

*Earth Data Analysis Center*  
at  
The University of New Mexico



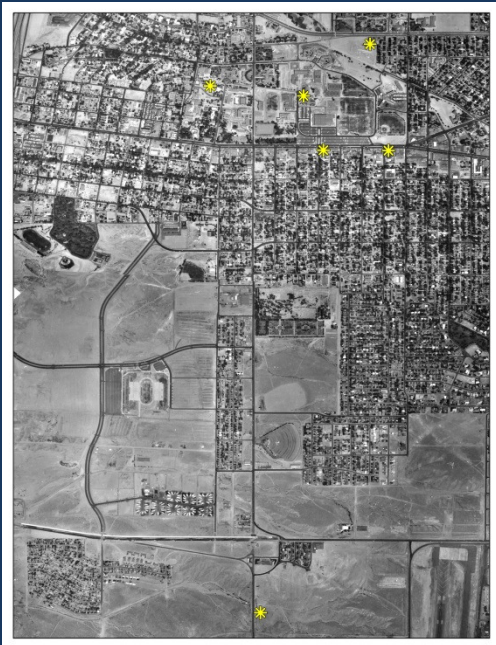
EDAC

EPSCoR/RGIS Metadata:  
FGDC to ISO Transformation



FGDC ISO Implementation Forum  
April 13, 2016

# Earth Data Analysis Center



Earth Data Analysis Center (EDAC) was established at the University of New Mexico (UNM) in 1964 to transfer NASA space-based technology to the private and public sectors. As geospatial technology has progressed EDAC has developed skills to meet those changing requirements. In 1968 EDAC expanded to include a library clearinghouse and in 1992 became a digital data clearinghouse. As remote sensing technology evolved EDAC began processing remote sensing data in 1973 and started image processing in 1979. EDAC acquired GIS software in 1983 and became one of the first ESRI users in New Mexico. In 1990, EDAC began collecting and processing GPS data and in 1999 created an information technologies program within the organization.



## New Mexico Resource Geographic Information System (RGIS) Program

- RGIS serves as a repository for New Mexico geospatial data. These data are publicly available for download from the RGIS Web site.
- Support public service programs, policy development and implementation, resource and assets management, and strategic planning within the state.

### Data & Tools

- Geospatial Data
- Web Services
- Browse Data
- Spatial Search
- Metadata

<http://rgis.unm.edu>

# RGIS History

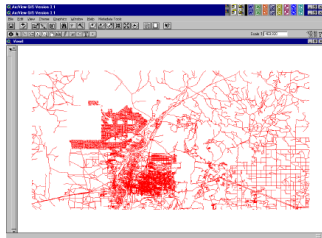
- 1988 – New Mexico State agencies surveyed by four UNM units to assess the feasibility for developing a statewide computer mapping and geographic information system. (RGIS)
- 1989 – House Bill 218 requested funds for establishing a GIS clearinghouse
- 1990 – RGIS became a member of the New Mexico Geographic Information Systems Advisory Committee (GISAC)
- 1992 – RGIS clearinghouse opened and provided digital data via 4mm and 8 mm tapes
- 1993 – Catalog of digital geographic data in New Mexico published. (cost \$40.00)
- 1994 – EDAC received FGDC Cooperative Agreement Program award to develop FGDC compliant metadata
- 1996 – RGIS website inaugurated. Provided information on the program and metadata. Data not available yet via the website. CD-ROM set of clearinghouse data released. Cost per CD was \$150.00.

# RGIS History

- 1997 – RGIS Clearinghouse upgraded to a National Spatial Data Infrastructure (NSDI) compliant node. Metadata could be searched by keywords and/or geographic coordinates
- 1998 – Version 2 of the Resource Data CD released. First metadata training workshops supported by FGDC and RGIS were held.
- 2001 – RGIS website redesigned to provide online access to digital data. Data available at no cost!
- 2002 – Road centerline data collected by New Mexico Counties were made available
- 2008 – RGIS website redesigned
- 2013 - The RGIS website was redesigned to accommodate more sophisticated capabilities such as data discovery, access, and web mapping services.
- 2013 - RGIS designated State Digital Geospatial Data Clearinghouse by the NM Legislature and Governor (2013, HB493)

# Metadata Training

## Documenting GIS Data Using ArcCatalog



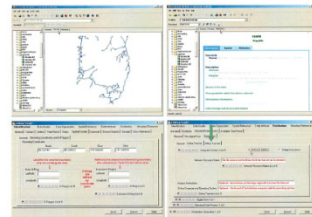
Workshop Presented by  
Amy Budge, Earth Data Analysis Center  
and  
Rich Friedman, McKinley County GIS Center

