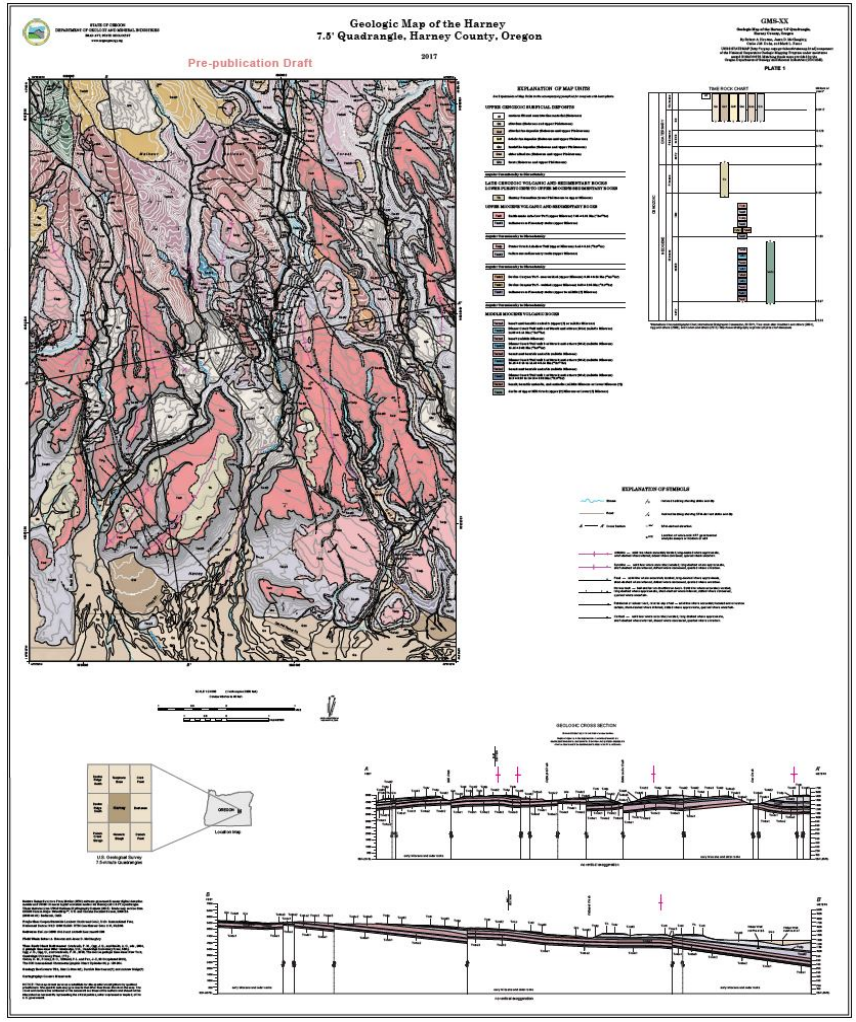
Harney Groundwater Study Advisory Committee Meeting
October 17, 2017

Geologic Maps:

1. What is a geologic map?
2. Why are they important?
3. The steps in making a geologic map.
   - a. Approval
   - b. Data Collection
   - c. Cartography
   - d. Written Report
   - e. Public Outreach
4. Can geologic mapping help solve local problems?
   YES! An Example.



Presenter:
Bob Houston, RG
Hydrocarbon & Metallic Ore Geologist
robert.houston@oregon.gov

