Underground mine and miners (source Jerome State Historic Park).

OPEN-FILE REPORT OFR-12-08
July 2012

Arizona Geological Survey
www.azgs.az.gov | repository.azgs.az.gov
Arizona Geological Survey
Mining Records Digitization Project

Progress: July 2011 to June 2012

Prepared by:
Casey Brown, Digital Librarian
M. Lee Allison, Director & State Geologist

July 13, 2012
Contents
Summary ........................................................................................................................................... 3
Milestones ........................................................................................................................................ 3
Background ...................................................................................................................................... 3
Accomplishments .............................................................................................................................. 4
Methods .......................................................................................................................................... 5
Cataloging Results .......................................................................................................................... 9
Digitization Results ........................................................................................................................ 11
Plans for FY2013 ............................................................................................................................. 12
Technical ......................................................................................................................................... 12
Outreach .......................................................................................................................................... 12
FY13 Work Plan ............................................................................................................................. 13
Budget and Expenditures ............................................................................................................... 14
References ....................................................................................................................................... 15
Appendix A: Metadata Elements ................................................................................................. 16
Summary
The Arizona Geological Survey (AZGS) achieved its annual goals of inventorying the mining records previously held by the Arizona Department of Mines and Mineral Resources. Twenty-eight out of 31 collections of mining records are inventoried and will have finding aids available online at the AZGS repository by mid-August. Seven of these inventories are currently available via the AZGS Document Repository as of July 11, 2012, http://repository.azgs.az.gov/collection/1322.

A librarian was hired to direct and coordinate this project in October 2011. Since then a number of cataloging efficiencies for the project have been implemented. Microsoft Access was chosen as the database to better control typographical errors and reduce data entry redundancy. This database is in use to create inventories of all the collections. Once fully completed, the inventories can be built upon to create geographic metadata for each item. Development of full geographic metadata for 10,000 records is targeted for Fiscal Year 2013.

The initial inventory of ADMMR collections identified by AZGS includes:

- 23 Special Collections containing approximately 13,500 folders, with 836,553 pages of records
- 6 Photo Collections containing approximately 7,400 images
- 1 Theses Collection with 371 papers
- 1 Map Collection containing approximately 10,000 maps

A state vendor specializing in comprehensive document management systems and file scanning services was retained to assist with the scanning and digitizing of mining records. The estimate to scan each report, photo, slide, and map in the mining records totaled $185,455. This past year, AZGS contracted with state vendor OSAM Inc. to scan the ADMMR Map Collection of approximately 10,000 maps. It should be noted that the OSAM work only includes scanning and does not include the metadata creation or cataloging of the files; this work remains the primary focus of the AZGS in FY13.

Milestones
- Preliminary inventories of most collections completed
- Scanning of 10,000 mining maps was completed by end of FY12
- Data Management Plan was finalized for mining preservation, June 2012
- Survey-wide Digitization Plan was created based on assessment and recommendations of federal, local, and industry standards, January 2012
- Relational database established for cataloging, querying, and sharing metadata, March 2012
- Inventories for several collections posted online at AZGS Repository, 28 out of 31 inventories expected to be posted by mid-August, 2012

Background
The Fiscal Year 2012 budget for the Arizona Geological Survey included a one-time increase of $100,000 from the General Fund for the digitization of records owned by the Department of Mines and Mineral
Resources (http://www.azleg.gov/jlbc/12app/geo.pdf). The Department (ADMMR) was merged with the AZGS in FY12.

In January 2011, the Arizona Geological Survey (AZGS) rescued and stored the records when ADMMR was shut down due to lack of funds. In FY12 AZGS began a comprehensive inventory of archival collections formerly held by ADMMR. The collections’ contents are geographically focused on Arizona, but many, particularly those donated by companies and individuals include reports, maps, and files on other states and countries. The first step was to create an inventory of the scope and size of the ADMMR collections and develop a plan for estimating and prioritizing the digitization of the records.

ADMMR files contain unpublished information collected over the years by agency staff, or donated by mining companies, exploration geologists, and consultants. Many of the files contain data of historical significance, dating as far back as the late 1800’s. The collection is the premier source of public information about mining activity, past and present, in Arizona.

