Water Use Measurement in Oregon

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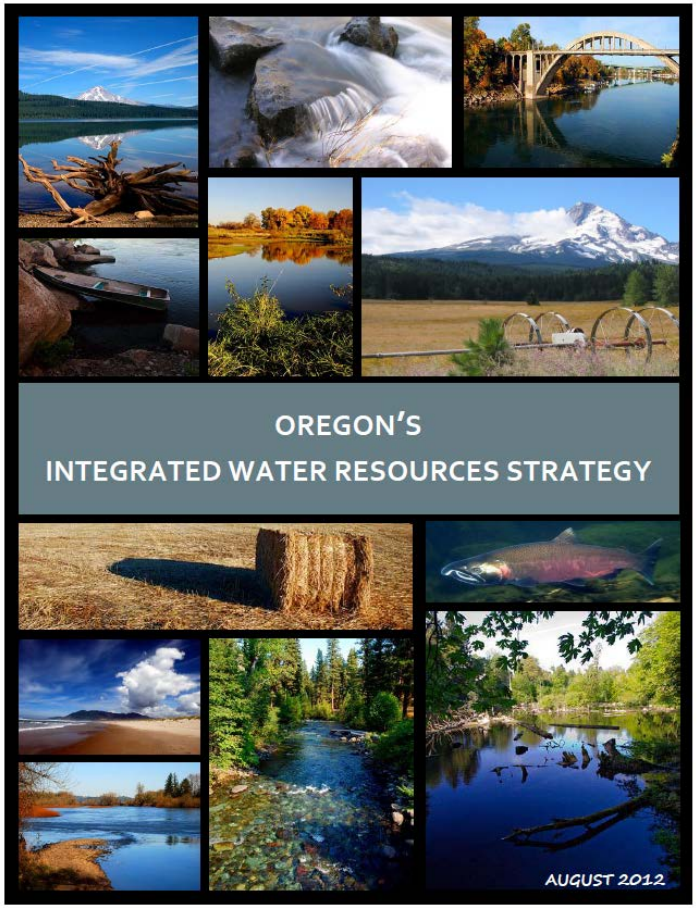
Today's Discussion

- Current approach and existing authority
- Selecting a measuring device
- Examples of measuring devices
- Remote Sensing
- Benefits and challenges
- Department's targeted approach

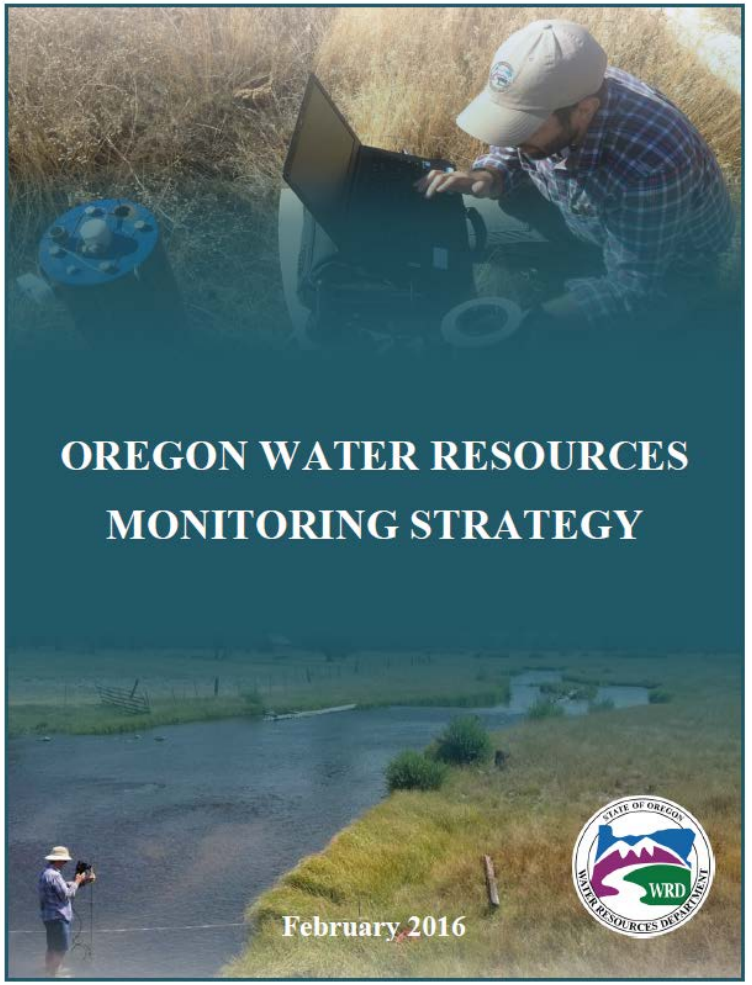
Integrated Water Resources Strategy (IWRS)

