

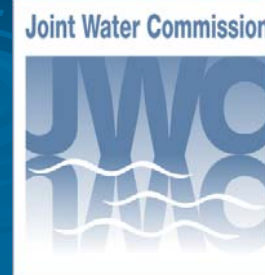
First Steps to Implementing a Source Water Protection Program for a Surface Water System

PNWS-AWWA Annual Conference
2015

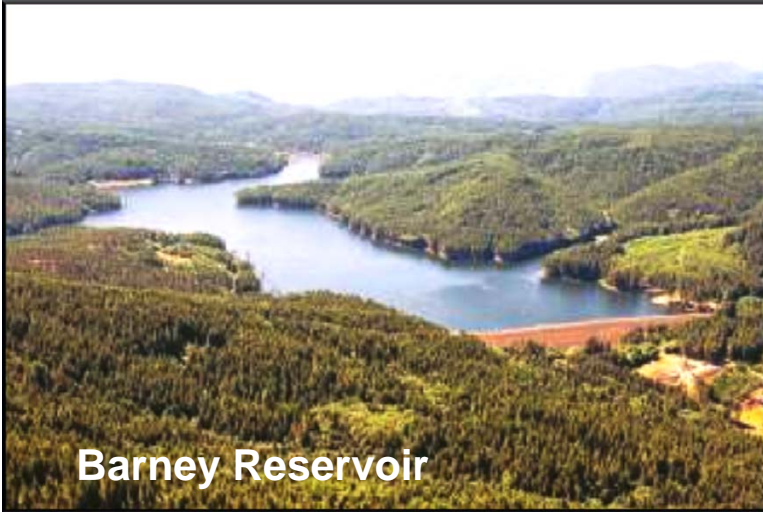
Bellevue, WA

Kristel Fesler

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City of Hillsboro, Oregon



The Joint Water Commission (JWC) is the drinking water provider for the Cities of Hillsboro, Forest Grove, Beaverton and the Tualatin Valley Water District



Barney Reservoir



USBR Springhill Pumping Plant



Water Treatment Plant

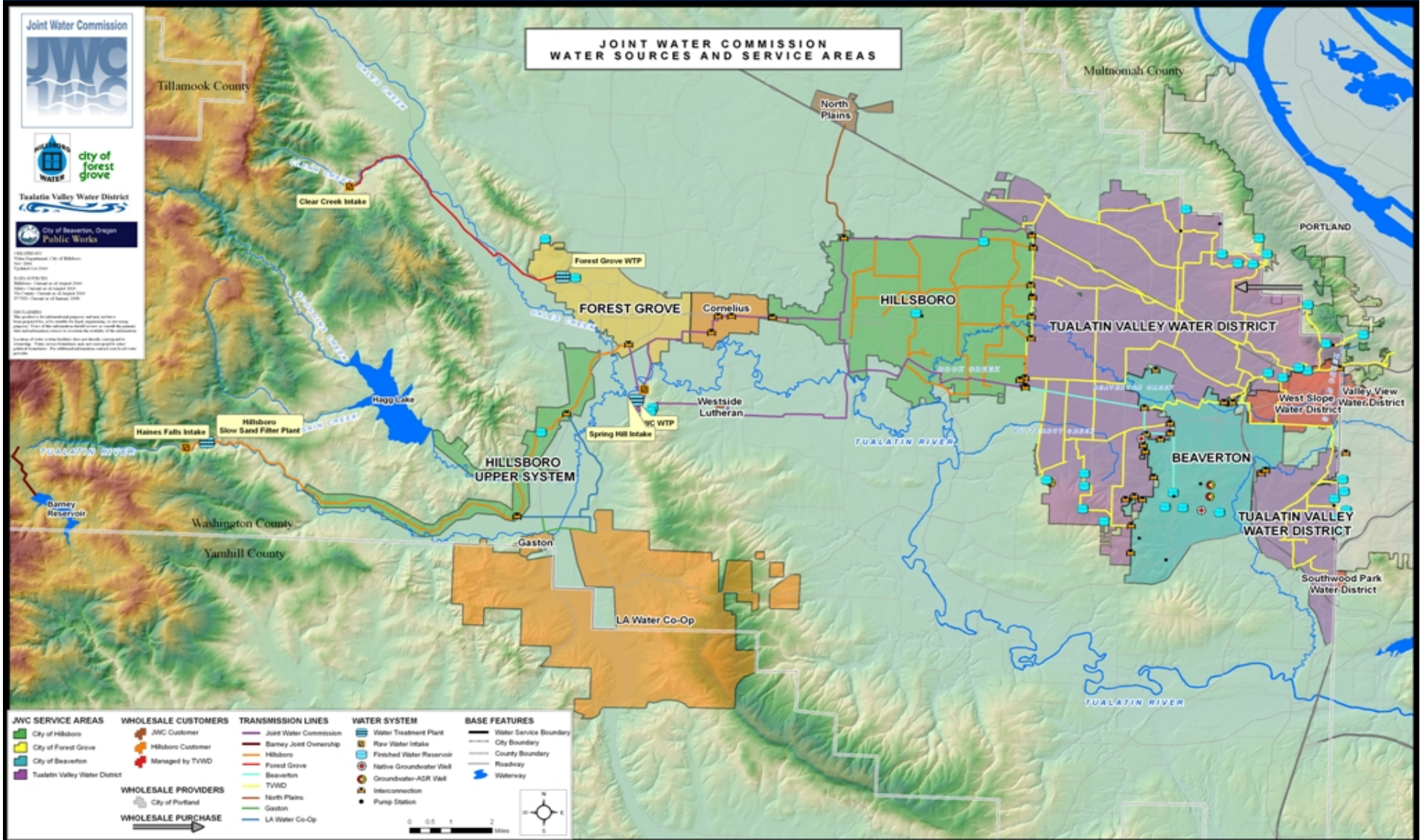


Fern Hill Reservoirs (40 MG)