For the  
Southwestern Indian Polytechnic Institute

Albuquerque, NM  
2003



## Documenting GIS Data Using ArcCatalog

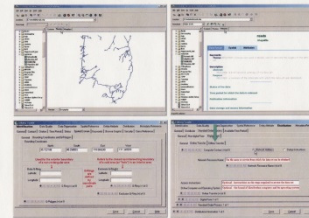


Workshop Presented by  
Amy Budge, Earth Data Analysis Center  
and  
Rich Friedman, City of Farmington

December 8, 2004  
Albuquerque, NM



## Documenting GIS Data Using ArcCatalog



Workshop Presented by  
Amy Budge, Earth Data Analysis Center  
and  
Rich Friedman, City of Farmington

March 15 & 16, 2005  
Albuquerque, NM



EPHT  
NMGIC  
State Offices  
County Offices  
BLM  
Students

# NM EPSCoR

Experimental Program to Stimulate Competitive Research

Data Management  
Data Access and  
Discovery  
Data Visualization  
Collaborative Tools  
Virtual Models  
Web Services

<http://nmepscor.org>

The screenshot shows the search results page for the NM EPSCoR Data Portal. The page features a search bar at the top left with a 'Search' button. Below the search bar, there are instructions: 'Please click Search or press Return after entering keywords to search for datasets.' A 'Keywords' field is present with the placeholder text 'Enter a word or phrase...'. On the left side, there is a 'Categories' list including Biological Energy, Climate Change Impacts (RII 3), Geothermal, Osmotic Power, Social and Natural Science Nexus, Solar Energy, Uranium, and Workforce Development. The main content area displays search results for 'Biological Energy'. It shows a legend with 'File', 'Table', 'Vector', and 'Raster' options. Below the legend, there are filters for 'Category: Biological Energy' and 'Your search returned 6 datasets'. The results are displayed in a grid of six cards. The first three cards show search results for 'PSI PSR culture density and temperature effects - Photoreactor-041 end 15C', 'PSI PSR culture density and temperature effects - Photoreactor-041 end 25C', and 'Algae Cultivation Experiments - Las Cruces, NM'. Each card includes a 'Downloads | Services | Metadata' link and a 'Date added' field. The last three cards in the grid indicate that data is not yet available for 'Encapsulated Algae (UNM)', 'Outdoor Cultivation Testbeds, NMSU', and 'Wastewater Treatment, ENMU'.

The screenshot shows the home page of the NM EPSCoR Data Portal. The page features a header with the 'New Mexico EPSCoR' logo and navigation links for 'ABOUT', 'SCIENCE', 'EDUCATION & OUTREACH', 'CYBERINFRASTRUCTURE', and 'DATA PORTAL'. Below the header, there are links for 'Browse Data' and 'Data Management'. The main content area includes a 'Browse Data' section with the title 'NM EPSCoR Data Portal'. A welcome message states: 'Welcome! This page provides access to data generated by the Energize New Mexico project as well as data gathered in our previous project that focused on Climate Change Impacts (RII 3). To get started, click on an icon below to see data sets related to that science focus area. On the search results page, click on the "More Info" link for an abstract description of the dataset as well as a link to download the data. We will continue to add Energize New Mexico data sets as they become available. For comments, questions and technical support please contact [epscor.data.support@edac.unm.edu](mailto:epscor.data.support@edac.unm.edu) at the Earth Data Analysis Center UNM <http://edac.unm.edu>.

 Below the welcome message, there is a 'Filter by Science Focus' section with eight icons representing different science focus areas: BIOALGAL, SOLAR, URANIUM, OSMOTIC, GEOTHERMAL, SOCIAL & NATURAL SCIENCE NEXUS, WORKFORCE DEVELOPMENT, and CLIMATE CHANGE IMPACTS (RII3).



## NM EPSCoR & WC WAVE - Virtual Watershed Platform

The Virtual Watershed will allow researchers from around the world to upload watershed data, run models and export results within one integrated platform.

### 1) Project Goals

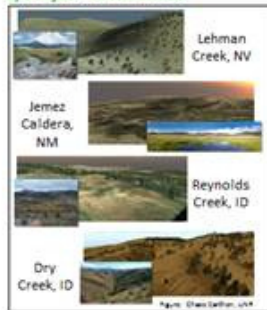
This NSF EPSCoR Track 2 project is advancing watershed science, workforce development and education with cyber-infrastructure (CI)-enabled discovery and innovation.