- Oregon's first IWRS adopted in 2012
- Blueprint for meeting Oregon's instream and out-of-stream water needs & demands
- More than 40 recommended actions to meet these needs
- Foremost on the list? The need for <u>better</u> data and information
- Five-year update due in 2017



Why We Monitor and Measure Use

- Surface water regulation/distribution
  - Timely & efficient dispute resolution
  - Confirming water right compliance
- Tracking flood and drought
- Monitoring groundwater levels
- Meeting instream needs
- Partnering with other agencies / entities



Monitoring includes various types of data including, streamflow and groundwater data, as well as water use

Why We Monitor

- Need for long-term monitoring to observe trends
  - climate change, watershed changes due to wildfire etc.
- Conducting water availability, basin water budgets, and basin yield analyses
- Supporting injury analyses for water right transfers with historical use data
- Defending Department actions in litigation

Measurement vs Reporting

- Department has broader authority to require measurement
- Department has less authority to require water use reporting
- Measurement is obtained via:
  - Permit condition
  - Order of the Watermaster
  - Voluntary, such as through cost-share program
  - Significant points of diversion

Which water rights must measure and report?

- Water rights with permit conditions (early 1990s)
- Water rights held by a governmental entity (ORS 537.099)
  - Governmental entities include state, federal, local, irrigation districts and water control districts
- Water rights in a Serious Water Management Problem Area

