

# The Role of Streamflow Measurement in Water Management

June 2026 Commission Meeting

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*Photo: Christi Haines, Applegate River, SW Region. By USGS*

# Agenda

## 1:15-2:15 – Presentation

- Why OWRD measures streamflow
- How data are used
- How data are developed
- What resources are required
- Case study: Tualatin Basin

## 2:15-3:15 – Field Demonstration (Mill Creek)

- Walk/drive time included
- Live Demonstration of streamflow measurement techniques

# Water management actions that use gaging

- Distribution and regulation for instream and out-of-stream uses
- Coordinated surface water operations (e.g. storage reports)
- Hydrologic studies for water allocation and basin investigations
- Legally required monitoring – settlement agreement, transfer order, etc.



# Evolution of monitoring and data

- Core function – gaging since early 1900s
- Historically monitored for distribution and water supply trends
- New water management paradigm



# Evolution of monitoring and data

## Equipment

- Shift from mechanical to digital

## Internet

- Increased accessibility and review
- Near-real time gages in early 2000's

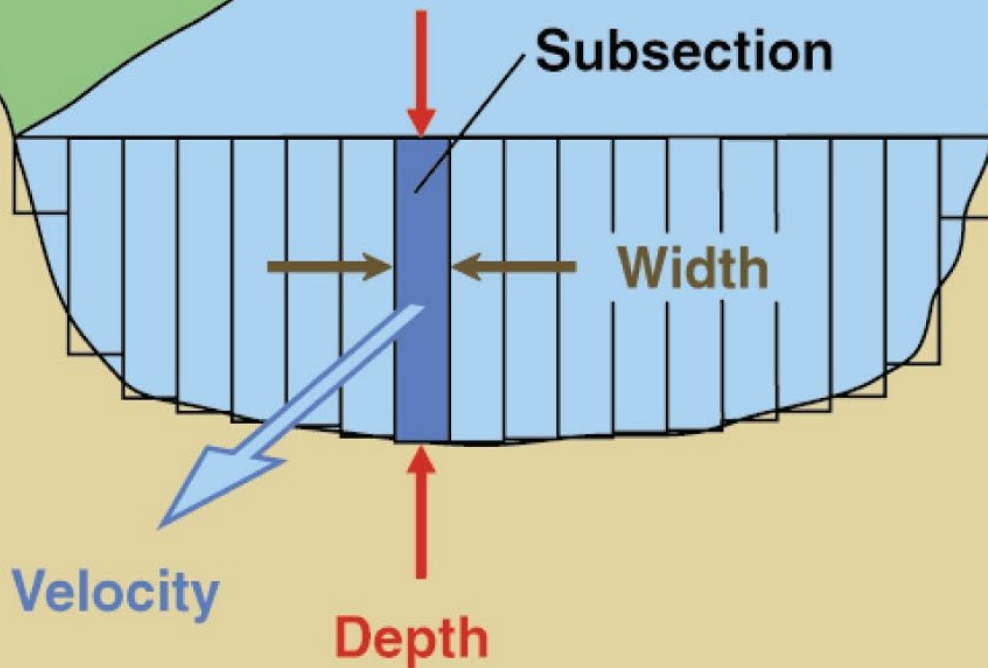
## Increased Gaging Stations

- 48 Gages in 1909 vs. 262 Gages in 2026

## Increased Staffing

- Increased staffing overall to support gages
- 2 to 3 times increase in specialized staff

# What are we measuring?



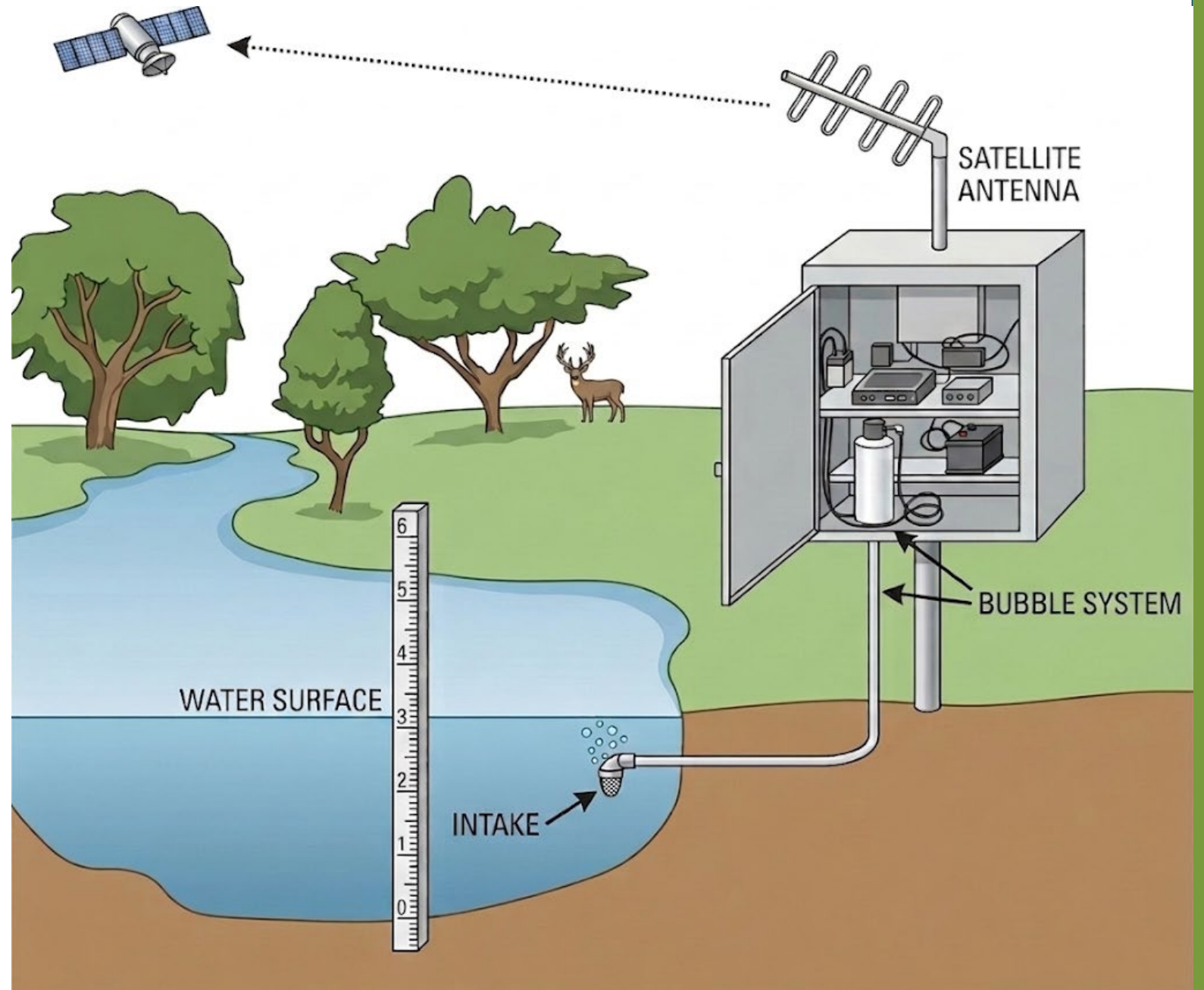
In each subsection:

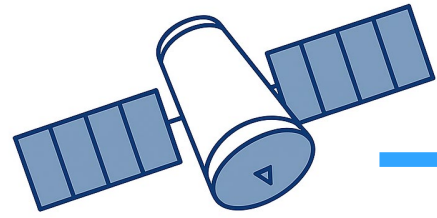
$$\text{Area} = \text{Depth} \times \text{Width}$$

$$\text{Discharge} = \text{Area} \times \text{Velocity}$$

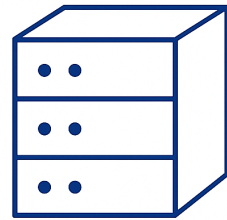
# How to we produce daily streamflow?

