Northwest railroad heritage.

3.5. Goals

- Implement a smoothly operating computer cataloging system that searches across all collections and presents digitized images of documents
- Develop a strong volunteer staff that meets operational needs
- Complete the building facility and equipment build-out
- Provide operating income to fully fund the ongoing activities
- Develop strong regional community outreach programs and relations with local/regional heritage communities
- Successfully complete the Capital Campaign
- Hire professional staff to lead the archive and initiate future key programs

3.6. Strategic Priorities

In 2016, the PNRA Board has identified the following top five prioritized initiatives for the next few years. It aspires to have an OAIS-compliant Trusted Digital Repository, as defined by the TRAC audit process by 2020.

1. Complete capital campaign
2. Provide continuing revenue
3. Finish building systems
4. Expand volunteer recruitment/leadership development
5. Complete leadership succession plan

4. BUSINESS/FINANCIAL PLAN

Business Plan Under Development

This Plan will articulate a sustainable funding model at a level suitable for routine functioning of the repository. It will address future costs and provide contingencies for financial cutbacks or emergencies to assure vital data is protected.

5. STAFFING PLAN

Staffing Plan Under Development

The staffing plan will assure that the PNRA acquires and maintains the skill sets needed to maintain the digital archive long-term. It will identify knowledge and skills needed by its personnel, define competencies and roles, and address the maintenance of skills. The plan will identify three possible staffing models based on needs and resources.

Draft section contents

Current Staffing and Gap Analysis
Required Roles and Responsibilities
Staffing Plan #1
Staffing Plan #2
Staffing Plan #3
Skill Maintenance

Tasks

Complete Business/Financial Plan

Appendices

None at this time

6. APPRAISAL AND ACQUISITION

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Tasks

Update existing Donor Agreement form.
Incorporate elements provided below into existing collection development policy.
Complete collection-level descriptions for PNRA collections (non-RHO collections).
Complete and adopt revised collection development policy.
Apply minimum level metadata requirements to acquisition procedure.
Incorporate Section 6.5 below, Acquisition of digital materials, into existing PNRA acquisition policy.

Appendices

Appendix B: Revised Donor Agreement form
Appendix C: Collection-level Description Record, sample

6.1. Current Procedures

Appraisal is "the process of identifying materials offered to an archives that have sufficient value to be accessioned[1]. Existing documentation on the PNRA's general policies and procedures for appraisal and acquisition is available in the PNRA Collections Policy and Operating Plan.

The following recommendations are provided to update and expand current PNRA appraisal and acquisition procedures to include digital materials.

6.2. Appraisal: Updated Collection Development Policy [draft]

PNRA should incorporate the following elements into its existing collection development policy.

1. Statement of purpose of the repository: Provide a permanent institution for the preservation of railroad records from the greater Pacific Northwest area and make them accessible over the Internet.

[1] Society of American Archivists Glossary.

2. **Types of programs and activities supported by the collections.**
    - Affordable space to house RHO collections and allow RHO members to preserve materials.
    - Equipment for RHO members to digitize and catalog their collections.
    - Making PNRA and RHO collections available online.
    - Interpretive exhibits promoting railroad history throughout the region.
    - Fulfillment of requests for specialized research and copies of materials by trained PNRA contractors.
3. **Audiences served:** Railroad historians, model railroad hobbyists, scholars and researchers, the general public.
4. **Geographic scope:** Pacific Northwest, Washington, Oregon, Idaho, Montana
5. **Time period:**
6. **Types of materials collected:**
    - Photo negatives, prints and slides
    - Rare documents, corporate records, and publications
    - Non-unique paper documents, files and records
    - Oversize objects (maps, timesheets, schematic drawings, etc)
    - Digital files (JPEG, TIFF, PDF, text, spreadsheet, database)
    - Selected artifacts
    - Selected publications
7. **Topical scope of collections** (subjects, people, organizations)
    - railroads
    - trains
    - locomotives
    - cabooses
    - engines
    - boxcars
    - rail
    - stations
    - depots
    - equipment
    - operations and traffic
    - structures
    - advertising
    - branch lines
    - disasters
    - rail yards
8. **Gaps** or areas of weakness by unit, chronological period, geographic location, or other criteria;
9. Locus of responsibility for acquiring materials. The PNRA Executive Director or the Chairman of the Board of Directors, or the appropriate RHO representative, should be responsible for approving new acquisitions. The PNRA cares for items owned by member RHO's. RHO's may designate materials they have acquired be added to the holdings at PNRA. In addition, the PNRA may accept materials on behalf of the RHO's.

The PNRA may acquire materials not related to a RHO under the authority of the Services Committee and the PNRA Executive Director.

10. Cooperative agreements and relationship with RHOs and other repositories.
    - Cascade Rail Foundation
    - Great Northern Railway Historical Society (GNRHS)
    - Northern Pacific Railway Historical Association (NPRHA)
    - Spokane Portland & Seattle Railway Historical Society (SP&SRHS)
    - Jackson Street Roundhouse (JSRH) facility, St. Paul, MN
    - Boeing Employees Model Railroad Club (BEMRRC)
11. De-accessioning policy (existing)
12. Practical procedures for implementing the policy: The PNRA Executive Director, the Board of Directors, and any persons directly involved in evaluating possible donations should be familiar with this policy. I can be referred to as needed when declining donations or determining whether a particular donation is within the scope what PNRA collects.
13. Schedule for evaluating/reviewing the policy: 3-5 years

6.3. Appraisal: Collecting Objectives for Digital Collections

PNRA's digital collections are collectively defined as any creative work, image, document, or digital media-type file that are either "born digital" or represent items in a digital format which serve as a resource for PNRA. The principal emphasis shall be materials and collections related to railroad history and operations from the region, including the transcontinental, regional, logging and industrial railroads. Railroads represented at the PNRA include the Northern Pacific Railway; the Great Northern Railway; Spokane, Portland & Seattle Railway; and the Milwaukee Railroad in Washington State. They may include digital versions of original images, documents, ephemera, company records, timetables, manuals, maps, selected publications, and other hardcopy materials.

6.4. Appraisal: Criteria for Accepting New Materials

When determining whether to accept a donation of records, consider the following:

- Do the materials meet the requirements of the PNRA collection policy?
- Do the materials duplicate collections already held by PNRA?
- Do the materials complement or compete with other collections?
- Do the materials have potential research value?
- What resources will be required to process, store, and provide researcher access to the collection for the long term?
- Are there ramifications to accepting or rejecting the material?
- Would the materials, and potential researchers, be better served by placing the material in another repository?

6.5. Acquisition: Digital Materials

Digital formats accepted: PDF, TIFF, JPEG, JPEG2000, WAVE

Guidelines and procedures

Exhaustive, upfront reformatting or processing of digital objects can be time-consuming and unnecessary when the value and future use of an object is unclear. Instead, current practice involves minimal initial processing that includes accessioning, assigning minimum-level metadata and a unique identifier, virus checking and validating files. Provided here are the steps for this process.

- STEP 1: State accepted methods for acquiring digital materials, eg: flash drive or file transfer (preferred); CD, DVD also accepted.

- STEP 2: Perform risk assessment of new digital acquisitions: a physical evaluation of digital material when it first arrives and an analysis of file formats. Physical evaluation is essential to determine if media is stable and readable.

- STEP 3: Input into accession log.

- STEP 4: Record metadata for digital acquisitions. Whenever possible, record as much information as possible in the donor agreement, at the point of acquisition, or during accession.
  Minimum level:

    - Unique identifier
    - Title
    - Creator
    - Donor
    - Date of materials
    - Material types, file formats
    - Extent (file size)
    - Summary description (scope and content note)
    - Conditions governing access

  Additional data:

    - Accrual or new collection
    - Original or copy
    - Processing priority
    - Preservation actions
    - Subject terms

- STEP 5: If a non-RHO acquisitions, assign a collection number based on the Arrangement Scheme or record as an accrual, as appropriate.

- STEP 6: Determine appropriate level of treatment. Digital media such as CDs, DVDs, disks, and flash drives are fragile and prone to obsolescence. Digital files can be copied to a network or cloud-based storage area designated for minimally processed or unprocessed materials.

- STEP 7: Utilize ingest tools provided by new PNRA digital archive platform -- or individual tools listed here.

    - Virus checker (eg, MS Defender)
    - Spyware checker
    - MD5 fixity checker (generates check sums) http://onlinemd5.com/
    - FTK Imager (forensic evaluation) http://accessdata.com/product-download
    - Bag-It Transfer Utility http://sourceforge.net/projects/loc-xferutils/
    - Duke Data Accessioner http://dataaccessioner.org/
    - JHOVE format identification and validation tool http://jhove.sourceforge.net/
    - Unified Digital File Format Registry http://udfr.cdlib.org/

- STEP 8: Create a collection-level record if not an accrual. Update existing collection-level record if an accrual. See Appendix C: Sample Collection-level Description Record, sample.

- STEP 9: Label and re-house materials as needed. Record shelf location.

7. CONTENT/DATA PLAN

Contents

Tasks

Establish a collection-level numbering scheme for PNRA-owned collections.
Finalize the draft Arrangement Scheme.
Incorporate digitization parameters provided here into existing procedures as needed.
Utilize Appendix H: Copyright Considerations in Digitizing Flowchart into digitization decision-making and prioritization.
Incorporate Appendix I: Sample Digital Preservation Decision Flowchart into digitization decision-making and prioritization.
Two or three copies of all digital objects and collection data, stored in separate locations, should be provided.
PNRA and the RHOs should eventually establish a mirror site or sites.
PNRA and RHOs should provide detailed and up-to-date documentation on software, hardware and systems used; changes and updates to hardware, software and systems; tests and evaluations of system functionalities
PNRA and RHOs should stay up-to-date and informed of current and emerging hardware, software and storage technologies.
Trial AtoM collection data management platform

Appendices

Appendix D: Open Archival Information System (OAIS) Reference Model, overview
Appendix E: Digital Collection Inventory [PENDING]
Appendix F: Draft Arrangement Scheme (PNRA-owned collections only)
Appendix G: Digitization Parameters
Appendix H: Copyright Considerations When Digitizing
Appendix I: Sample Digital Preservation Decision Flowchart
Appendix J: Access to Memory (AtoM) Platform information

7.1. Overview: OAIS model and digital object management

Digital collections must be actively managed unlike their non-digital counterparts which can be passively managed. Digital files are inherently more fragile and vulnerable to damage, corruption, and loss. They are also more expensive to manage. Successful digital repositories are based not on expensive or elaborate technical solutions, but rather on careful, thorough planning and good management.

One way to think of a repository, in very simplified, generalized terms, is of a dark archive (master files, usually stored offline), a gray archive (used for managing files, creating copies, reformatting, etc.) and a light archive (the discovery or access platform).

The OAIS model defines digital objects in terms of SIPS, AIPS, and DIPS, submission, archival and dissemination information packages, respectively. Various tools and platforms can be utilized to create, manage and preserve the information packages. See Appendix D: Open Archival Information System (OAIS) Reference Model, overview.

According to the OAIS Reference Model, there are six mandatory responsibilities for a digital repository.

1. Negotiate for and accept appropriate information from information producers.
2. Obtain sufficient control of the information to meet long-term preservation objectives.
3. Determine scope of an archive's user community.
4. Ensure preserved information is independently understandable to the user community.
5. Follow documented policies and procedures to ensure the information is preserved against all reasonable contingencies, and that there are no *ad hoc* deletions.
6. Make preserved information available to the user community, and enable dissemination of authenticated copies of the preserved information in its original form, or in a form traceable to the original.

The OAIS model also describes the essential functions of a digital repository.:

- Ingest
- Data management
- Preservation Planning
- Archival Storage
- Administration
- Access

7.2. Repository Size and Specifications

Existing repository size

- Total data: 2.79 TB
- Available to users: 250 GB
- Objects: 273,010 Files

Quantities

- 125,000 digital objects to be archived per year
- 40,000 items scanned per year
- 97% of digital objects are scanned copies of non-digital holdings.
- 3% of digital holdings are born digital

Existing formats

- MSWord
- XLS
- PDF
- TIFF, JPEG images
- MDB MS Access

Digital media

- DVDs and CDs
- thumb (flash) drives
- 3.5," 5," and 8" disks,
- digital files of photos and documents, etc.