Oregon Department of Geology and Mineral Industries

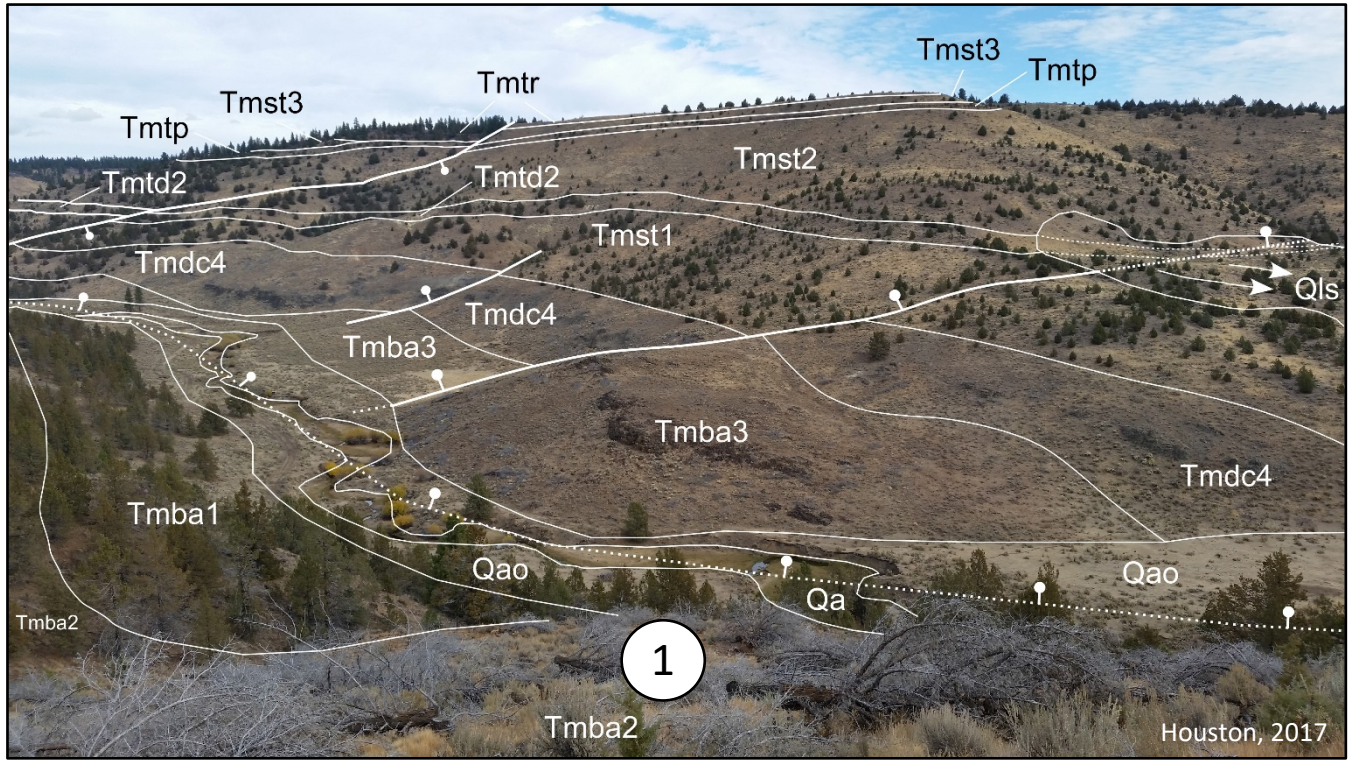
Geologic Maps

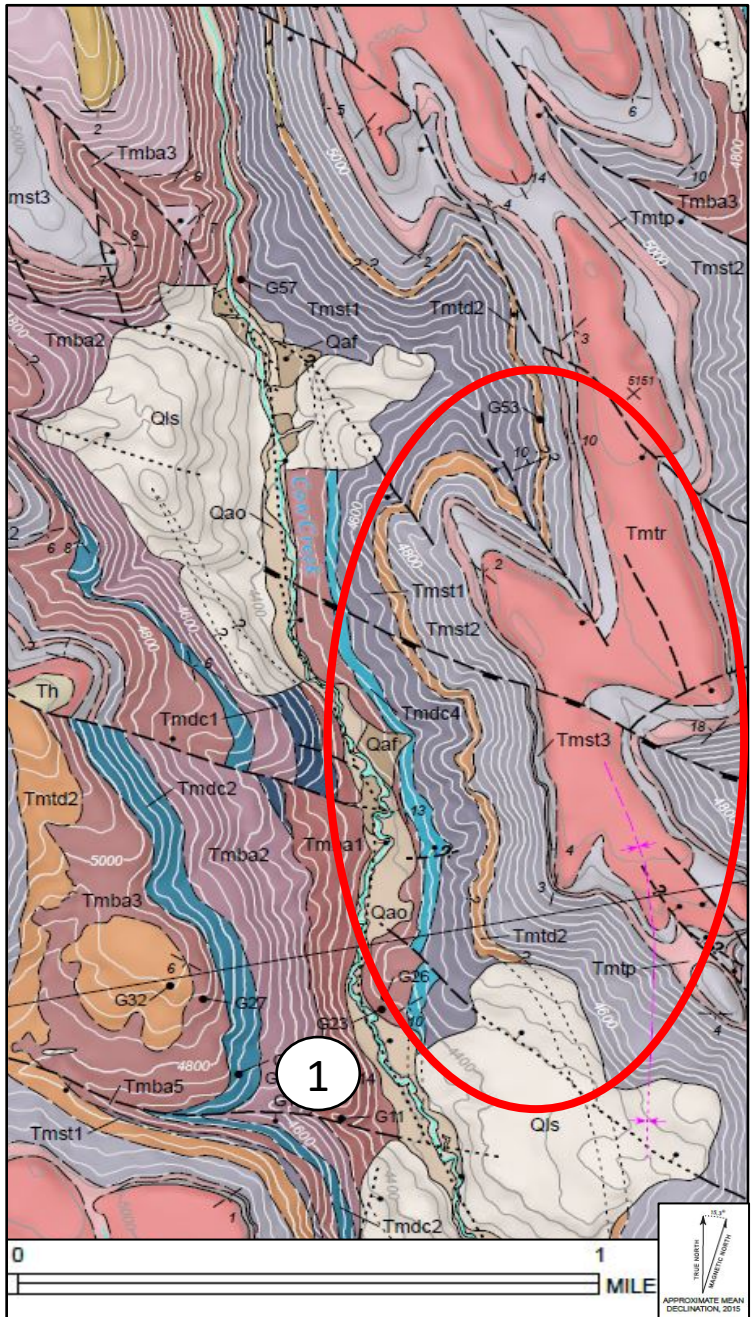
❶ What is a Geologic Map?

- Geologic maps represent the distribution of different types of rock and surficial deposits, as well as locations of geologic structures such as faults and folds.
- Geologic maps are uniquely suited to solving problems involving Earth resources (minerals, materials, and groundwater), hazards (earthquake, tsunami, and landslide), and environments.

❷ Why are they important?

- Geologic maps are the primary source of information (minerals, materials, \and hazards) for various aspects of land-use planning, including the siting of buildings and transportation systems.
- And perhaps most importantly, such maps help identify ground-water aquifers, aid in locating water-supply wells, and assist in locating potential polluting operations, such as landfills, safely away from the aquifers.





The steps in making a geologic map

Why map at this location?

Determination of Priorities and Need

Oregon Geologic Mapping Advisory Committee (OGMAC)

Geologic Mapping Priorities

-Conservation and sustainability of water resources

-Identifying and reducing losses from tsunamis, landslides, flooding, earthquakes, and volcanoes.

-Land use evaluation and planning (e.g., mining vs. agriculture).

-Design and construction of infrastructure requirements such as utility lifelines, transportation corridors, and surface water impoundments.

-Exploration for and development of metallic mineral, aggregate, and energy resources.

-Correlation between geology and fire-fuel loads.

- Basic earth-science research.