- Establish and maintain stage-discharge relationship
- Monitor stage
  - Channel
  - Equipment
  - Transmission
  - QA/QC

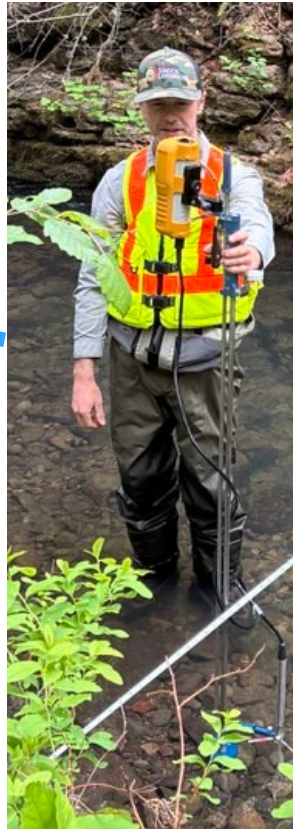
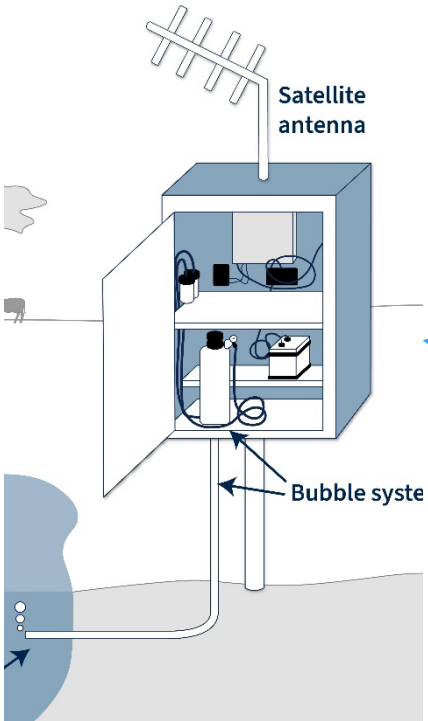
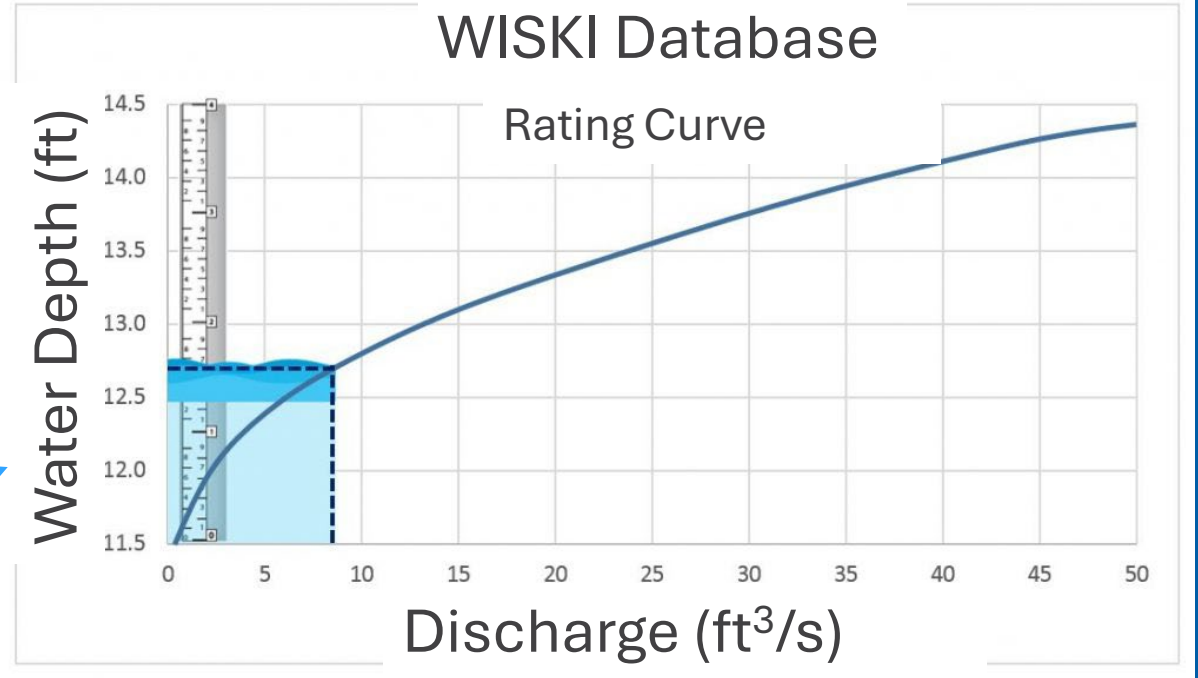




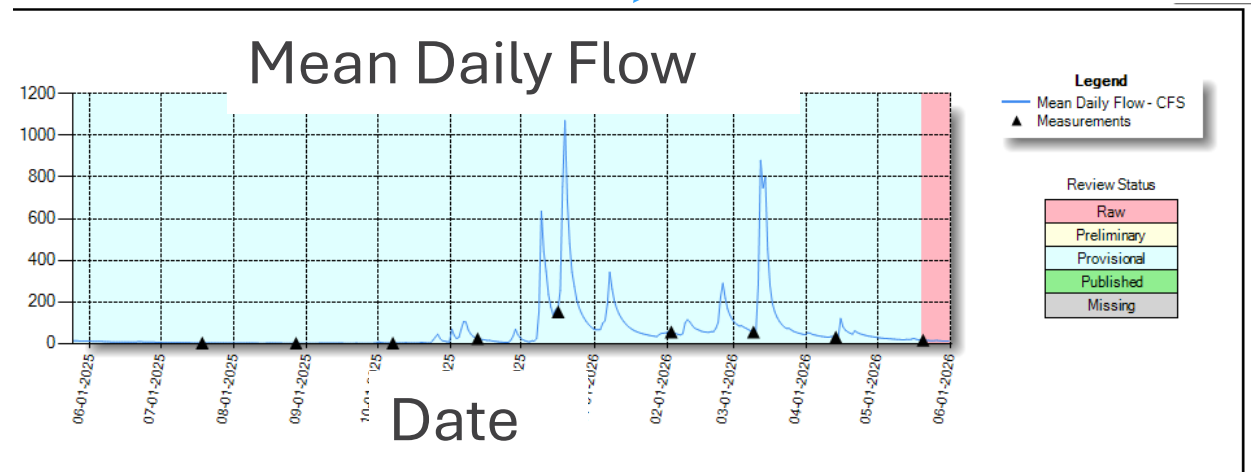
Satellite



Ground Servers



Discharge (ft<sup>3</sup>/s)