Data characteristics

- Data complexity: primarily simple data (spreadsheets-text formats, images, video)
- Data sensitivity: A high proportion contains sensitive information such as: personal data; bridge structural data; proprietary images. Bulk: Project files; maps; common images, technical drawings

7.3. Collection Summaries

Non-digital collection summaries

Collection Owner	Extent	Summary
CRF Cascade Rail Foundation	~500 boxes	Materials relating to the Milwaukee Road in Washington State

GNRHS Great Northern Railroad Historical Society	<100 boxes	● Box-level description ● In storage ● Has box numbers and locations recorded ● No cataloging or inventories ● Computer system in St. Paul and not accessible here ● Box-level inventory being performed by 2 PNRA volunteers ● MS Access database, ~150,000 records ● A lot online ● NPGN joint site: ~100,000 records; only place where GN stuff appears (Share an office in St. Paul 10,000 sq ft of records there; 3 million pieces of paper; NP microfilmed some stuff and threw out paper; way more than here, similar facilities)
NPRHA Northern Pacific Railroad Historical Association	~600 boxes	● Uses excel to record contents ● Jim Fredrickson collection here (~35% of this collection) ● Like GN, lots on a list and stuff on the web
SP&SRHS Spokane, Portland and Seattle	~360 boxes	● 15 databases ● No photo collection yet ● Inventoried to folder level ● Uses excel
PNRA Pacific Northwest Railroad Archive	~75 boxes list of 211 collections (accessions)	● PNRA publication library ● Lots on Seattle trolleys ● Ainsworth, c. 1970-2005; 74 file cabinet drawers, 14 vertical cabinets (4 contained books), AFES (?) photos, 100,000 negatives, donor won't allow GN materials to be transferred to GN, one of 3 founders of PNRA ● Dan Perkins, a slide collection organized by date ● Emerson – loaned to Perkins, he died, wife died, back to Mrs. Emerson. ● See Appendix C: Collection-level Description Record, sample

		● See Appendix F: Draft Arrangement Scheme
BEMRRC Boeing Employees Model Railroad Club		● No archival collections

Digital collection summaries [PENDING]

- RHO
- PNRA-owned
- See: Appendix E: Digital Collection Inventory [PENDING]

7.4. Collection Organization

Requirements

Arrangement Scheme

Archival collections are organized (arranged) both physically and intellectually. Physical arrangement often corresponds with the intellectual arrangement system, which is called an arrangement scheme. An arrangement scheme provides a framework which simplifies the incorporation of new accessions and facilitates locating collections and items. Archival collections of the records of a corporation, organization or other entity are generally arranged by record group, subgroup and series but the scheme can be more granular as needed. Archival collections of materials produced by families and individuals can be organized by collection and series, such as correspondence, images, artifacts, manuscripts, calendars, diaries, etc.

A preliminary arrangement scheme for the PNRA-owned collections is provided in Appendix F: Draft Arrangement Scheme. This scheme will be reviewed and revised as needed during the second phase of the Digital Archive planning project.

The RHOs have their own collection organization systems. Arrangement schemes can be developed for the RHO collections in the future.

Item and Collection Numbering

The PNRA and RHOs already assign unique identifiers to items that are digitized. In order to make PNRA and RHO collections more widely visible and findable on the Internet, a collection-level numbering system is needed. To this end, PNRA should ultimately generate EAD

collection-level finding aids. EAD stands for Encoded Archival Description and is XML-based and is the de facto standard for online finding aids. Large, online aggregators of archival finding aids, such as Archives West and Archive Grid, require finding aids to be in EAD format. AtoM, the digital archiving platform the PNRA will trail in Fall 2017, generates EAD encoded finding aids. A collection numbering system is often simply the alpha-numeric code assigned to record groups, subgroup, series, and special collections in the arrangement scheme.

7.5. Digitization Parameters

General Guidelines

- Highest resolution available, not rescaled or interpolated
- Highest bit depth available, 16 bits per channel if available
- Embedded color profile or specified color space used in published version
- Uncompressed
- Unlayered

Master digital images should be stored in a nonproprietary / open source file format that supports long-term preservation of the image. The recommended format most frequently used for master digital images is TIFF or JPEG 2000 (not to be confused with standard “JPEG” format).

The **service master** is an optimized working copy of the master file, that can be used as a source for all subsequent derivatives. They are also used to create print publications. Creation of a service master from a master will depend on the source file and the resources and time of the organization. Typically, all scans of photos and most scans of historic documentation are more likely to be subject of needing rework and the creation of a service master file. Newer documents may need no rework so need no master service file if resources are slim.

Derivative files are created from the service master or master file and are used for general Internet or network access. Derivative files typically include an preview image, which is sized to fit within the screen of an average monitor or other delivery mechanism and a often a thumbnail image, which is small enough to load quickly and linked to the larger preview image

Derivative files are created from the service master or master file and are used for general Internet or network access. Derivative files typically include an preview image, which is sized to fit within the screen of an average monitor or other delivery mechanism and a often a thumbnail image, which is small enough to load quickly and linked to the larger preview image

File Naming

File naming recommendations (Minnesota Historical Society)

- Use lowercase letters of the Latin alphabet and the numerals 0 through 9.
- Use underscores or dashes in place of spaces
- Characters to avoid: ¬ ! " £ $ % ^ & * ( ) + = { [}] : ; @ ~ # ? < > , | \ ` '
- Begin each filename with a two- to three-character acronym representing the organization's name
- Follow the organization's acronym with an object ID. The object ID consists of any unique numbering scheme already in use to represent the object or, if no such number exists, a short description representing the item
- Include a part designator after the object ID, if it is part of series when applicable
- File names should be limited to 31 characters, including the three-character file extension
- Remember Think long-term
- Select a system that will outlast staff involved in the current project
- Consider the number of files your institution will ultimately be managing
- How simple or easy will it be to make a mistake?
- File names do not take the place of metadata
- Keep them simple and straightforward.

Specific digitization parameters for photographs

- Parameters for other material formats (maps, text, film negatives and graphics) are provided in Appendix G: Digitization Parameters.
- Digital content management platforms, such as AtoM, that PNRA reviewed, generate thumbnail images.

	Master	**Web Access**	**Thumbnail**
File format	TIFF	JPEG	JPEG
Bit depth	16 bit color 24 bit color	8 bit grayscale 24 bit color	8 bit grayscale 24 bit color
Spatial resolution	400-800 ppi	72 ppi	72 ppi
Spatial dimensions	4000 to 8000 pixels across the long dimension, depending on size of original, excluding mounts and borders	600 pixels across the long dimension	150 to 200 pixels across the long dimension

7.6. Packaging

The The Open Archival Information System (OAIS) information model is built around the concept of an information package, which consists of the digital object that is the focus of

preservation, along with metadata necessary to support its long-term preservation, access, and understandability, bound into a single logical package. There are three important variants of the information package concept: the Submission Information Package (SIP), the Archival Information Package (AIP), and the Dissemination Information Package (DIP). See Appendix D: Open Archival Information System (OAIS) Reference Model, overview for more information.

Archivematica, a back-end digital archive preservation platform reviewed by PNRA during this planning process, generates SIPs, AIPs, and DIPs. Not all platforms perform this process. As digital archiving systems continue to mature, this function will become typical. Once the initial phases of the new digital archive system are in place, the PNRA will pursue implementation of Archivematica, or a similar system, for the generation and preservation of digital object information packages.

7.7. Storage and Backup

Existing

- Onsite: Local machine copies + PNRA12; website copies on two local machines; external hard drives used for monthly backup
- Offsite: Data center in Tukwila hosting PNRA-owned web servers which maintain a three-day backup.
- Cloud: The Amazon Web Services provides a place for us to store an off-site backup to be used in case our datacenter burns or is flooded and our servers are destroyed. That off-site backup is pulled once a month. We can't operate the sites from this Amazon Web Service, only restore the web site configuration to a new set of servers in case of disaster.
- External drives are refreshed monthly; dark when not being refreshed.
- Work is stored in two locations at the PNRA site

Planned

- The PNRA will continue to utilize its existing configuration of local, remote and cloud-based storage and backup.
- Two or three copies of all digital objects and collection data, stored in separate locations, should be provided.
- Most digital archive platforms offer hosted storage but costs are high. Instead, at least initially, PNRA will integrate AtoM and Archivematica (or similar platform) with its Amazon Cloud site.
- PNRA and the RHOs should eventually establish a mirror site or sites.
- PNRA and RHOs should provide detailed and up-to-date documentation on software, hardware and systems used; changes and updates to hardware, software and systems; tests and evaluations of system functionalities
- PNRA and RHOs should stay up-to-date and informed of current and emerging hardware, software and storage technologies.

- Higher level storage requirements for the long-term preservation of Archival Information Packages (AIPs) are articulated by the Trustworthy Repositories Audit & Certification Checklist (TRAC)[2]. These requirements include: the use of migration, transformations, checksums, multiple copies, distributed storage, and tracking of processing history.

7.8. Collection Information Management

Current Practices

The PNRA stores collection information in myriad Excel spreadsheets, SharePoint and MS Access databases. This includes accession records, item cataloging, collection inventories, donor lists, shelf locations, and other data. This system makes it difficult to organize, manage, process, locate, access digital and non-digital holdings and prioritize tasks and workflows. The PNRA is anxious to migrate to a more unified and coherent system.

Planned

Five of the six digital archiving platforms that PNRA reviewed over the past six months provide collection management functionality. In the fall of 2017, PNRA will perform a trial of the AtoM platform which will provide PNRA with a single interface for accession logs, donor records, location codes, collection- and item-level descriptive records, processing prioritization, metadata standardization, public search interface, thumb-nail image generation, and permission levels for administration, RHOs, and volunteers. For more information on AtoM, see Appendix J: Access to Memory (AtoM) Platform information.

[2] Center for Research Libraries. *Trustworthy Repositories Audit and Certification: Criteria and Checklist* (TRAC). 2007. https://www.crl.edu/sites/default/files/d6/attachments/pages/trac_0.pdf

8. METADATA

Contents

Tasks

Establish a RHO- and collection-level unique identifier scheme; should/can be based on the Arrangement Scheme.
Adopt Dublin Core data elements to accession and cataloging procedures.
Map and convert PNRA data fields to Dublin Core schema for eventual upload to new platform.
Incorporate DACS cataloging standards into collection description practices.
Adopt section 8.4 Digital Image Minimum Metadata recommendations.
Create DACS-based collection level descriptions for all collections.

Appendices

Appendix F: Arrangement Scheme
Appendix K: AtoM Metadata Crosswalks

8.1. Overview

Utilizing appropriate metadata is a core element of a digital archive. PNRA and RHOs should adopt the widely used metadata standards described here in order to improve collection organization, optimize discovery, promote interoperability with external systems and future platforms, and assure long-term access.

There are three types of metadata standards that PNRA should implement: descriptive, preservation and technical. Most of the digital archiving platforms reviewed by PNRA as part of this Digital Archive Plan, such as Archivematica, utilize these standards and some generate the preservation and technical metadata. This section provides guidelines for PNRA staff on needed revisions and standardization of existing cataloging data fields, collection-level description, and a proposed arrangement scheme for PNRA-owned collections. All of these will provide PNRA

with foundation of standards-based, widely-adopted metadata schema that will improve collection management practices.

The core metadata standards PNRA will adopt are:

- Dublin Core (DC) for descriptive metadata elements -- AtoM provides a customizable DC template.
- Describing Archives: A Content Standard (DACS) provides the 'cataloging' rules for archival descriptive records -- AtoM provides a customizable DACS template
- PREMIS for preservation metadata -- Archivematica platforms generates PREMIS metadata
- METS for technical metadata -- Archivematica platform generates METS metadata
- Encoded Archival Description (EAD) -- XML-based coding for finding aid interoperability with other discovery platforms and and digital finding aid aggregators. -- EAD encoded finding aids can be generated easily from Dublin Core descriptive records.

8.2. PNRA Metadata

PNRA fields	Dublin Core	DACS	Scope note
Required metadata fields			
		2.2 Name and location of repository	
RHOs? Arrangement Scheme collection IDs Accession No. Collection ID (accession number) Photo ID AFE Item Number	Identifier	2.1.3 Local Identifier (for the individual item)	DACS: 3 elements 1. local 2. repository: not required but a ISIL code request for PNRA has been submitted to Library of Congress. 3. Country: US for United States Note: #2 and #3 useful later for EAD encoded finding aids.
	Title	2.3 Title	Follow DACS guidelines when creating titles.
Begin Date End Date	Date	2.4 Date	Follow DACS guidelines when formatting dates eg, YYYY

			Month DD. DC qualifier fields:
Item Size	Format	2.5 Extent	DC: The file format, physical medium, or dimensions of the resource.
Donor ID Donor Name Photographer	Creator	2.6 Name of creator(s)	DC: An entity primarily responsible for making the resource. DACS: A description of the context in which the materials being described were created, assembled, accumulated, and/or maintained.
	Contributor	2.6 Name of creator(s)	DC: Examples of a Contributor include a person, an organization, or a service. Typically, the name of a Contributor should be used to indicate the entity. A person, organization, or service responsible for the content of the resource.
Collection Description Item Description	Description	3.1 Scope and content	
Location Sublocation Division? Subdivision? Milepost Station, Station Name?	Coverage	3.1 Scope and content	DC: Spatial or temporal
	Rights	4.1 Conditions governing access	DC: Information about rights held in and over the resource. Defaults statement: The collection is open for research use.
	Language	4.5 Language/scripts of the material	Default statement: Materials entirely in English.

