Harney Basin GW Study Update

Oregon Water Resources Commission
June 14, 2018

Justin Iverson, Groundwater Section Manager

Photo credit: Darrick Boschmann, OWRD

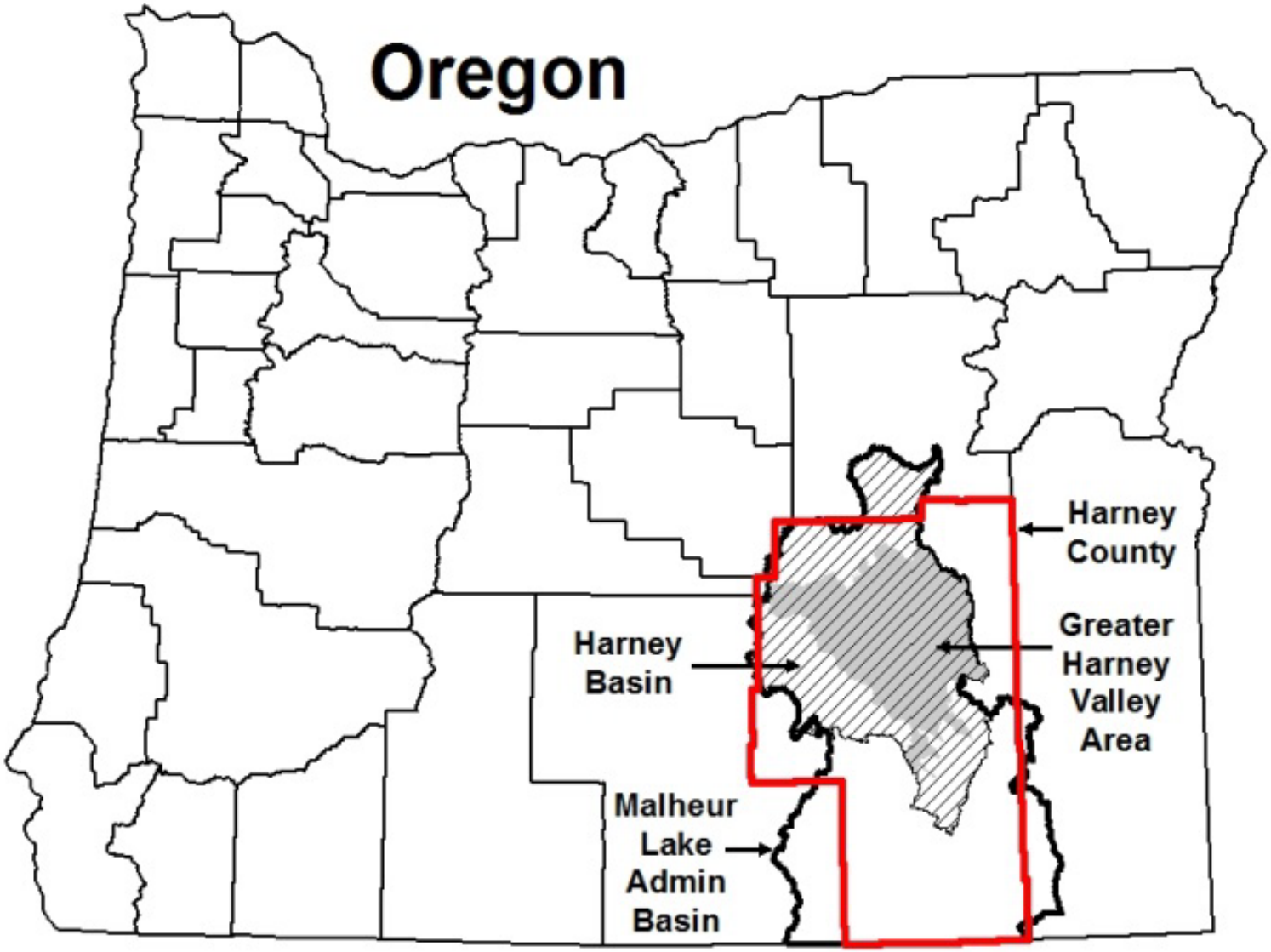
Overveiw

- Background
  - Events leading to rule revisions designating the Greater Harney Valley Groundwater Area of Concern (GHVGAC)

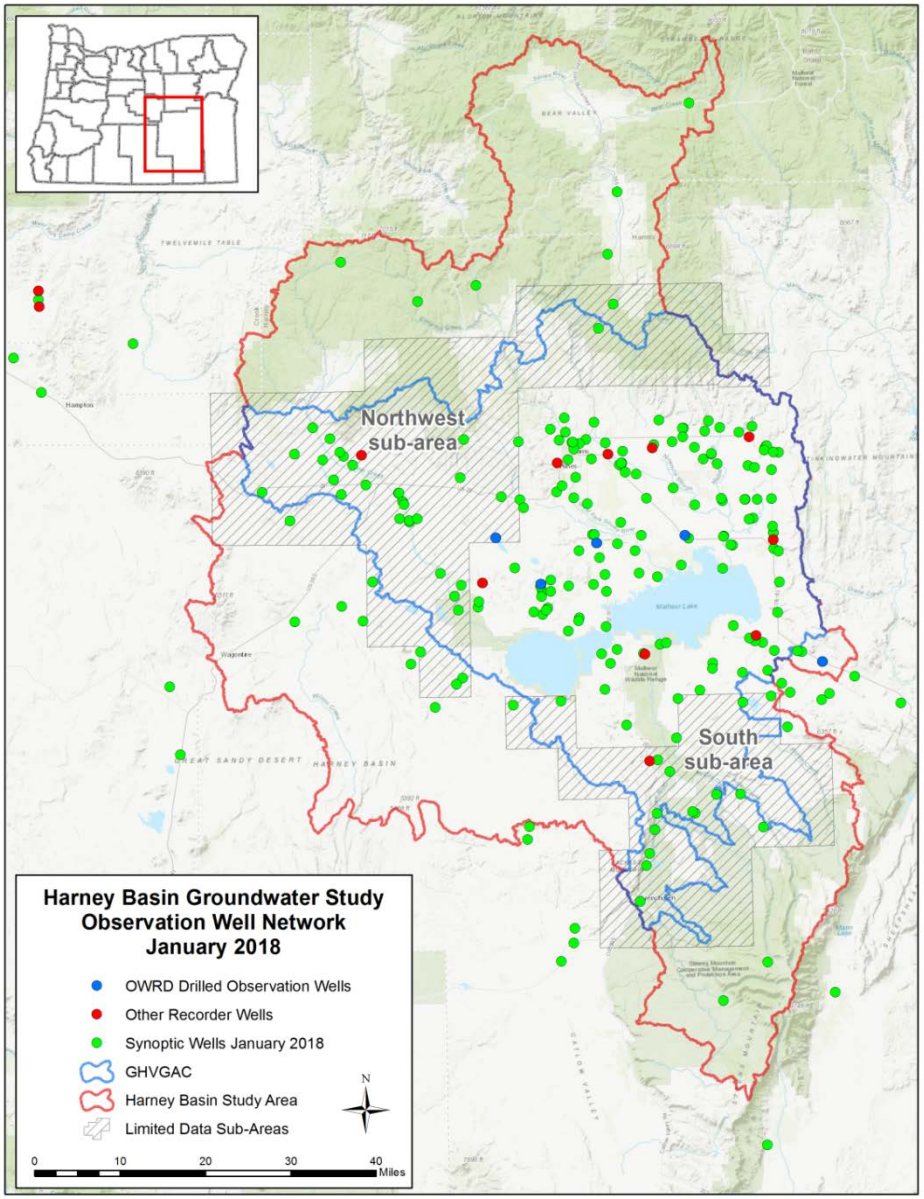
- **Groundwater Study Update**
  - **Progress on the cooperative groundwater basin study encompassing the GHVGAC**

