

Harney Basin Groundwater Investigation

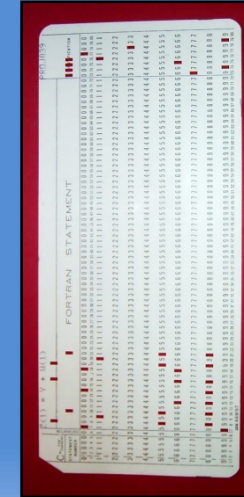
Continuing the OWRD-USGS Collaboration Legacy of
Ken Lite and Marshall Gannett

GSA Cordilleran Section Meeting
Portland, Oregon
15 May 2019



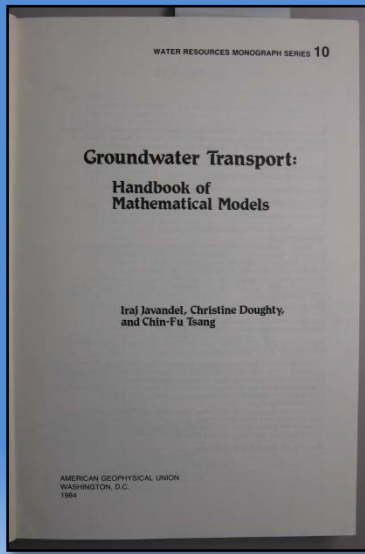
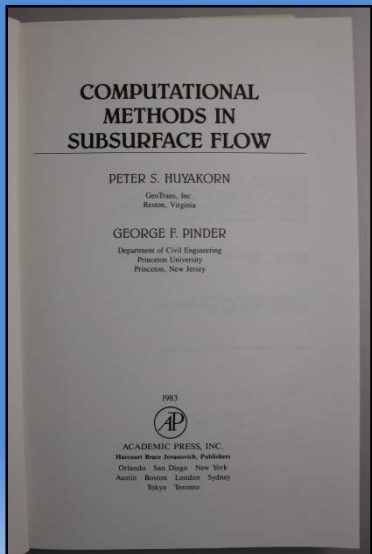
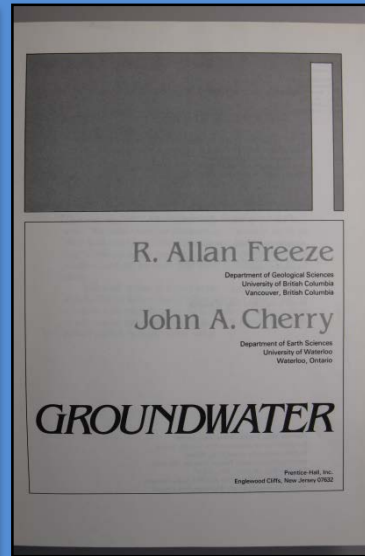
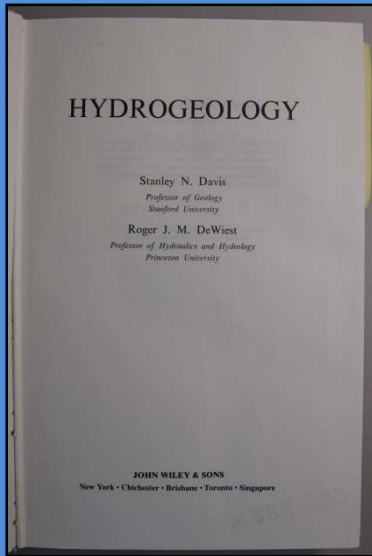
Jerry Grondin
OWRD Hydrogeologist