# Hydrographics – ensuring reliable data

## Systems reviewed and addressed

- Assessing measurement quality
- Reviewing gage height and rating curve:
  - Changes to hydraulics/channel
  - Functioning of equipment/power
  - Continuity of the transmission system

## When problems arise

- Offer 1-on-1 technical guidance/field support
- Training, education, and increased system efficiency
- Data and transmission system management
- Troubleshooting complex measurement needs
- Ask FSD to check on a gage

# Resources: Staff, equipment, databases, and training

## Positions

- 23 Watermasters
- 31 Assistant Watermaster
- 3 Hydrotechs
- 4 County-funded Assistant Watermasters
- 10 Hydrographers

## Organized Training

- Hydro-Training team
- Hydrographics trainings

## Equipment

- Gages: 262
- Flowtrackers: 72
- Acoustic Doppler Current Profiler: 12

## Information Technology

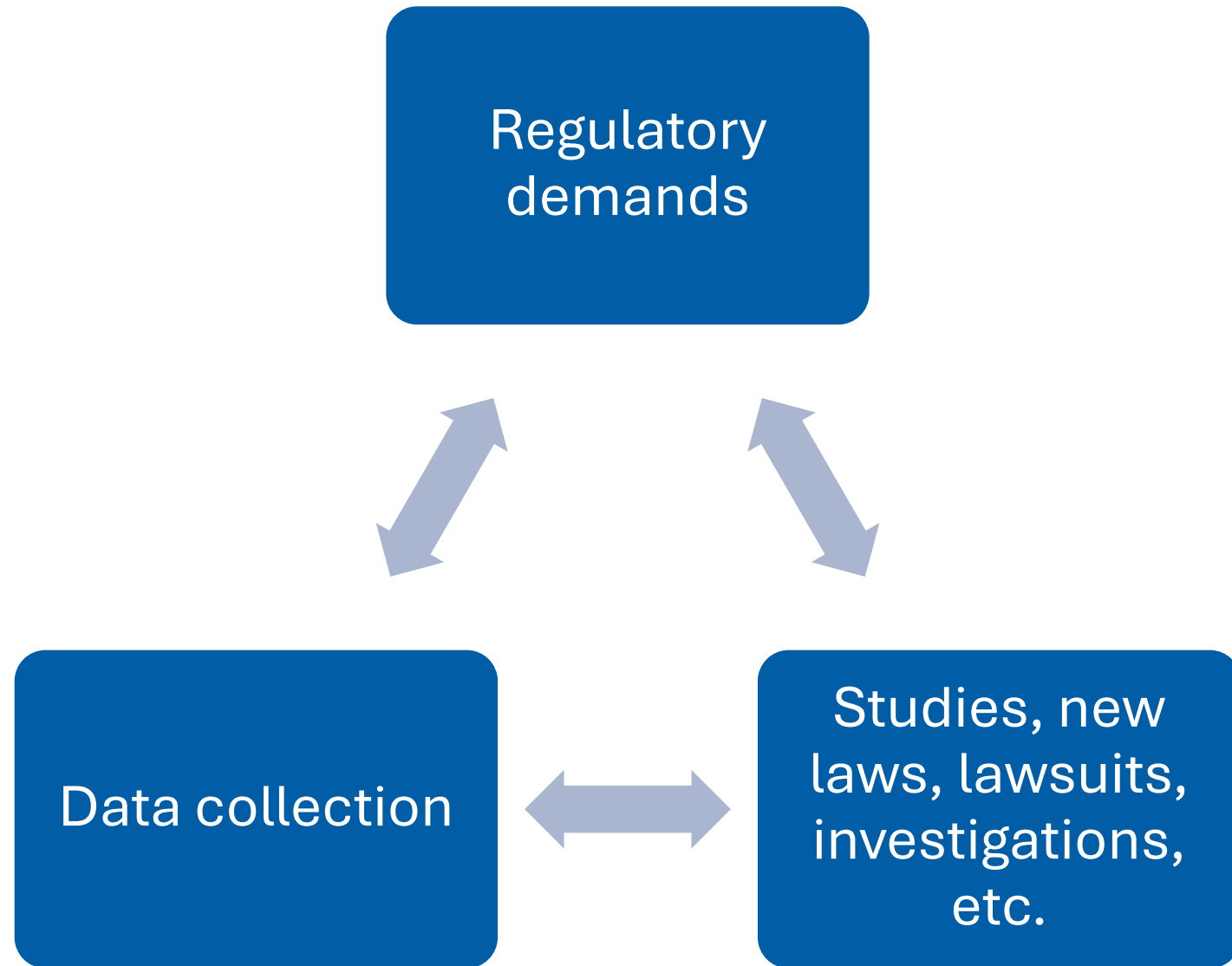
- Server maintenance
- Applications and software
- Satellite data management