Funding:

USGS National Cooperative Mapping Program (StateMap) Program, State, and other Federal partnerships

Jason McClaughry, RG

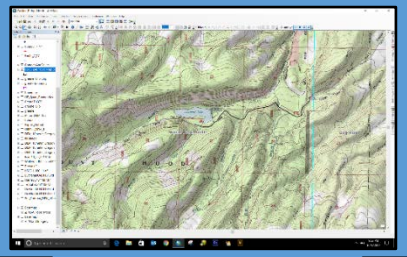
Eastern Oregon Regional Geologist, Earth Science Section Supervisor

Data Collection

The steps in making a geologic map

Field Methods

Plan a route based on exposures



Field Observations: BIG & small

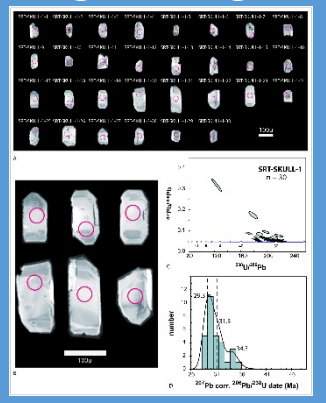
Measuring orientations

Noting Observations

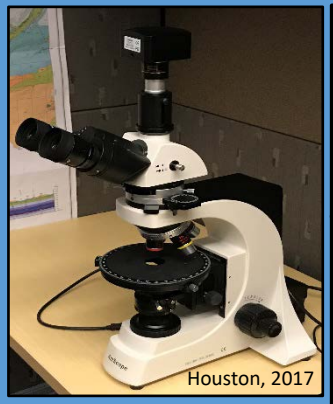
Sampling

Analytical Work

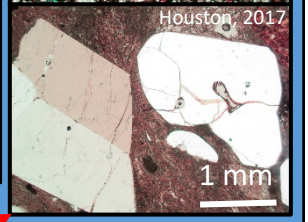
Age dating



Petrography



Olivine Basalt

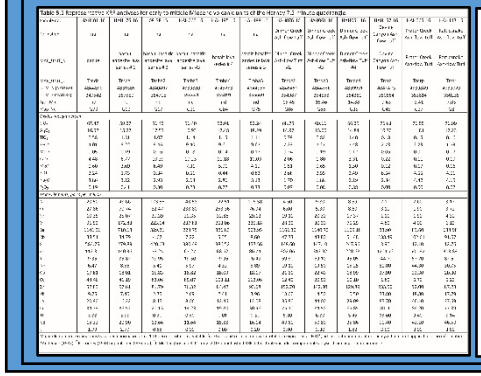


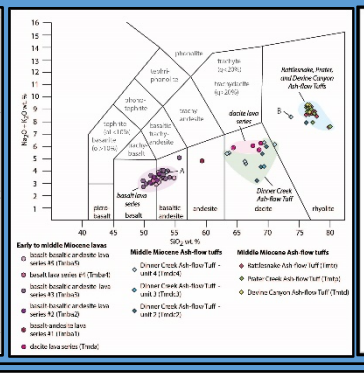
Divine Canyon Ash-flow Tuff

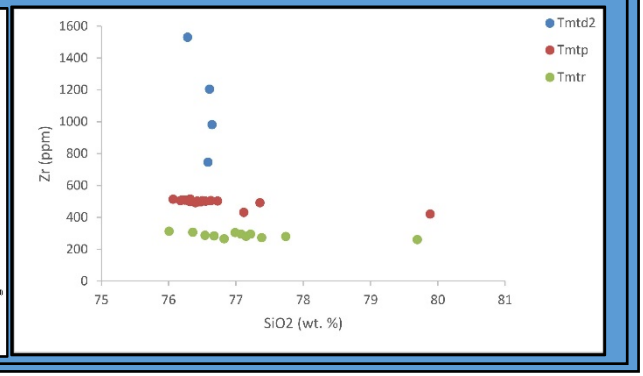
Polarity

I am positive it is negative

Geochemistry: Turning rocks into numbers



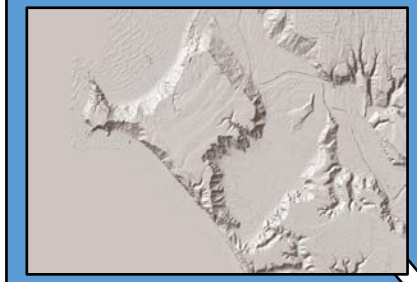




The steps in making a geologic map