Statutory duties (Arizona Revised Statutes 27-152) assigned to the AZGS related to data and sample preservation include:

- Operate and maintain a central repository and a computerized database for reports, books, maps and other publications regarding the geology, mineral resources and associated technologies. Such repository and database shall be available for the use of the public and may be located at or connected with the University of Arizona or another state university or agency of this state.
- Operate and maintain a central repository for rock cores, well cuttings and related subsurface samples and all associated supplemental data consistent with the laws of this state requiring the deposit of such material and information. Such repository shall be available for the use of the public.
- Maintain a computerized bibliographic database of maps and reports on the geology of this state that is accessible to the public.
- Maintain an internet web site that includes information about the Arizona Geological Survey, products and services available and the geologic character of this state.

Accomplishments
The first stage of metadata gathering began with an initial inventory of the special collections and library materials held at AZGS – Phoenix Branch (former ADMMR offices). Partial lists were compiled from previously created finding aids. A more comprehensive inventory followed minimal-level archival processing procedures.

Mandatory fields of minimal-level archival processing include:

- Collection
The initial inventory of ADMMR collections identified by AZGS includes:

- 23 Special Collections containing approximately 13,500 folders
- 6 Photo Collections containing approximately 7,400 images
- 1 Theses Collection with 371 papers
- 1 Map Collection containing approximately 10,000 maps

The collections contain derived geosciences, engineering, and economic data such as drilling reports, field notes, assays, geologic maps, subsurface maps, photographs, paper reports, newspaper clippings and periodical articles.

Intermittent scanning had been in progress under ADMMR prior to the transfer to AZGS, on a limited basis driven by customer requests. The AZGS librarian converted the unstandardized listing of collections to a relational database with data entry forms that allow staff to enter data in a consistent manner. This has allowed creation of a preliminary inventory including unique IDs, names, counties, and dates for 9000 folders and 7400 photos.

**Methods**

**Digitization and Publication**

Prior to the merger, ADMMR digitization was done at a 200 dots per inch (dpi) resolution and in black and white, due to limitations in digital storage capacity and challenges of delivering large digital files to users. The AZGS decided to adopt state-of-the-art digital archival resolution and standards for this project to ensure long term preservation of the data and maximum functionality for users. This could lead to the paper records moving to State Archives at lower cost and better preservation, while still providing users with the highest quality digital versions of the records.

The AZGS librarian consulted with the State Librarian, the Library of Congress, USGS, other state geological surveys, industry experts, and others, to determine the appropriate resolution and parameters for archival quality digital preservation. This is a rapidly evolving field and many parameters are not formally adopted yet.
An access copy is converted to PDF, OCR processed, and compressed to 300dpi. Digital files are reviewed for legibility, cropped or folded pages, and correct page order. Access copies are reviewed for removal of copyrighted materials that would exceed fair use for research purposes. Scanning at higher resolution, particularly for large-format maps was deemed impractical because the size of the digital files greatly exceeded the ability of many software programs to handle them. Photographs are scanned at much higher resolution and are considered separately from other documents. We initially set a resolution of 600ppi for documents smaller than ledger size but dropped that requirement for <17” documents after reviewing that USGS Publications Warehouse and Library of Congress National Digital Newspaper program that use 300-400ppi.

In 2006, many of the Arizona Mineral Industry Location System (AzMILS) folders were scanned at a lower resolution than we deem acceptable today. Also, there was no equipment for scanning oversized maps that are common in these files. It appears that after April, 2007, files began to be scanned at the higher 400dpi resolution. It is necessary to replace the 200dpi scans with 400dpi scans. Some files were scanned and saved only as PDF. In December 2011, policy was instated that master copies be saved as TIFF.

**AZGS Digitization Guidelines for maps and textual documents:**

<table>
<thead>
<tr>
<th>Document Type</th>
<th>Bit depth</th>
<th>Resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black and white text</td>
<td>Bitonal B&amp;W</td>
<td>400ppi</td>
</tr>
<tr>
<td>Documents with any graphics, diagrams, line maps, or low contrast text to background</td>
<td>8-bit grayscale</td>
<td>400ppi</td>
</tr>
<tr>
<td>Document for which colors are essential to their meaning</td>
<td>24-bit color</td>
<td>400ppi</td>
</tr>
</tbody>
</table>

As part of the data rescue plan and to fulfill our statutory duties to maintain a repository “for reports, books, maps, and other publications regarding the geology, mineral resources and associated technologies . . . available for the use of the public,” we will follow the understanding of “fair use” that complies with the “Well-intentioned Practice for Putting Digitized Collections of Unpublished Materials Online” by OCLC Research. During the metadata gathering phase of the project, staff will make note of whether or not a folder contains published materials with commercial intents that may reasonably be thought to be copyrighted. As resources permit, we will seek explicit permission to distribute excerpts from published materials for research purposes as part of the greater archival collections.