## Average annual number of measurements

- 2,100 measurements at gages
- 620 miscellaneous measurements
- 40 levels runs

# Staffing impacts data

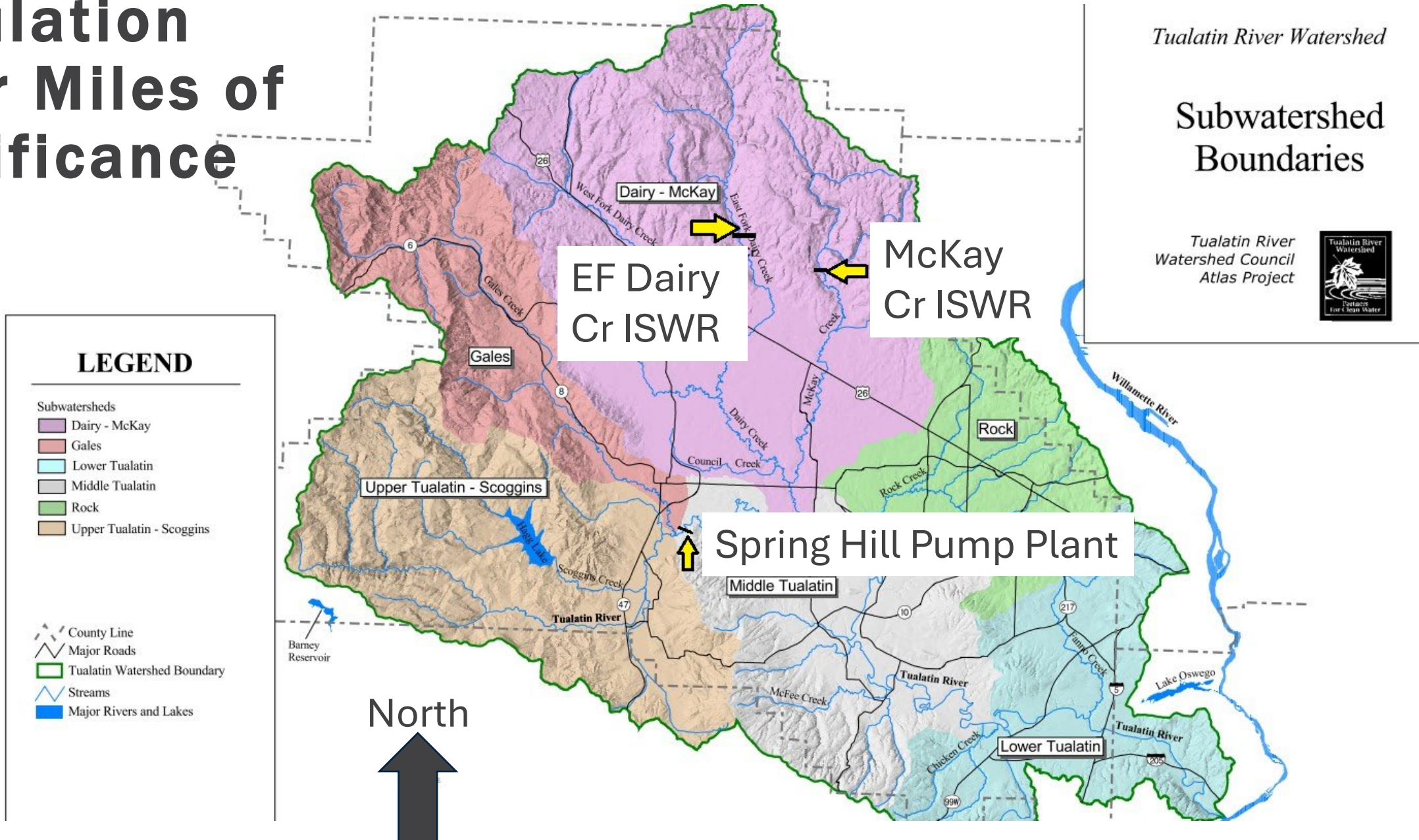
- **Assistant Watermasters perform most gage measurements**
- **Capacity is strained when:**
  - Positions vacant
  - Equipment budget cut
  - Environmental conditions
  - New initiatives added



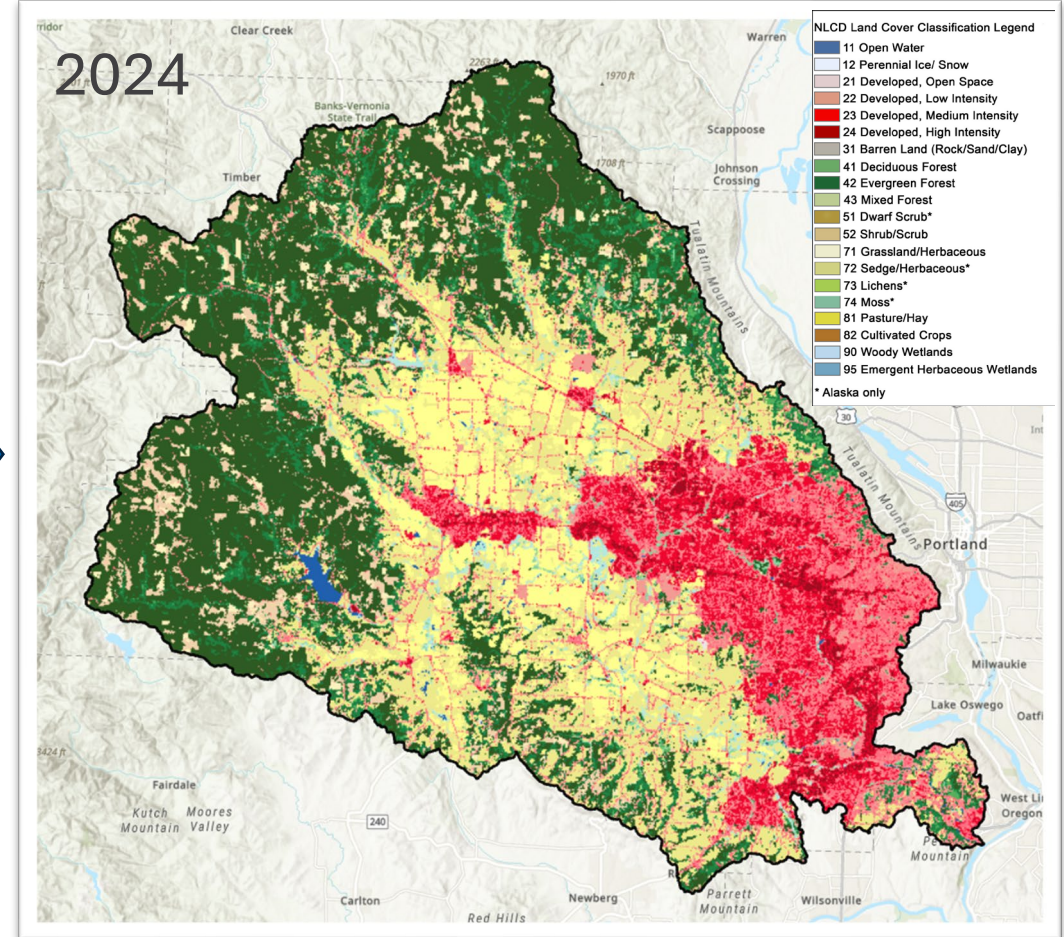
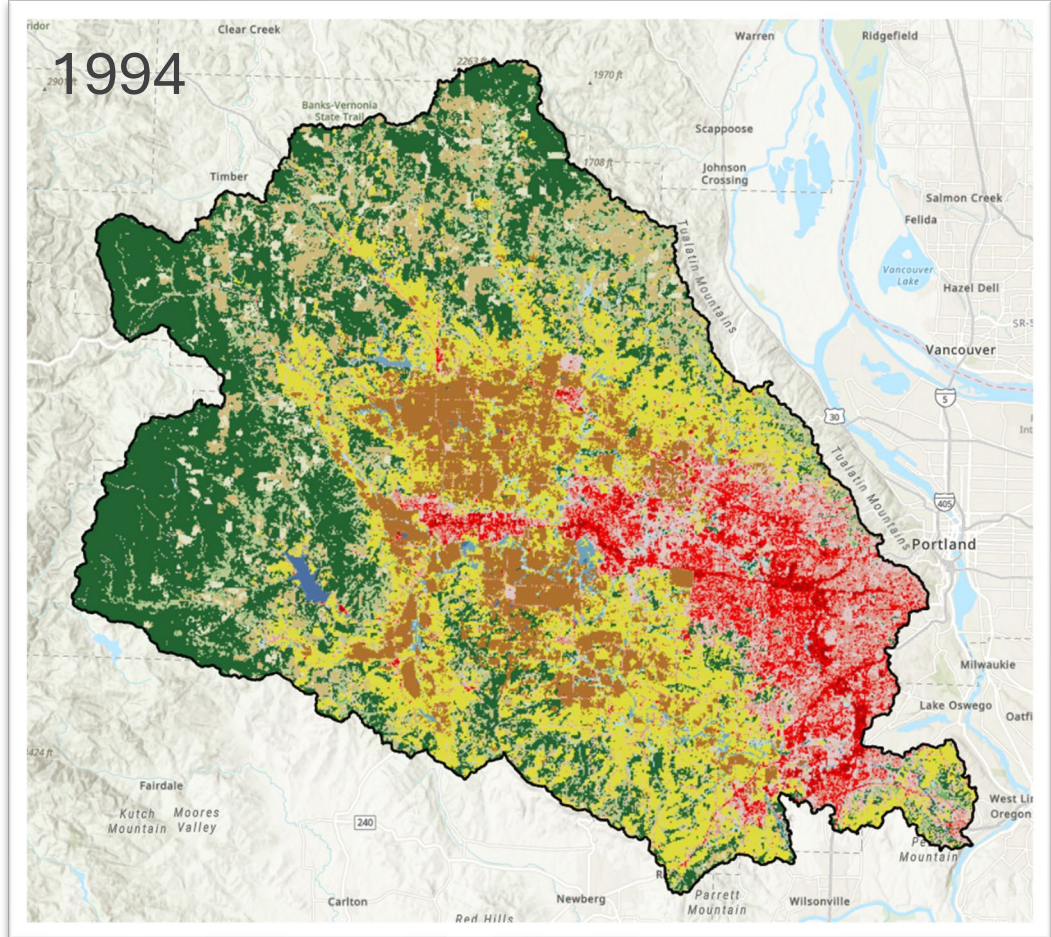
# Tualatin Basin Case Study