- Improve understanding of hydrologic interactions and impact on ecosystem services
- Accelerate interdisciplinary watershed research through innovative visualization and streamlined data management
- Engage faculty and broaden student participation in STEM through modeling and visualization

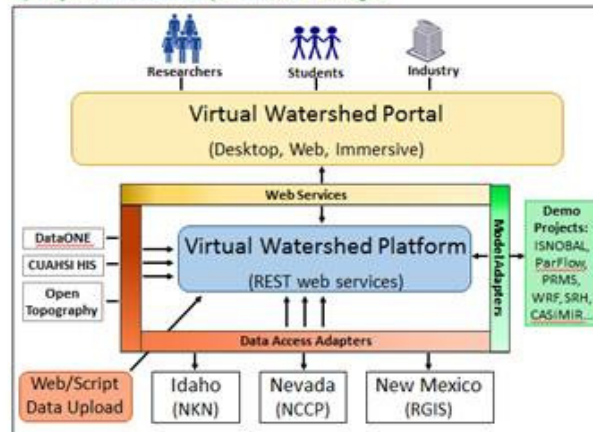
### 2) Tri-State Collaboration



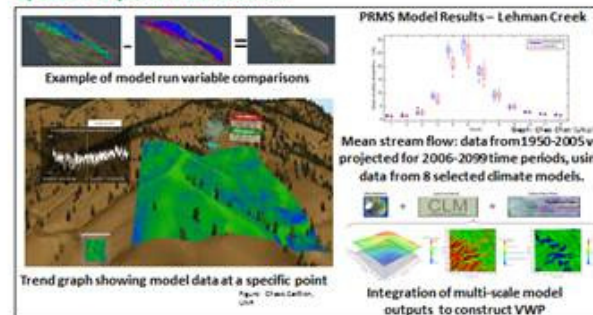
### 3) Project Watersheds



### 4) Project Research Components and Linkages



### 5) Data Analysis and Visualization



### 6) Workforce Development Efforts



Grad Student Field Training  
Snow Camp organizer Jim McNamara (Boise State University) demonstrates collection equipment operation to participants.



Undergrad In-Classroom Hands-On-Trainings  
Building a digital sandbox to demonstrate hydrological flow.