Optional metadata fields			
	Source	5.1 Custodial history 5.2 Immediate source of acquisition	
	Publisher	3.1 Scope and content	
Subject NPRHA Cataloging Subject List RR Name State Station Name Division Subdivision Milepost? Names (Persons) Trains Equipment	Subject	Controlled access terms	DC: Typically, the subject will be represented using keywords, key phrases, or classification codes. Recommended best practice is to use a controlled vocabulary. DACS Categories: Names Places Subjects Documentary forms Occupations Functions ● LC authorities ● Getty Thesaurus of Geographic Names
	Relation	~~Controlled access terms~~	DC: A related resource
		2.7 Administrative/Biographical history	Create name and organization authority records
Item Type	Type		DC: Recommended best practice is to use a controlled vocabulary such as the DCMI Type Vocabulary [DCMITYPE]: Collection Dataset Event Image INteractiveResource MovingImage

			PhysicalObject Service Software Sound StillImage Text
RHO Owner			
Location Sublocation			
	Relation?	5.4 Accruals 6.3 Related archival materials	

8.3. Descriptive Metadata

Minimum Descriptive Metadata:

Unique Identifier
Title
Creator
Donor
Date

Describing Archives: A Content Standard DACS

Note: The PNRA has a paper copy of this book. It is also available online: http://files.archivists.org/pubs/DACS2E-2013_v0315.pdf
(DACS) is an output-neutral set of 'cataloging' rules for describing archives, personal papers, and manuscript collections, and can be applied to all material types. It is the U.S. implementation of international standards (i.e., ISAD[G] and ISAAR[CPF]) for the description of archival materials and their creators.

DACS facilitates consistent, appropriate, and self-explanatory description of archival materials and creators of archival materials. This new edition reflects the growing convergence among archival, museum, and library standards; aligns DACS with the descriptive standards developed and supported by the International Council on Archives; and provides guidance on the creation of archival authority records. DACS can be applied to all types of material at all levels of description, and the rules are designed for use by any type of descriptive output, including MARC 21, Encoded Archival Description (EAD), and Encoded Archival Context (EAC).

Source: Society of American Archivists Technical Standards: DACS: http://www2.archivists.org/groups/technical-subcommittee-on-describing-archives-a-content-standard-dacs/dacs

DACS Single-level Required and Optimum metadata fields

- Reference Code (required)
- Name and Location of Repository (required)
- Title (required)
- Date (required)
- Extent (required)
- Name of Creator(s) (required)
- Scope and Content (required)
- Conditions Governing Access (required)
- Language (required)
- Administrative/Biographical History (optional)
- Scope and Content (optional)
- Access Points (optional) -- subject terms, controlled vocabulary
- Custodial History (optional)
- Immediate Source of Acquisition (optional)
- Accruals (optional)
- Existence and Location of Originals (optional)

Dublin Core

Dublin Core is the de facto descriptive standard for archival materials. It is a relatively simple, generic, XML-based metadata element set applicable to a variety of digital object types.

Dublin Core Unqualified Metadata Element Set

The Dublin Core Metadata Element Set is a vocabulary of fifteen properties for use in resource description.

1. Contributor
2. Coverage
3. Creator
4. Date
5. Description
6. Format
7. Identifier
8. Language
9. Publisher
10. Relation

11. Rights
12. Source
13. Subject
14. Title
15. Type

Access to Memory (AtoM): Dublin Core Metadata Element Set:
https://www.accesstomemory.org/en/docs/2.1/user-manual/data-templates/dc-template/

- Identifier
- Title
- Names
- Dates
- Subject
- Description
- Type
- Child Levels
- Format
- Source
- Language
- Relation
- Coverage
- Rights

8.4. Digital Image Minimum Metadata

Digital Images metadata

Source: Library of Congress Recommended Formats
http://www.loc.gov/preservation/resources/rfs/stillimg.html#photodigital

- As supported by format:
    - Title
    - Creator
    - Creation Date
    - Place of publication
    - Publisher/producer/distributor
    - Contact information

- Include if available:
    - Common embedded schema (e.g., FGDC, ISO 19115, IPTC)
    - Language of work
    - Other relevant identifiers (e.g., DOI, LCCN, etc.)
    - Subject descriptors

- Abstracts
- Key or reference to each data field and technical production information (e.g. EXIF metadata from digital camera)

8.5. Technical Metadata

The digital archive platform that PNRA will adopt will mostly likely generate technical metadata. The information provided here is important for PNRA and RHO staff to be aware of.

Metadata Encoding and Transmission Standard (METS)

An XML schema for encoding structural metadata about complex digital objects. METS also acts as a container with places to insert descriptive, administrative, and technical metadata. From NISO Building Good Digital collections, p. 71

METS is an XML metadata standard intended to package all the information needed to represent a complex object, including both primary files and metadata that describes them. It defines its own structure for representing files and the relationships between them, and allows embedding or referencing descriptive, technical, rights, source, and digital provenance metadata defined by other schemas. METS has various levels of support in digital asset management systems like DuraSpace and Greenstone, and tools such as OpenWMS and the Archivists' Toolkit. This standard grew out of early work on representing complex digital objects by the Making of America II project. METS is maintained at the Library of Congress and through a volunteer Editorial Board.

Source: Society of American Archivists Technical Standards: Metadata Encoding and Transmission Standard http://www2.archivists.org/groups/standards-committee/metadata-encoding-and-transmission-standard-mets

Technical metadata elements

- Fixity
- Size
- Format
- Environment
- Checksum
- Version
- Hardware
- Operating system
- Rendering software
- Embedded images
- Media properties
- Digital provenance
- Type, age etc

- Authenticity
- Digital signatures
- Inhibitors
- Significant Properties

The technical metadata for digital still image may include:

- file format
- file resolution (pixels per inch)
- dimensions (image dimension or size in inches or centimeters)
- bit-depth (e.g., 8-bit, 16-bit, 24-bit, etc.)
- color mode (e.g., RGB, CMYK, or grayscale)
- scanner or digital camera brand, name, and model number
- software used to manipulate or compress the image, including the software name and version.

Source: University of Illinois Library Best Practices for Technical Metadata
http://www.library.illinois.edu/dcc/bestpractices/chapter_10_technicalmetadata.html#10.2.2Stillimage

8.6. Preservation Metadata

The digital archive platform that PNRA will adopt will mostly likely generate preservation metadata. The information provided here is important for PNRA and RHO staff to be aware of.

PREMIS is the de facto standard for preservation metadata. It is a data dictionary and XML schema for the encoding of information necessary to support the digital preservation process. Its data elements are divided into 5 categories, reflecting information on the PREMIS container, objects, events, agenda, and rights. A key feature of the PREMIS model is the definition of Objects as made up of Representations, Files, and Bitstreams. Also of note is the fact that PREMIS considers Objects immutable; if an action is taken on an Object that changes it, the result is a new but related Object. PREMIS intentionally excludes format-specific technical metadata from its scope, assuming implementers will use other relevant standards for tracking this information. The Library of Congress is the official PREMIS maintenance agency.

Source: Society of American Archivists Technical Standards: PREMIS:
http://www2.archivists.org/groups/standards-committee/preservation-metadata-implementation-strategies-premis

8.7. Metadata Harvesting Protocol: OAI-PMH

Open Archives Initiative Protocol for Metadata Harvesting (OAI-PMH)

The Open Archives Initiative develops and promotes interoperability standards that aim to facilitate the efficient dissemination of content. The Open Archives Initiative Protocol for Metadata Harvesting is a technology used to share metadata in a mostly automated way. “Data providers” set up servers where descriptions of resources are available using requests governed by the OAI-PMH protocol, and “service providers” collect metadata from multiple data providers and create value-added services on top of the aggregated data, such as cross-repository discovery. The protocol requires at a minimum a Simple Dublin Core record for every resource exposed, but also allows supplemental metadata formats as long as they are represented by a W3C XML Schema. The OAI-PMH protocol grew out of communities wishing to share pre-prints of scientific papers, but was quickly adopted by the larger cultural heritage community. While OAI-PMH is primarily about sharing metadata, some implementers have experimented with using it to share content as well, by providing links to thumbnail images or sharing full METS packages encapsulating or linking to full digital objects.

Source: Society of American Archivists Technical Standards: OAI-PMH
http://www2.archivists.org/groups/standards-committee/open-archives-initiative-protocol-for-metadata-harvesting-oai-pmh

8.8. MARC Code for PNRA

The MARC Code List for Organizations contains short alphabetic codes used to represent names of libraries and other kinds of organizations that need to be identified in the bibliographic environment. It is maintained by the Library of Congress. A MARC Code for the Pacific Northwest Railroad Archive was assigned in March, 2016. It is useful if PNRA chooses to generate MARC encoded versions of its finding aids into the OCLC WorldCat worldwide library catalog. This code was created for PNRA by the Library of Congress on March 18, 2016

WaBuPNRA
Normalized: wabupnra
ISIL: US-WaBuPNRA

8.9. Implementation

The good news is that increasingly, digital archive platforms and collection data platforms provide templates for entering descriptive metadata and some generate preservation and technical metadata as part of their suite of functions. The AtoM and Archivematica digital archive platforms provide the following metadata functionality.

- Dublin Core (DC) for descriptive metadata elements -- AtoM provides a customizable DC template.

- Describing Archives: A Content Standard (DACS) provides the ‘cataloging’ rules for archival descriptive records -- AtoM provides a customizable DACS template
- PREMIS for preservation metadata -- Archivematica platforms generates PREMIS metadata
- METS for technical metadata -- Archivematica platform generates METS metadata
- Encoded Archival Description (EAD) -- XML-based coding for finding aid interoperability with other discovery platforms and digital finding aid aggregators. -- EAD encoded finding aids can be generated easily from Dublin Core descriptive records.

9. PRESERVATION PLAN AND POLICY STATEMENTS

Contents

Tasks

Update and expand policy statements annually as the new digital archiving platform is implemented and procedures are developed.

Appendices

None as this time.

9.1. Introduction

The Pacific Northwest Railroad Archive was formed in 2009 and in June 2010 it acquired the building in which it now resides. Over the past five years, the PNRA has focused its efforts on renovating the 6,000 sq ft space and acquiring the necessary shelving and equipment to accommodate its collections and activities and meet the needs of its participating Railroad History Organizations. It has a very enthusiastic, knowledgeable and productive core of volunteers who assist in scanning, cataloging and managing the collections. During this time, the PNRA has acquired a number of grants which have brought in outside experts in archives and cultural heritage preservation to assure it is properly addressing critical preservation concerns. The PNRA has reached a point in its development where it is ready to address long-term preservation of its digital collections and data.

A preservation plan is a core policy element of any digital archive. The plan provided here is a preliminary one, based on the digital preservation policy framework developed by Ohio State

University[3]. Some sections will be completed as the PNRA implements its Digital Archive Plan and is able to better codify core digital preservation practices.

9.2. Guiding Principles

- As described in the vision, mission and its statement of purpose, the Pacific Northwest Railroad Archive is committed to the long-term preservation of PNRA and RHO content.
- Digital preservation is an integral part of PNRA processes and activities.
- Processes, policies, and the institutional commitment are transparently documented and in sync with RHO policy.
- Levels of preservation and time commitments are determined by the PNRA Executive Director; the PNRA Board, which includes RHO representatives and when appropriate, in consultation with a professional archivist.

9.3. Operating Principles

- Develop a scalable, reliable, sustainable, and auditable digital preservation infrastructure that supports RHO and PNRA needs.
- Comply with the Open Archival Information System (OAIS) and other appropriate digital preservation standards and practices.
- Ensure that the digital archive is as interoperable as possible by utilizing open-source options whenever feasible.
- Manage, monitor, and upgrade the hardware, software, and storage media components of the digital preservation function in accordance with archival practice, quality control specifications, RHO needs and security requirements.
- Ensure the integrity of the data.
- Document digital preservation actions, policies and procedures, including archival storage policies, procedures, and practices that ensure effective capture, ongoing and reliable archival storage, and responsiveness to inevitable technological change.
- Secure metadata (e.g. administrative, descriptive, preservation, provenance, rights, and technical) necessary for the use of the digital assets.
- Comply with copyright, intellectual property rights, and/or other legal rights related to copying, storage, modification, and use of digital resources.

9.4. Scope (categories of commitment)

[3] Noonan, Daniel. W. 2014. *Digital Preservation Policy Framework: A Case Study.* Educause.http://er.educause.edu/articles/2014/7/digital-preservation-policy-framework-a-case-study

The levels of commitment as outlined below recognize that developing solutions for "born digital" materials informs solutions for the other categories; it does not imply that these assets are inherently more valuable or important than any of the other categories and/or our traditional, analog materials.

1. Existing digitized versions of print or analog materials
   Reasonable measures will be taken to extend the life of the digital objects with a readily available print analog. However, the cost of re-digitizing as needed will be weighed against the cost of preserving the existing digital objects.
2. Non-digitized collections and items
3. Born-digital materials (no available analog)
   Every reasonable step will be taken to preserve materials that are unique holdings of PNRA or an RHO and that do not have a print version, or when re-digitizing is not possible, and/or no analog versions are located elsewhere. Also included are digitized materials that have annotations or other value-added features making them difficult or impossible to recreate.
4. Born digital materials
   Efforts will be made to ensure preservation in perpetuity of material selected for preservation.
5. Other items and materials
   No preservation steps will be taken for materials requested for short-term use such as materials scanned for research purposes, promotional materials, exhibits, or for content that is deemed unessential.

9.5. Implementation

Implementation of the preservation policy will occur based on this plan and its successive phases, as resources allow, and in line with RHO needs.

9.6. Roles and Responsibilities

PNRA recognizes the following stakeholder categories for its digital preservation program. The terminology is adapted from the OAIS Reference Model.