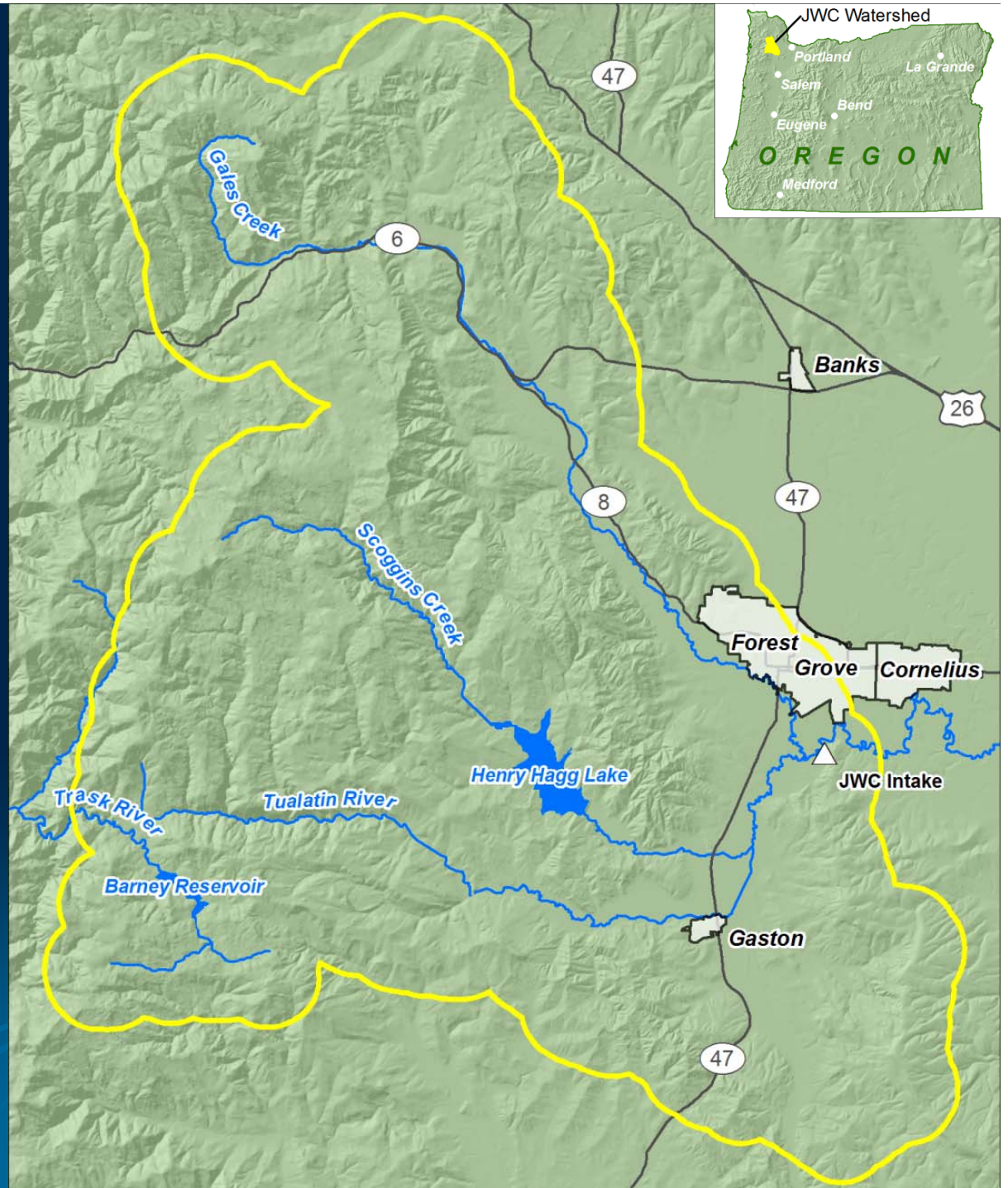
**Northside
Transmission Line**

Joint Water Commission

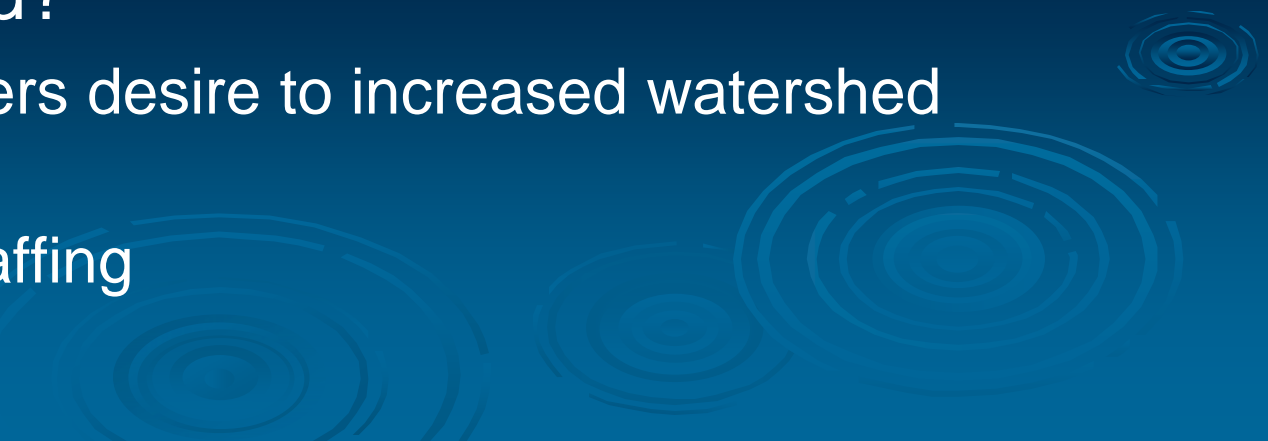


Study Area

- 228 sq mi (~200,000 acres)
- 10,872 tax lots
- Mostly privately owned
- Forestry and Agriculture are predominant uses
- Development along Hwys and in Cities



Previous Source Water Approach

- Active in the watershed
 - More reactive in nature
 - Programs developed out of convenience, and through continued past partnerships with other government agencies
 - What changed?
 - Commissioners desire to increased watershed presence