1980s Hydrogeology



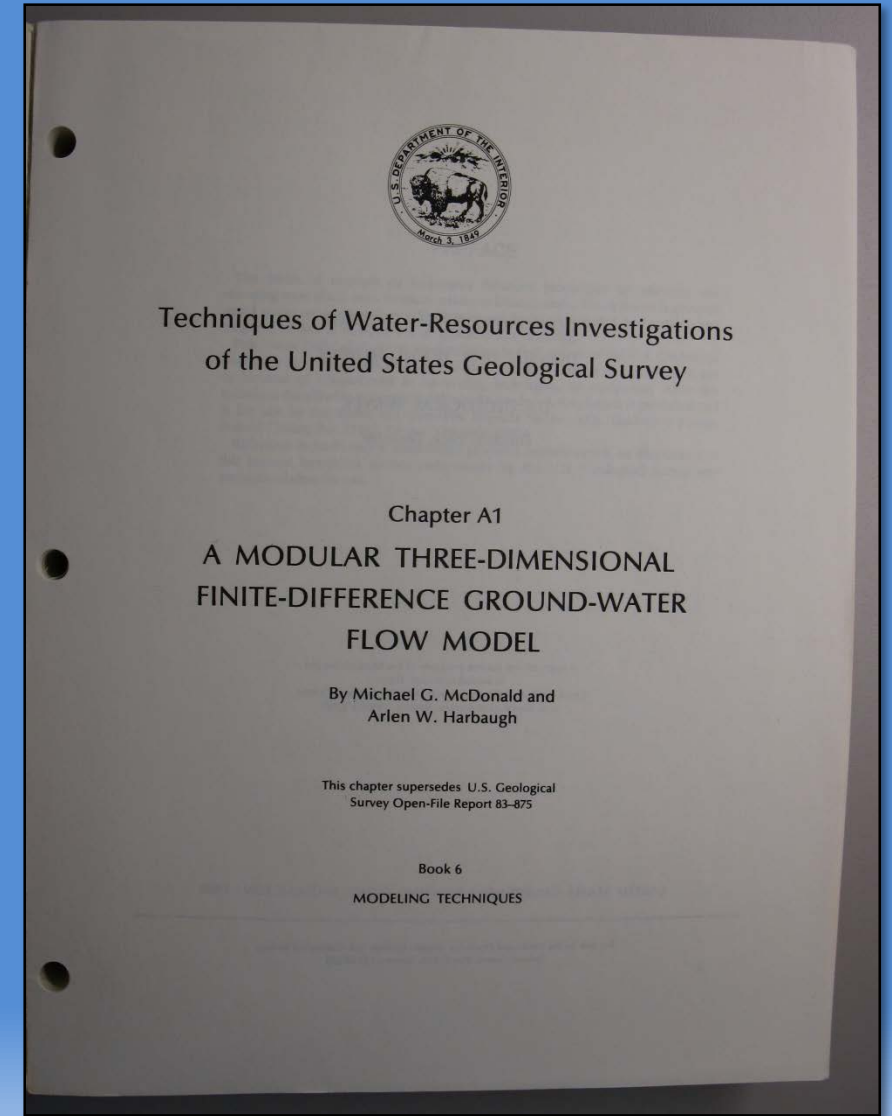
Time of Transition

1980s Hydrogeology



**Davis & DeWiest
To
Freeze & Cherry**

**1-D & 2-D
Analytic & Numerical
Models (Flow - Transport)
To
3-D Finite Difference &
Finite Element
Numerical Models**



Time of Transition

1980s Hydrogeology

Ken Lite

**Southern Oregon University
Portland State University**

Private Consulting

Joined OWRD mid-1980s

**Mosier Hydrogeology
1988**

**OWRD Liaison to USGS
Portland Basin GW Study & Model**

**SE Portland Stratigraphy-Structure
MS Thesis 1992**



Photo Source: Aurora Bouchier



Marshall Gannett

**Oregon State University
Portland State University**

Private Consulting

Joined OWRD mid-1980s

**Powell Buttes GW Availability
1987**

**Vale Geothermal Hydrogeology
1988**

**Ontario Hydrogeology
1990**

Ken Lite & Marshall Gannett

1980s Hydrogeology



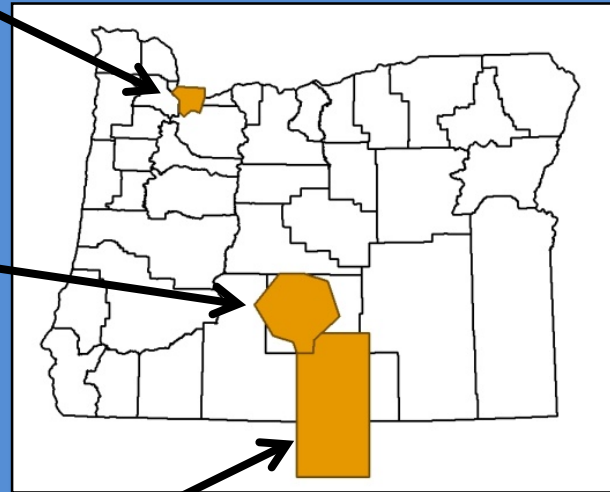
Photo Source: City of Portland



Photo Source: Oregon State Parks



Photo Source: Oregon State Parks



USGS Cooperative Studies

**Portland Basin
Hydrogeology &
Numerical Model
(Morgan, McFarland, others)**