- Community Involvement
  - Mark Owens, Brenda Smith, and Angie Ketcher will present

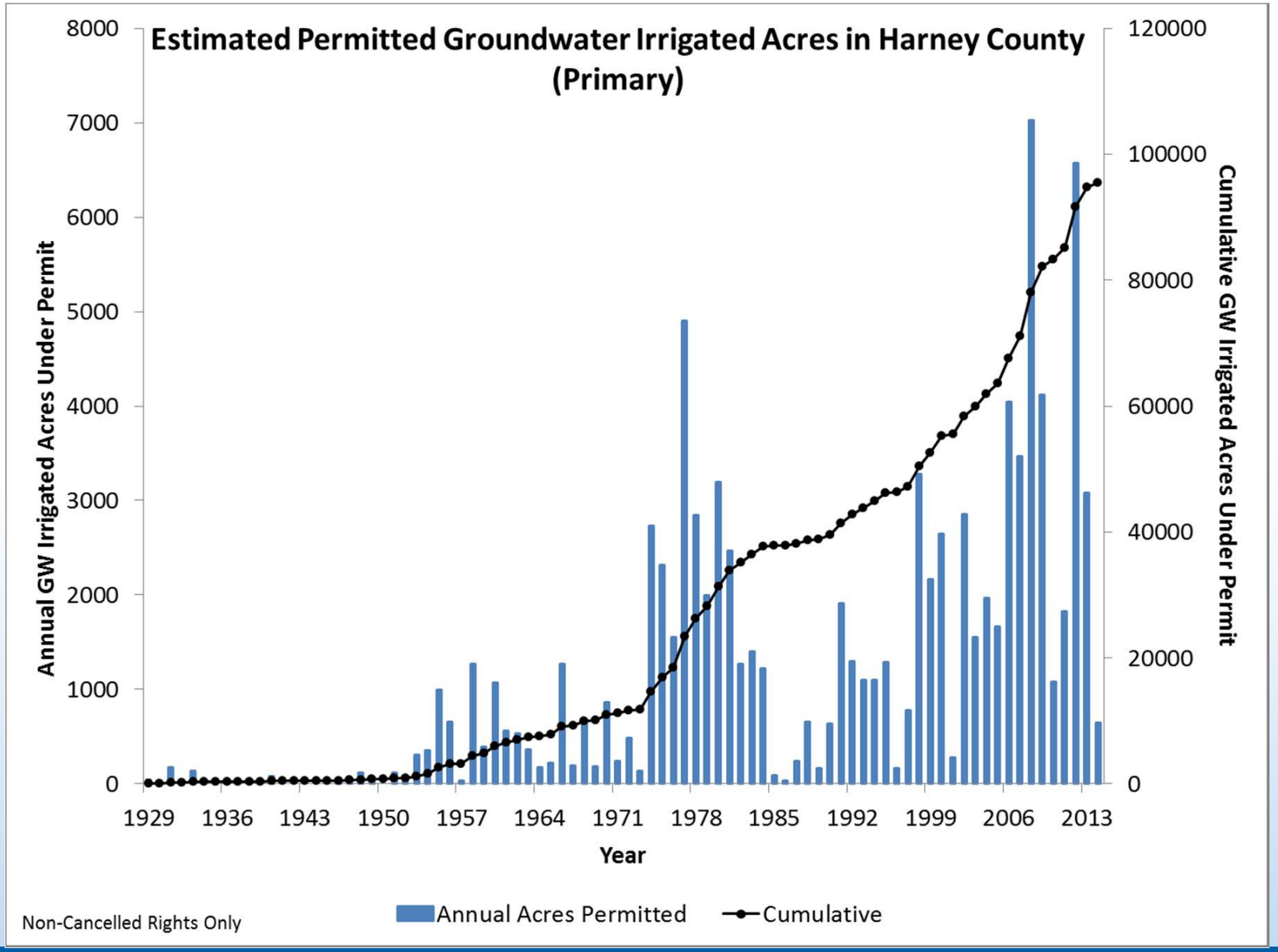
Background – Geographic Setting



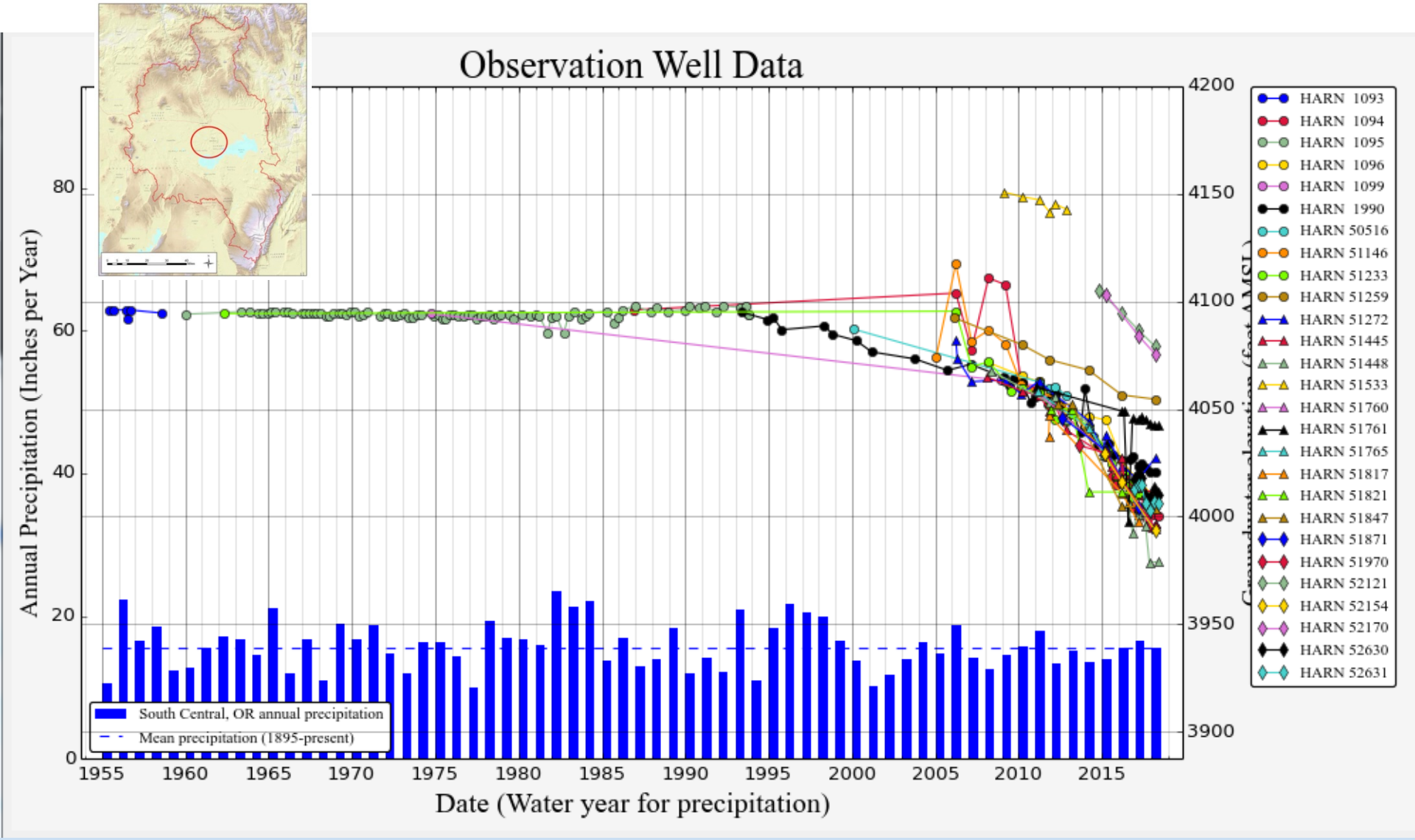
Background – Area of Interest



Background – Permit Development

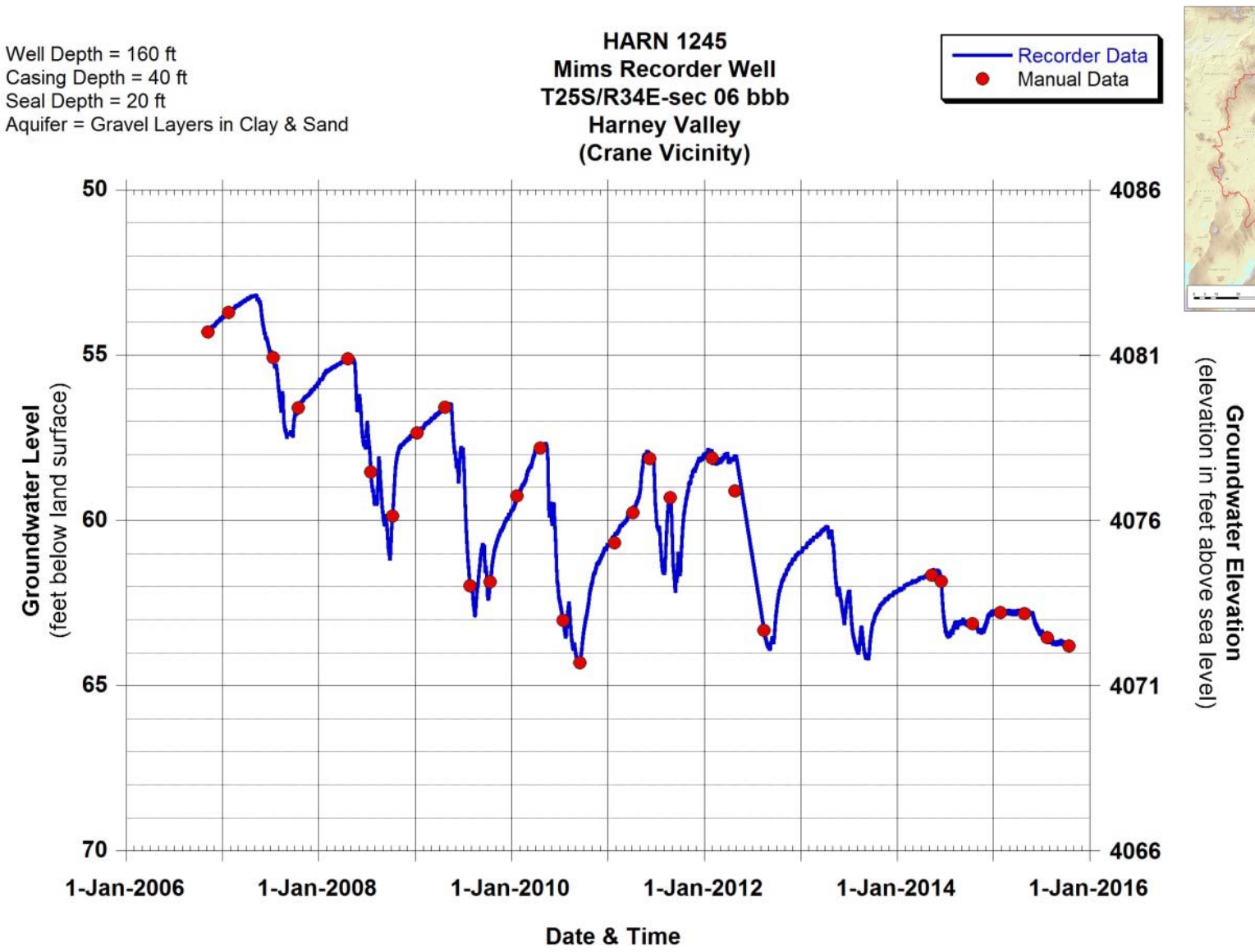


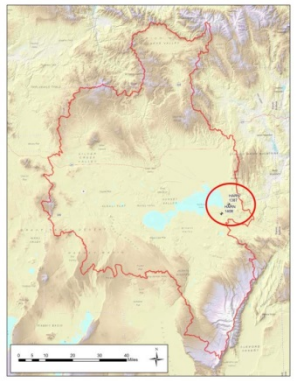
Background – Water Level Trends



Background – Water Level Trends

Well Depth = 160 ft
Casing Depth = 40 ft
Seal Depth = 20 ft
Aquifer = Gravel Layers in Clay & Sand





Source: USGS Circular 1139, Groundwater and Surface Water: A Single Resource

Background - Rulemaking

- Division 512 rules established the Greater Harney Valley Groundwater Area of Concern (GHVGAC) in the Malheur Lake Basin Program in April 2016

- Rules intended to:
  - Protect existing groundwater users
  - Allow pending applications to become permits
  - Gather additional information with a basin-wide groundwater study
  - Convene a local Groundwater Study Advisory Committee

Groundwater Basin Study

Study objectives:

- Develop a commonly accepted and accurate understanding of the hydrologic system in the Harney Basin.

- Plan and conduct the Study in coordination with a local Groundwater Study Advisory Committee.