 - Increased staffing
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Developing Source Water Protection Programs

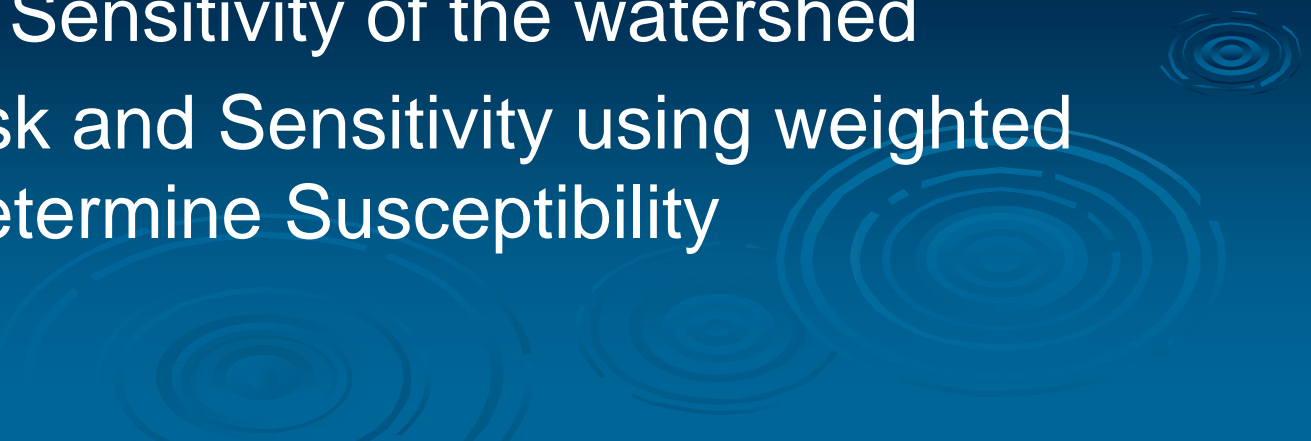
- Assess the Source Water Area
- Plan for Drinking Water Protection
- Implement Programs



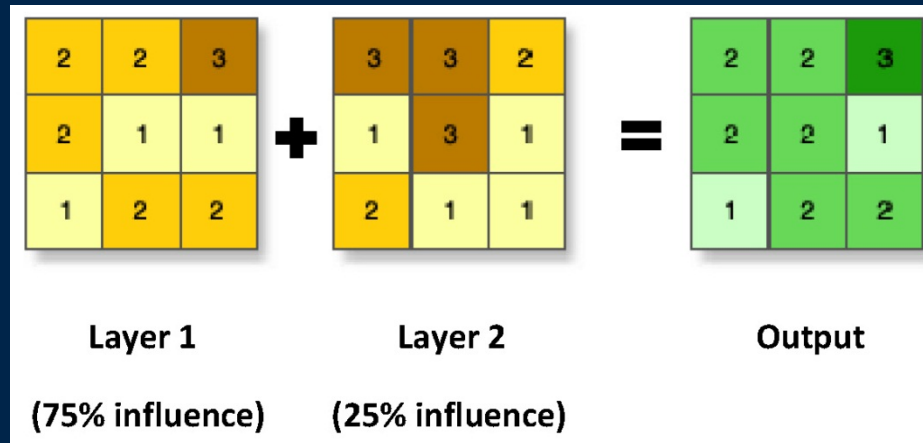
Source Water Assessment Goals

- Evaluate potential water quality risks to drinking water
- Inventory all the land uses, hydrology and soils in the drinking water basin
- Use GIS and create a geodatabase
- Source Water Assessment from 2011-2013