**Fort Rock Basin
Numerical Model to
Assess Data Adequacy
(McFarland & Ryals 1991)**

**Goose Lake Basin
Hydrogeology &
Numerical Model
(Morgan 1987)**

USGS Cooperative Groundwater Studies

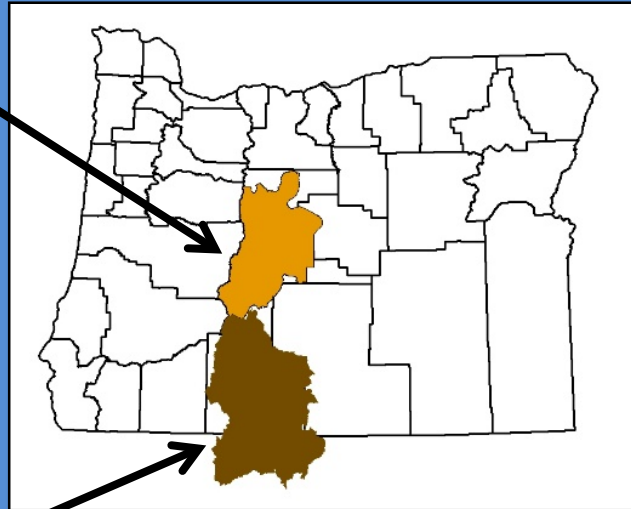
1990s & 2000s Hydrogeology



Photo Source: USGS



Photo Source: USGS



USGS-OWRD Collaboration

**Upper Deschutes Basin
Hydrogeology &
Numerical Model
(Gannett, Lite, others)**

**Upper Klamath Basin
Hydrogeology &
Numerical Model
(Gannett, Lite, others)**

**Willamette Basin
Hydrogeology &
Numerical Model
(Conlon, Herrera, Wozniak, others)**

USGS-OWRD Cooperative-Collaborative Groundwater Studies

Lite & Gannett Accomplishments

- ❖ **Advancing the Characterization and Understanding of Basin-Scale Groundwater Systems in Complex Volcanic Terrains with Significant Surface Water Interaction**
- ❖ **Applying Cutting Edge Scientific and Numerical Modeling Tools**
 - **Geologic Tools**
 - **Hydrologic Tools**
 - **Numerical Modeling**
 - **Optimization Modeling**
- ❖ **Demonstrating and Setting Standard for Successful USGS-State Cooperator Collaborative GW Studies**

