# A Summary Comparison of the Idaho Geological Survey's Digital Geological Map Data Model, Version 2.0, with The North American Digital Geologic Map Data Model, Version 4.3

Loudon R. Stanford
Digital Geologic Mapping Manager
Idaho Geological Survey
http://www.idahogeology.org
208-885-7479
stanford@uidaho.edu
October 30, 2001

## BACKGROUND AND DESIGN CRITERIA

### INTRODUCTION

This is a brief comparison of the major features of the Idaho Geological Survey's Digital Geologic Map Data Model, with North American Digital Geologic Map Data Model, Version 4.3.

Digital geologic map data at the Idaho Geological Survey are compiled in 30' by 60' tiles. Each geologic map tile is a database of geologic map information collected at original field scale where possible. Individual map sources in the compilation are tracked via object-level source attributes. To keep current production levels high, any data model the Idaho Survey adopts must use our existing capture system and protocols.

In addition, there is a key difference in the purpose of the two models. Version 4.3 of the North American Digital Geologic Map Data Model (NADM) is designed to be a catalog of separate, digitized geologic maps. The Idaho model is designed to be a state-wide database of the best available geologic map data collected in edge matched tiles.

The users of digital geologic map data need it in a format easily transferable and readily useable. Within Idaho's GIS community, ESRI software has become a defacto standard. The Idaho Survey releases geologic map data as ArcInfo coverages and ArcView projects. This further defines the operating parameters in which the Idaho variant model must operate.

Finally, software tools are an important element of any data model design effort. Simply put, well-designed tools enable complex queries and nested queries possible. Although the Idaho Survey has been working on map browser and query tools for ArcView, they are not available at this time.

## COMPARISON OF THE IDAHO SURVEY'S VARIANT MODEL WITH NADM 4.3

### METADATA AND RELATED TABLES

All metadata for each map tile are compliant with the Federal Geographic Data Committee's (FGDC) *Content Standard for Digital Geospatial Metadata*,1998. Geologic source (entity and map-tile levels), projection, and other metadata are stored in a relational database. A metadata record can be generated on the fly via a web interface or linked as need for a query.

## LEGEND AND RELATED TABLES

The Idaho Survey variant addresses all core elements of 4.3 except symbolization. The Idaho Survey keeps all color and pattern data in a separate database for in-house use, which could be added to the model later. A color geologic map image is available at the Idaho Survey's Web Site for many of the 30' x 60' tiles (Acrobat Reader format). An ArcView project with colorized units and symbolized point data is included with each data set. A Classification Object Table is present in the Idaho variant, but is called Class Type Table.

## SPATIAL OBJECT ARCHIVE AND RELATED TABLES (GIS)

All spatial information about map objects are stored in ArcInfo GIS relational database tables. Additional entity-level attributes are stored with each object. For example, entity-level source attribute, line-type (accuracy) attributes, and map feature attributes are captured in the digitizing process and stored in the GIS tables.

## SINGULAR OBJECT ARCHIVE TABLES

While no explicitly named singular object archive exists in the Idaho Survey's model, point data for symbols, samples, and other singular data are stored in spatial GIS data tables and related to lookup tables in the metadata section. This includes structure, line type, and symbols tables. Entity-level source and map-tile sources are stored with each map object in the spatial data tables.

## COMPOUND OBJECT ARCHIVE TABLES

A modified compound object archive (COA) exists in the Idaho Survey's model. Since map data are compiled in an edge-matched tile database, I believe that the COA is not as important to the function of map data queries as it is in the NADM. The role of the COA is carried by the Map Unit table, which is roughly equivalent to the Rock Unit table in NADM 4.3

## IDAHO MODEL EXTENSIONS TO NADM 4.3

There are several added features in the Idaho Survey's variant data model.

- History database–supplies compilation history metadata
- Genetic origin–map unit genetic origin
- Landform and form–supplies form info (e.g., pluton, dike, bed) and landform where appropriate
- Extensive lithologic modifiers:
  - Lithology structures
  - Lithology modifiers
  - Lithology mineral modifiers
  - Lithology textures
  - Lithology colors
  - Lithology abundance
  - Lithology fossils
- Stratigraphic time additions:
  - Stratigraphic map unit age table–stores ALL age units for each map unit.
  - A maximum/minimum relationship indicator item

Absolute sorting number item has been added.

- Source attributes–entity level attributes are maintained on all objects in the Idaho Survey's model in the sources table. Typical bibliographic information is stored here, plus additional data on the base map used, field scale, digitizing parameters, and more.

## REFERENCES

Johnson, B.R., Boyan Brodaric, G.L. Raines, J.T.. Hastings, and Ron Wahl, 1999, Digital geologic map data model, version 4.3(a): American Association of State Geologists / U.S. Geological Survey unpublished draft document, 69 p., <http://geology.usgs.gov/dm/model/Model43a.pdf>