The repository will include a take-down policy in-case of potential copyright disputes:

> These digitized collections are accessible for purposes of education and research. We’ve indicated what we know about copyright and rights of privacy, publicity, or trademark. Due to the nature of archival collections, we are not always able to identify this information. We are eager to hear from any rights
owners, so that we may obtain accurate information. Upon request, we’ll remove material from public view while we address a rights issue.

Processing includes flattening maps, removing rusted staples, removing rubber bands, gathering metadata, and relating folders to their Arizona Mineral Industry Location System (AzMILS) records which contain data on site commodities, alternate names, a shorthand bibliography, and spatial keywords.

Initially, most of these collections had only a text inventory with a folder name. An example of the incompleteness of the metadata for inventory at the time of the merger is provided by the G.M. Colvocoresses mining collection:

1. A.B. Extension Claims, Arizona
2. Abe Lincoln, Arizona
3. Ada C Claims, Arizona
4. Adjust Mining Co., Arizona
5. Agua Fria Placer, Arizona
6. Allis Group, Arizona
7. American Eagle Mining Co.
8. American Kirkland Mines, Arizona
9. Anarchist Gold Claims, Arizona
10. Angelus, Arizona

Records in the ADMMR mining collection, created by that agency rather than by donors, are better cataloged since they relate 1:1 to the Arizona Mineral Industry Location System (AzMILS ID) database which contains locality, commodity, and bibliographic information on 10,000 localities. One goal is to relate records in the other collections to an AzMILS ID, thereby harvesting coordinates, theme keywords, and spatial keywords for mine specific records. Since some records are non-geographic in nature and instead are company or subject specific, not all records benefit from the AzMILS table.

Metadata
Metadata, or data about the data, is key to search functionality and record management. AZGS is carrying out full archival processing and metadata creation for records inclusion in the National Digital Catalog maintained by the U.S. Geological Survey. AZGS conforms to national standards for digitization specifications. Metadata is consistent with the US Geoscience Information Network (USGIN– a collaboration between State Geological Surveys and the U.S. Geological Survey) profile for International Organization for Standardization (ISO) 19115. This includes geographic bounding boxes, accurate descriptions, thematic keywords, spatial keywords, temporal keywords, and preservation metadata and is searchable through the USGIN catalog, the National Digital Catalog Metadata Profile, and AZGS’s online Document Repository. Once digitized, files are accessible for download through the AZGS Document Repository.
The metadata was also used to create a relational database. The database relates collections to records and records to mineral locations. Since each record comes from a particular collection, all the associated collection information including distribution contacts and metadata contacts must only be entered into the collection record rather than for each folder, map, or photo. The librarian created a data entry interface with controlled values, so metadata records can be easily entered and data types remain consistent.

Creating additional metadata makes textual and spatial searching of these files more useful to our user groups, enabling effective search of resources for commodities, counties, districts, alternate names, and document types. In addition, the new metadata standards will tell users whether a file contains the types of information they are seeking, i.e., maps or photographs. Thematic keywords will tell users whether the files contain chemical analyses, drillhole records, subsurface maps, etc.

Those catalogued (i.e., “metadata”) records will be exported to our website and shared with other sites such as the USGS National Digital Catalog via [http://ndc.sciencebase.gov](http://ndc.sciencebase.gov) in compliance with the Federal Geographic Data Committee (FGDC) and ISO19115 metadata standard, which include location, commodity, alternate names, map names, and bibliographic information. To meet this metadata standard, each record must have location coordinates which are not always available in the ADMMR records. When staff can match records to an Arizona Mineral Information Location System (AZ MILS) table, AZGS records will be in compliance with FGDC metadata standards.

Capturing metadata begins with the information available in the finding aids for each collection. Sometimes this is nothing more than Collection ID, Title, and County. Other location fields may be completed by referencing AZGS materials such as the Metallic Mineral District listing, the 1961 AzBM Map and Index of Arizona Mining Districts, the AzMILS dbase tables, and the Survey’s Physiographic Area Shape Map. The fields used in the Mine Files Schema are:

1. ResourceID
2. MineID (From the AZMILS dbase files)
4. Title takes the title of the folder (Mine Files titles should match AzMILS PrimaryName)
5. Dates (of the earliest and most recent items in a folder)
6. AKA takes any AKA or PRINAME from the MILS file or from the document itself
7. File Name is the name of the digital scan of folder contents.
8. Description is brief abstract of the contents of the folder/item.
9. Collection (e.g. G. M. Colvocoresses collection, Walter Heinrichs collection, Arizona Department of Mines and Mineral Resources photo collection)
10. Restrictions (copyrighted or confidential)
11. ThemeKeywords (Commodities, subjects, and content details using USGS Thesaurus))
12. LocationKeywords (Country, State, County, TRS, Lat/Long, Mining Dist, Metallic Mineral Dist, Physiographic Area)
13. Data type (text, map, photos)
14. File size (in Kb)
15. Digitization (scan dpi)
16. Date Digitized
17. Notes (physical condition of the documents: Poor, Fair, Good)
   a. Good condition shows no signs damage and is not difficult to read.
   b. Fair condition shows minor damage or fading, but can still be read with some effort
   c. Poor condition shows significant fading or damage and is very difficult or impossible to read.
18. Metadata date

Based on decades of public service to our users, our content experts determined what extra metadata should be collected. The documentation serves the Agency’s immediate information needs and fulfills all the required ISO 19115 standards to make the records interoperable with NGGDPP and the National Digital Catalog.

The Survey identified the following elements to include in the metadata of this digitization project:

- quadrangle map name
- township range section
- commodities
- mining district
- metallic mineral district
- physiographic area
- intellectual originators
- contributors
- digitization techs
- digitization dates

The librarian follows quality standards and procedures established by AZGS under the USGS National Geological & Geophysical Data Preservation Program and other programs. All cataloging and metadata entries are reviewed by a project geologist to assure consistency with protocols and for accuracy.

The AZGS has implemented a Catalog Service for the Web (CSW) to enable responses to simple thematic queries and spatial metadata queries. This in-house metadata catalog is a developing gateway for Web navigation to the actual 'resources' (e.g., log, sample record, geochronology or geochemical data, core photos, etc.) and is compliant with U.S. Geoscience Information Network (USGIN) specifications and protocols.

**Cataloging Results**

In FY12 we began with only inconsistent listings of collections which lacked standardization. AZGS has created preliminary inventories of records for 9,500 folders and 7,400 photos in the relational database.
**Overview of the number of records in each collection**

<table>
<thead>
<tr>
<th>Records</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. F. Budge Mining Ltd. mining collection</td>
<td>325 folders</td>
</tr>
<tr>
<td>ADMMR Geologic Reports and Theses collection</td>
<td>371 reports</td>
</tr>
<tr>
<td>ADMMR mining collection</td>
<td>4219 folders</td>
</tr>
<tr>
<td>Arimetco mining collection</td>
<td>86 folders</td>
</tr>
<tr>
<td>Cambior Exploration USA Inc. mining collection</td>
<td>390 folders</td>
</tr>
<tr>
<td>Doug K. Martin mining collection</td>
<td>253 folders</td>
</tr>
<tr>
<td>Edwin Noel Pennebaker mining collection</td>
<td>149 folders</td>
</tr>
<tr>
<td>Fred Hohne mining collection</td>
<td>15 folders</td>
</tr>
<tr>
<td>George M. Colvocoresses mining collection</td>
<td>422 folders</td>
</tr>
<tr>
<td>Grover Heinrichs mining collection</td>
<td>1285 folders</td>
</tr>
<tr>
<td>Hahman mining collection</td>
<td>36 folders, 40 maps</td>
</tr>
<tr>
<td>Jaba Resources mining collection</td>
<td>40 boxes of unprocessed files</td>
</tr>
<tr>
<td>James Doyle Sell mining collection</td>
<td>1873 folders</td>
</tr>
<tr>
<td>John E. Kinnison mining collection</td>
<td>468 folders</td>
</tr>
<tr>
<td>Kelsey Boltz mining collection</td>
<td>512 folders</td>
</tr>
<tr>
<td>Larry Kersey mining collection</td>
<td>156 folders</td>
</tr>
<tr>
<td>Reconstruction Finance Corporation AZ records</td>
<td>226 folders</td>
</tr>
<tr>
<td>Richard Mieritz mining collection</td>
<td>167 folders</td>
</tr>
<tr>
<td>Roland Mulchay mining collection</td>
<td>338 folders</td>
</tr>
<tr>
<td>Sylvia Fink mining collection</td>
<td>141 folders</td>
</tr>
<tr>
<td>Unocal mining collection</td>
<td>275 folders</td>
</tr>
<tr>
<td>W. H. Crutchfield, Jr. mining collection</td>
<td>50 folders</td>
</tr>
<tr>
<td>Walter E. Heinrichs, Jr. mining collection</td>
<td>1143 folders</td>
</tr>
<tr>
<td>West Oatman Project mining collection</td>
<td>92 folders</td>
</tr>
</tbody>
</table>