- Typical reporting is monthly totals, reported annually

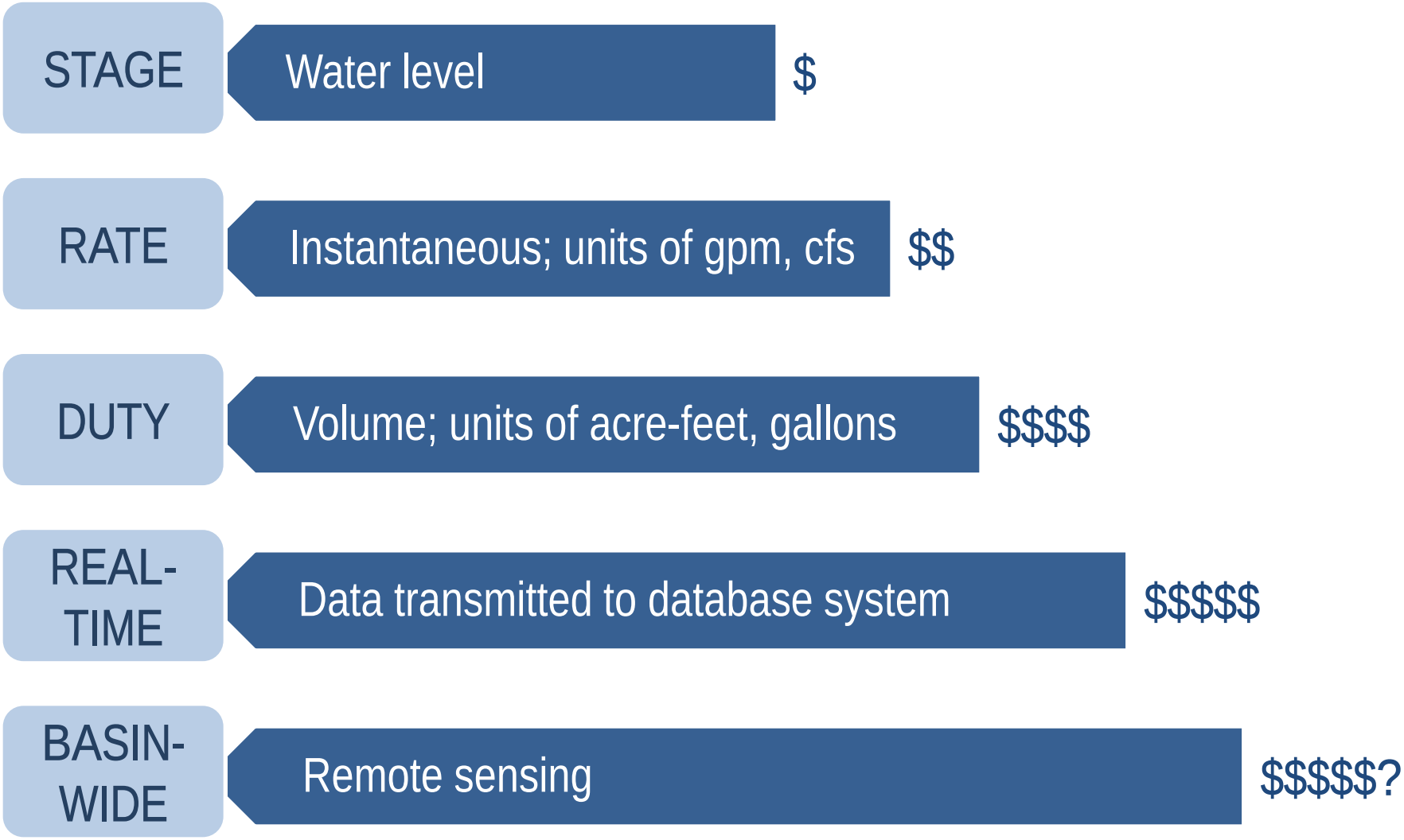
Water Right Statistics

- Close to 89,000 water rights issued in Oregon (surface water, groundwater, and storage)
- 14,800 (17%) are required to *measure and report* water use
- In 2015, the Department received water use data for 10,200 water rights (11% of total water rights; 70% compliance rate)

(as of February 2017)

Typical Devices

Water Use Data Options



Selecting the Right Measuring Device

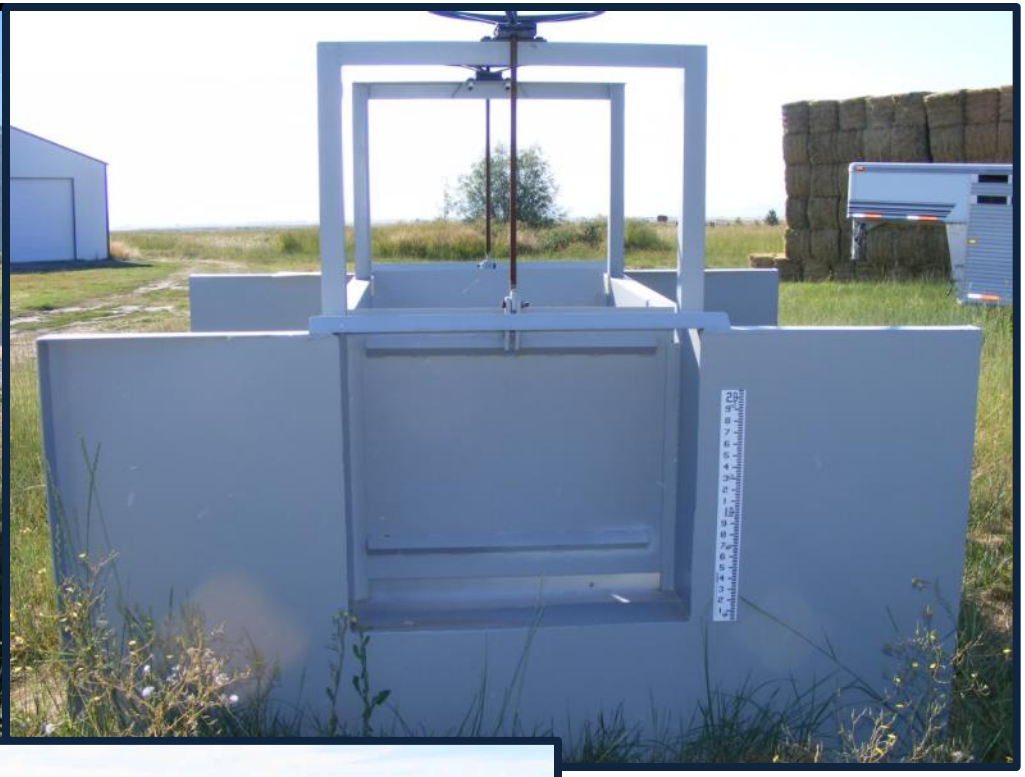
- Not one-size-fits-all (e.g., gravity vs. pressurized)
- Piped diversion versus ditch or canal
- Open channel (stream and river, reservoirs)
- What the information will be used for
- Many factors to consider when selecting measuring option
  - Accuracy
  - Longevity
  - Other factors (topography, tidal influence, etc.)