#### Curriculum Development

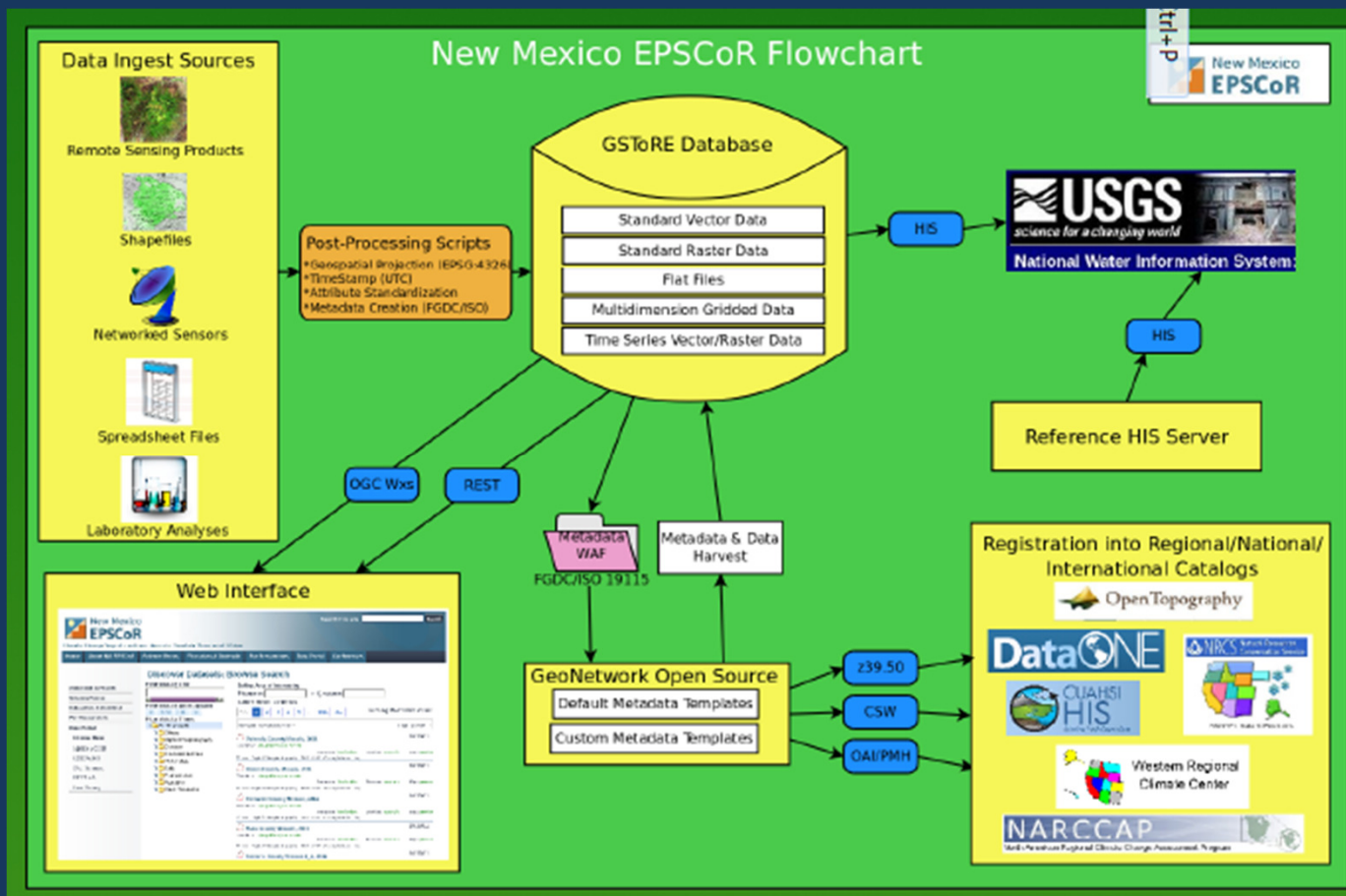


Interdisciplinary modeling course for graduate students

### 7) Acknowledgements

This project is funded by NSF EPSCoR grant #: IA-1329469, IA-1329470 and IA-1329513. All material presented are the result of efforts by faculty and students in ID, NV and NM.





# RGIS/APOLLO

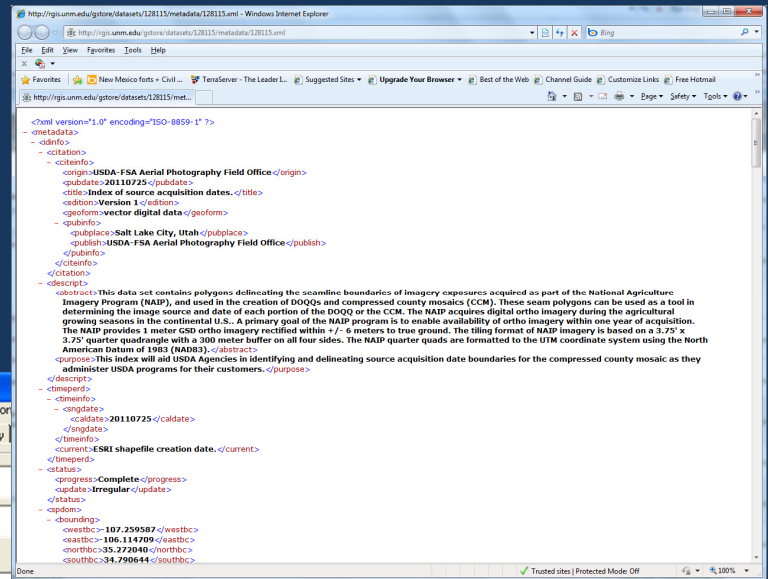
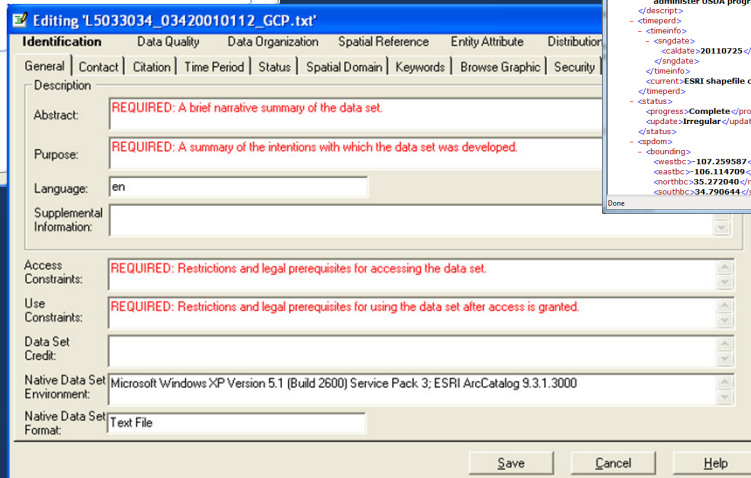
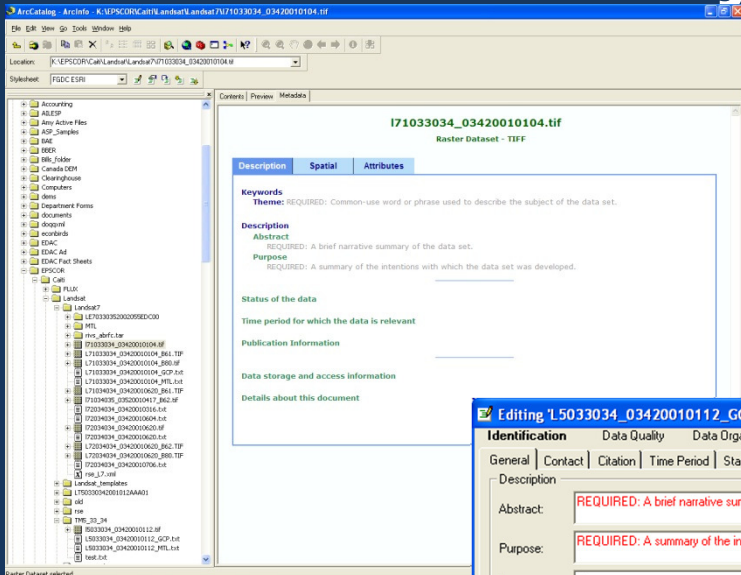
The screenshot displays the RGIS Data Portal interface. The main map area shows a topographic map of Bernalillo County, New Mexico, with a green rectangular selection box highlighting a specific area. A metadata window titled "2014 MRCOG Bernalillo County Mosaic" is open on the right side of the map. The metadata window contains the following information:

- ISO Metadata**
  - Date Stamp: 2015-07-01
  - File Identifier: RGIS::MRCOG2014\_Bernalillo::ISO-19115:2003
  - Character Set: UTF8
  - Metadata Standard Name: ISO 19115 Geographic Information - Metadata
  - Metadata Standard Version: ISO 19115
  - Hierarchy Level: dataset
- Contact Information:**
  - Role:
- Spatial Representation:**
  - Grid Spatial Representation:
    - Number Of Dimensions: 2
    - Axis Dimension Properties:

The interface also includes a search bar at the top, a navigation menu on the left, and a footer with the URL <http://rgis-data.unm.edu>.

<http://rgis-data.unm.edu>

# Early Metadata



<http://rgis.unm.edu>

# FGDC Metadata Validation

```
C:\Windows\system32\cmd.exe
08/26/2013 02:43 PM 18,047 WhiteSands.txt
18 Files(s) 644,298 bytes free
0 Dir(s) 7,938,422,259,912 bytes free

K:\Laure\meta\mpbatch>mp
mp 2.9.13 - Peter M. Schweitzer (U.S. Geological Survey)

Usage: mp [options] input-file

Parse FGDC metadata, report structural errors and generate useful
re-expressions of the information.

input-file is indented text or sgml or xml

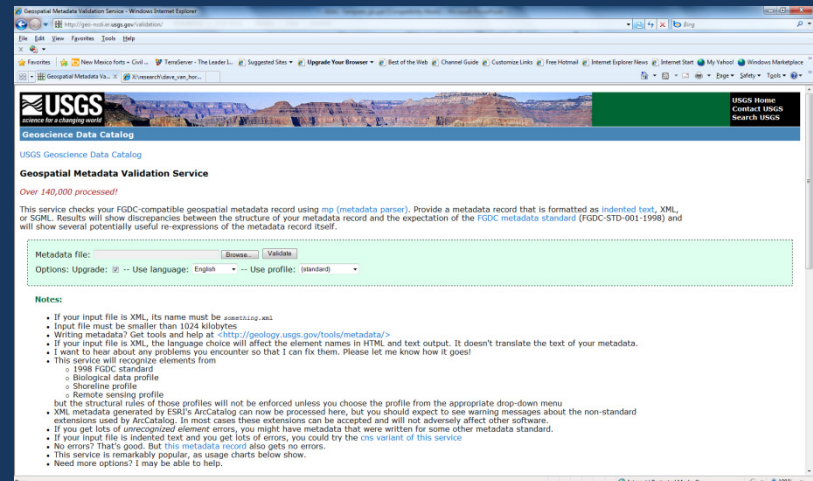
Options:
-c config-file      Read supplied config-file for more options
-l language-code   Use element names in the language specified
-o error-file       Write errors to the named error-file
-t text-file        Write indented text to the named text-file
-h html-file        Write outline-style HTML to the named html-file
-f faq-file         Write FAQ-style HTML to the named html-file
-s sgml-file        Write SGML to the named sgml-file
-x xml-file         Write XML to the named xml-file
-d dif-file         Write DIF (MSBIS 06) to the named dif-file
-fixdoc            Run special clean-up on DOCUMENT.xml output

Language codes are 2-letter abbreviations
en English (default)
es Spanish
ca Catalan
id Indonesian
fr French
de German
pt Portuguese

Further information at <http://geology.usgs.gov/tools/metadata/>

K:\Laure\meta\mpbatch>mp -x s_quad_index.txt s_quad_index.xml
mp 2.9.13 - Peter M. Schweitzer (U.S. Geological Survey)
Info: input file = s_quad_index.xml
Info: process date = 20130813
Info: process time = 11:01:35
Error (line 209): improper value for Latitude_Resolution
Error (line 210): improper value for Longitude_Resolution
2 errors: 2 bad_value

K:\Laure\meta\mpbatch>
```