Harney Basin Groundwater Study



Photo Source: OWRD



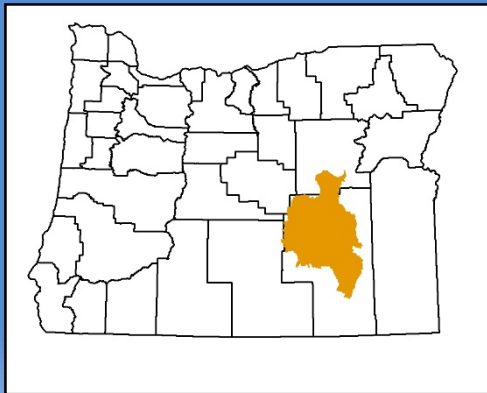
Photo Source: OWRD



Photo Source: OWRD

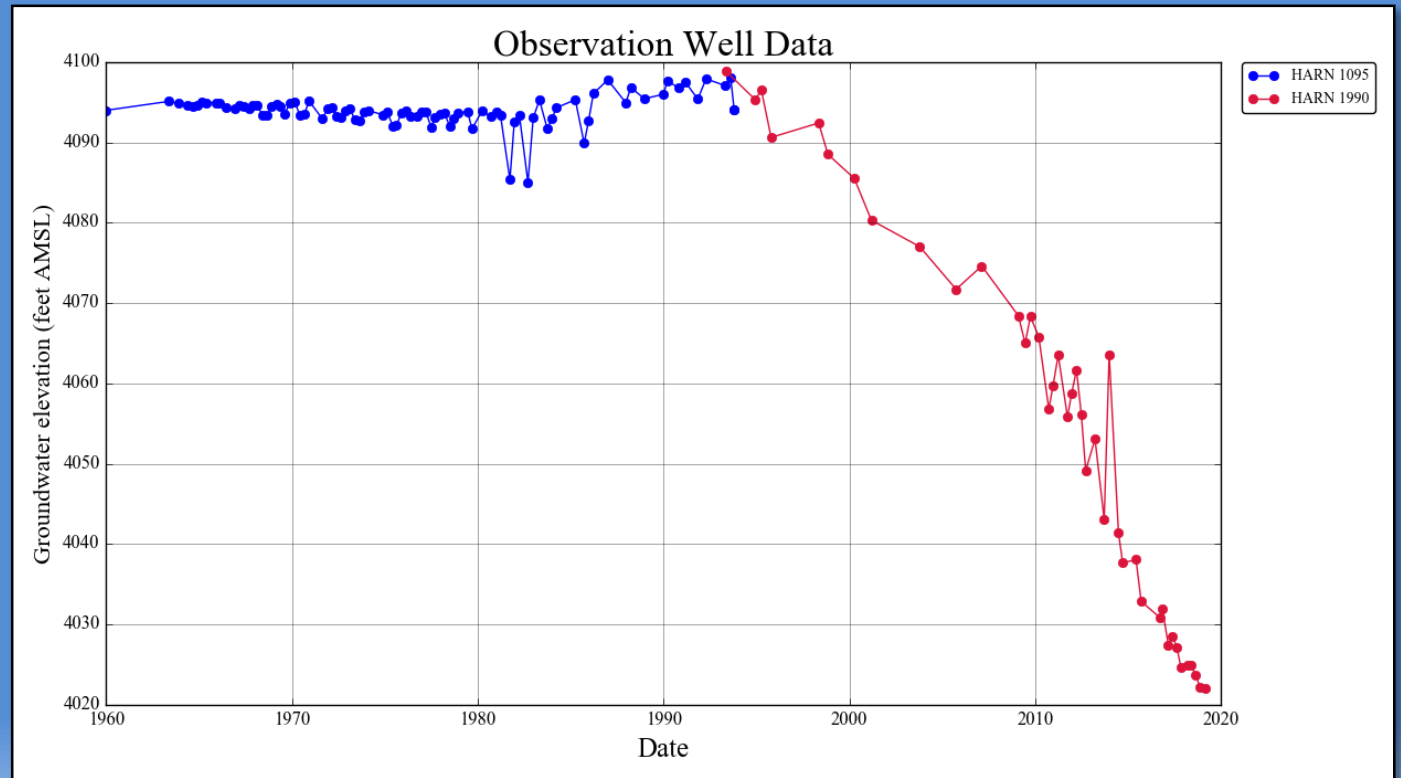


Photo Source: OWRD



USGS-OWRD Collaboration

Harney Basin Groundwater Study



USGS-OWRD Cooperative-Collaborative Groundwater Studies



Harney Basin Groundwater Study

USGS-OWRD Collaboration

USGS Core Team

Steve Gingerich

Hank Johnson

Amanda Garcia

Nick Corson-Dosch

OWRD Core Team

Jerry Grondin

Darrick Boschmann

Jordan Beamer

Mellony Hoskinson

Team Coordination Meetings

Anticipated Reports

Hydrogeology (Phase 1)

Numerical Model (Phase 2)