Geospatial Analysis Approach

- Determine the susceptibility of JWC's drinking water to potential contamination and impacts
 - An activity can have a different impact depending upon where it occurs in the watershed
 - Quantify the Risk of land uses
 - Quantify the Sensitivity of the watershed
 - Combine Risk and Sensitivity using weighted overlay to determine Susceptibility
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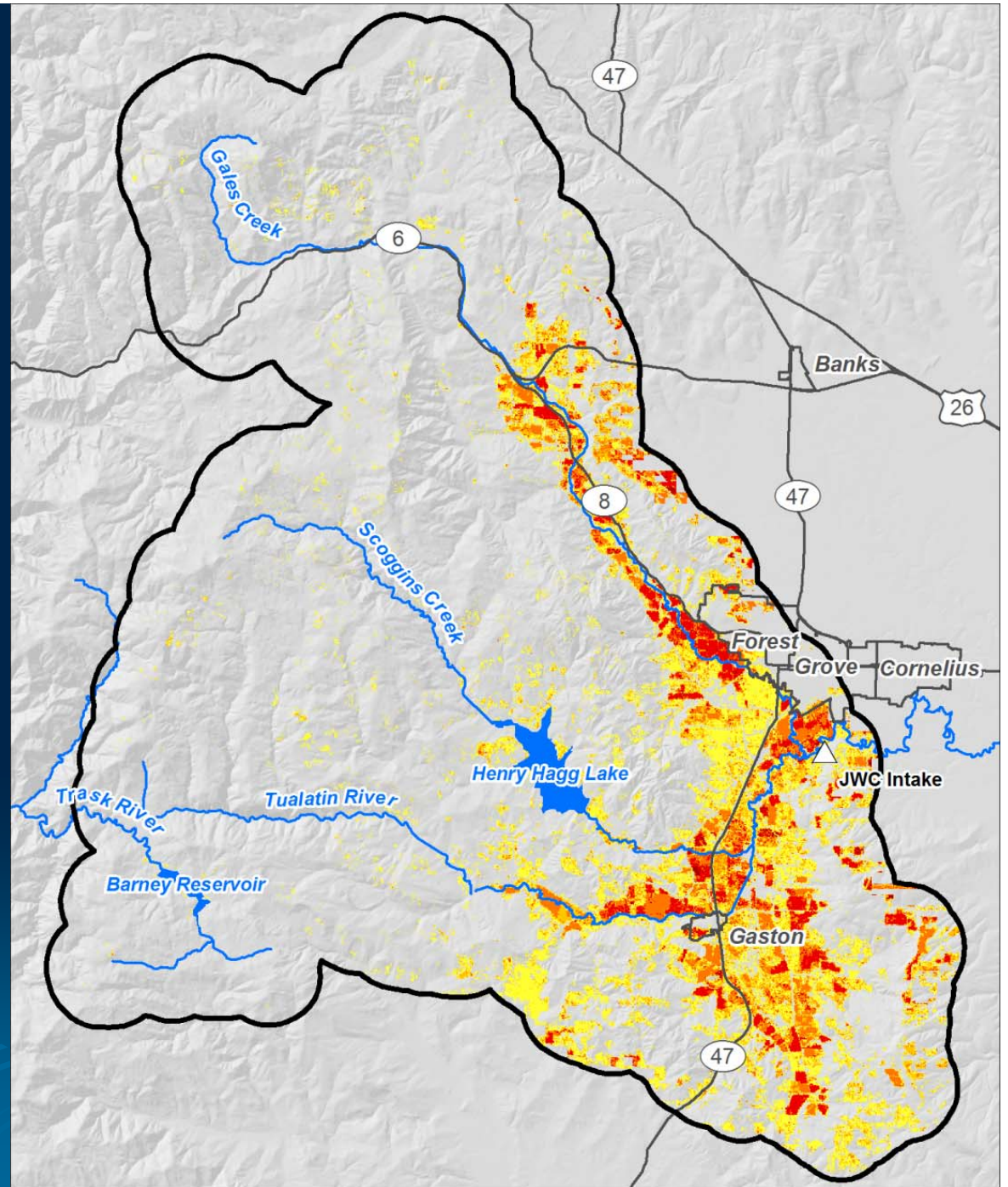
Weighted Overlay



- Combines related datasets that stresses each dataset's significance in the overall analysis
- User must rank variables within each dataset's on a common measurement scale (i.e., 1 to 10)
- User must define weights of importance between each dataset (expressed as a percentage of 100%)
- Output represents an all-inclusive, numeric view of risk and sensitivity within the project area