- Producer: The role played by those persons or entities that provide the information to be preserved. Producers include collectors, creators of content, and others.
- Management: The role played by those who oversee the management and operation of the digital preservation program.
- Administration and management: PNRA staff, board, work teams, and volunteers who are responsible for the daily operation of the digital archive as well as the selection, cataloging, scanning, physical preservation of PNRA holdings.
- Cooperating Entities: This includes the member Railroad History Organizations (RHOs):
    - Cascade Rail Foundation

    - Great Northern Railway Historical Society
    - Northern Pacific Railway Historical Association
    - Spokane, Portland & Seattle Railway Historical Society
- User Groups: The role played by those persons or organizations who search, access and use the PNRA collections.

9.7. Formats

PNRA preserves the following file formats: PDF, JPEG, JPEG2000, TIFF, WAVE.

9.8. Collaboration

Digital preservation is a shared community responsibility and often most successful when the assets, expertise and capacities of related organizations collaborate. Below are existing and proposed collaborations that will strengthen PNRA's digital preservation efforts -- and increase the discoverability of and access to its collections.

- RHOs
- Jackson Street Roundhouse, St. Paul, Minnesota
- Association of King County Heritage Organizations (AKCHO)
- Archives West
- Digital Public Library of America

9.9. Selection and Acquisition

See Section 6: Appraisal and Acquisition and existing RHO policies for this process.

9.10. Access and Use

See Section 11: Access. This policy section will be articulated once PNRA is farther along in the process of implementing the new digital archive platform.

9.11. Review Cycle

The Preservation Plan and Policy Statements will be reviewed annually and expanded as needed to include additional policy statements until the PNRA and RHOs feel the policy framework is established and stable enough to extend the review period.

10. TECHNICAL SYSTEMS

Contents

Tasks

Create schematic of proposed PNRA Digital Archive software and hardware components.
Trial and customize AtoM content and data management platform.
Establish timeline for migration from SharePoint.
Evaluate the feasibility of the Archivematica preservation platform -- future task.

Appendices

Appendix D: Open Archival Information System (OAIS) Reference Model, overview
Appendix J: Atom Platform Information [includes committee review]
Appendix L: Levels of Preservation

10.1. Current Technical Specifications

Specification	PNRA
Present external network speed (xMbps).	18 Mbps
Present internal network speed.	Cisco RV130 Wireless Router, 1.0 Gbps
Existing digital repository size.	Data: 2.79 TB Objects: 273,010 Files
Existing digital repository elements: Collection data management.	Accessions: 225 Collections
Existing digital repository elements: Storage strategy.	Onsite: Local machine copies + PNRA12. Backed up on 9 TB External Drives. Refreshed monthly; dark when not being refreshed.

	Website copies on two machines. Offsite: 5 PNRA-owned web site servers in Data Center in Tukwila.
Existing digital repository elements: Backup	Web sites hosted at Tukwila data center backed up every three days; Also Amazon cloud backup.
Existing digital repository elements: Access	○ PNRA12 ○ Websites: SharePoint & SQL Server
Estimated distinct end-users which access the repository annually	34,310 average in 2015
Amount added to archive.	2014: ~0.5 TB 2015: ~1.0 TB
Expected amount added to archives per year.	1.3 TB
Estimated quantity of digital objects currently ingested per year.	Scanned: 97% Born digital: 3%
Quantity of digital objects to be archived per year.	125,000 files per year Scanned: 97% Born digital: 3%
Existing digital media and formats.	○ Excel: ○ PDF: ○ Images: ○ Access MDB: ○ CD: ○ DVD: ○ External Drives: Note: most digital objects are scanned copies of non-digital holdings.
Existing digital file formats and quantities	TIFF, JPEG, PDF, XLS, MDB
Primary acquisition method.	Non-digital items donated to PNRA.

Data complexity.	Primarily simple data (spreadsheets-text formats, images, video)
Data specialization.	Moderate, some knowledge of railroads required.
Data sensitivity. What proportion is sensitive?	High: personal data; bridge structural data; proprietary images. Bulk: Project files; maps; common images, technical drawings
Access rights	Proprietary: Controlled access to high resolution data. Bulk Data: Open
Source of metadata.	Extracted or created by hand from non-digital accessions.
Interoperability standards	None presently.
Software support strategy.	All software is supported by Microsoft with local help desk by volunteer-members.
Minimum metadata requirements for discovery (description)	unique ID, title, creator, donor, date, and keyword fields, i.e. railroad, station, state, etc.
Specify digital object formats the repository will accept.	Excel; Tiff; JPEG; PDF;
Metadata standards to be implemented.	DACS (collection-level description) Dublin Core (item-level description) PREMIS (preservation) METS (technical)

10.2. Digital Archive Platforms Reviewed

Platforms

Five platforms were reviewed by PNRA, including Archivematica, Atom, Content DM, DSpace Direct, and Preservica. Information provided below is on the two platforms PNRA will trial, Archivematica and Atom. Review information on the other platforms is available at PNRA.

Process

A platform review committee was assembled to review the platforms with Gary Tarbox and me. The members were Greg Arndt, Bill Kajdzik, and Chuck Soule. Each person received a packet of information on the OAIS Reference Model, basic digital archive terminology and concepts, a few articles containing reviews of current platforms, and information on the POWRR (Preserving (Digital) Objects with Restricted Resources Tool Grid. POWRR performed a comprehensive review of current digital archiving platforms and tools and developed a matrix of functionalities.

After each platform demonstration, the committee members, Gary and I met to discuss the pros and cons of each platform relative to PNRA system needs and wants. Gary, Chuck and I also met with Ann Lally, Head of Digital Initiatives Program at the University of Washington to disuss platforms in general and their use of ContentDM in particular. It was concluded that, AtoM most closely met the needs of PNRA in terms of functionality, cost, back-end and front-end ease of use, customization capabilities and ability to integrate with the Archivematica, which is a back-end digital object preservation platform that can be utilized for the long-term preservation of PNRA and RHO digital content. The AtoM + Archivematica system, if adopted by PNRA will put it on track to ultimately become a Trusted Digital Repository.

10.3. AtoM and Archivematica

Archivematica

- OAIS-compliant, backend system, which can be implemented locally via free download or hosted, which manages digital collections through a suite of web-based services.
- Generates SIPs, AIPs and DIPs, metadata, can normalize to new file formats.
- Cloud-based hosting uses Amazon cloud service.
- Artefactual offers archivesDIRECT which combines Archivematica with DuraCloud storage. https://www.artefactual.com/services/hosting/
- Integrates with AtoM front end which provides accession log, generation of heirarchical descriptive records (collection, series, item)
- $10,000 annual fee for 1 TB Archivematica plus $625 for AtoM
- $24,999 annual maintenance agreement package available from Artefactual. https://www.artefactual.com/services/maintenance/

AtoM

- See Appendix J: AtoM Platform Information
- Free download. Standards-based, OAIS-compliant, open source
- Offers backend and frontend collection information management including accession log, generation of descriptive records, filtered searching,
- customizable public interface. https://www.artefactual.com/services/atom-theming/
- Permission levels
- Hierarchical data management (RHO, collection, series, item)

- Metadata templates. Uses Dublin Core and recognizes DACS (both descriptive metadata standards to be used at PNRA)
- Filtered searching categories: subject, language, repository, creator, name, genra (photos, maps, etc) Some customization available, based on Dublin Core fields
- Can upload taxonomies, thesauri
- generates thumbnails and reference images
- Integrates with Archivematica for full digital archive repository functionality and long-term preservation.
- Artefactual data migration service: https://www.artefactual.com/services/data-migration/
- Artefactual hosting $1700-$3000 annually https://www.artefactual.com/services/site-hosting/

10.4. Next Steps

During phase two of this planning process and as early as Fall 2017, PNRA will perform a trial of the AtoM platform. Phase two activities are likely to include the following tasks:

- Trial and customization of the AtoM platform;
- Completion of the Business/Financial Plan, Staffing Plan and Succession Plan;
- Schema of proposed PNRA Digital Archive software, hardware, and cloud components;
- Develop a schedule and priorities for implementing the tasks recommended in this document;
- Analysis of PNRA alignment with Trusted Digital Repository audit requirements; and
- Review and update Digital Archive Plan.

11. ACCESS

Contents

Tasks

Wikipedia: create pages for PNRA and RHOs.
Create online exhibits and timelines utilizing tools like Omeka and ViewShare.

Appendices

None at this time

11.1. Current Access Policy and Mechanisms

Audience

PNRA and RHO holdings are of interest to local and national historians, scholars, and rail fans, advertisers and publishers.

Current access procedures

- PNRA homepage provides access to PNRA collections and links to: GN-NP Joint Archive, NPRHA website and collections; Cascade Rail Foundation website; GNRHS website and archives. Approximately 10% of PNRA digitized content is available via the SharePoint website.
- PNRA and RHOs would like to offer much easier search functionality for users. SharePoint was not designed to serve as a robust, publicly searchable digital archive interface.
- Researchers can also contact the PNRA or a RHO directly to inquire about specific holdings.
- Rights statements for items and collections is limited and not consistent.

11.2. Digital Access Policy Statements

Access policy statements will be developed as the PNRA further develops and implements the Digital Archive plan and new platform. They will be incorporated into Section 9 Preservation Plan and Policy Statements.

The OpenDOAR Policy Tool can be utilized to present access policies for digital content to user community. OpenDOAR Access Policy critera include:

- **Metadata Policy** - for information describing items in the repository.
    - Access to metadata; Re-use of metadata
- **Data Policy** - for full-text and other full data items.
    - Access to full items; Re-use of full items
- **Content Policy** - for types of document and dataset held.
    - Repository type; Type of material held; Principal languages
- **Submission Policy** - concerning depositors, quality and copyright.
    - Eligible depositors; Deposition rules; Moderation; Content quality control; Publishers' and funders' embargos; Copyright policy
- **Preservation Policy**
    - Retention period; Functional preservation; File preservation; Withdrawal policy; Withdrawn items; Version control; Closure policy

11.3. Proposed Discovery and Access Methods

- Website: provide collection overviews and collection-level summaries here.
- Website: will become AtoM intefrace, which is customizable.
- Provide an AtoM search box on RHO websites.
- Wikipedia: create pages for PNRA and RHOs.
- Create online exhibits and timelines utilizing tools like Omeka and ViewShare.
- Upload descriptive records to OCLC Archive Grid
- Register repository in OpenDOAR registry

12. SUCCESSION PLAN

Full Succession Plan Under Development

This plan is intended to assure the preservation of PNRA's digital materials in perpetuity in the event of changes to staff or operational capacity, funding, changes in scope, technological changes and innovations, crises, or other fundamental changes. It recognizes that organizations last for a finite period of time. Contingency plans and exit strategies will also be addressed.

Draft Plan Sections

12.1 Internal Commitment and Plan Priorities
12.2 Current Challenges
12.3 Internal Training and Leadership Development
12.4 Emergency Leadership Transition Plan
12.5 Preservation Tasks

Tasks

Complete Succession Plan

Appendices

None at this time.

12.1. Internal Commitment and Plan Priorities

The PNRA Board is committed to a systematic transition plan for all leadership positions. Officers, Key players and Volunteers are included in the succession plan. Officer positions will be the highest priority for implementation of back-up plans, documenting of standard processes and development of future leaders. Key Players such as crew leaders and committee chair-persons will be the second priority. Volunteers who work in all forms of supporting the archive will be the third priority.

12.2. Current Challenges

The age of all Officers, Key Players and Volunteers requires that plans be in place for daily back-up as well as replacement in an emergency situation.

Expansion of work crews and adding additional work sessions to meet the Mission will require additional volunteers and leaders at all levels.

12.3. Internal Training and Leadership Development

At this time the PNRA does not have a systematic training or leadership development process. Currently orientations and training for work projects is informal and peer to peer. Specific work such as special scanning or processing materials has been presented to a limited number of volunteers by archive professionals.

12.4. Emergency Leadership Transition Plan

Executive Director

The Board President will replace the Executive Director in an emergency. They may act as Board President and Executive Director on an interim basis as determined by the Board. Or the Board may elect to have the Board Vice-President take over as the Board President.

President of the PNRA Board

The Board President will be replaced by the Board Vice-President in an emergency.

Treasurer

In an emergency the Executive Director and the Board President may take over the duties of the Treasurer for an interim period of time determined by the Board. Past Treasurers will be used as an advisory group to assist in transition.

12.5. Preservation Tasks

PNRA is adopting widely recommended standards and practices to assure the preservation of its digital collections beyond the lifetime of the repository. These standards and practices assure compatibility and interoperability with future systems, the ability to retrieve or migrate collections and collection information, re-formatting of obsolete file formats to assure access, and redundancy to prevent loss. Standards include the are not limited to the widely-adopted Open Archival Information System (OAIS) Reference Model; Dublin Core, PREMIS, and DACS metadata standards, and a preference for open source tools and platforms over proprietary systems.

~~**Repository Planning and Audit Criteria**~~

PLATTER:

Manage obligations to ensure preservation of material beyond the lifetime of the repository.

