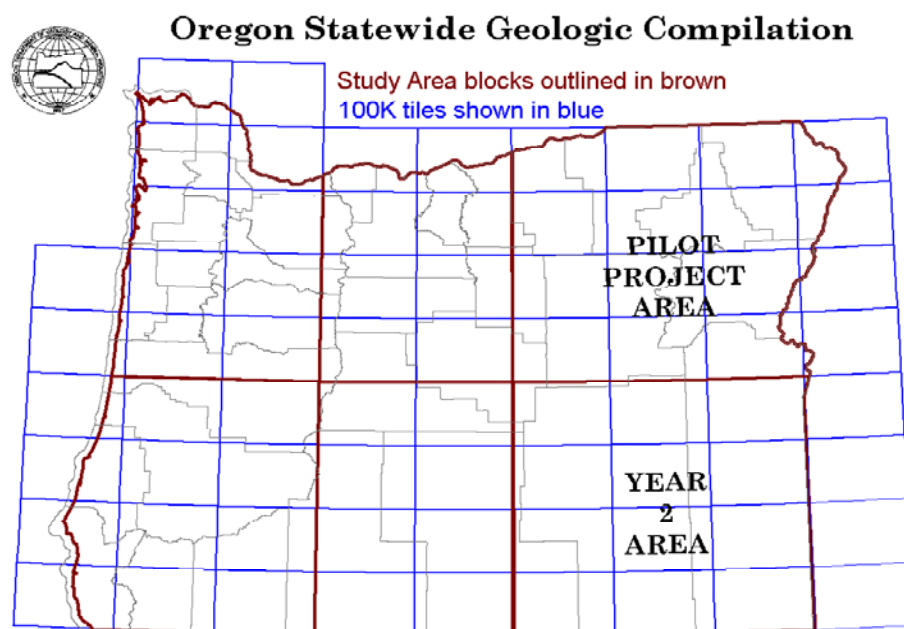


Oregon Geoscience Framework Statewide Geologic Map Compilation

The Oregon Department of Geology and Mineral Industries (DOGAMI) has begun a multi-year project to compile uniform digital geologic data for the entire state at a scale of 1:100,000. This effort brings together the best available geologic mapping from state and federal sources, student thesis work, and consultants. To accomplish this project, DOGAMI is working in partnership with the U.S. Geological Survey (USGS) and the Oregon Geographic Information Council (OGIC). This partnership serves a number of important functions. First, it shares the funding burden of this ambitious compilation effort. Equally important, the partnership provides a review process to ensure the resulting data is consistent in structure, fully documented, and serves the greatest number of potential users. Furthermore, OGIC has identified Geoscience as one of thirteen Oregon Framework Themes, with statewide Geologic data the top priority among several Geoscience layers (for more information see this link <http://www.gis.state.or.us/coord/FrameLayers/GeoFrame.html>)



A DOGAMI Compilation Mapping Team (CMT) is performing the Geologic data gathering and development effort. The CMT has developed a plan to complete the Geologic Compilation for all of Oregon over a period of six years. A pilot project has begun in the northeastern portion of the state. This pilot will test data structuring and mapping techniques, and establish the working partnerships. The geologic map data will be stored in standard geographic information system (GIS) spatial data formats, linked to a standard relational database format. CMT is working with an OGIC committee to determine the priority user needs for geologic data and to receive user feedback about the data content, formatting, and structure.. A Geologic Map Data Model has been designed and this provides a structure for the

organization, storage, and use of the computerized geologic map information. The Oregon Geologic Data Model has four major components: spatial, geologic, descriptive, and metadata. Design concepts for the Oregon Geologic Data Model came from two primary sources. The North American Data Model, v. 4.3 developed by USGS, and the Idaho Geological Survey (IGS) Data Model, v. 2.1, both served as references in designing the Oregon Data Model. Details of the Oregon Data Model and how it differs from the other models follow.

Oregon Data Model Principles

Several overarching principles govern the way that the model approaches and uses the mapping that is being compiled. In its basic structure the model differs from the North American and IGS data models. At the data input stage the Oregon model works solely with the original mapping documents. Thus, **the first overarching principle is that the model, in both the spatial and database areas, remains as honest as possible to the original mapping.** To accomplish this, the original geologic features—polygons, lines, and points—are vectorized at the scale of the original geologic map. In the database the uninterpreted information about the rocks is being entered, as it is described by the original mappers. The CMT is not attempting to bring older verbiage or data up to present interpretations. If changes are made to the original data in either the spatial or the database information, these changes are tracked.

The **second overarching principle is that the model will be easily updatable.** Thus, it will not be a static product, but instead will continue to change as new and better geologic information is developed within DOGAMI or by other agencies and individuals. By using the original mapping and geologic information in the database, and then using the relational database to make the unit changes for the final compiled map, the CMT is creating a document that maintains the original data, but is flexible, allowing it to be continually changed or updated in the future. The compilation part of the process occurs when each original map unit is assigned a compilation unit name and label and a lithology unit name and label. Both of these new types of labels are based on the amount of detail that can be shown on a 1:100,000 scale map. The new labels are chosen using the judgment of CMT geologists who are familiar with all of the rocks in the area, and thus can make informed judgments about which units can be compiled together. Because the original data is retained, the compilation and lithology units can be changed as knowledge evolves, and new mapping becomes available.

The third overarching principle is that the geologic data model that the CMT is creating is **only the foundation for the model as it will exist in the future.** Using a relational database means that the model can be expanded as time and personnel allow. To create this foundation, at this time only the most basic information from the original geologic maps is being input into the model. This information includes the unit polygons, the major structural information (like faults and folds), and some minor structural information (inclination of beds, foliation, etc.). The database information includes bibliographic and metadata about the original maps, geologic information including general information about time and

genetic environment, and lithologic descriptions for the rocks in each unit or subunit. Thus, the database does not incorporate every bit of geologic information that is presently contained within the written geologic map explanations and discussions. It is not a substitute for the original geologic map, it simply distills the most important geologic information out of the map. In the future the CMT envisions that the information captured within the database will be expanded to include geochemical, paleontological, well log, mineral exploration, and many other types of geologic data. The key to expanding the model is the linking system that has been set up for each map, and for each unit within those maps.

The final principle is that **the information must be accessible and readily useful to the many different end-users** of the model. To accomplish this, the amount of numerical coding of information has been kept to a minimum. Whenever codes have been used, they either are the original symbol code from the map for the geologic unit, or a mnemonic code has been created that incorporates parts of actual words or phrases. The CMT has worked with both the geologists in DOGAMI and the Geoscience workgroup of OGIC to ensure that the database information meets user needs and is easily understandable.

NE Oregon Pilot Project -- Goals and Priorities

- 1) Create the model's database structure in which the geologic information is stored and related
- 2) Document the table and field definitions of the model database
- 3) Identify and capture digitally all of the useable geologic reference maps
- 4) Compile, edgematch, and fit the geologic polygons to the 1:100,000 scale USGS base map
- 5) Capture the basic map unit information in the database tables
- 6) Document the rules or guidelines for the way that information is entered in the database
- 7) Review the rules and guidelines, as well as the basic model structure, with internal department users and external end-product users
- 8) Choose compilation units and lithologic units that can be used to make derivative map products

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