# Tualatin Basin Regulation River Miles of Significance



# Tualatin Basin Land Cover



% Land Cover	1994	2024/current
Developed/Urban	20.8%	25.2% <span style="color: red;">↑</span>
Agricultural	31.2%	27.8% <span style="color: orange;">↓</span>
Forest	35.7%	37.7% <span style="color: green;">↑</span>



# Tualatin River Flow Management Technical Committee

## Contract Partners



## Other Interested Parties



# Tualatin Basin Stored Water Projects

## Barney and Scoggins Reservoirs

### Barney

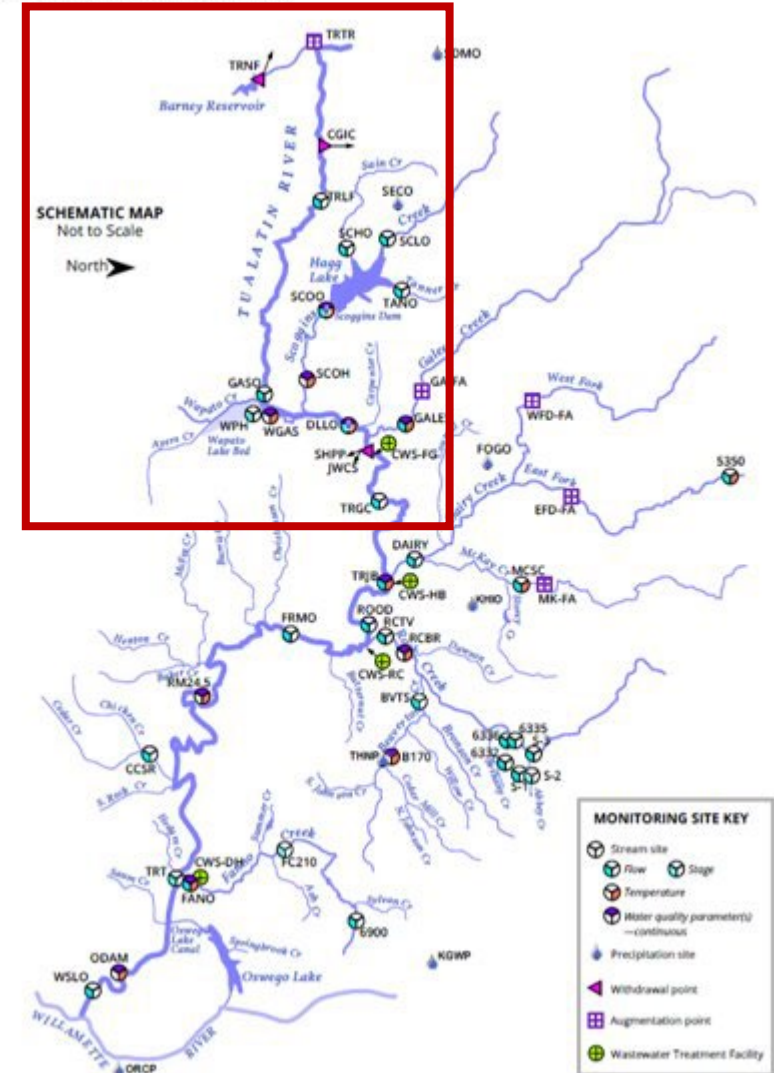
- 20,000 acre feet capacity
- Storage project for Joint Water Commission

### Scoggins

- 53,640 acre feet capacity
- BOR contracted water for irrigation, municipal, industrial, and water quality uses