Groundwater Basin Study

Harney Basin Study Supported by:

- 2013 Legislature provided ongoing groundwater study funds $375k/biennium

- 2016 Legislature provided a one-time funding package to support the Harney Basin Study
  - NRS-4 Hydrogeologist (1 FTE, GW Studies)
  - Harney Study Funds ($575k, one time)

- USGS cooperative water program federal matching funds

Groundwater Basin Study

OWRD Staff:

TSD:

- Jerry Grondin
- Darrick Boschmann
- Halley Barnett
- Phil Marcy
- Aurora Bouchier
- Jordan Beamer
- Mellony Hoskinson

FSD:

- Jonathan La Marche
- JR Johnson
- Dally Swindlehurst
- Scott Ceciliani

DO:

- Harmony Burright

Groundwater Basin Study

Study Cooperators:

- Oregon Water Resources Department (OWRD)
- United States Geological Survey (USGS)
- Local involvement through the Groundwater Study Advisory Committee
- Oregon Department of Geology and Mineral Industries (DOGAMI)

Groundwater Basin Study

Complimentary Studies:

- UNR-Desert Research Institute / NASA-ROSES remote sensing of evapotranspiration study
- DEQ groundwater quality survey
- TNC groundwater dependent ecosystem study
- PSU geologic mapping masters theses (in coordination with DOGAMI and USGS EdMAP program)

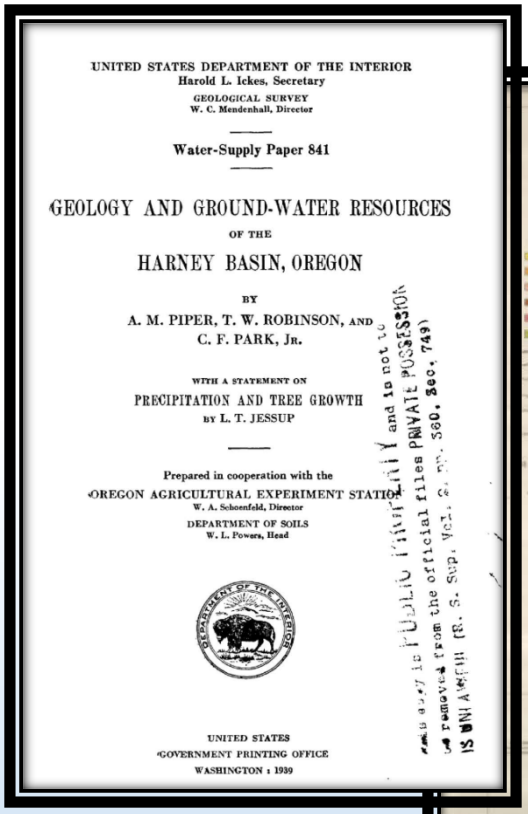
Groundwater Basin Study

Technical Objectives:

- Gather and assess existing data
- Collect new data required to better define the hydrogeologic system
- Develop a detailed water budget
- Develop an improved conceptual model of the Harney Basin groundwater-flow system

GW Study – Existing Data

- USGS & OWRD Databases, Published Studies, Driller's Logs, Private Data…



UNITED STATES DEPARTMENT OF THE INTERIOR
Harold L. Ickes, Secretary
GEOLOGICAL SURVEY
W. C. Mendenhall, Director

Water-Supply Paper 841

GEOLOGY AND GROUND-WATER RESOURCES
OF THE
HARNEY BASIN, OREGON

BY
A. M. PIPER, T. W. ROBINSON, AND
C. F. PARK, JR.

WITH A STATEMENT ON
PRECIPITATION AND TREE GROWTH
BY L. T. JESSUP

Prepared in cooperation with the
OREGON AGRICULTURAL EXPERIMENT STATION
W. A. Schoenfeld, Director
DEPARTMENT OF SOILS
W. L. Powers, Head

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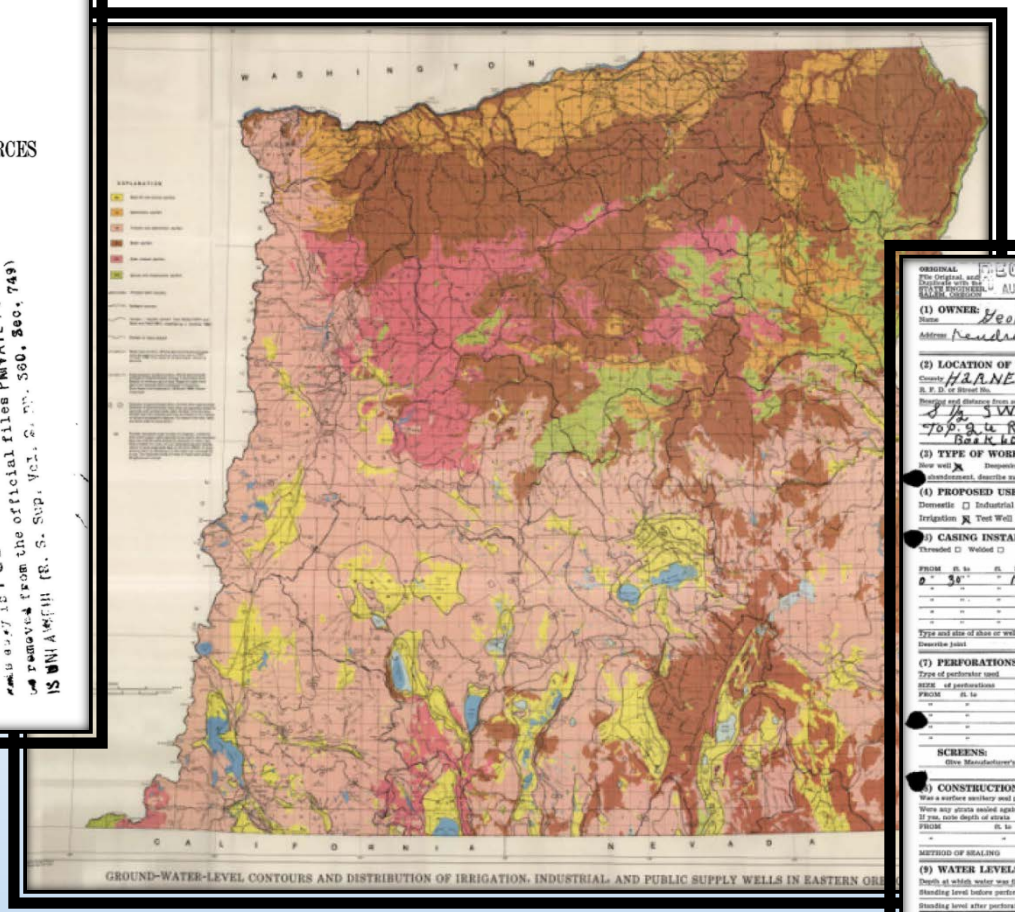
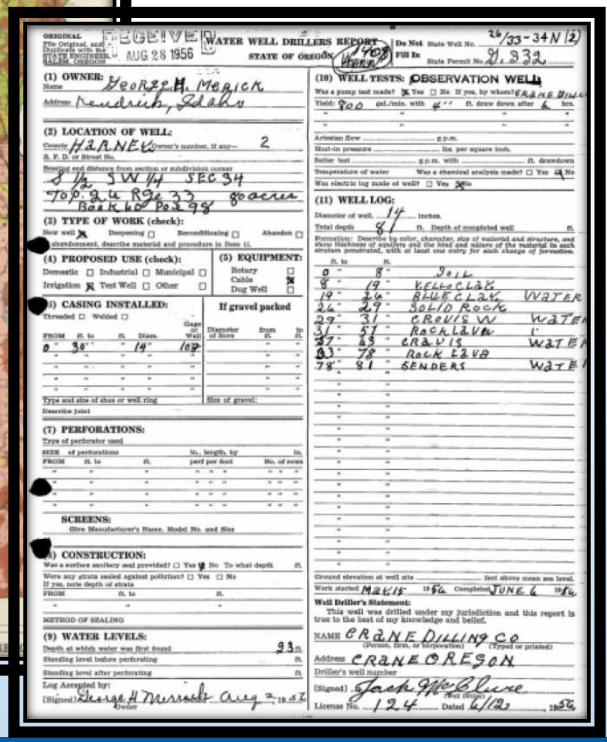