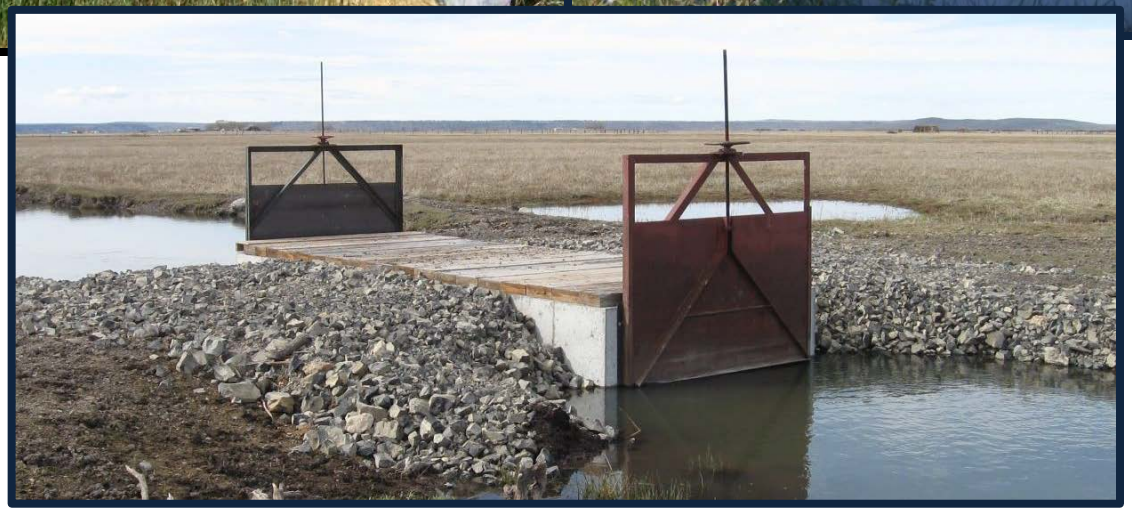
Rate Restriction: Flow Restrictor

Diversion Rate: Rectangular Orifice

Diversion Rate: Mason Ditch Rectangular Weir

Diversion Rate: 36-inch Submerged Orifice