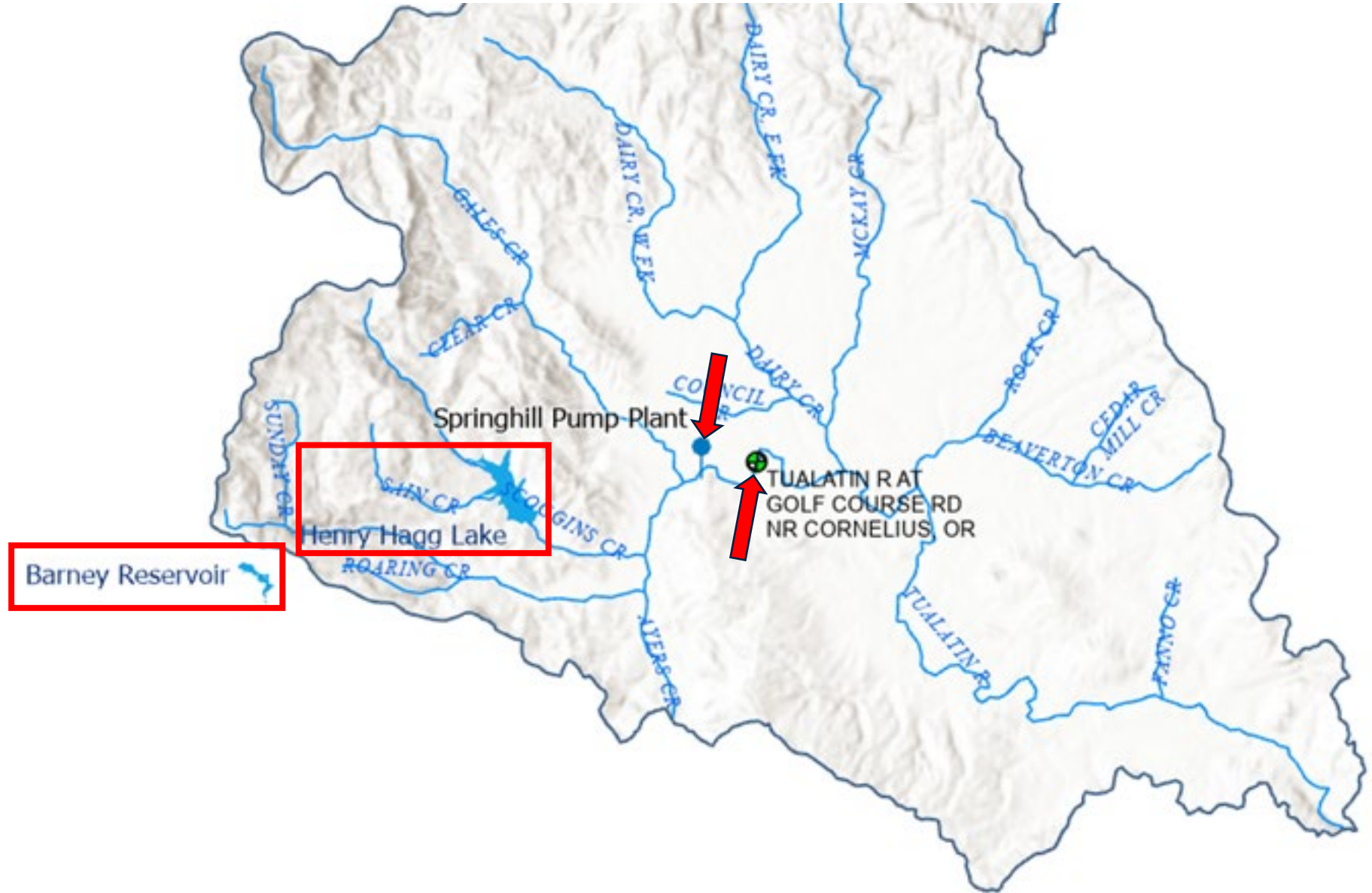


TUALATIN BASIN MONITORING SITES



# Tualatin River Regulation

North



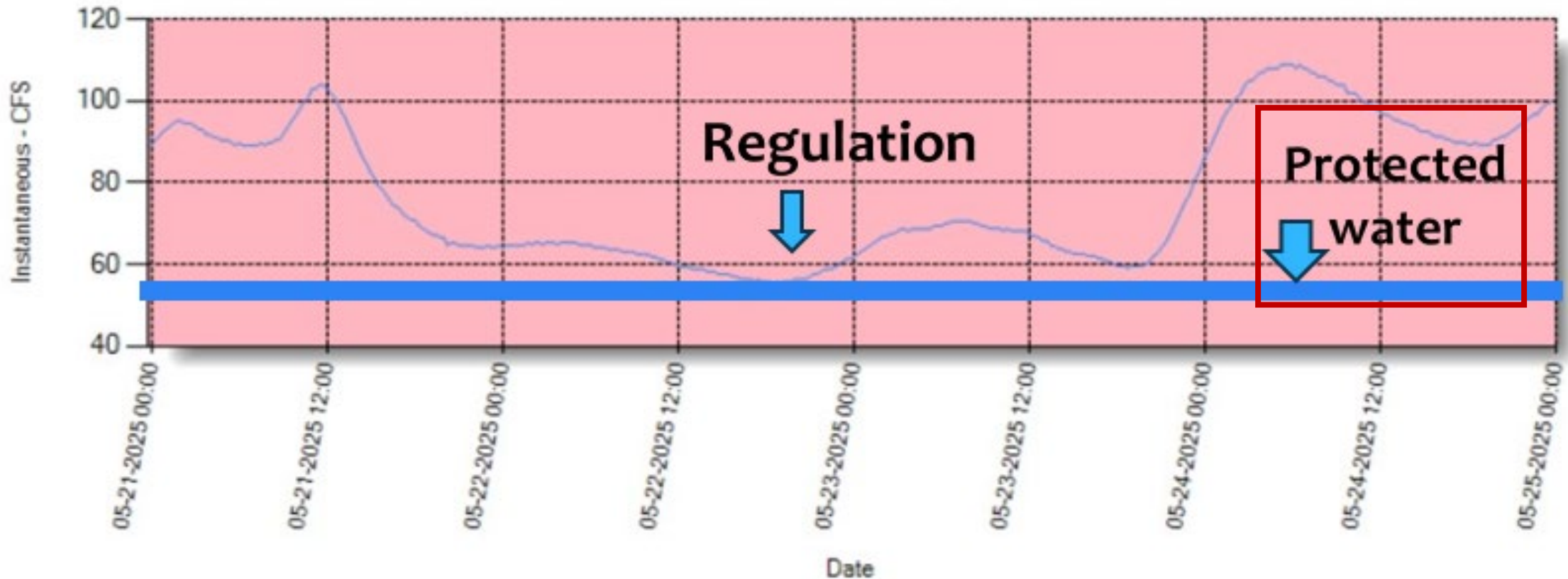
# Tualatin River Regulation – Golf Course Gage (ID 14204800)

Protected Water Calculation  
10 – CWS (releases)  
5.5 - CWS instream lease  
40 – collective protected flow  
~55CFS – total