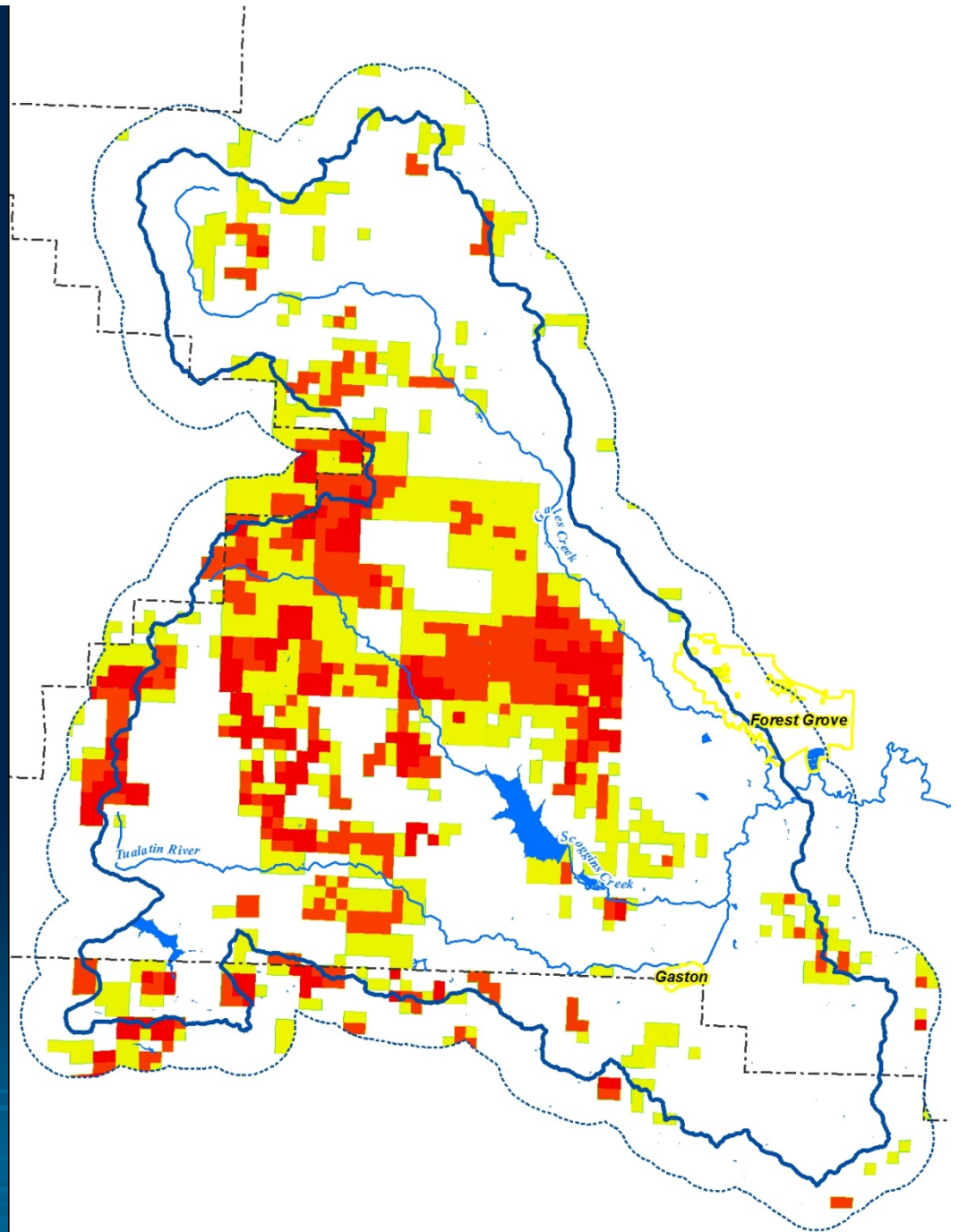
Agricultural Chemicals

- Used crop type data derived from satellite imagery
- Ranked pesticides according to toxicity and persistence
- Researched fertilizer applications rates
- Results are an average of 3 years