**Photos**

<table>
<thead>
<tr>
<th>Photos</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADMMR Photo Archive</td>
<td>6508 photos</td>
</tr>
<tr>
<td>Arthur L. Flagg mining photo collection</td>
<td>366 photos</td>
</tr>
<tr>
<td>Frederick Warren Osborn AZ photo collection</td>
<td>93 photos</td>
</tr>
<tr>
<td>Guy Atlee mining photo collection</td>
<td>66 photos</td>
</tr>
<tr>
<td>Mason Coggin mining photo collection</td>
<td>237 photos</td>
</tr>
<tr>
<td>Richinbar Mine photo collection</td>
<td>151 photos</td>
</tr>
</tbody>
</table>

**Maps**

<table>
<thead>
<tr>
<th>Maps</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADMMR Map collection</td>
<td>Approximately 10,000 maps</td>
</tr>
</tbody>
</table>

1. ADMMR mining collection has a backlog of 5 feet of folders whose titles do not match a mine record
2. Jaba Resources records remain in storage and are inaccessible at this time.
3. The map collection is grouped by subject and location, but an item-inventory remains to be finished.
Seven of the preliminary inventories of special collections are currently accessible through the AZGS Document Repository, [http://repository.azgs.az.gov/collection/1322](http://repository.azgs.az.gov/collection/1322). The metadata records will be uploaded to our website and shared with other repository sites such as the USGS National Digital Catalog. A total of twenty-eight special collections inventories will be available in August, 2012. The remaining three special collections inventories will be accessible by December, 2012.

The available inventories include:

- Reconstruction Finance Corporation AZ records - [http://repository.azgs.az.gov/uri_gin/azgs/dlio/1402](http://repository.azgs.az.gov/uri_gin/azgs/dlio/1402)
- Edwin Noel Pennebaker mining collection - [http://repository.azgs.az.gov/uri_gin/azgs/dlio/1422](http://repository.azgs.az.gov/uri_gin/azgs/dlio/1422)
- Doug K. Martin mining collection - [http://repository.azgs.az.gov/uri_gin/azgs/dlio/1420](http://repository.azgs.az.gov/uri_gin/azgs/dlio/1420)
- George M. Colvocoresses mining collection - [http://repository.azgs.az.gov/uri_gin/azgs/dlio/1407](http://repository.azgs.az.gov/uri_gin/azgs/dlio/1407)
- Richard Mieritz mining collection - [http://repository.azgs.az.gov/uri_gin/azgs/dlio/1417](http://repository.azgs.az.gov/uri_gin/azgs/dlio/1417)
- Cambior Exploration USA Inc. mining collection - [http://repository.azgs.az.gov/uri_gin/azgs/dlio/1404](http://repository.azgs.az.gov/uri_gin/azgs/dlio/1404)
- Roland Mulchay mining collection - [http://repository.azgs.az.gov/uri_gin/azgs/dlio/1403](http://repository.azgs.az.gov/uri_gin/azgs/dlio/1403)

**Digitization Results**

Per AZGS request, OSAM Inc., a state vendor specializing in document digitization, provided an estimate for digitizing all collections. The resulting survey estimated that AZGS has 836,553 pages of records, 7,400 photos, 1,800 slides and 10,939 maps. The total estimated cost of scanning these documents according to archival digitization guidelines is $185,455. The proposed timeline for this work is three months. In FY12, AZGS contracted with OSAM Inc. to scan mine maps for a total of $24,119. OSAM is currently processing the images and saving them to hard disks in preparation for final delivery. We are analyzing our budget and work plan to evaluate how to proceed in the 2013 fiscal year.

Not included in the OSAM Inc. proposal is the ADMMR Mining Collection of 4,219 records, most of which have been previously scanned by customer request. Out of this collection, 3,274 records were scanned in FY12 or earlier. The plan is to complete digitization of this collection in FY13 using the specifications in the AZGS Data Preservation plan.