TRAC Audit criteria:

Repository has an appropriate, formal succession plan, contingency plans, and/or escrow arrangements in place in case the repository ceases to operate or the governing or funding institution substantially changes its scope. *Evidence: Succession plan(s); escrow plan(s); explicit and specific statement documenting the intent to ensure continuity of the repository, and the steps taken and to be taken to ensure continuity; formal documents describing exit strategies and contingency plans; depositor agreements.*

13. DISASTER PREPAREDNESS

Draft Plan Sections

14.1 Environmental: dPlan Disaster Preparedness Plan
14.2 Technological
14.3 Organizational (economic, staff, purpose)
14.4 Security

Tasks

Complete dPlan
Purchase and create emergency preparedness supplies kit

Appendices

None at this time.

13.1. Environmental: dPlan Disaster Preparedness Plan
13.2. Technological
13.3. Organizational (economic,staff, purpose)
13.4. Security

14. REVIEW AND UPKEEP

This Plan is the first phase of the Pacific Northwest Railroad Archive's effort to make its collections discoverable to a wider audience and assure the long-term preservation of its digital collections.

Over the next couple years, PNRA will systematically select and test technical systems and platforms for its digital collections and migrate collections and collection information management and preservation to the new systems. As this effort unfolds, elements of this plan will be implemented and most likely, revised or expanded. The first review and modification of this plan will occur as part of the second phase of this process, by June 2017.

The practice of preserving and managing digital information in perpetuity is undergoing rapid change as technologies evolve, systems improve, and emerging standards and best practices are adopted. Thus, this Plan and the process undertaken to achieve the ultimate goal of the PNRA achieving Trusted Digital Repository status, will be updated and modified to adapt to new information and opportunities.

15. RESOURCES

American Association for State and Local History (AAHSL)
URL: *http://www.aaslh.org/*
Description: Provides leadership, service and support for the preservation and interpretation of American state and local history.

American Alliance of Museums: Standards and Best Practices
URL: *http://www.aam-us.org/resources/ethics-standards-and-best-practices*

Center for Research Libraries. Trustworthy Repositories Audit and Certification: Criteria and Checklist (TRAC). 2007.
URL: https://www.crl.edu/sites/default/files/d6/attachments/pages/trac_0.pdf
Description: Many of the TRAC criteria were incorporated into the PNRA Digital Archive Plan. An audit is required to be certified as a Trusted Digital Repository. DRAMBORA is another self-audit tool.

***Describing Archives: A Content Standard, Second Edition.* 2013**
URL: http://files.archivists.org/pubs/DACS2E-2013_v0315.pdf
Description: Official content standards of the U.S. archival community. Conforms with the International Council on Archives (ICA) standards and incorporates all ICA data elements.
Note: PNRA has a printed copy of this document.

Digital Curation Centre (DCC)
URL: http://www.dcc.ac.uk/
Description: World-leading center on digital information curation.

Digital POWRR Project
URL: http://digitalpowrr.niu.edu/
Description: From 2012-2014, the Digital POWRR Project, an Institute of Museum and Library Services (IMLS)-funded study investigated, evaluated, and recommended scalable, sustainable digital preservation solutions for libraries with smaller amounts of data and/or fewer resources. The PNRA Platform Review Committee utilized POWRR to identify and evaluate selected repository platforms.

Digital Preservation Coalition: DPC Handbook
URL: http://www.dpconline.org/advice/preservationhandbook
Description: The Handbook provides an internationally authoritative and practical guide to the subject of managing digital resources over time and the issues in sustaining access to them.

DigitalPreservationEurope: Repository Planning Checklist and Guidance (PLATTER) 2008.
URL: http://content.yudu.com/Library/A10tra/PLATTERRepositoryPla/resources/6.htm

Description: This planning model was adopted as the framework for the PNRA Digital Archive Plan.

Digital Preservation Management: Tools and Techniques
URL: http://www.dpworkshop.org/workshops/management-tools
Description: Provides guiding principles, policy framework information, and a checklist for determining an organization's readiness to address digital preservation.

Federal Agencies Digitization Guidelines Initiative (FADGI)
URL:
http://www.digitizationguidelines.gov/guidelines/FADGI_Still_Image_Tech_Guidelines_2015-09-02_v4.pdf
Description: Draft Technical Guidelines for Digitizing Cultural Heritage Materials (September, 2015)

Hirtle, Peter B., E. Hudson and A.T. Kenyon. 2009. *Copyright & Cultural Institutions: Guidelines for Digitization.* Ithaca: Cornell University Press.
URL: https://ecommons.cornell.edu/bitstream/handle/1813/14142/Hirtle-Copyright_final_RGB_lowres-cover1.pdf;jsessionid=B459720CE13E2E8C3CB3072450E4D3A7?sequence=2
Description: Describes copyright law and issues that directly pertain to digital collections held by cultura heritage institutions.

Image Permanence Institute
URL: *https://www.imagepermanenceinstitute.org/*
Description: Provides information, consulting services, practical tools and preservation technology to libraries, archives, and museums worldwide.

Lavoie, Brian F. 2014. *The Open Archival Information System (OAIS) Reference Model: Introductory Guide (2nd Edition)*. DPC Technology Watch Report 14-02 October 2014. Digital Preservation Coalition.
URL: http://www.dpconline.org/component/docman/doc_download/1359-dpctw14-02
Description: The Open Archival Information System (OAIS) was originally developed as part of a broader effort to develop formal standards for the long-term storage of digital data generated from space missions. The OAIS has since formed the foundation of numerous architectures, standards, and protocols, influencing system design, metadata requirements, certification, and other issues central to digital preservation.

Library of Congress: Digital Preservation
URL: http://www.digitalpreservation.gov/
Description: Provides technical and metadata digitization guidelines and format stability information.

National Information Standards Organization (NISO): Framework for Building Good Digital Collections, Third Edition.

URL: http://www.niso.org/publications/rp/framework3.pdf
Description: An essential resource which provides an overview of the major components and activities involved in creating good digital collections within the context of the four core types of entities: collections, objects, metadata and initiatives.

Northeast Document Conservation Center (NEDCC)
URL: *http://www.nedcc.org/*
Description: Provides preservation best practices (preservation leaflets series) and training opportunities.

Society of American Archivists: Standards and Best Practices
URL: *http://www2.archivists.org/standards*
Description: Establishes standards and best practices for archival institutions. Also publishes educational materials and provides training.

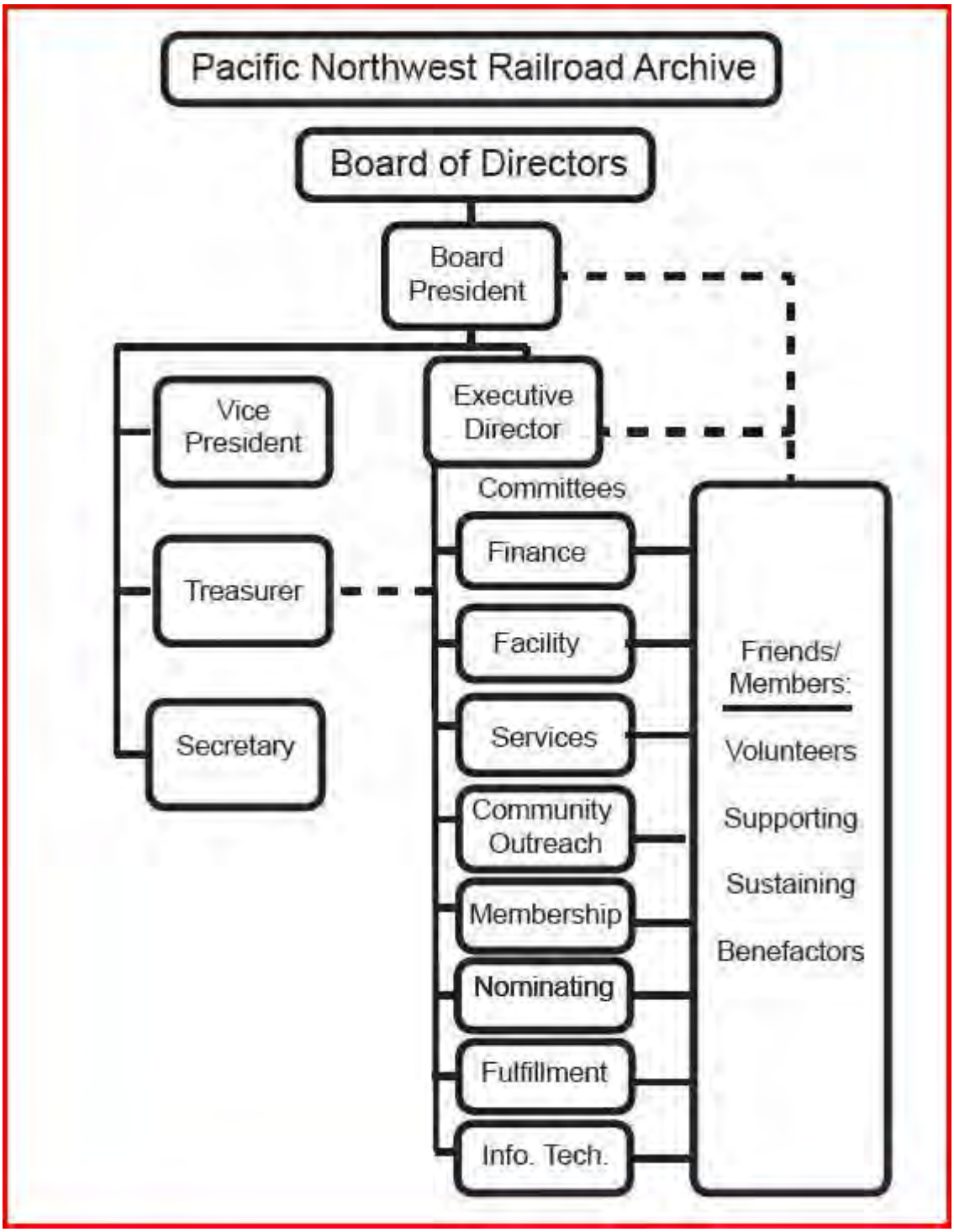
Space Data Systems Practices: *Reference Model for an Open Archival Information System. OAIS.* (Magenta Book). 2012.
URL: http://public.ccsds.org/publications/archive/650x0m2.pdf
Description: Technical recommended practice for use in developing a broader consensus on what is required for an archive to provide permanent, or indefinite long term, preservation of digital information. The primary conceptual model recommended for use by digital repositories. Note: This is a very long and tec hnical document. Read the Lavoie Introductory Guide to the OAIS, listed here.

Well-intentioned practice for putting digitized collections of unpublished materials online (endorsed by SAA)
URL: *http://www.oclc.org/content/dam/research/activities/rights/practice.pdf*
Description: " ...a good basis for establishing a community of practice that will increase and significantly improve access to collections of unpublished materials for the purpose of furthering research and learning. It promotes a practical approach to identifying and resolving rights issues that is in line with professional and ethical standards."

Western States and Territories Preservation Assistance Service (WESTPAS)
URL: *http://westpas.org/*
Description: Provides regional disaster response assistance service and training workshops.

APPENDIX

Appendix A: PNRA Organizational Chart



Appendix B: Revised Donor Agreement form

Accession Number

Pacific Northwest Railroad Archive
Donor Agreement

I,_____, the legal owner of the records or duly authorized agent of the legal owner, _____, of the records and materials described below, do hereby unconditionally and irrevocably give and transfer to the Pacific Northwest Railroad Archive all of my rights, title, and interest (including all copyright and related rights) in the records and materials, as an unrestricted gift without limitation, except as on the attached inventory.

1. **Restrictions** – The records and materials listed on the attached inventory shall be available for access and use by the public without restrictions unless specified in this document or the attached inventory. If any restrictions are imposed, a termination date must be stipulated.

2. **Disposition** – Except as instructed in this agreement the Pacific Northwest Railroad Archive may transfer, sell, discard, or dispose of all or any portion of this collection as the Pacific Northwest Railroad Archive shall determine without prior notice or permission.

3. **Duplication** – The Pacific Northwest Railroad Archive reserves the right to duplicate, reproduce, scan, migrate, or otherwise reformat these records for purposes of preservation, security and/or dissemination for research, education and use within the limits of copyright law.

4. **Exhibition** – The Pacific Northwest Railroad Archive can freely exhibit the records and materials in this collection physically or online.

Agreed and accepted

Signature of donor or agent	*Signature of PNRA representative*
Print name	*Print name*

Date	*Date*

Donor or agent contact information

Name: _____

Full street address:_____

Phone number:_____

Email address:_____

Summary description of donation

Title	
Date range	
Extent *Quantity; number of boxes or containers.*	
Creator *Whenever possible, please provide biographical or historical information on the creator or originator. This can be included in a separate document.*	
Summary Description	
Material types *(documents, diaries, images, audio/visual, ephemera, artifacts, digital files)*	
Any restrictions on access?	

Notes	

Digital collection information

Delivery format	
Donation file size (MB)	
File formats	
Source	
Born digital or scanned copies	

Collection Inventory

Donors or agents are requested to provide a box or container-level inventory of the items in the collection. This can be provided as a separate attachment.