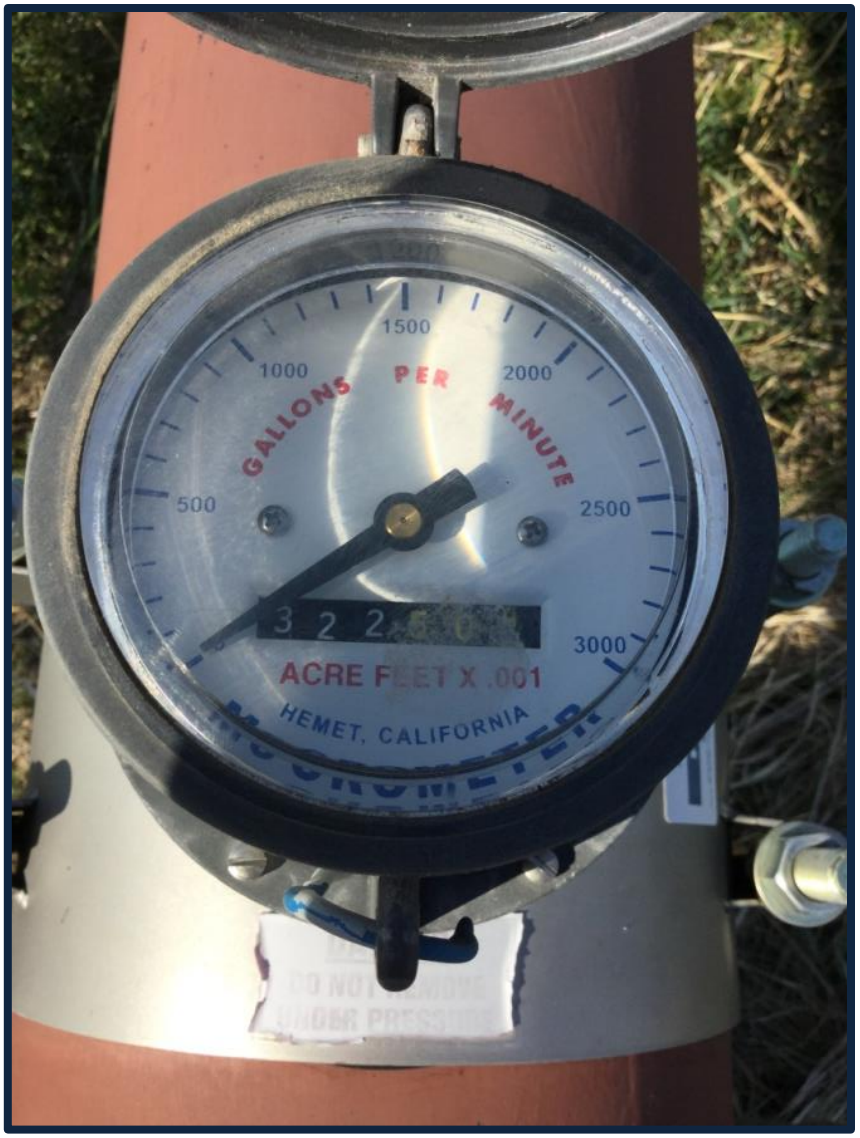


Diversion Rate: Parshall Flume

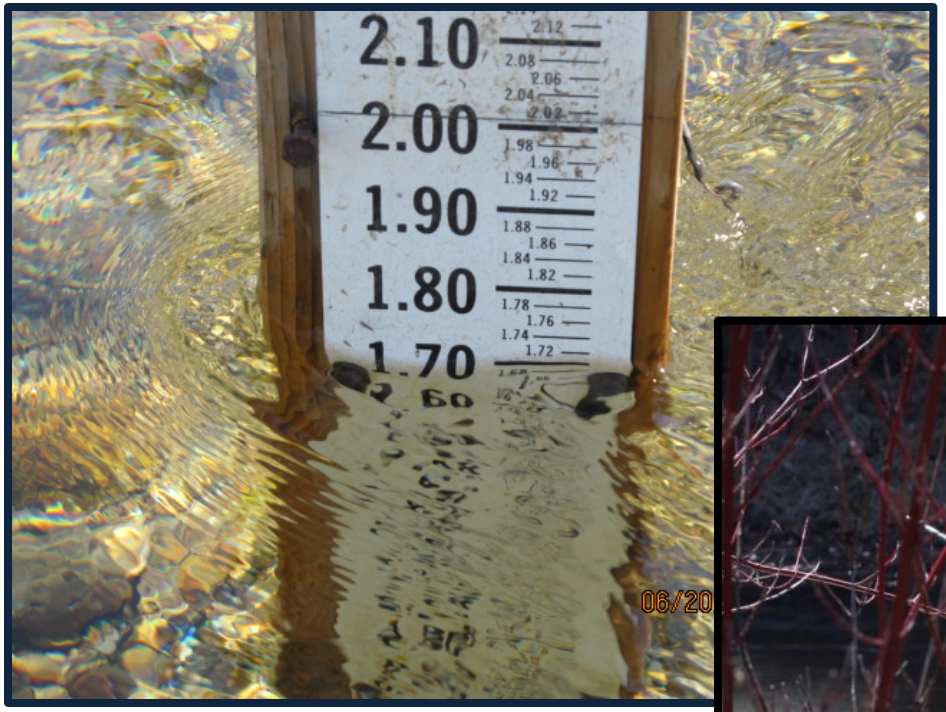
Rate of stored water release: Cipoletti weir