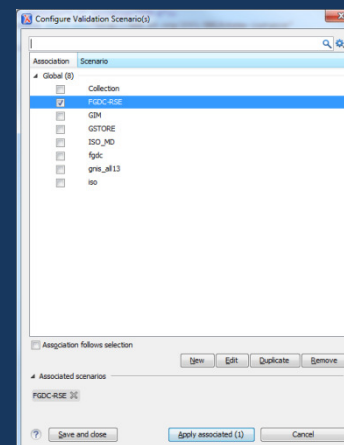
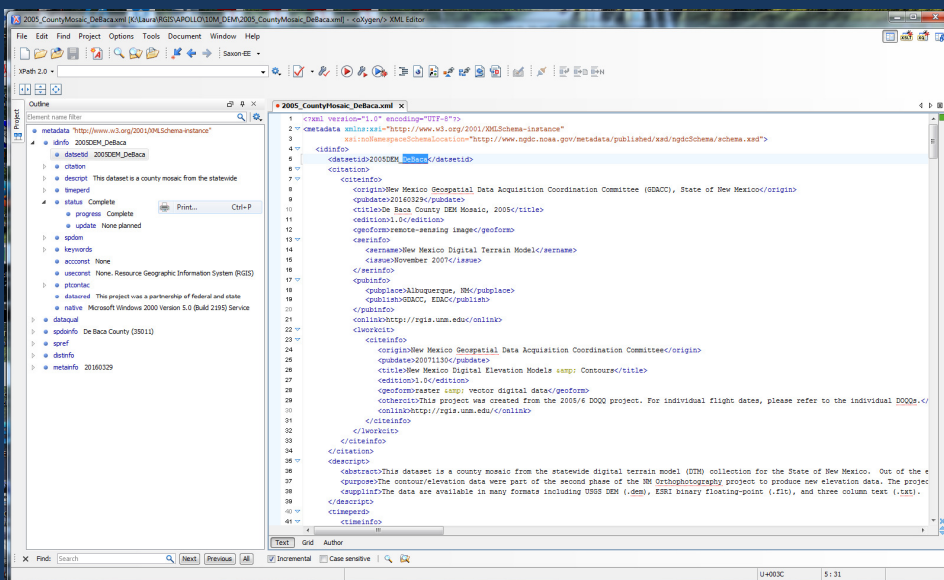


MP / CNS – DOS Command Line

<http://geo-nsdi.er.usgs.gov/validation/>

<http://rgis.unm.edu>

# Oxygen Metadata Validation



<http://www.ngdc.noaa.gov/metadata/published/xsd/ngdcSchema/schema.xsd>

<http://rgis.unm.edu>

<http://www.oxygenxml.com/>

# Oxygen Metadata Transformation

Online schemas to validate against:

ISO

<http://www.ngdc.noaa.gov/metadata/published/xsd/schema.xsd>

FGDC

<https://www.fgdc.gov/schemas/metadata/fgdc-std-001-1998.xsd>

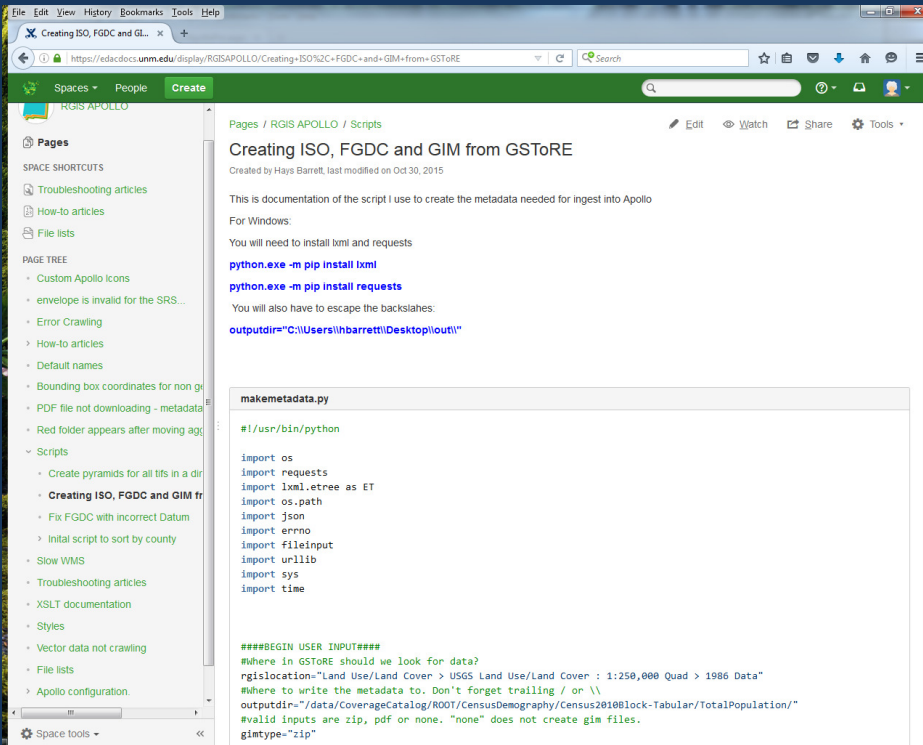
```
1 <?xml version="1.0" encoding="UTF-8"?>
2 <metadata>
3   <original>
4     <standard version="FGDC-STD-001-1998">
5       <title>FGDC Content Standards for Digital Geospatial Metadata</title>
6     </standard>
7     <profile>
8       <title>Extensions for Remote Sensing Metadata, FGDC-STD-012-2002</title>
9       <url>http://www.fgdc.gov/standards/projects/FGDC-standards-projects/csdgm_rs_ex/MetadataRemoteSensingExtens.pdf</url>
10      </profile>
11    </original>
12    <identification identifier="2005DEM_DeBaca">
13      <title>De Baca County DEM Mosaic, 2005</title>
14      <abstract>This dataset is a county mosaic from the statewide digital terrain model (DTM) collection for the State of New Mexico. Out of the entire
15      <purpose>The contour/elevation data were part of the second phase of the NM Orthophotography project to produce new elevation data. The
16      <supplinfo>The data are available in many formats including USGS DEM (.dem), ESRI binary floating-point (.flt), and three column text (.
17      <contact role="point-contact" ref="dnl190"/>
18      <citation role="identify" ref="dnl10"/>
19      <citation role="larger-work" ref="dnl51"/>
20    </identification>
21    <time>
22      <range>
23        <start date="2005-07-07"/>
24        <end date="2006-09-17"/>
25      </range>
26      <current>ground condition</current>
27    </time>
28    <isotopic/elevation</isotopic>
29    <place>
30      <place thesaurus="Spatial Reference System Identifiers">
31        <term>EPSG:4269</term>
```

```
1 <?xml version="1.0" encoding="UTF-8"?>
2 <gmd:MD_Metadata xmlns:fn="http://www.w3.org/2005/xpath-functions"
3   xmlns:gwa="http://www.isotc211.org/2005/gwa"
4   xmlns:dps="http://www.isotc211.org/2004/dps"
5   xmlns:gmd="http://www.isotc211.org/2005/gmd"
6   xmlns:gco="http://www.isotc211.org/2005/gco"
7   xmlns:gov="http://www.isotc211.org/2004/gov"
8   xmlns:igs="http://www.isotc211.org/2005/igs"
9   xmlns:gss="http://www.isotc211.org/2005/gss"
10  xmlns:gts="http://www.isotc211.org/2005/gts"
11  xmlns:gmx="http://www.isotc211.org/2005/gmx"
12  xmlns:gfc="http://www.isotc211.org/2004/gfc"
13  xmlns: xlink="http://www.w3.org/1999/xlink"
14  xmlns:gml="http://www.opengis.net/gml/3.2"
15  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
16  xmlns:gmi="http://www.isotc211.org/2005/gmi"
17  xsi:schemaLocation="http://www.isotc211.org/2005/gmi http://www.ngdc.noaa.gov/metadata/published/xsd/schema.xsd">
18  <gmd:fileIdentifier>
19    <gco:CharacterString>RGIS:2005DEM_DeBaca::ISO-19115:2003</gco:CharacterString>
20  </gmd:fileIdentifier>
21  <gmd:language>
22    <gco:CharacterString>eng</gco:CharacterString>
23  </gmd:language>
24  <gmd:characterSet>
25    <gmd:MD_CharacterSetCode codeList="http://www.isotc211.org/2005/resources/Codelist/gmxCodeLists.xml#MD_CharacterSetCode"
26      codeListValue="utf8"/>
27  </gmd:characterSet>
28  <gmd:hierarchyLevel>
29    <gmd:MD_ScopeCode codeList="http://www.isotc211.org/2005/resources/Codelist/gmxCodeLists.xml#MD_ScopeCode"
30      codeListValue="dataset"/>
31  </gmd:hierarchyLevel>
```

FGDC to GSTORE

<http://rgis.unm.edu>

GSTORE to ISO



# Script Transformation

To get Apollo ready metadata from GSToRE replace "UUID" in the URLs below with the UUID of the dataset you are working on:

ISO  
[http://129.24.63.99/gstore\\_v3/apps/rgis/datasets/UUID/metadata/apollo.xml](http://129.24.63.99/gstore_v3/apps/rgis/datasets/UUID/metadata/apollo.xml)

FGDC  
[http://129.24.63.99/gstore\\_v3/apps/rgis/datasets/UUID/metadata/apollo\\_FGDC.xml](http://129.24.63.99/gstore_v3/apps/rgis/datasets/UUID/metadata/apollo_FGDC.xml)