**Legend**  
— Mean Daily Flow - CFS  
▲ Measurements

Review Status

Raw
Preliminary
Provisional
Published
Missing



# Tualatin River Regulation – Golf Course Gage (ID 14204800)

Stored water calculation

65 CWS

5-10 TVID

3 LO

75 ~ Total

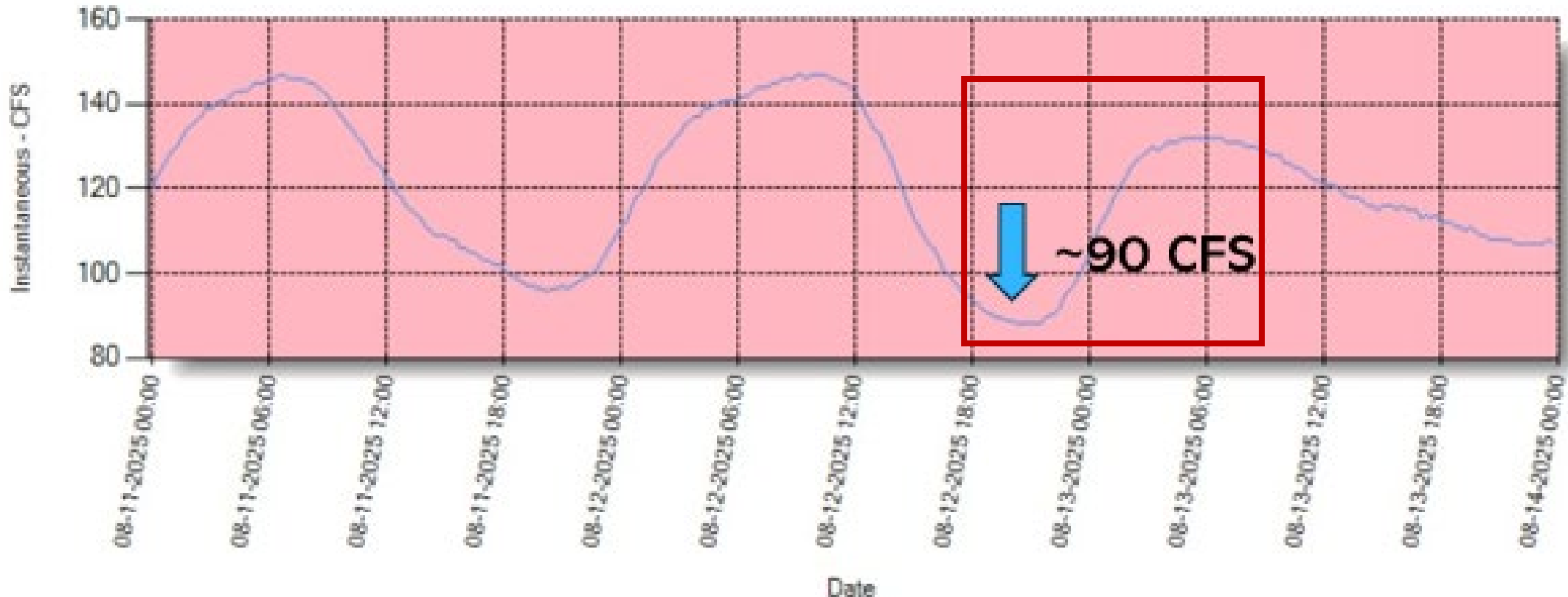
## Legend

— Mean Daily Flow - CFS  
▲ Measurements

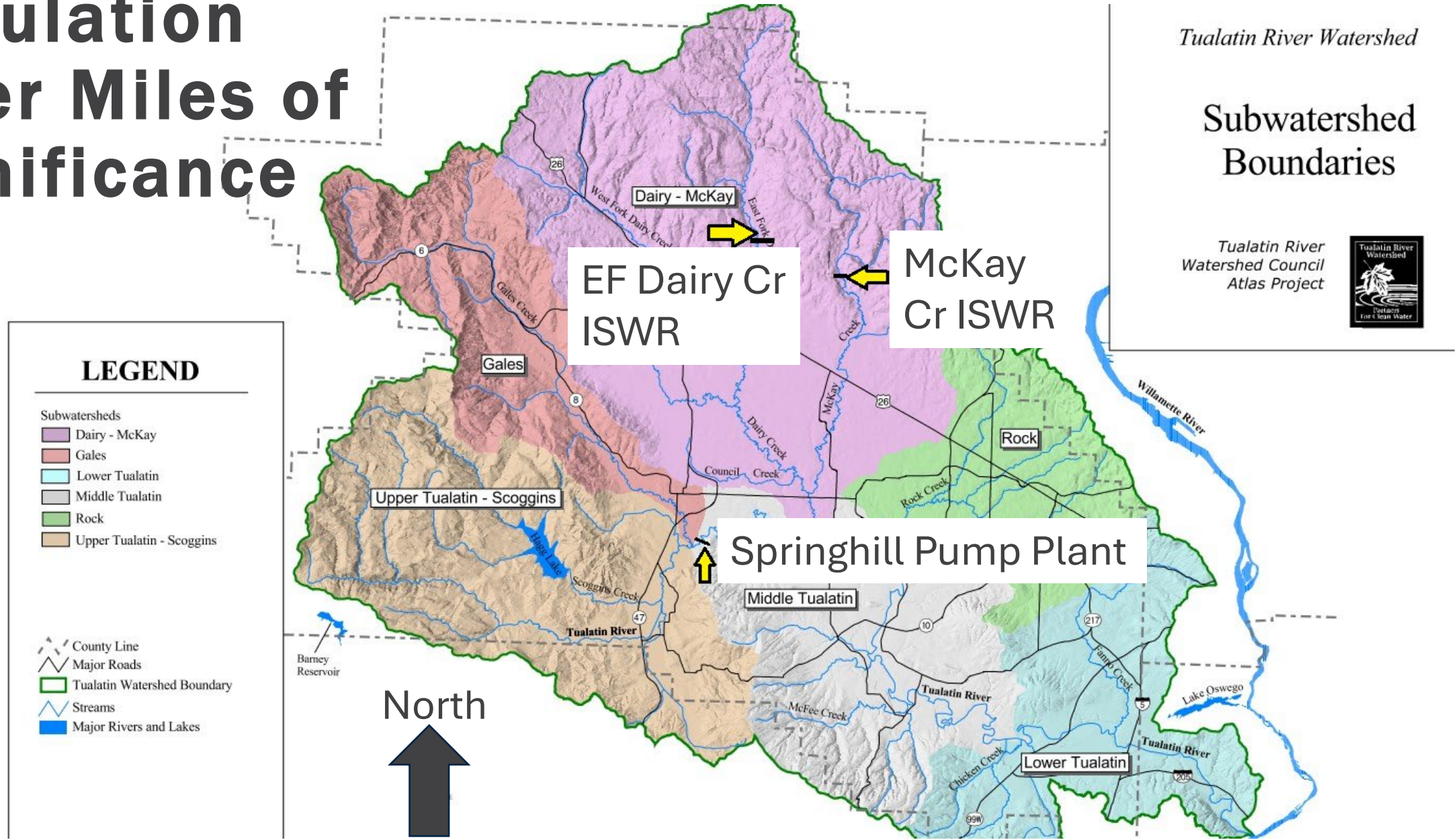
## Review Status

Raw
Preliminary
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Missing

## Instantaneous Flow

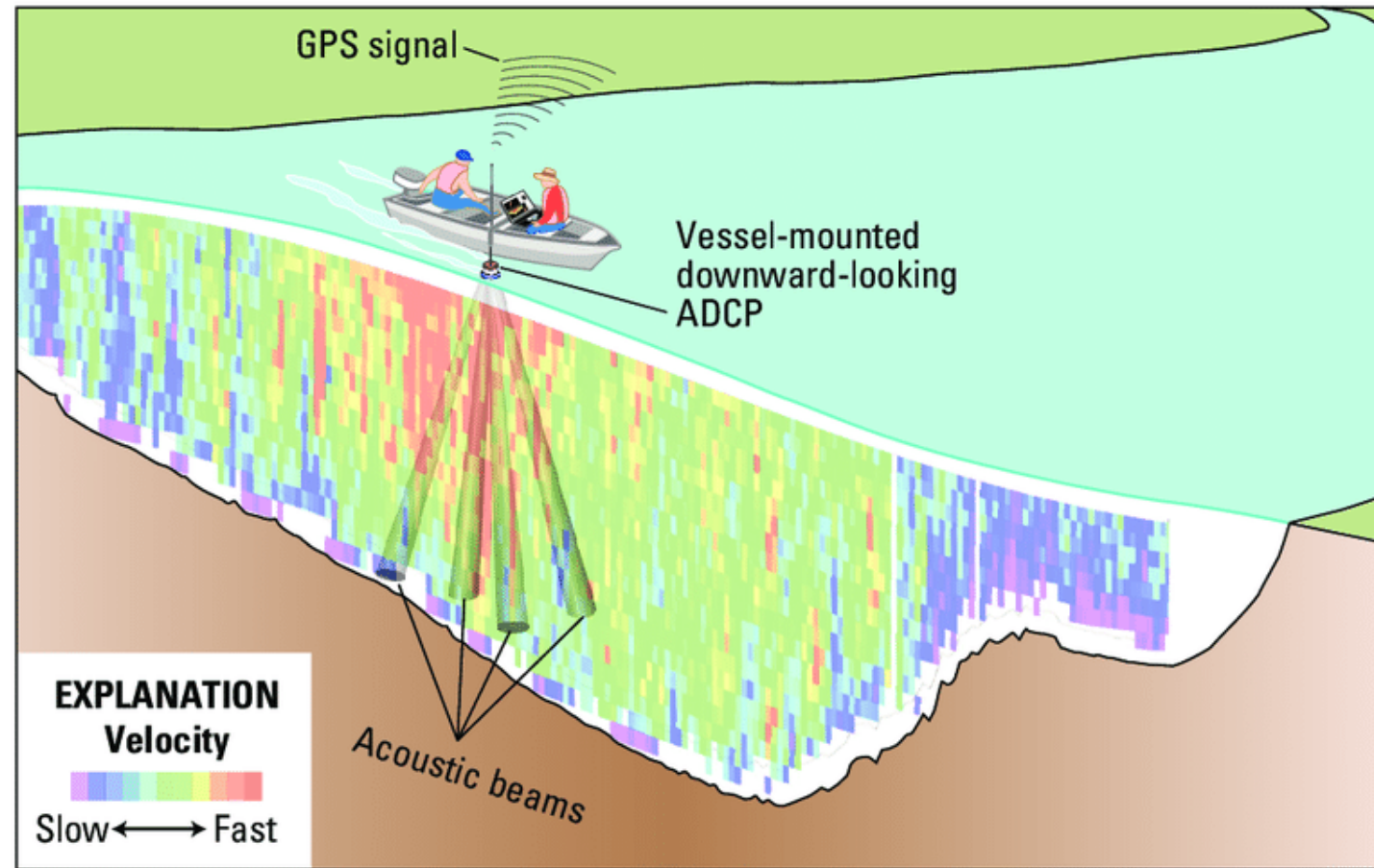


# Tualatin Basin Regulation River Miles of Significance



# Overview of field visit

- **Methods of measurement**
  - Wading with FlowTracker
  - High flow with ADCP