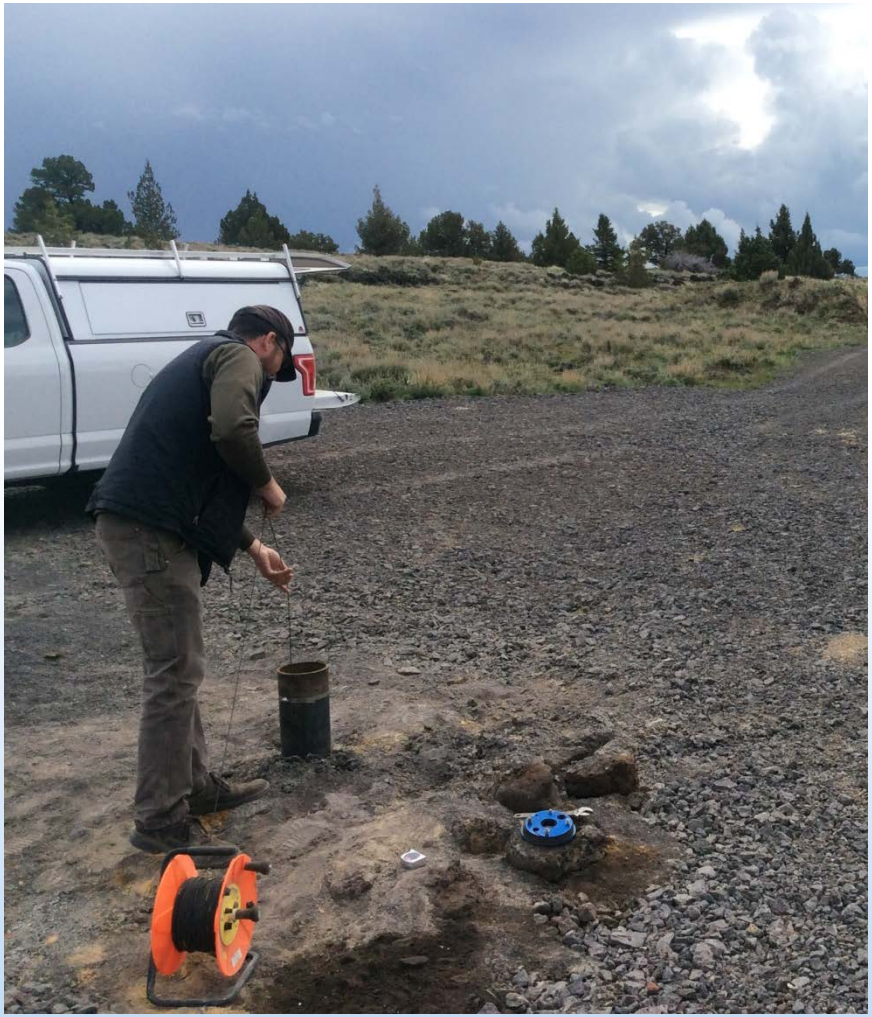


GW Study – New Data

Year	2017	2016	2014
Total Wells Field-Located	567	335	51
Total Water-Level Synoptic Wells	236	189	-
Total Water-Level Quarterly Wells	118	108	23
Spring Water Level Synoptic Measurements	213	149	-
Fall Water Level Synoptic Measurements	242	180	-
Total Water Levels Measured per Year (by OWRD staff)	689	672	78
Continuous Recorder Instruments Installed	21	13	2
New Observation Wells Constructed	9	8	-