Also not included in the OSAM Inc. proposal, and key to making the collections discoverable to the public, is metadata creation. Digitization alone does not make the records useful. Cataloging these records put them in context and allows users to search for them according to their titles, creators, places or subjects. In the digital age, users expect this type of search functionality.
Plans for FY2013

Technical

Cataloging
A top priority for the upcoming year is to finish the inventory of the ADMMR Map Collection. Building on the inventories created in FY12, the AZGS will begin the task of associating each mining record, mine map, and photo with a mineral locality in Arizona in compliance with the FGDS metadata standard and ISO 19115. To meet this metadata standard, each record must have location coordinates. This can be time-consuming as staff must sometimes use incomplete information to pinpoint the mine’s location. Once the records are matched to an Arizona Mineral Information Location table, our records will show location, commodity, alternate names, map names, and bibliographic information for all those records. Additionally, administrative metadata such as intellectual originators, contributors, digitization techs, and digitization dates all contribute to understanding the provenance of the print and digital documents. Appendix A identifies the USGIN and ISO 19115 metadata requirements.

Geologic and geographic data requires more location elements than is typical of other archival records. We estimate that one staff person will produce 100 records per week. With two staff members cataloging records full-time, we estimate that 10,000 new mining records will be completed according to FGDC metadata standards in FY13, one-third of all records. If records in the mining collections are outside Arizona then we will consider them outside the scope of this project for FY13.

Digitization
The proposal for scanning mining records from OSAM Inc. remains advantageous in terms of time and cost compared to having AZGS staff scan documents.

Summary of the proposed costs to scan the records

<table>
<thead>
<tr>
<th>Type</th>
<th>Est. Qty</th>
<th>Service Description</th>
<th>Est. Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Photos</td>
<td>7,392</td>
<td>Prep, scan, save, deliver</td>
<td>$4,153.32</td>
</tr>
<tr>
<td>Slides</td>
<td>1,800</td>
<td></td>
<td>$1,857.00</td>
</tr>
<tr>
<td>Records (pages)</td>
<td>838,122</td>
<td></td>
<td>$155,325.22</td>
</tr>
<tr>
<td>Maps</td>
<td>10,939</td>
<td></td>
<td>$24,119.43</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td><strong>$185,454.97</strong></td>
</tr>
<tr>
<td><strong>Expended in FY12</strong></td>
<td></td>
<td></td>
<td><strong>$24,119.43</strong></td>
</tr>
<tr>
<td><strong>Remaining</strong></td>
<td></td>
<td></td>
<td><strong>$161,335.54</strong></td>
</tr>
</tbody>
</table>

Outreach
In FY13, one outreach mechanism to publicize these records will be to digitize all the photo collections and make them available online beyond the AZGS Document Repository. The Arizona Memory Project (AMP), managed by the Arizona State Library, Archives and Public Records, is a local portal to Arizona’s historic digital collections. A small sample of AZGS mining records are already posted on the AMP website. Cultural heritage institutions from all across Arizona participate in the project and AZGS’s
thousands of photos of Arizona’s mining history will add to the historical significance of the collaboration.

Knowing who holds which records is one of the challenges faced by researchers and information professionals. In February, 2013, dozens of archivists and librarians from around the state meet during a full-day Arizona Archives Summit hosted by the Arizona State Library, Archives and Public Records. The AZGS Librarian will attend the Summit to promote awareness of the Mining Preservation project so more librarians and archivists may direct researchers to our collections.

**FY13 Work Plan**

Figure 1: Major tasks associated with the AZGS Digitization Effort

<table>
<thead>
<tr>
<th>Task</th>
<th>Dates</th>
<th>Milestone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Task 1: Finalize collections inventory</td>
<td>July 1, 2012 – August 15, 2012</td>
<td>Complete inventory of ADMMR Collections</td>
</tr>
<tr>
<td>Task 2: Process the remaining 3 collections</td>
<td>August 16, 2012 – December 1, 2012</td>
<td>Process the two remaining special collections (69 boxes) and the ADMMR Map Collection, 10,000 maps.</td>
</tr>
<tr>
<td>Task 3: Item level metadata for inventoried collections</td>
<td>July 1, 2012 – June 30, 2013</td>
<td></td>
</tr>
</tbody>
</table>

Detailed Description of FY13 Tasks:

- **Task 1: Finalize collections inventory**
  - Dates: July 1, 2012 – August 15, 2012
  - Milestone: Complete inventory of ADMMR Collections

- **Task 2: Process the remaining 3 collections**
  - Dates: August 16, 2012 – December 1, 2012
  - Milestone: Process the two remaining special collections (69 boxes) and the ADMMR Map Collection, 10,000 maps.