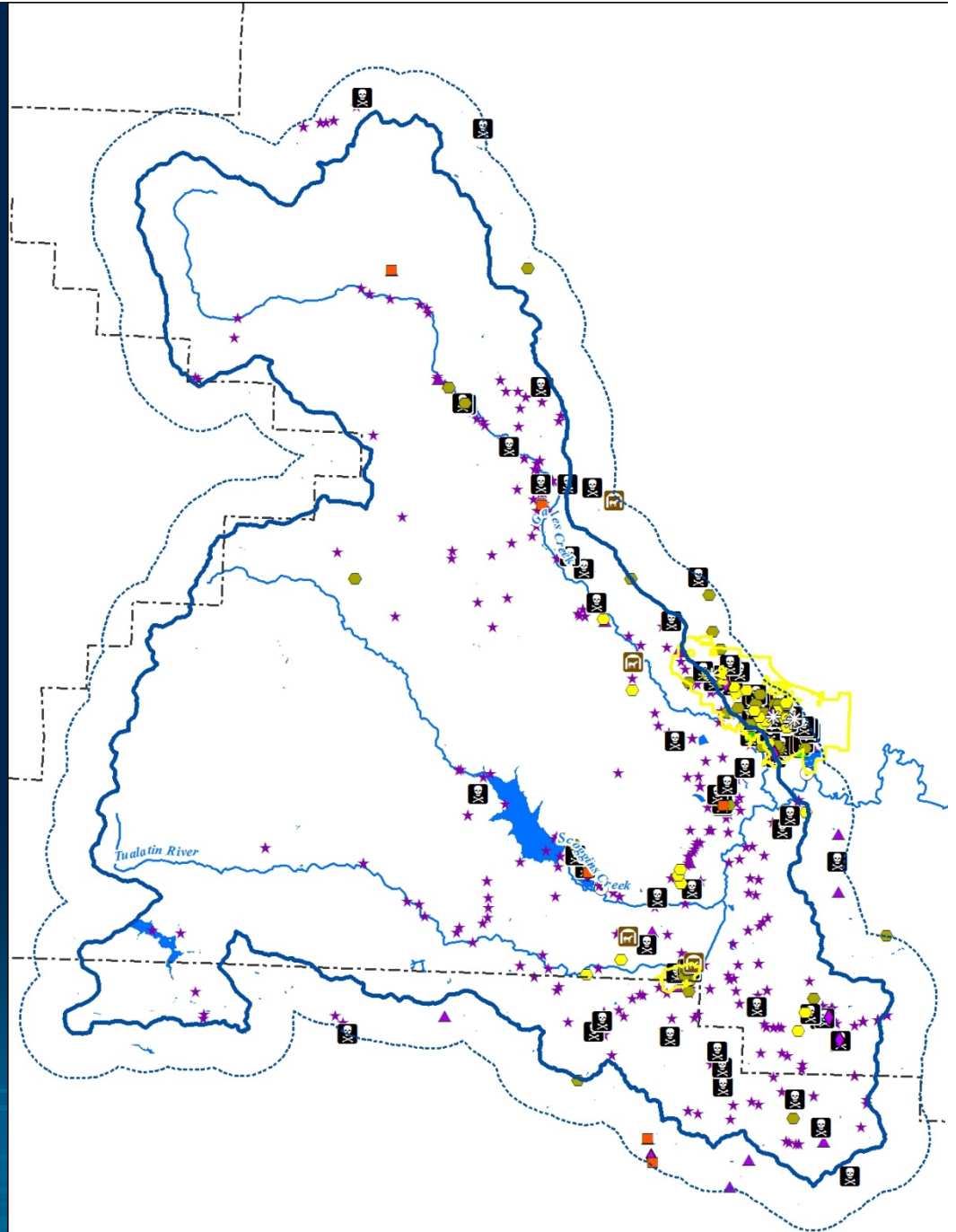
Forestry Chemical Applications

- Forestry database included pesticide applications on State and Private lands
- Aggregated to 40 acres
- Ranked pesticides according to toxicity and persistence
- Results are an average 3 years