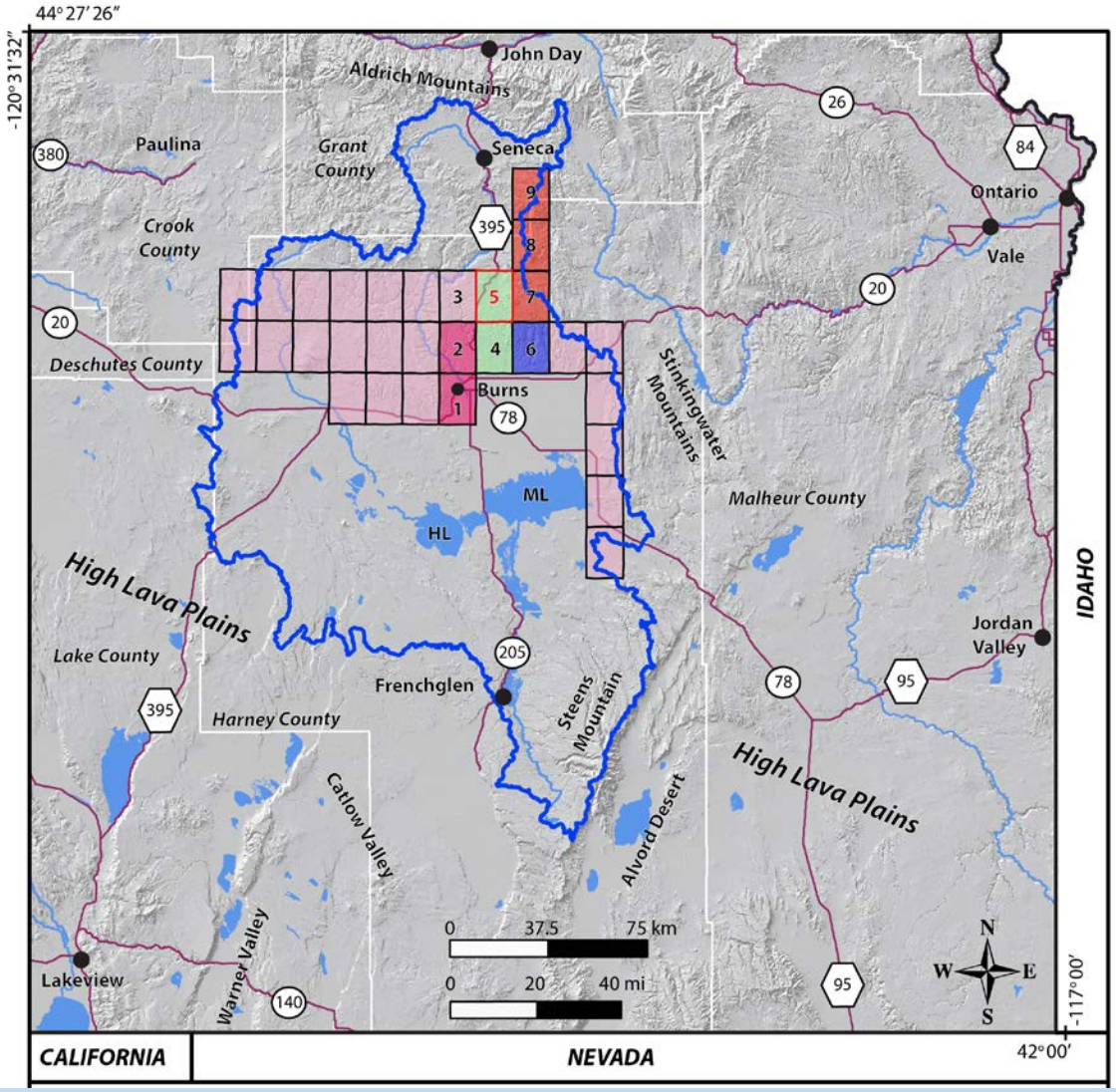
GW Study – New Data

- Water Level data from Greatly Expanded Observation Well Network



GW Study – New Data

- DOGAMI / PSU Detailed Geologic Mapping



LEGEND

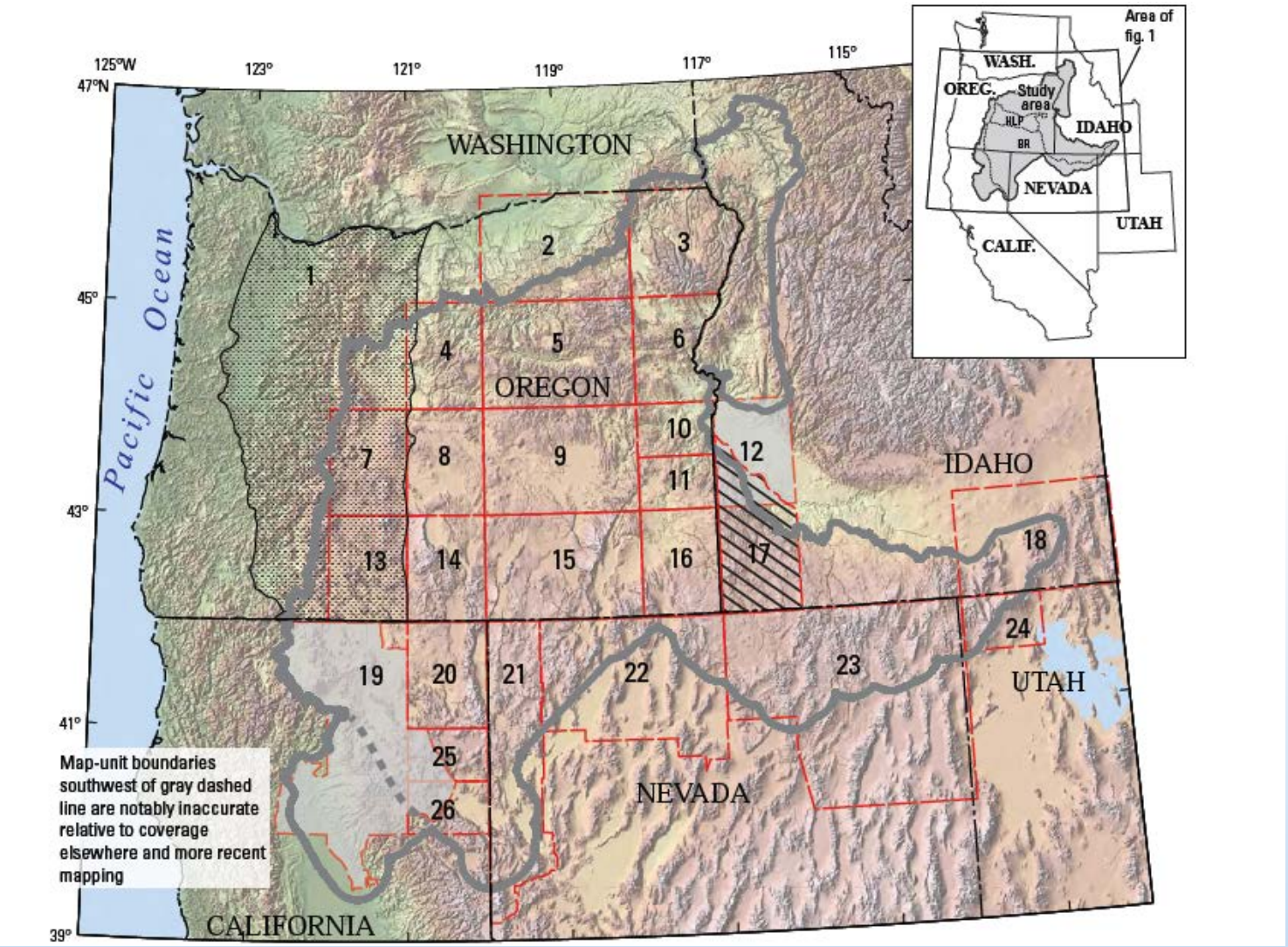
- City
- Geographic location or landmark

- FY2018 DOGAMI STATEMAP Proposed
- FY 2017 DOGAMI STATEMAP
- FY 2016 STATEMAP Completed
- FY 2016/2017 EdMap Project Areas (PSU)
- Future DOGAMI geologic mapping targets
- Stream centerline
- Boundary of the Harney hydrologic basin
- Highway (78) State (95) Federal

Source: Figure modified from DOGAMI

GW Study – New Data

- USGS Compilation Geologic Mapping



Source: Figure modified from USGS Open-File Report 2018-1030

GW Study – New Data

- Drilled 9 Observation Wells at 5 sites to date, plus cleaned and retrofitted 4 more.

Photo credit: Darrick Boschmann, OWRD

GW Study – New Data

- Core Samples and Cuttings Analysis

Photo credit: Darrick Boschmann, OWRD

GW Study – New Data

- Stable Isotope and Aqueous Geochemistry

Photo credit: Darrick Boschmann, OWRD

GW Study – New Data

- Seepage Runs (Surface Water Gain/Loss)