Rate and Duty: Ramp Flume with Recorder

Rate and Duty: Totalizing Flow Meter



Staff Gage and Wading Measurement

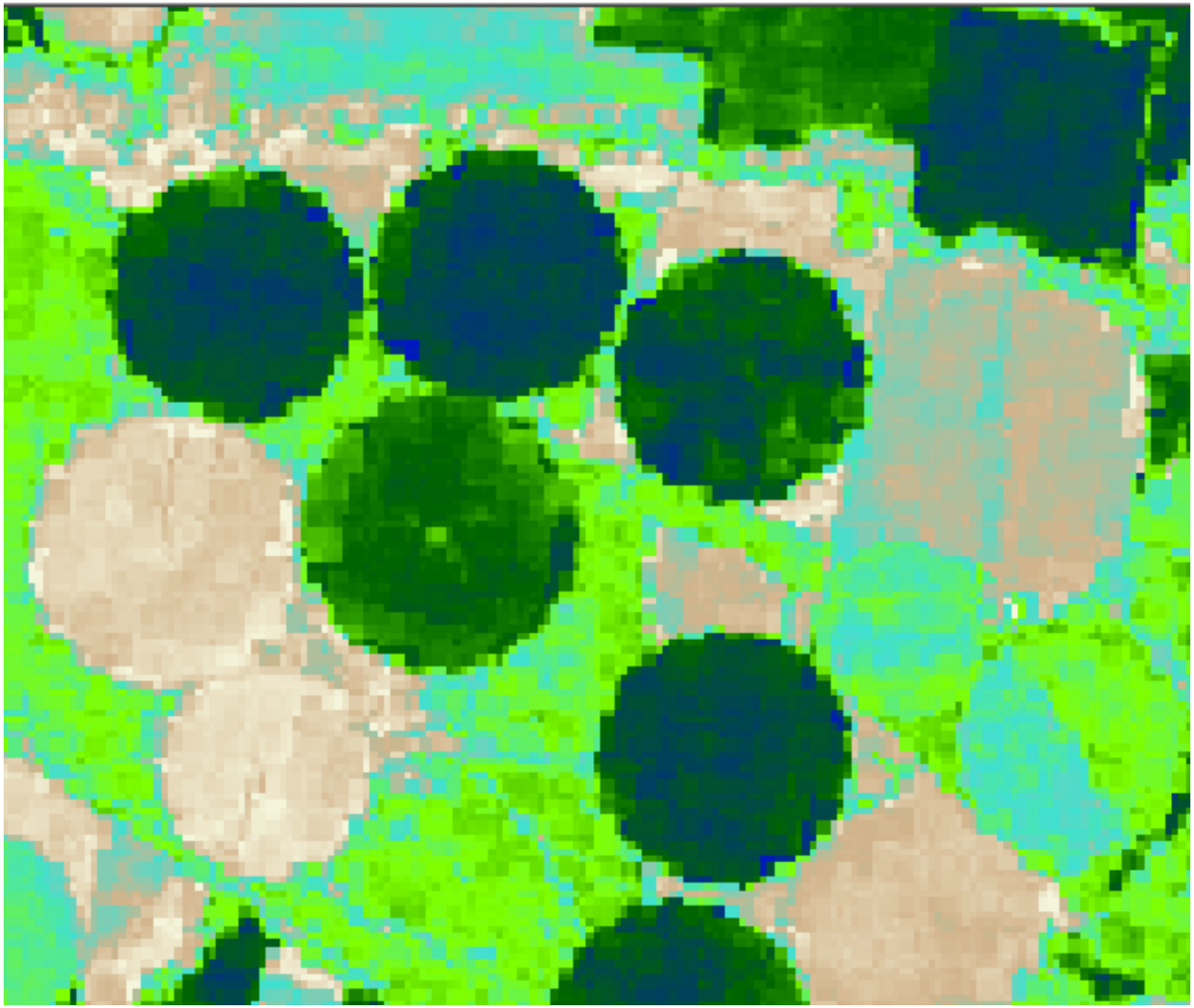


Real-Time Data: Gaging Station & Cableway

Remote Sensing

- METRIC = Mapping Evapo-Transpiration using high Resolution and Internalized Calibration
- Uses satellite-based thermal imagery
- Measures crop consumptive water use
  - Does not measure diversion rate/volume
  - Requires ground based data for calibration