- **Task 3: Item level metadata for inventoried collections**
  - Dates: July 1, 2012 – June 30, 2013

- **Milestone**
  - **Scan All Photographic Collections**: Completed on 8/5/2013
  - **Publish Digital Photo Collection**: Completed on 3/8/2013
  - **Item Level Metadata for Inventoried Collections**: Completed on 6/16/2013
  - **Process Remaining Collections**: Completed on 8/20/2013
Milestone: 7,400 photos from 6 collections completed with full geographic metadata by December 1, 2012 and 2,000 folders from multiple collections completed with full geographic metadata by March 1, 2013.

Task 4: Scan all six photographic collections
Dates: October 1, 2012 – November 1, 2012
Milestone: Archival quality digital images scanned and saved for all 7400 images from six collections

Task 5: Publish digital photo collection to AZGS Document Repository
Dates: December 1, 2012 – March 1, 2013
Milestone: Upload metadata records and digital images for all those photos which AZGS has permission to distribute online

**Budget and Expenditures**
The FY12 budget for this project is as follows:

<table>
<thead>
<tr>
<th>State Appropriation</th>
<th>Expenses</th>
</tr>
</thead>
<tbody>
<tr>
<td>$100,000.00</td>
<td></td>
</tr>
<tr>
<td>Personnel</td>
<td>$ 59,822.00</td>
</tr>
<tr>
<td>Pro'f Svcs</td>
<td>$ 39,158.00</td>
</tr>
<tr>
<td>Travel</td>
<td>$  205.00</td>
</tr>
</tbody>
</table>

**TOTAL** $100,000.00  $ 99,185.00

FY12 Justification:
Salaries included a full-time digital librarian to plan, implement, and provide quality control for the project, two full-time data entry technicians, and guidance and review by AZGS geologists. After estimating the costs of hiring staff to digitize records or contracting with the state vendor OSAM Inc. to digitize the records, the Survey selected OSAM and expended $24,119 for scanning mine maps as high resolution archival files. The scanning is the fastest aspect of the digitization project. It is research intensive to georeference maps and reports, ascertain their provenance, determine key words, and enter the metadata into the digital catalog. Travel included professional development courses in digital data management and in-state trips between the Tucson and Phoenix office.

AZGS successfully competed for $42,495 in federal matching funds from the US Geological Survey’s National Geological & Geophysical Data Preservation Program. Those funds were used for salary support in FY2012 and remaining funds are supporting AZGS staff into FY2013. AZGS submitted a proposal for additional federal matching funds in the federal fiscal year beginning October 1, 2012. Competition for the small amount of funds is intense and the USGS budget for this program has been cut, so we cannot be certain of receiving additional support. An award of NGGDPP funds would help pay for the continuation of the project.
The estimated budget for completion of this project is as follows:

<table>
<thead>
<tr>
<th>Expenses</th>
<th>FY13</th>
<th>FY14</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personnel</td>
<td>$97,600.00</td>
<td>$91,600.00</td>
</tr>
<tr>
<td>Pro'l Svcs</td>
<td>$159,047.00</td>
<td>$0.00</td>
</tr>
<tr>
<td>Annual Budgets</td>
<td>$256,647.00</td>
<td>$91,600.00</td>
</tr>
<tr>
<td><strong>PROJECT TOTAL</strong></td>
<td><strong>$348,247.00</strong></td>
<td><strong>$348,247.00</strong></td>
</tr>
</tbody>
</table>

Justification for Project Completion Budget:
We estimate that one staff person can produce 100 digital metadata records per week. With two staff members cataloging records full-time, we estimate that 10,000 ADMMR records will be completed according to FGDC metadata standards in FY13, one-third of all the records. If we exclude non-Arizona records (one third of the records in the Survey’s custody), we estimate the project will take two employees two more years to fully catalog all 32 archival collections. Salaries include a full-time librarian, two part-time data technicians (student interns), and time for geologist oversight.

References
Adobe. Understanding Acrobat’s Optimizer
http://acrobatusers.com/tutorials/understanding-acrobats-optimizer


ASLAPR Digital Projects Guidelines

Federal Agencies Digitization Guidelines Initiative
http://www.digitizationguidelines.gov/guidelines/digitize-technical.html

http://www.loc.gov/ndnp/guidelines/archive/techspecs09.html


University of Florida. George A. Smathers Libraries. Retrospective Dissertation Scanning Policy
http://ufdc.ufl.edu/AA00007596/00001/pdf
Appendix A: Metadata Elements

Recommended metadata elements for USGIN and ISO 19115:

Key: Groupings; **required**, **conditional**, and **optional** metadata fields; (number of values that can be specified).