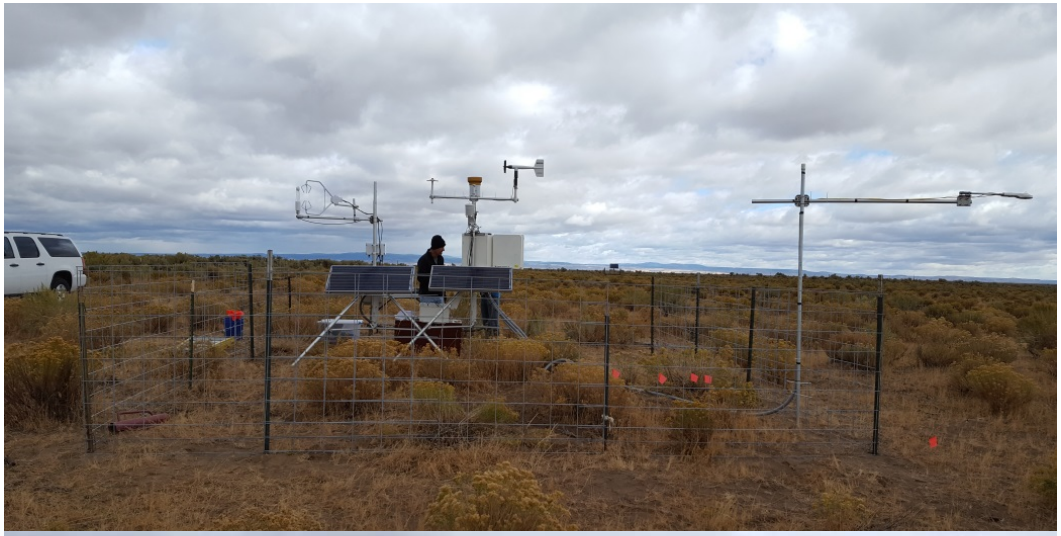
Photo credit: Jonathan La Marche, OWRD

GW Study – New Data

- Two Eddy Covariance Stations Installed

Native Vegetation Site:

https://www.wrcc.dri.edu/cgi-bin/rawMAIN.pl?orolwn



Alfalfa Center Pivot Site:

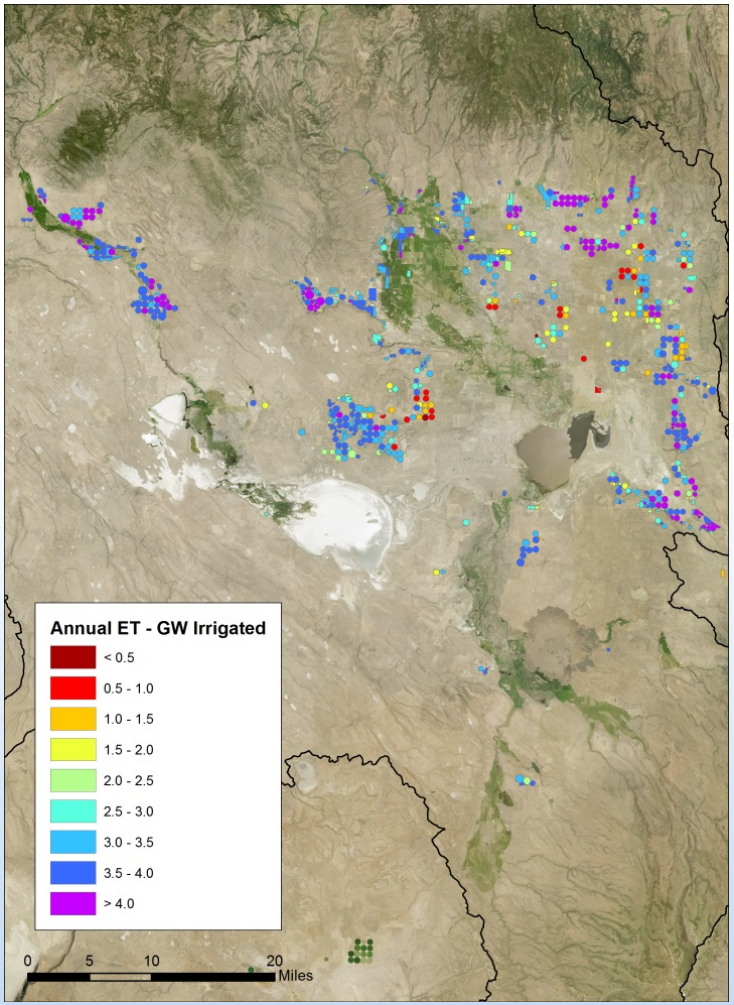
https://wrcc.dri.edu/cgi-bin/rawMAIN.pl?orocrn