# Useful Tools

NOAA ISO Training Classes  
FGDC-CSDGM v2 Summary  
ISO-FGDC Metadata Crosswalk  
Early FGDC training workbooks  
Templates

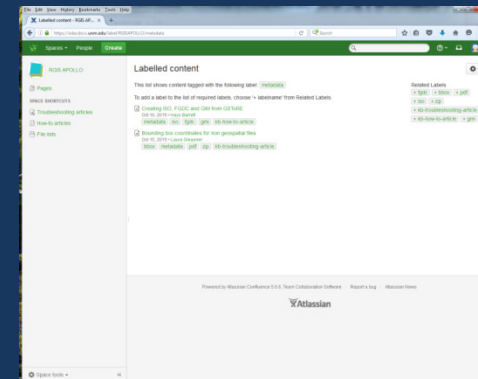
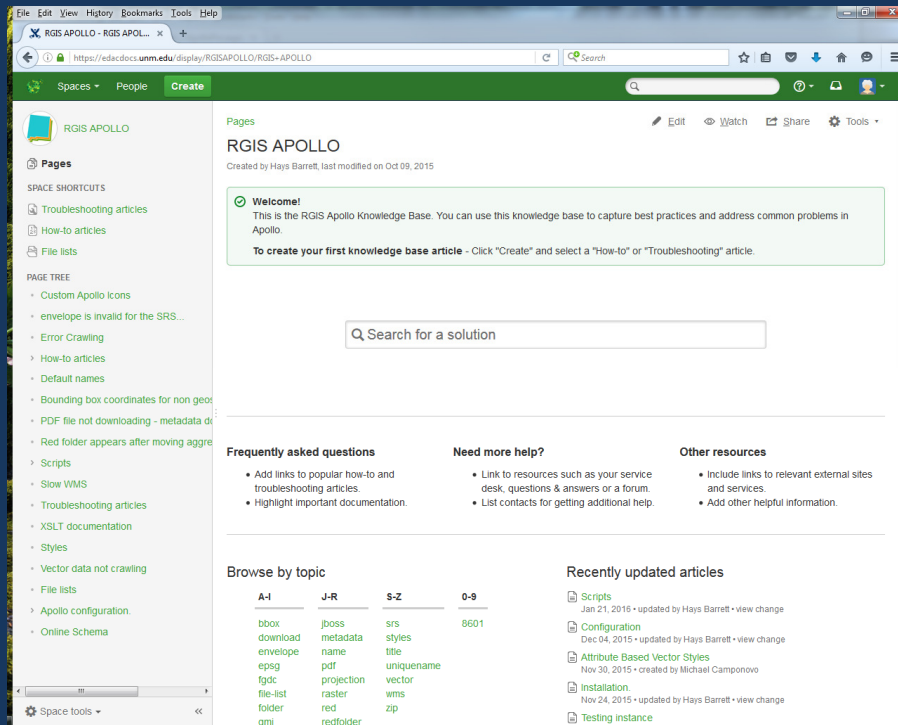
The image displays two software windows. The top window is Adobe Acrobat, showing a PDF document titled "FGDC-CSDGM v2 Summary.pdf". The document is organized into sections, with a table of contents on the left. The main content area shows a detailed table with columns for "Section", "Item", "Status", and "Comments". The bottom window is Microsoft Excel, displaying a spreadsheet titled "ISO-FGDC-METADATA-CROSSWALK-V01.xls". The spreadsheet has columns for "FGDC name", "FGDC XML Tag", "ISO name", and "Comment". It contains a list of metadata elements and their corresponding ISO standards, with some cells highlighted in green. A legend in the spreadsheet explains the color coding: green for "The mapping required (crosswalk element)", yellow for "Indicates that further action is required", and red for "Indicates that a change was made from previous versions".

# Lessons Learned

- Patience!!
- Validation processes are not created equal
- ISO metadata does not contain attribute information
  - Serving both FGDC and ISO metadata
- APOLLO doesn't like folders with more than 500 items
- APOLLO uses International ISO standard
- Use scripts whenever possible

<http://rgis.unm.edu>

# RGIS/APOLLO Knowledge Base



<http://rgis-data.unm.edu>

<https://github.com/edac>

# Contact Information



Data Services Manager  
Earth Data Analysis Center  
MSC01 1110 Bandelier West Room 118  
1 University of New Mexico  
Albuquerque, NM 87131

505-277-3622 ext. 230  
lgleasner@edac.unm.edu  
<http://edac.unm.edu>

Geographic Storage, Transformation and Retrieval Engine Version 3: A data framework for data discovery, delivery and documentation (GSToRE)  
<http://gstore.unm.edu/>