- **Gaging Station**
  - Components
  - Transmission process



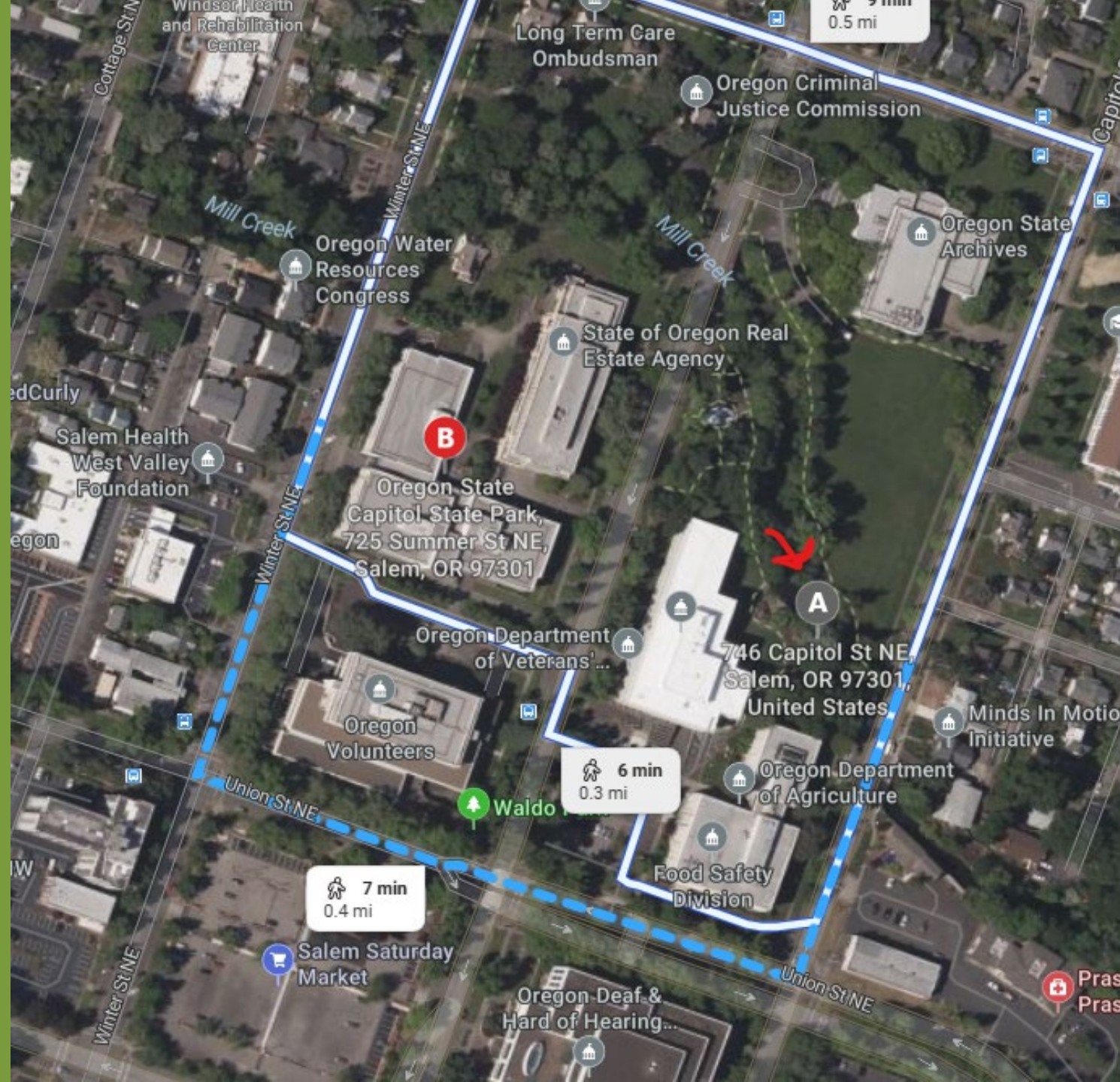
# Field visit with staff

- Esther Shin – Assistant Watermaster for FSD
- Dylan Thompson – Assistant Watermaster for FSD
- Scott Prose – Assistant Watermaster for FSD
  
- Hunter Alexander – Hydrographer for TSD
- Kara Morris – Senior Hydrographer/Lead Worker for TSD

# Field Visit Map

Location – about ½ mile walk from NMOB

Meet field team on Mill Creek between Dept. of Agriculture and Dept. of Veterans Affairs



# Questions

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WATER RESOURCES  
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# Thank you!

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