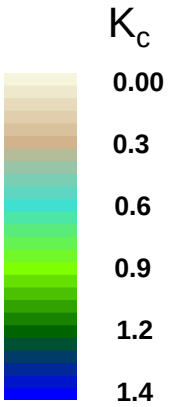
Why Use High Resolution Imagery?



METRIC application in La Mancha, Spain, 2003

ET from *individual* fields can be valuable for:

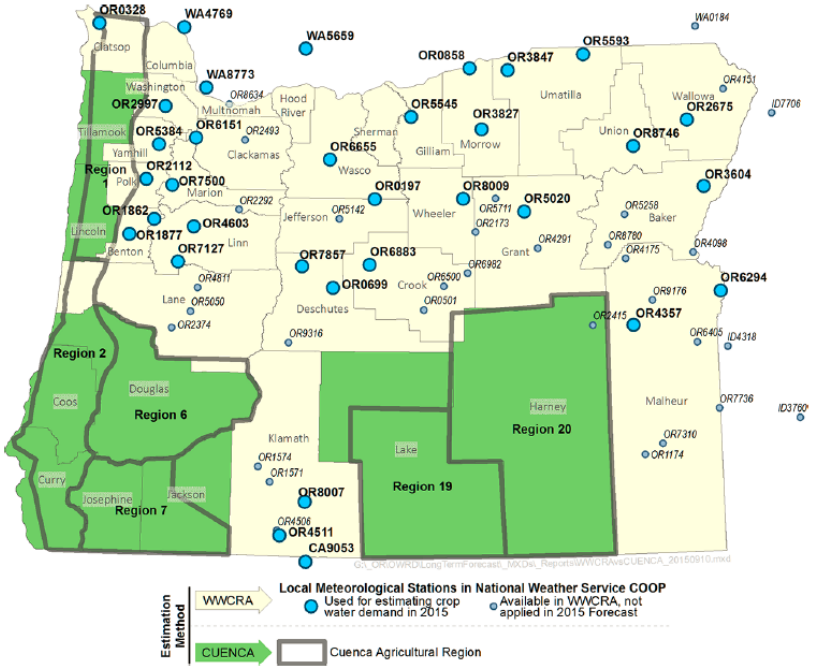
- Water Rights,
- Water Transfers,
- Farm Water Management



Source: Rick Allen, University of Idaho

METRIC: Potential Uses

- Aquifer depletion
- Water rights retirements
- Planning: ET by land use class
- Water use by irrigated agriculture



Picture: 2015 Statewide Long-Term Water Demand Forecast

- Water rights compliance monitoring
- Modeling: ET for computing water budgets
- Analysis of water-rights curtailment alternatives

Source: Idaho Department of Water Resources

Benefits for Water User

- Day-to-day operations / management / decision-making
  - Calculations: cost to irrigate and resulting crop yield
  - Coordinate and track stored water releases
  - Increased awareness of use by user; self-regulation

Benefits for Water User

- Plans and water right transactions
  - Document the “proving up” of a water right
  - Support applications for conserved water allocation and split-season leases
  - Develop water use and conservation plans
  - Evidence of use to rebut forfeiture allegation / cancellation proceedings

Measurement Challenges

- Selecting the correct device and install properly
- Calibrating and maintaining the device
- Reading and reporting accurate water use data
- Connecting PODs and water rights
- Housing, protecting, and sharing the data