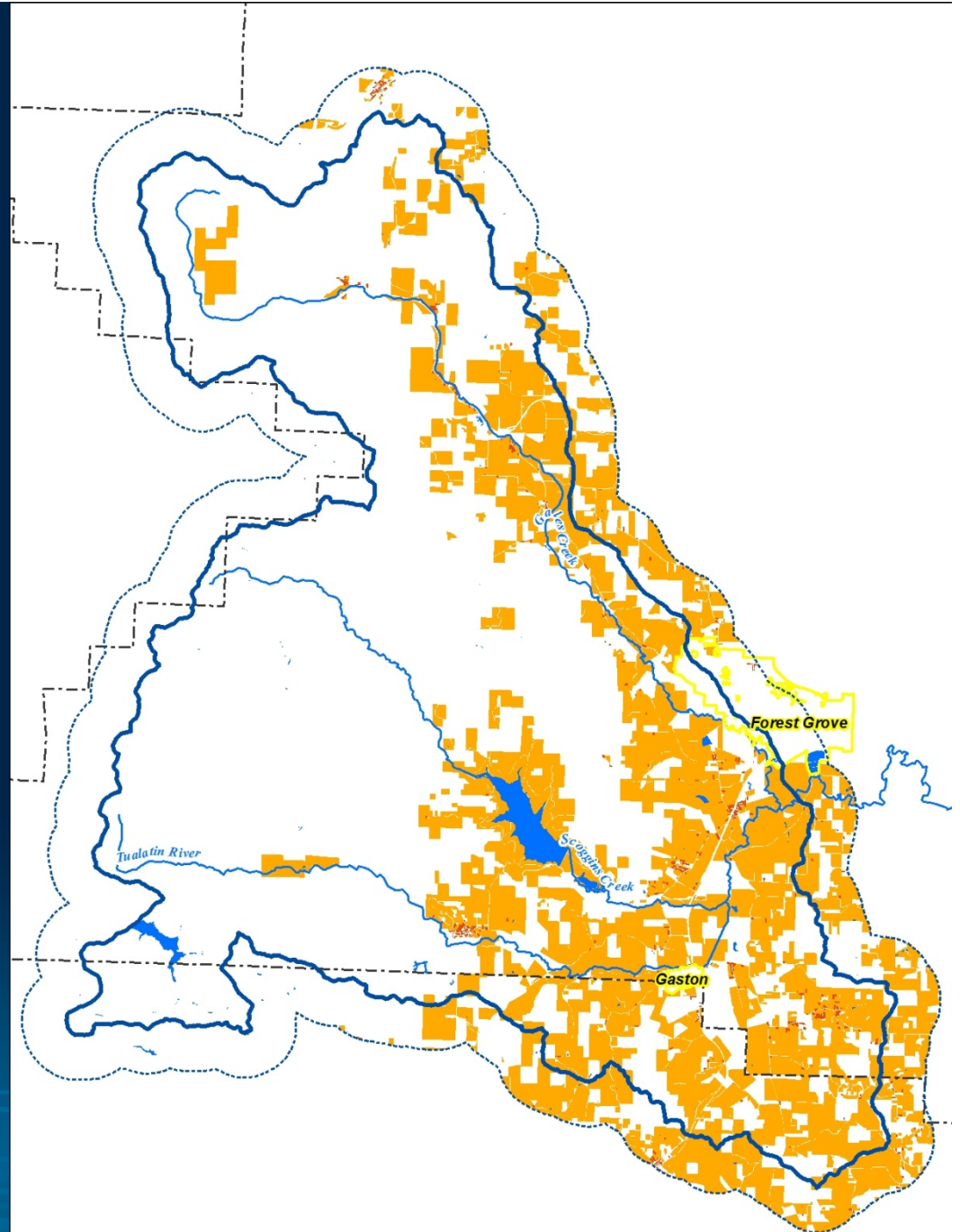
Point Sources

- Combination of 7 different databases
- 1,085 point sources identified
- 650 Hazardous Storage Sites
- 87 Underground Storage Tanks, 15 identified as high priority
- Opted to use point data instead of tax lot representation



Septic Systems

- Identified tax lots outside of wastewater provider and with a building
- 3,362 tax lots (31%) are likely on septic
- 640 on tax lots <2 acres and in a cluster



Risk Categories and Available Data

- Urban Development
 - City Limits, Urban Growth Boundary, Urban Reserve Boundary, County Zoning
- Transportation Networks
 - Railroads and Public and Forestry Roads



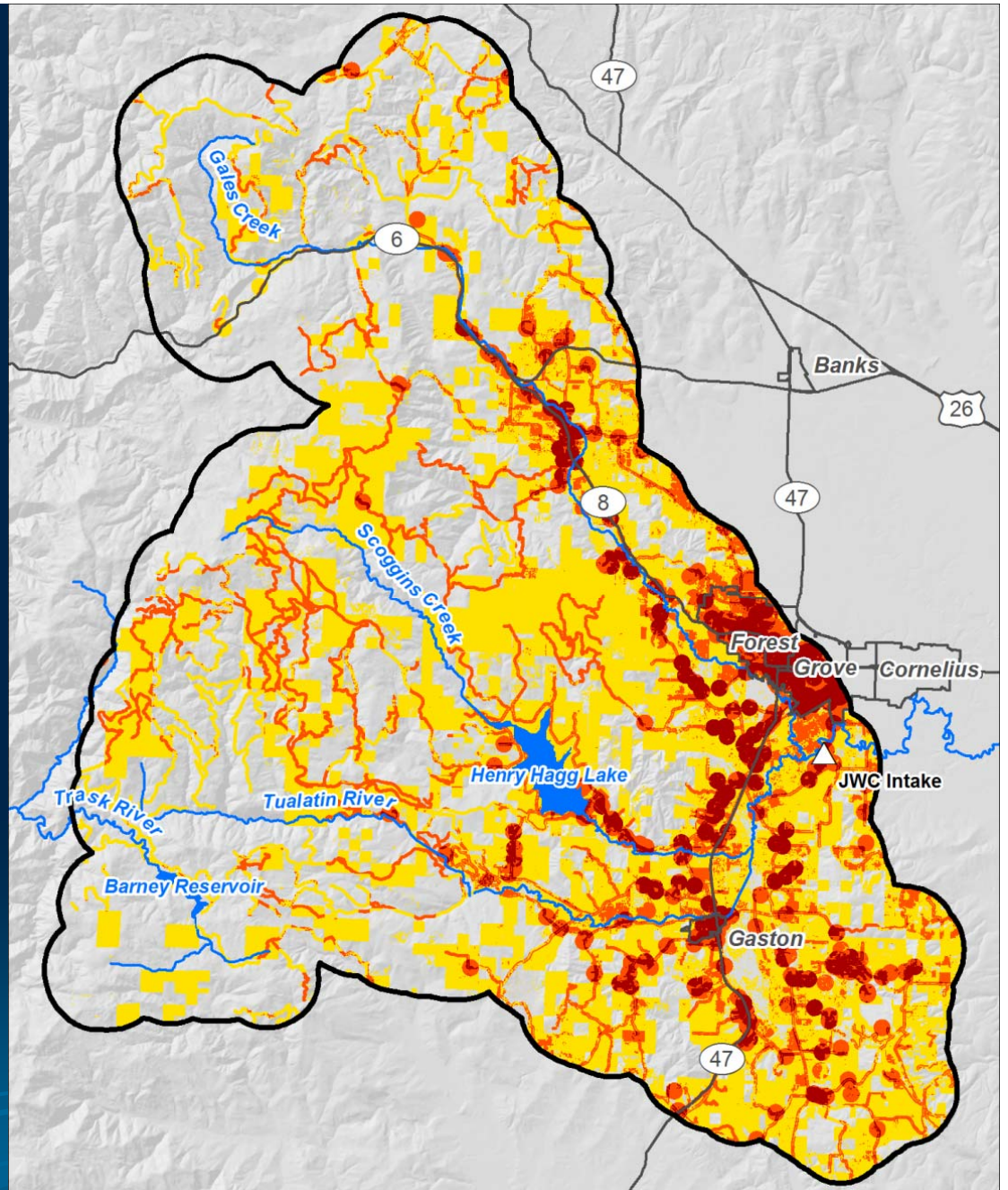
Weighted Overlay for Risk

- 20% - Agricultural Chemicals
- 20% - Forestry Chemicals
- 20% - Point Sources
- 10% - Septic Tanks
- 15% - Urban Development
- 15% - Transportation