Item or container	Description

Biographical/historical information including sources

Donors or agents are requested to provide any biographical or historical information on the creator or originator of the collection if available.

Pacific Northwest Railroad Archive Use Only

Location:
Accrual information:
Acknowledgement sent:
Processing note:

Date: Signature:

The Pacific Northwest Railroad Archive thanks you for your donation.

Pacific Northwest Railroad Archive | 425 SW 153rd Street, Burien, WA 98166 | (206)349-6242

Appendix C: Collection-level Description Record, sample

David Sprau Collection

PNRA Collection Description Worksheet

DACS = *Describing Archives: A Content Standard, Second Edition*. 2013. Society of American Archivists.

DACS element	Description
Reference Code Element (2.1)	GNRHS #65
Name and Location of Repository (2.2)	Pacific Northwest Railroad Archive, Burien, Washington Jackson Street Roundhouse, St Paul MN
Title Element (2.3)	David Sprau Collection
Date Element (2.4)	1926 - 1975
Extent Element (2.5)	20 boxes of train orders, ~1000 dispatcher train sheets, 16 boxes of GN records, blueprints, and objects. 15 boxes of GN operational records, maps, forms
Name of Creator(s) Element (2.6)	David Sprau
Scope and Content Element (3.1)	Train orders (flimsies), dispatcher trainsheets, train order books, blank forms, other operating paperwork. Progress reports on electrification of Cascade Tunnel, information about passes issued; phone service - Scenic to Seattle; Publicity file about new tunnel - 4/29/26 to 12/31/28; Depreciation information on tools and equipment used in construction; Blaine Colebrook line relocation (it didn't happen); Locomotive diagrams #204; GN Locomotive diagrams #232 10/30/40; GN Freight Car diagrams; GN MOW car diagrams; AFE #2198, Corea, Steam Locomotive inspection reports; AFE #21105; GN Store Dept. price book 1956. Also objects such as hats and signs. Railroads covered in the collection are Great Northern, Northern Pacific, Milwaukee, Spokane- Portland and Seattle, and others
Conditions Governing Access Element (4.1)	Access is governed by the GNRHS -PNRA Collections Management Policy. No other restrictions are in place.
Language Element (4.5)	All materials are in English
Optional Elements	
Administrative/Biographical History Element (2.7)	
Access Points (controlled vocabulary)	Great Northern, Northern Pacific, Milwaukee, Spokane Portland and Seattle, Locomotive, Cascade Tunnel, Dispatcher Train Sheet, Train Order book

Custodial History (5.1)	GNRHS 65 arrived in 2004 and was in storage in Seattle WA by GNRHS, it was moved to PNRA on various dates in 2013. Additions to the collection were made in 2012 and 2013 by delivery to Burien, WA at the PNRA office
Immediate Source of Acquisition (5.2)	David Sprau
Appraisal, Destruction, Scheduling (5.3)	
Accruals (5.4)	GNRHS 65 in 2004 additions in 2012 and 2013
Existence and Location of Originals (6.1)	Majority of the items are at PNRA, Burien WA, nine items are at Jackson Street Roundhouse, St Paul, MN, two boxes are in Sornsin storage at Seattle, WA
Archivist and date (8.1.5)	REK 11/16/2015

Appendix D: Open Archival Information System (OAIS) Reference Model, overview

OAIS Reference Model

Source: *OAIS Introductory Guide, Second Edition.* 2014.
http://www.dpconline.org/component/docman/doc_download/1359-dpctw14-02

Executive Summary

The Consultative Committee for Space Data Systems (CCSDS) initiated work aimed at developing formal standards for the long-term storage of digital data generated from space missions. Part of this effort involved the development of a reference model for an 'open archival information system' (OAIS). The reference model would represent a comprehensive and consistent framework for describing and analyzing digital preservation issues, provide a sound footing for future standards-building activity, and serve as a point of reference for vendors interested in building digital preservation products and services. The OAIS reference model was approved in January 2002 as ISO International Standard 14721; a revised and updated version was published in 2012 as ISO Standard 14721:2012.

The central concept in the reference model is that of an open archival information system. An OAIS-type archive must meet a set of six minimum responsibilities to do with the ingest, preservation, and dissemination of archived materials.

An OAIS-type archive operates in an environment populated by three types of entities: Management, Producer, and Consumer. A special class of Consumer is called the Designated Community: the subset of Consumers expected to independently understand the archived information in the form in which it is preserved and made available by the OAIS. An OAIS-type archive's external environment could also include interaction with other OAIS archives.

The reference model identifies and describes the core set of mechanisms with which an OAIS-type archive meets its primary mission of preserving information over the long term and making it available to the Designated Community. These mechanisms are summarized by the OAIS functional model, which defines six high-level services, or functional entities, that collectively define the OAIS's preservation and access operations:

Ingest,
Archival Storage,
Data Management,
Preservation Planning,
Access, and
Administration.

Operating alongside these six functional entities are Common Services, which consist of basic computing and networking resources. An OAIS-type archive will implement each of the six

functional entities, along with Common Services, in the course of building a complete archival system.

The reference model provides a high-level description of the information objects managed by an OAIS-type archive. The OAIS information model is built around the concept of an information package, which consists of the object that is the focus of preservation, along with metadata necessary to support its long-term preservation, access, and understandability, bound into a single logical package. There are three important variants of the information package concept: **the Submission Information Package (SIP), the Archival Information Package (AIP), and the Dissemination Information Package (DIP).**

The AIP is the information package variant which the OAIS is committed to perpetuate over the long term. Construction of the AIP begins with the Content Data Object – the information that is the focus of preservation. The Content Data Object is accompanied by Representation Information: information necessary to render and understand the bit sequences constituting the Content Data Object. The Content Data Object and its associated Representation Information are collectively known as Content Information. Long-term retention of the Content Information requires additional metadata to support and document the OAIS's preservation processes. This metadata is called Preservation Description Information, or PDI. PDI consists of five components:

1) Reference Information;
2) Context Information;
3) Provenance Information;
4) Fixity Information; and
5) Access Rights Information.

Packaging Information binds Content Information and Preservation Description Information into a single logical package; Descriptive Information supports the discovery and retrieval of Content Information by an OAIS's Consumers.

The OAIS reference model includes a discussion of different classes of interoperability across OAIS-type archives: independent archives, cooperating archives, and federated archives. The reference model also notes that archives can interoperate through shared functional areas.

The Open Archival Information System (OAIS) Reference Model: Introductory Guide (2nd Edition) Executive Summary

A number of initiatives have used the OAIS reference model as a conceptual foundation and starting point for more focused work in digital preservation. Areas of application include, but are not limited to, 'OAIS compliant' repository architectures and systems; repository self-assessment and certification; metadata requirements for digital preservation; methods and protocols for encoding and exchanging archived information; and other OAIS-related standards.

Because the reference model is a conceptual framework rather than a blueprint for concrete implementation, the meaning of 'OAIS-compliant' is necessarily vague and open to interpretation. A key element in the design of OAIS is its flexibility and level of abstraction: it makes no assumptions about how the concepts and models in OAIS are to be implemented, and imposes no requirements concerning the technologies used to support the implementations. Despite the attendant ambiguity, the notion of OAIS conformance has been

beneficial, to the extent that it helps consolidate understanding of the fundamental requirements for securing the long-term persistence of digital materials – a necessary condition for building well-understood, interoperable, and ultimately, trusted digital preservation systems.

Perhaps the most important achievement of the OAIS reference model to date is that it has become almost universally accepted as the lingua franca of digital preservation, shaping and sustaining conversations about digital preservation across disparate domains, and supplying a general mapping of the landscape that stewards of our digital heritage must navigate in order to secure the long-term availability of digital materials. Alignment with concepts defined in OAIS helps orient a technical implementation, draft standard, or other activity within the broader repository context that the OAIS reference model defines, making it part of a cohesive 'big picture'. It seems reasonable to conclude that OAIS has become a foundation resource for understanding digital preservation, a language for talking about digital preservation issues, and a starting point for implementing digital preservation solutions.

It is possible to identify a few limitations associated with OAIS's impact. Very few of its concepts have been directly and formally operationalized as standards in their own right. A design, a protocol, even a standard can self-declare itself OAIS-conformant (but without an explicit accounting of how conformance is actually manifested). Initiatives can use OAIS concepts as a means of labelling or describing various components within their structure (but these concepts can be used quite superficially, more as an expositional shorthand rather than a detailed mapping); OAIS can be cited as a foundation or starting point for a particular initiative, or alternatively the initiative can declare itself informed by OAIS (but without necessarily any elaboration on how this was so). It is useful to remember that an OAIS-type archive is still one built primarily on OAIS concepts, not an OAIS suite of standards. The digital preservation community would benefit from a careful assessment of where more precise and authoritative definitions of OAIS concepts and relationships would accelerate progress in achieving robust, widely applicable, and interoperable digital preservation solutions.

Figure 1: OAIS Functional Model

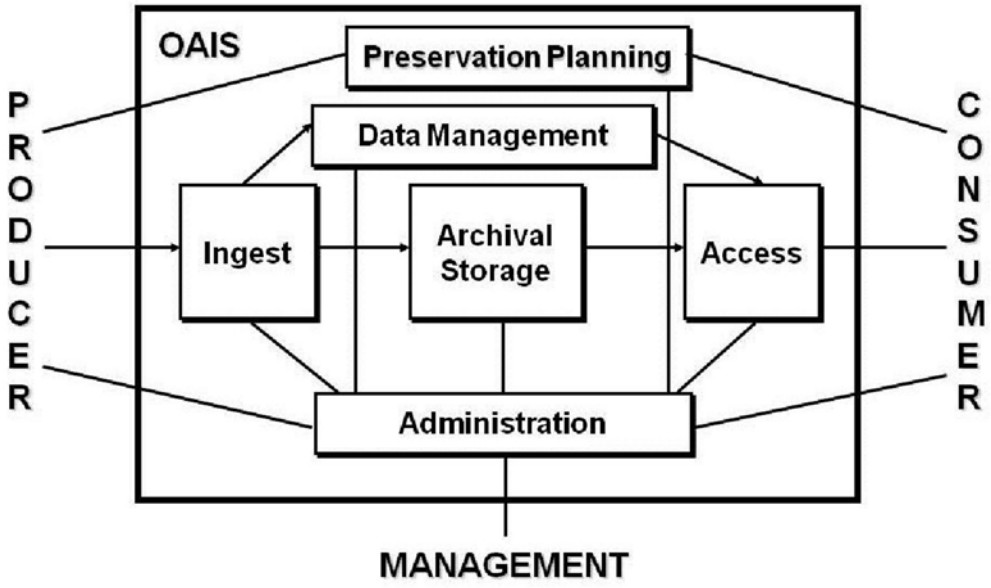


Figure 2: OAIS Information Packages (SIP, AIP, DIP)

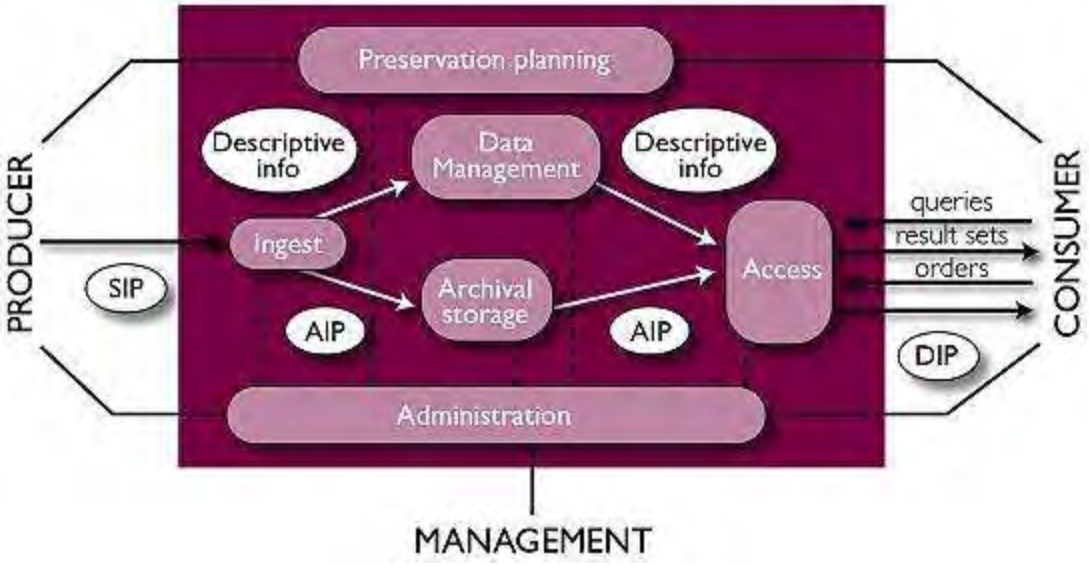
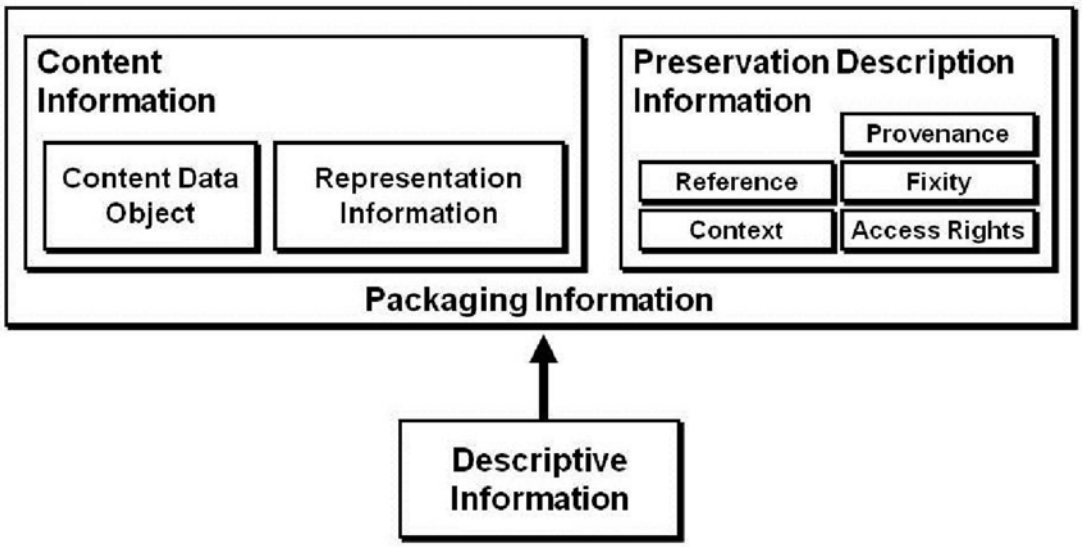


Figure 3: OAIS Archival Information Package (AIP)



Appendix E: Digital Collection Inventory [PENDING]

Appendix F: Draft Arrangement Scheme (PNRA-owned collections only)

DRAFT PNRA Arrangement Scheme
April 21, 2016

I suggest that PNRA adopt three broad categories of materials, as described below for PNRA-owned collections only, not RHO collections.