- **Citation**
  - **Title** (1 entry): Succinct (preferably <250 characters) name of the resource.
  - **Description** (1 entry): Inform the reader about the resource’s content as well as its context.
  - **Originators** (1 to many entries): Authors, editors, or corporate authors/curators of the resource.
  - **Publication Date** (1 entry): Publication, origination, or update date (not temporal extent) for the resource. Use a "year" or ISO 8601 date and time format. Alternative date formatting must be machine readable and consistent across all datasets.
  - **Keywords** (0 to many entries): Thematic, spatial and temporal free-form subject descriptors for the resource. A keyword may be assigned on metadata import if none are present.
  - **Resource language** (0 to 1 entries): Use three letter ISO 639-2 language code (defaults to "eng" for English).
  - **Resource ID** (0 to many entries): Resource identifier(s) following any public or institutional standard. Identified consists of an identifier string and if applicable a Resource ID Protocol identifier string that specifies the protocol for the resource ID standard. For example: undefined, ISBN-10, ISBN-13, ISSN, URN, URI, IRI, DOI, HTTP, SSN, etc. Many protocols build the identifier for the protocol into the identifier string.
  - **Intellectual Originator Contact** (0-1 entry): The primary party responsible for creating the resource. Organization name, person name, street address, city, state, ZIP code, email, phone, fax, URL.

- **Geographic Extent - Horizontal** (1 entry, point or minimum bounding rectangle): north bounding latitude, south bounding or point latitude, east bounding longitude, west bounding or point longitude. Values given in decimal degrees using the WGS 84 datum. A minimum bounding rectangle will be created if point coordinates are given. Some resources may not be usefully described by an extent; if no extent is specified the default is Earth. This convention would have to be modified for systems describing extraterrestrial resources.
- **Geographic Extent – Vertical** (0 to 1 entries*): **datum elevation, datum type, maximum elevation, minimum elevation**. Values given in meters. Maximum and minimum elevations are relative to the reported datum elevation, which will typically be the Earth surface at the location of the resource or sea level. Datum elevation must be reported relative to mean sea level. Datum type must be a controlled vocabulary (Earth surface, MSL, Kelly bushing, etc.). The maximum is always numerically greater than the minimum elevation. For boreholes with datum at the earth surface, depth below surface is reported as a negative number. *Vertical extent may be reported relative to different datums (e.g. sea level, Earth surface) in the same record.

- **Temporal Extent** – Temporal range over which the resource was collected or is valid. If the resource pertains to specific Geologic time periods, those terms should be entered as keywords.

- **Start date** (0 to 1 entries): Use ISO 8601 date and time format.

- **End date** (0 to 1 entries; required if start date exists): Use ISO 8601 date and time format.

- **Resource**
  - **Link to the resource** (0 to 1 entries): A URL pointing to a resource or resource webpage.
    - **URL, function, format**. Function term from controlled vocabulary specifying what an HTTP get using the URL will invoke. Format is a controlled vocabulary term specifying the format (MIME media type) of a file-based response if applicable. The function might be return an html page, and electronic document in some other format, an end point for a service, an online application that requires user interaction, etc.
  - **Access instructions** (0 to 1 entries): A sentence or paragraph describing how to access the information.
  - **Distribution Contact** (1 entry): The party to contact about accessing the resource.
    - **Organization name, person name, street address, city, state, ZIP code, email, phone, fax, URL**. In general, a contact for distribution should be required for physical resources.
  - **Quality statement** (0 to 1 entries): describe the quality of the resource.
  - **Constraints statement** (0 to 1 entries): describe the resource’s legal and usage constraints.
  - **Lineage statement** (0 to 1 entries): describe the resource’s provenance.

- **Metadata**
  - **Metadata Date** (1 entry): Last metadata update/creation date-time stamp in ISO 8601 date and time format. This may be automatically updated on metadata import if a metadata format conversion is necessary.
  - **Metadata UUID** (0-1 entries): A Universally Unique Identifier (UUID) will be assigned during the metadata import process if one is not provided. Unique identification of each metadata record is required to avoid duplicate entries across multiple metadata catalogs. The UUID format provides unique identification without centralized coordination.
  - **Metadata Contact** (1 entry): The party to contact with questions about the metadata itself.
    - **Organization name, person name, street address, city, state, ZIP code, email, phone, fax, URL**.
  - **Metadata Specification** (1 entry): Identifier string that specifies the metadata specification used to create a metadata record encoding this content. Should indicate the base standard and version, as well as any profile that applies to the content or encoding. Ideally the identifier could be dereferenced to obtain information about the applicable specification.