Photo credit: Jordan Beamer, OWRD

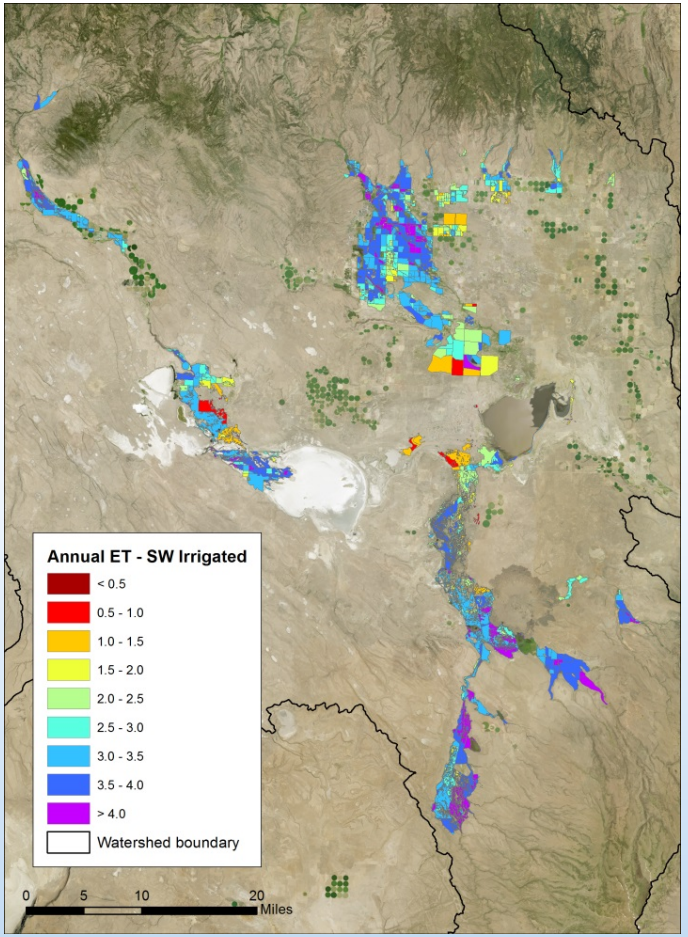
GW Study – New Analysis

- Field Averaged Annual Total ET (ft) - 2016

Groundwater Irrigated Fields



Surface Water Irrigated Fields + Refuge



GW Study – New Analysis

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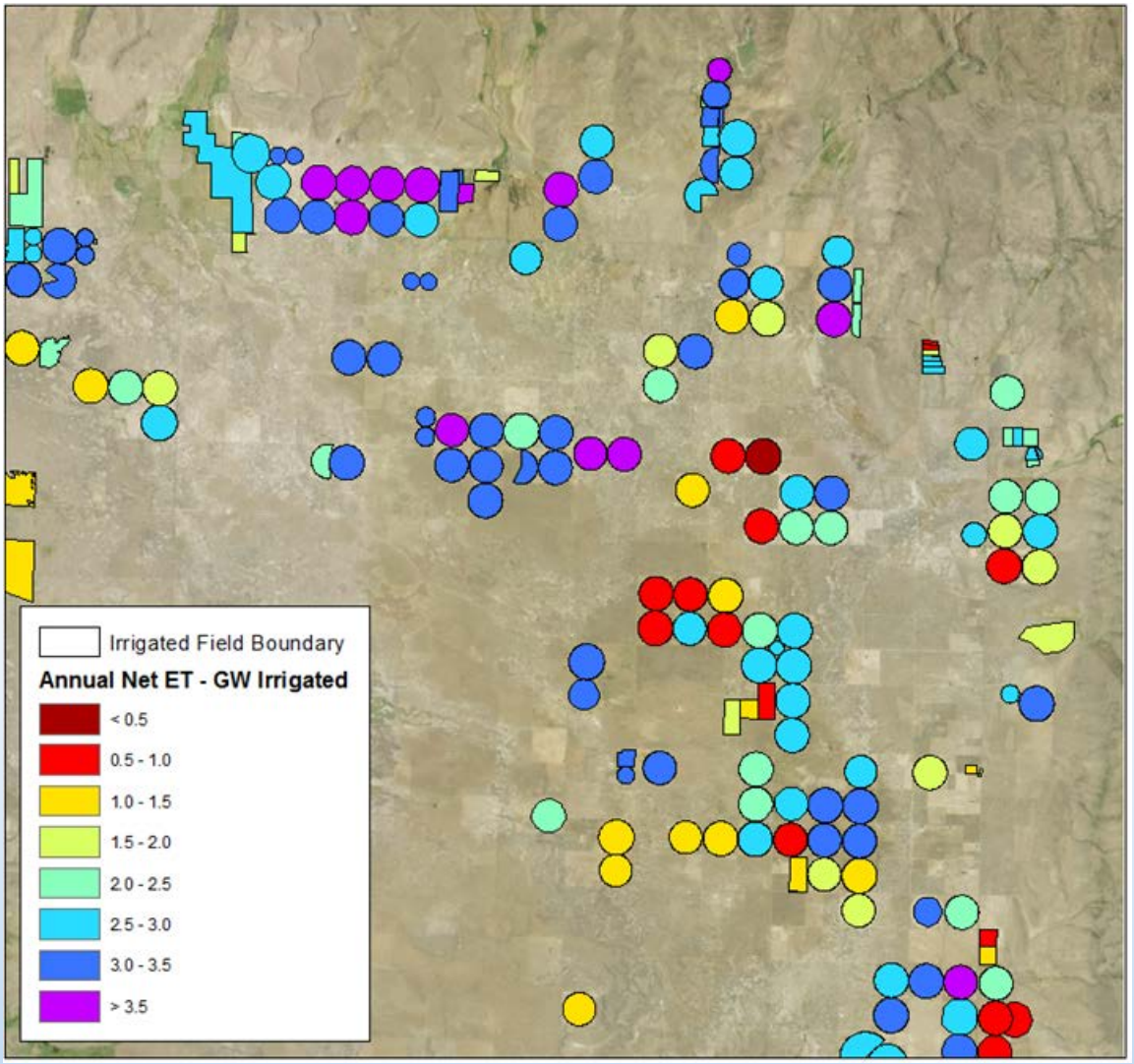
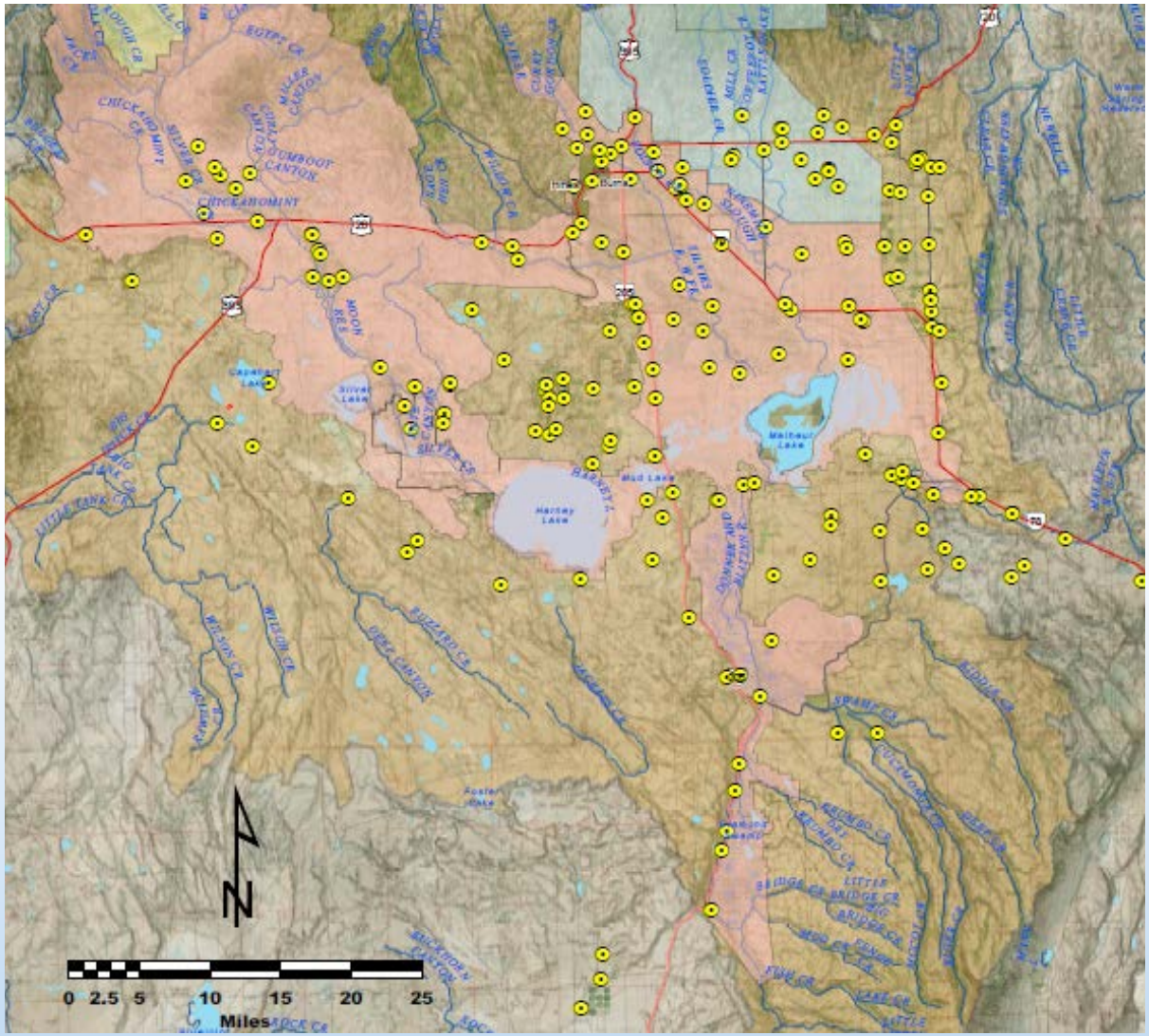


GW Study – Additional Data

- LiDAR and Obs. Well Elevation Survey



Source: OWRD

GW Study – Next Steps

- Transitioning from data collection to data analysis – final report by 2020