1. Special Collections (SC001, SC002, etc) -- Donations that should remain together under the name of the donor. I expect that a number of these listed here will not remain in this category.
2. General Collections (PNRA001, PNRA002, etc.) -- Donations that are absorbed into the PNRA 'general' collections of, say photographs.
3. Record Groups (RG 001, RG002, etc.) -- Corporate records of each railroad [not held by an RHO]

I will continue to refine this with the aim of fitting the majority of the accessions on the PNRA collection list into the categories below. Your input will also help me refine this arrangement scheme. Once it's established, PNRA is free to tweak and add to as needed.

1. PNRA Special Collections

SC001 Reynolds Brightshue Collection (NP engineer)

SC002 Loren Buenther Collection #395

SC003 David Cantlin Manuscript Collection (files, photos for Tacoma Rail book)

SC004 Photos and Drawings from the Vance Colyar Collection

SC005 Ruth and Ed Eckes notes, railroad story notes

SC006 Dave Emerson Collection (11,000 slides, 8200 photos, 7500 negatives, 600 post cards, 5 VHS, misc items)

SC007 James M. Fredrickson Collection

SC008 Peter Halgren clippings, drawings and photographs (156 binders)

SC009 William Harrison railroad correspondence and memorabilia

SC010 Reese Humphrey's Collection?

SC011 Robert Hutchison Collection

SC012 Jack R. Johnson Collection #396.1, GNRHS

SC013 Alfred E. (Ted) Michon Collection of GN/BN collectibles

SC014 Oscar Peterson Collection

SC015 Herb Schneider Collection

SC016 Pat Stafford Collection #295

SC017 Waldo Thomas Collection

2. PNRA General Collections

PNRA001 Photographs

PNRA002 Slides

PNRA003 Maps and Plats [or separate?]

PNRA004 Blueprints (or corporate records?)

PNRA005 Ephemera
- calendars
- post cards
- mini soap NPRY
- brochures, flyers
- Bob Hierman

PNRA006 Videos and films

PNRA007 Audio recordings

PNRA008 Clippings

PNRA009 GN NP and Pacific Northwest history (113 reels of microfilm)? I need to know more about this collection

PNRA010 Artifacts
- framed items
- drawings
- paintings, prints, water color
- spike paperweight
- telegraph key
- hats
- UP lithograph
- tie tack
- matchbook
- plates?
- train set
- NP switch lock
- model locomotive

cuff links

NOTE: Publications such as books, magazines, catalogs, booklets, etc., should be part of the PNRA library tho collection-level archival records can be made of selected publication collections.

3. PNRA Corporate Records

RG001 Burlington Northern

RG002 Great Northern

RG003 Union Pacific

RG004 etc.

Suggested categories (series) of records for each railroad.

AFEs
Blueprints
Bulletins
Charters?
Correspondence
Equipment diagrams
Field completion reports
Ledgers
Locomotive Reports?
Manuals
Maps and drawings
Operating information?
Plans
Reports and studys
Rosters
Rule books
Stock certificates?
Time tables
Track profiles
Train orders
Train sheets
Transportation rule books

Appendix G: Digitization Parameters

Source:
Digital Imaging for the Small Organization. 2012. Minnesota Historical Society
http://discussions.mnhs.org/mnlocalhistory/wp-content/uploads/2011/05/guidelines_digital_for_small_organizations.pdf

Photographs

- Digitize from the negative (or the earliest generation of the photograph) to yield a higher-quality image.
- In the case of photographs developed according to artist specifications, the photograph itself should be digitized rather than the negative.
- Digitize sepia-tone as color images to create a more accurate image.
- Digitize the backs of photographs as separate image files if there is significant information on the back of the photo (which may be of interest to users)

	Master	**Web Access**	**Thumbnail**
File format	TIFF	PNG or JPEG	JPEG
Bit depth	16 bit grayscale 24 bit color	8 bit grayscale 24 bit color	8 bit grayscale 24 bit color
Spatial resolution	400-800 ppi	72 ppi	72 ppi
Spatial dimensions	4000 to 8000 pixels across the long dimension, depending on size of original, excluding mounts and borders	600 pixels across the long dimension	150 to 200 pixels across the long dimension

Film negatives

Master scans of black and white camera originals may be captured and saved in RGB, particularly those negatives that contain color information as a result of staining, degradation or intentional color casts. Derivative files could later be reduced to grayscale in the scanning software or during post-processing editing.

	Master	Web Access	Thumbnail
File format	TIFF	PNG or JPEG	JPEG
Bit depth	16 grayscale 24 bit color	8 grayscale 24 bit color	8 grayscale 24 bit color
Spatial resolution	Resolution to be calculated from actual image format and/or dimensions - approx. 2800 PPI for 35mm originals, ranging to approx. 600 PPI for 8x10 originals	72 ppi	72 ppi
Spatial dimensions	4000 to 8000 pixels across the long dimension, depending on size of original, excluding mounts and borders	600 pixels across the long dimension	150 to 200 pixels across the long dimension

Text

- Documents with smaller printed text may require higher resolutions and bit depths than documents that use large typefaces.
- Images that produce the best results for OCR may not be pleasing to the eye and may require separate scans for OCR and human display. Test pages at several resolutions to find the most satisfactory results.
- Projects with large amounts of textual materials, particularly hard-to-read materials such as manuscripts, should provide transcriptions of the materials in addition to the digital image.
- As rekeying text can be cost prohibitive, projects considering transcriptions should investigate including Optical Character Recognition (OCR) software in their toolkit as well as using WikiSource to crowd source transcribing public domain documents http://en.wikisource.org
- Access to textual material can be further enhanced through SGML/XML markup schemes such as the Text Encoding Initiative (TEI) http://www.tei-c.org.

	Master	Web Access	Thumbnail
File format	TIFF	PDF, PDF/A	JPEG
Bit depth	16 grayscale 24 bit color	8 grayscale 24 bit color	8 grayscale 24 bit color

Spatial resolution	Adjust scan resolution to produce a minimum pixel measurement across the long dimension of 6,000 lines for 1bit files and 4,000 lines for 8 to 16 bit files	72 to 200 ppi	72 ppi
Spatial dimensions	4000 to 6000 pixels across the long dimension, excluding mounts and borders	600 pixels across the long dimension	150 to 200 pixels across the long dimension

Maps

- Scanning maps may involve items that vary widely in size, condition and amount of detail.
- Small maps may fit easily onto a flatbed scanner, while large plat maps may need captured by a camera.
- Size of the image can become a problem for storage, but also for viewing, serving over the web or processing.
- Smaller maps (less than 36 inches on the longest dimension) should be digitized at 600 PPI, 24-bit color or 16-bit grayscale if possible.
- Larger maps, 300-400 PPI may be more practical.
- If it becomes necessary to digitize a map in sections and stitch the image together in Photoshop, keep both the original images of the sections as well as the combined image.

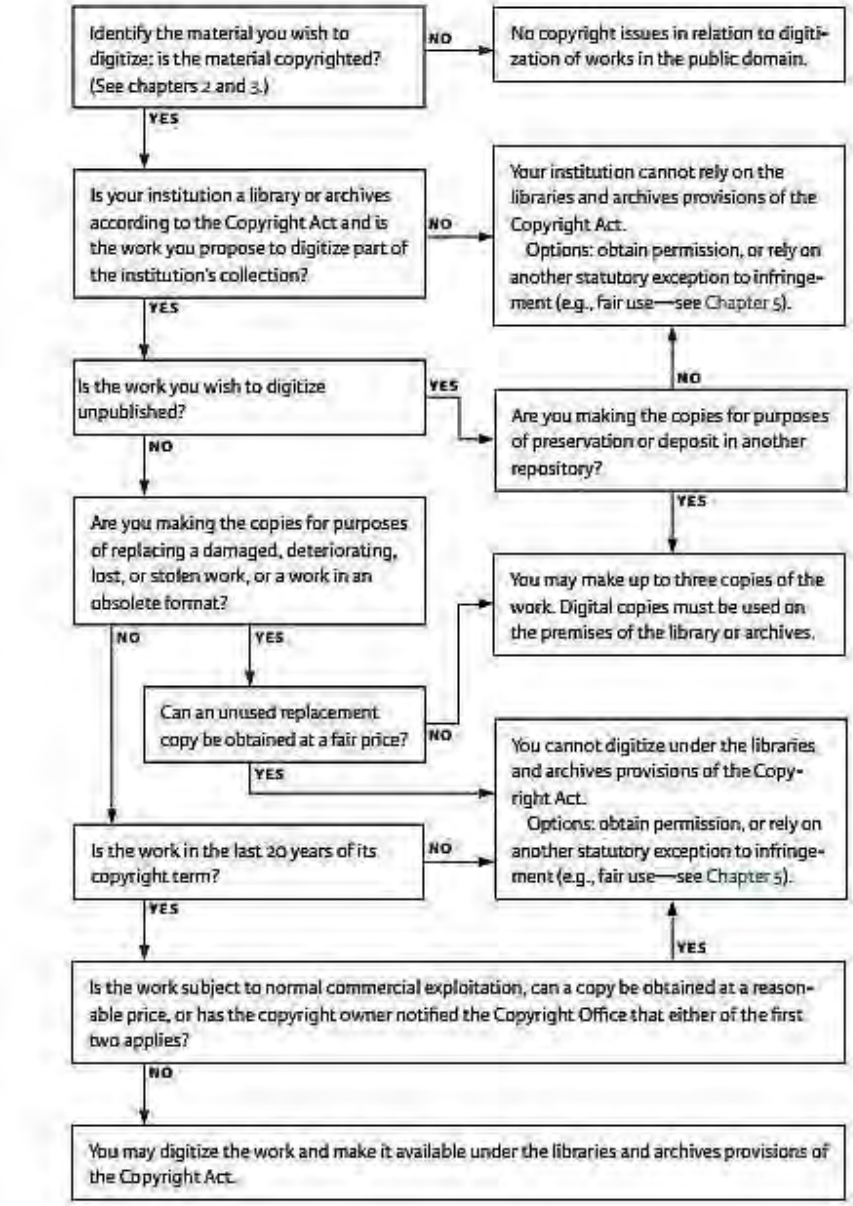
	Master	**Web Access**	**Thumbnail**
File format	TIFF	PNG or JPEG	JPEG
Bit depth	16 grayscale 24 bit color	8 grayscale 24 bit color	8 grayscale 24 bit color
Spatial resolution	400-800 ppi	72 ppi	72 ppi
Spatial dimensions	4000 to 8000 pixels across the long dimension, excluding mounts and borders	600 pixels across the long dimension	150 to 200 pixels across the long dimension