Citizen Advisory Committee

Appointed by State & County

Quarterly Update Meetings

Data Share with Other Studies

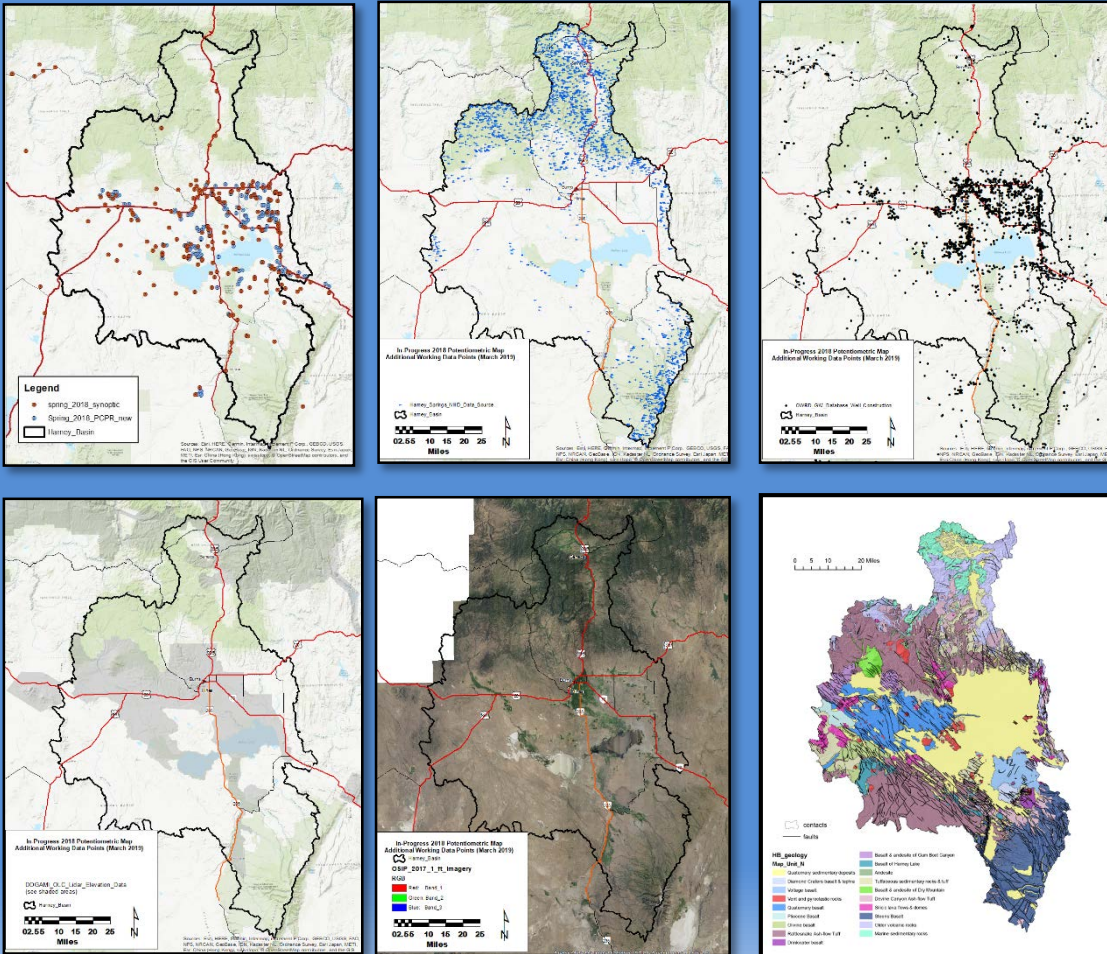
USGS-OWRD Cooperative-Collaborative Groundwater Studies

Harney Basin Groundwater Study

Applying Best Available Data & Tools

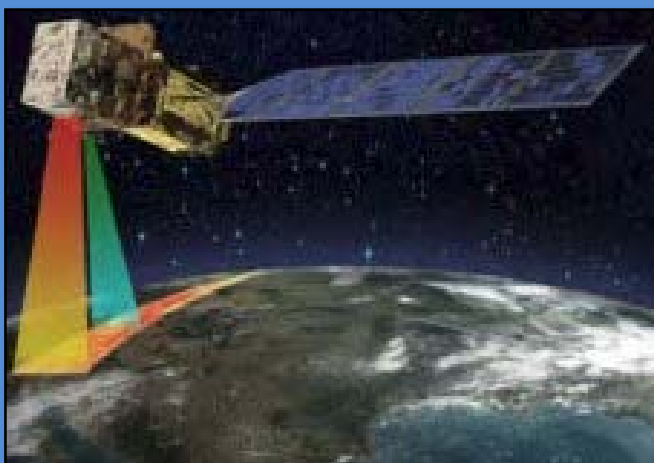
Potentiometric Map

- Project Wells
- Permit Condition Wells
- Watershed Council Wells
- OWRD GW Database
- OWRD Well Log Database
- Springs
- Survey Grade GPS
- Lidar
- Satellite Imagery
- Surface & Borehole Geology



Harney Basin Groundwater Study

Applying Best Available Tools



Photos Source: Jordan Beamer

Evapotranspiration

- Phreatophytes
- Irrigated Agriculture
- Satellite Imagery
- Model Evapotranspiration
- Validation:
 - ✓ Ground Measurements
 - ✓ Pumping Measured

Harney Basin Groundwater Study

Thank You



Photo Source: Chad Sobotka