3c Cartography: The map making factory

DEM



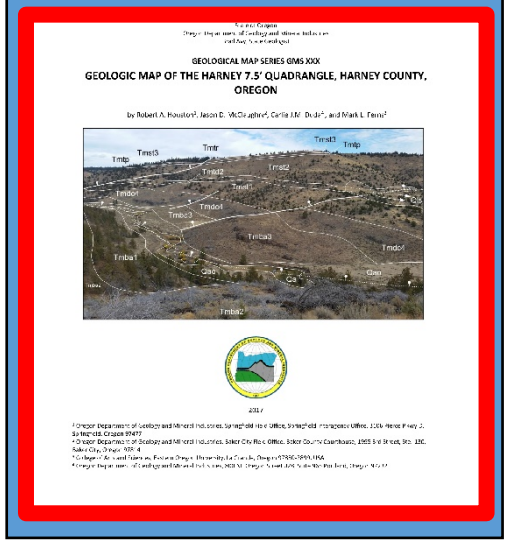
Geologic Units

Physical and Political

Annotation

Geologic Features

3d Written Report


GEOLOGICAL MAP SERIES GMS XXX

GEOLOGIC MAP OF THE HARNEY 7.5′ QUADRANGLE, HARNEY COUNTY, OREGON

3e Public Outreach

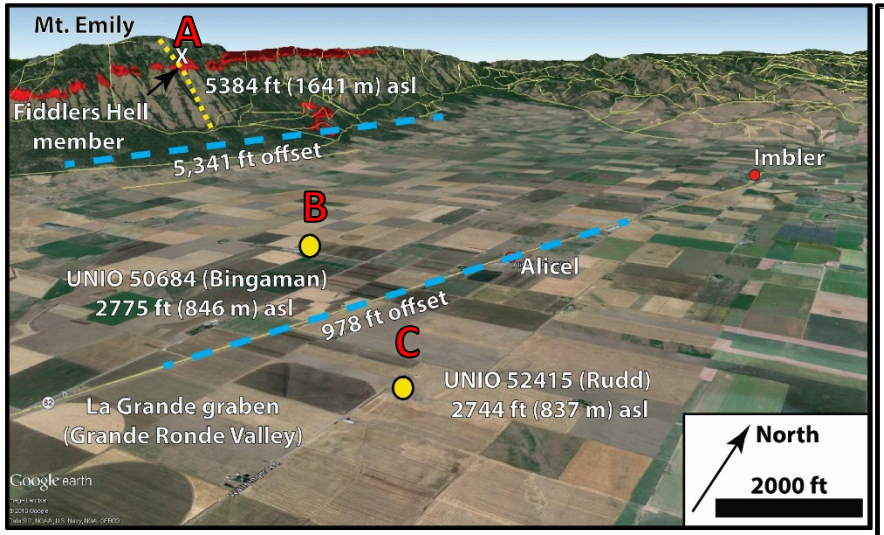
Seminars

Educational Displays

Field Trips

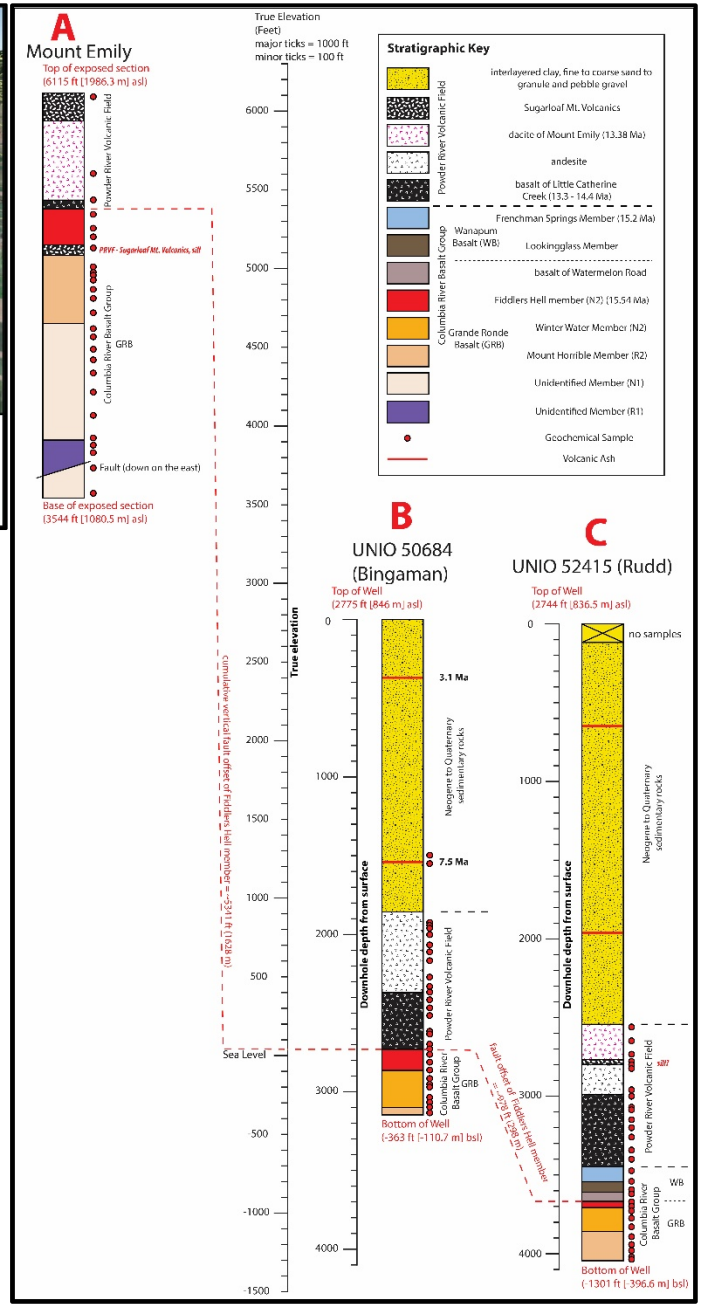
Maps and **Reports** are **available at** DOGAMI Publications Center:
http://www.oregongeology.org/pubs/index.htm

Can geologic maps Help solve problems? An Example



In 2013, Mr. Rudd approached DOGAMI with the question how far do I need to drill in order to reach an aquifer that was not in hydraulic connection with surface water. Based on recent mapping in the Grand Ronde Valley, the department informed Mr. Rudd that he should expect to encounter a deeper aquifer in the CRB units at a deep of 3,500 ft. The well was drilled at a cost of $1.3 million and encounter water at 3,501 ft. Through this example, the department was able to convey geologic information to solve local problems.

- As this example shows, the goal of the department here in the Harney Basin is to provide the public a broad understanding of the geology and occurrence of local natural resources.



Where can I get More Information on geologic mapping in Oregon?

- **Website**: http://www.oregongeology.org;
- **DOGAMI Publications Center:** http://www.oregongeology.org/pubs/index.htm

Talk to an Expert!

- **Ali Ryan Hansen – Communications Director (971) 673-0628**
- **Jason D. McClaughry, RG - Eastern Oregon Regional Geologist|Earth Science Section Supervisor|National Cooperative Geologic Mapping Program (STATEMAP) Coordinator for Oregon (541) 523-3133**

THANK YOU

Bob Houston

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