Appendix H: Copyright Considerations in Digitizing

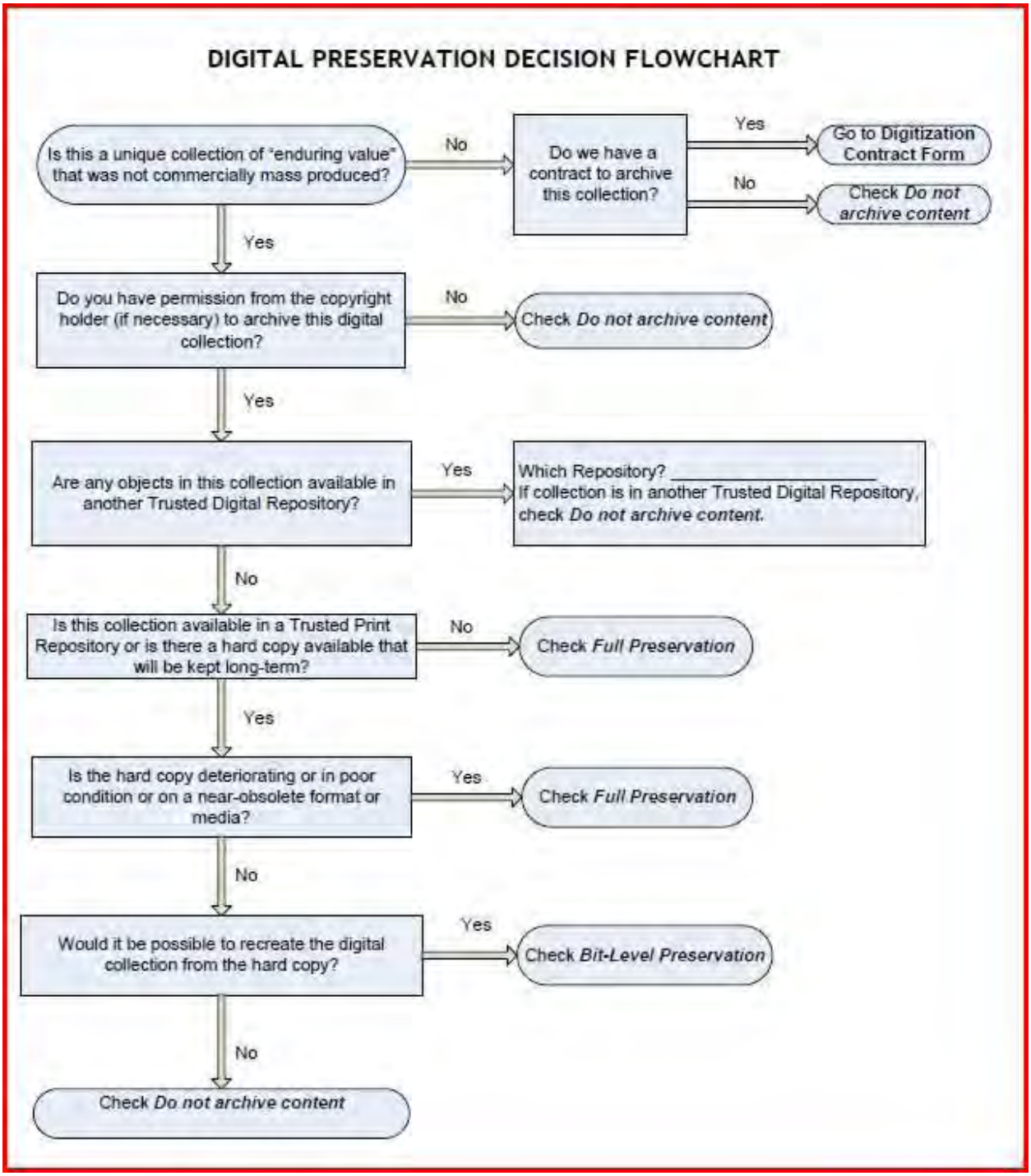
Source: Hirtle, Peter B., E. Hudson and A.T. Kenyon. 2009. *Copyright & Cultural Institutions: Guidelines for Digitization.* Ithaca: Cornell University Press.

FLOWCHART 6.1

Digitization Under the Libraries and Archives Provisions



Appendix I: Sample Digital Preservation Decision Flowchart



___DO NOT PRESERVE
___FULL PRESERVATION
___BIT-LEVEL PRESERVATION

Name: _____ Date: _____

Digital collection or content: _____

1. Preservation decision and priority (complete above flowchart)

   The final preservation decision is:
   ____Ingest content into the digital archive
   ____Do not archive content

   The final preservation priority is:
   ____ Full preservation
   ____ Bit-level preservation

2. Digital content: access options

a. Do these objects also have publicly accessible versions?_____
b. Where are the accessible versions located?_____
c. Are high resolution copies likely to be requested?_____

3. Additional considerations. Please add documentation as needed.

Source: *J. Willard Marriott Library Digital Preservation Application.* J. Willard Marriott Library, University of Utah. September 2012.

Appendix J: Access to Memory (AtoM) Platform information

From the AtoM website

- AtoM stands for Access to Memory. It is a web-based, open source application for standards-based archival description and access in a multilingual, multi-repository environment. It is an active, dynamic open-source project with a broad user base.

- All core AtoM functions take place via a web browser, with minimal assumptions about end-user requirements for access.

- Standards-compliance is built into the core of AtoM, and it offers easy-to-use, web-based edit templates that conform to a wide variety of international and national standards.

- Repository data will never be locked into AtoM – AtoM utilizes a number of metadata exchange standards to support easy import and export through the AtoM user interface.

- Built for use by a single institution for its own descriptions, or as a multi-repository platform which accepts descriptions from any number of contributing repositories, AtoM is flexible enough to accommodate your needs.

Pacific Northwest Railroad Archive
Digital Archive Platform Review
By: Elizabeth Knight, PNRA Consulting Archivist

Platform: AtoM
Documentation: https://www.accesstomemory.org/en/docs/2.2/
Date: January 20, 2016
Demo: January 14, 2016 by Sarah Romkey (sromkey@artefactual.com), Artefactual.
Notes: Demo included Archivematica.
Attendees: Elizabeth, Gary, Chuck, Bill, Gregg

Overview

- Free download. Standards-based, OAIS-compliant, open source
- Offers backend and frontend collection information management including accession log, generation of descriptive records, filtered searching,
- customizable public interface. https://www.artefactual.com/services/atom-theming/
- Permission levels
- Hierarchical data management (RHO, collection, series, item)

- Metadata templates. Uses Dublin Core and recognizes DACS (both descriptive metadata standards to be used at PNRA)
- Filtered searching categories: subject, language, repository, creator, name, genra (photos, maps, etc) Some customization available, based on Dublin Core fields
- Can upload taxonomies, thesauri
- generates thumbnails and reference images
- Integrates with Archivematica for full digital archive repository functionality and long-term preservation.
- Artefactual data migration service: https://www.artefactual.com/services/data-migration/
- Artefactual hosting $1700-$3000 annually https://www.artefactual.com/services/site-hosting/

Requirements (from AtoM website)

Hardware and Software Requirements

Please note that it is difficult to provide an authoritative baseline or recommended system specification for running AtoM because what is considered an “acceptable” performance level is subjective, and the performance of the application depends greatly on factors such as the how much data is in the database, and how many users are accessing the site simultaneously.

Furthermore, AtoM makes use of different components and services that could be deployed in a distributed manner (across multiple machines in a network) in order to accept an escalating number of users. The main goal of this documentation is to describe the configuration of AtoM and its dependencies on a single machine, but some aspects of a Multi-node deployment will also be described.

Software Dependendies (required)

These are the minimum requirements, but please remember that in most of the cases you’ll experience better results working with the latest stable releases of each component.

- A webserver like Apache or Nginx; Artefactual prefers the latter in development
- Elasticsearch 1.3.0 or newer
- Oracle Java 8 or newer (required for Elasticsearch)
- MySQL 5.1 or newer
- PHP 5.3.10 or newer (PHP 5.4 and PHP 5.5 work too)
- Memcached
- Gearman job server

Additionally, the following PHP extensions are mandatory:

- cURL (php5-curl)
- JSON (php5-json)
- APC (php-apc, or php5-apcu in PHP 5.5)
- PDO and PDO-MySQL (php5-mysql)

- XSL (php5-xsl)

Optionally:

- Readline (php5-readline, required in 14.04 only, not available in Windows).

Recommended Minimum Requirements for production processing

Archivematica can be installed one or more machines. It is recommended that each machines have these minimum requirements:

- Processor: dual core i5 3rd generation CPU or better
- Memory: 8GB+
- Disk space: 20GB plus the disk space required for the collection.

Firewall requirements

When installing Archivematica on multiple machines, all the machines must be able to reach each other on the following ports:

- http, mysqld, gearman, nfs, ssh

POWRR Review -- Not reviewed by POWRR

Appendix K: AtoM Metadata Crosswalks

Source: AtoM Metadata Crosswalks
https://wiki.accesstomemory.org/Resources/Metadata_crosswalk

3.1 Identity Statement Area

ISAD(G)	RAD	DACS	DC	MODS	EAD
3.1 Reference code	1.8B11. Alpha-numeric designations	2.1.3 Local identifier	identifier	<identifier>	<unitid>
3.1.2 Title	1.1B. Title proper	2.3 Title	title	<titleInfo><title>	<unittitle>
3.1.3 Date(s)	1.4B. Date(s) of creation	2.4 Date	coverage (temporal) date (created)	<originInfo><dateCreated>	<unitdate>
3.1.4 Level of description					<archdesc level="___">
3.1.5 Extent and medium	1.5B. Extent of descriptive unit (including specific material designation)	2.5 Extent	format (extent) format (medium)	<physicalDescription><extent> <genre>	<physdesc><extent>

3.2 Context area

ISAD(G)	RAD	DACS	DC	MODS	EAD
3.2.1 Name of creator(s)	21.1 Provenance access points	2.6 Name of creator(s)	<name type="___"><namePart> <name><role><roleTerm type="text">creator		
3.2.2 Administrative / biographical history	1.7B Administrative history / biographical sketch	2.7 Administrative / biographical history			
3.2.3 Archival history	1.7C Custodial history	5.1 Custodial history			

3.2.4 Immediate source of acquisition or transfer	1.8B12 Immediate source of acquisition	5.2 Immediate source of acquisition		

3.3 Content and structure area

ISAD(G)	RAD	DACS	DC	MODS	EAD
3.3.1 Scope and content	1.7D Scope and content				
3.3.2 Appraisal, destruction and scheduling information					
3.3.3 Accruals	1.8B19 Accruals				
3.3.4 System of arrangement	1.8B13 Arrangement				

3.4 Conditions of access and use area

ISAD(G)	RAD	DACS	DC	MODS	EAD
3.4.1 Conditions governing access	1.8B16a Restrictions on access				
3.4.2 Conditions governing reproduction	1.8B16c Terms governing use and reproduction 1.8B16d Terms governing publication				
3.4.3 Language / scripts of material	1.8B14 Language				
3.4.4 Physical characteristics and technical requirements	1.8B9a Physical condition				
3.4.5 Finding aids	1.8B17 Finding aids				

3.5 Allied materials area

ISAD(G)	RAD	DACS	DC	MODS	EAD
3.5.1 Existence and location of originals	1.8B15a Location of originals				
3.5.2 Existence and location of copies	1.8B15b Availability of other formats				
3.5.3 Related units of description	1.8B18 Associated material 1.8B20 Related groups of records external to the unit being described 1.8B20a Related groups of records within the same fonds, series or collection				
3.5.4 Publication note					

3.6 Notes area

ISAD(G)	RAD	DACS	DC	MODS	EAD
3.6.1 Notes					

3.7 Description control area

ISAD(G)	RAD	DACS	DC	MODS	EAD
3.7.1 Archivist's note					
3.7.2 Rules or conventions					
3.7.3 Date(s) of description					

Appendix L: Levels of Preservation

Source: National Digital Stewardship Alliance, Library of Congress.
http://www.digitalpreservation.gov/ndsa/NDSAtoDLF.html

Table 1: Version 1 of the Levels of Digital Preservation

	Level 1 (Protect your data)	Level 2 (Know your data)	Level 3 (Monitor your data)	Level 4 (Repair your data)
Storage and Geographic Location	- Two complete copies that are not collocated - For data on heterogeneous media (optical discs, hard drives, etc.) get the content off the medium and into your storage system	- At least three complete copies - At least one copy in a different geographic location - Document your storage system(s) and storage media and what you need to use them	- At least one copy in a geographic location with a different disaster threat - Obsolescence monitoring process for your storage system(s) and media	- At least three copies in geographic locations with different disaster threats - Have a comprehensive plan in place that will keep files and metadata on currently accessible media or systems
File Fixity and Data Integrity	- Check file fixity on ingest if it has been provided with the content - Create fixity info if it wasn't provided with the content	- Check fixity on all ingests - Use write-blockers when working with original media - Virus-check high risk content	- Check fixity of content at fixed intervals - Maintain logs of fixity info; supply audit on demand - Ability to detect corrupt data - Virus-check all content	- Check fixity of all content in response to specific events or activities - Ability to replace/repair corrupted data - Ensure no one person has write access to all copies
Information Security	- Identify who has read, write, move and delete authorization to individual files - Restrict who has those authorizations to individual files	- Document access restrictions for content	- Maintain logs of who performed what actions on files, including deletions and preservation actions	- Perform audit of logs
Metadata	- Inventory of content and its storage location - Ensure backup and non-collocation of inventory	- Store administrative metadata - Store transformative metadata and log events	- Store standard technical and descriptive metadata	- Store standard preservation metadata
File Formats	- When you can give input into the creation of digital files encourage use of a limited set of known open formats and codecs	- Inventory of file formats in use	- Monitor file format obsolescence issues	- Perform format migrations, emulation and similar activities as needed

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