Outreach Approach

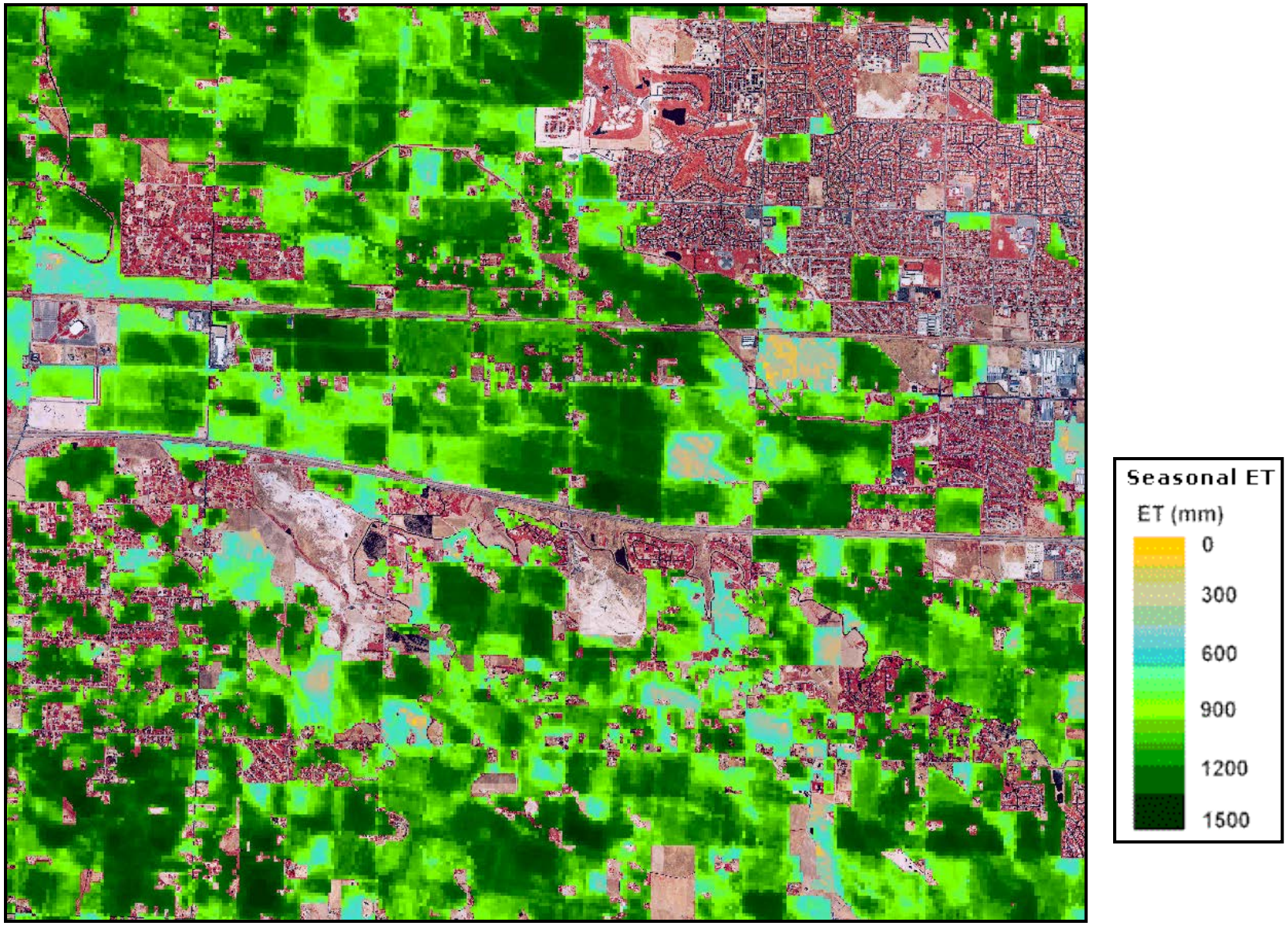
- Identify and contact the owner/responsible party for each water right
- Evaluate type of measurement needed; apply cost share program where appropriate
- Authority to require installation of measuring device is in ORS 540.310, but process is cumbersome
- Only authority to require reporting is on the original permit or by designating administrative areas

Targeted Approach

- Modify Commission's 2000 Water Measurement Strategy
  - Add: streams with high regulatory needs and instream water rights
  - Add: vulnerable aquifer systems
    - e.g., Walla Walla Sub-basin "Serious Water Management Problem Area"
- Expand cost-share program to include groundwater
  - Committee Bill
- Expand geographic use of METRIC data and analysis

Questions?

METRIC: Agricultural Water Use



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