Risk Results

- High Risk (5%)
 - Point Sources and urban development
- Medium Risk (12%)
 - When Transportation crosses another risk
- Low Risk (35%)
 - Agriculture & Forestry Applications
- No Risk (48%)

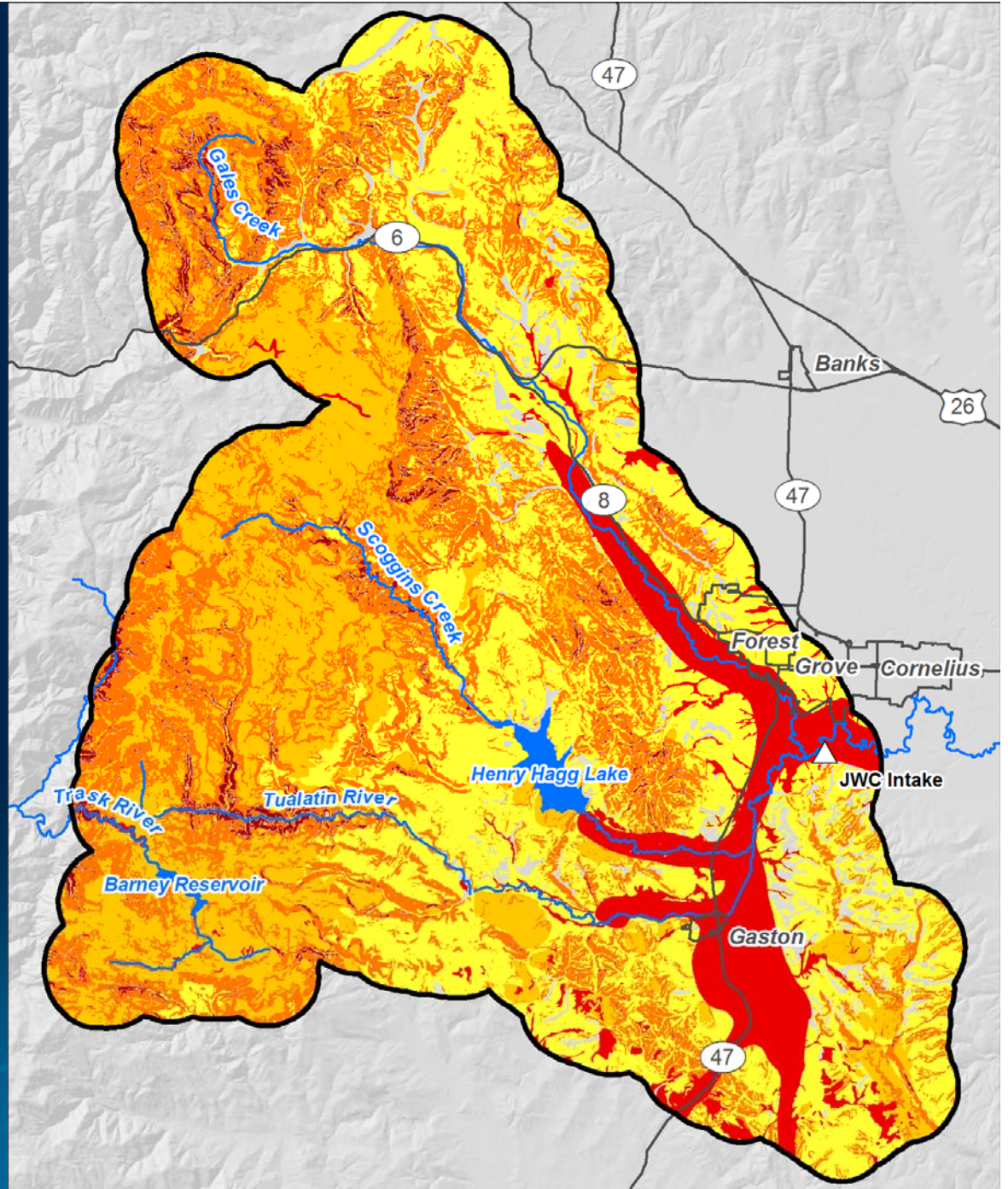


Sensitivity Categories and Available Data

- Time of Travel
 - 8-hr time of travel to the JWC intake
- Water Ways
 - USGS water bodies and rivers
- Wetlands
 - National wetland inventory, USGS water bodies and water courses
- Forestry Activities
 - Harvest and Road building on State and Private lands

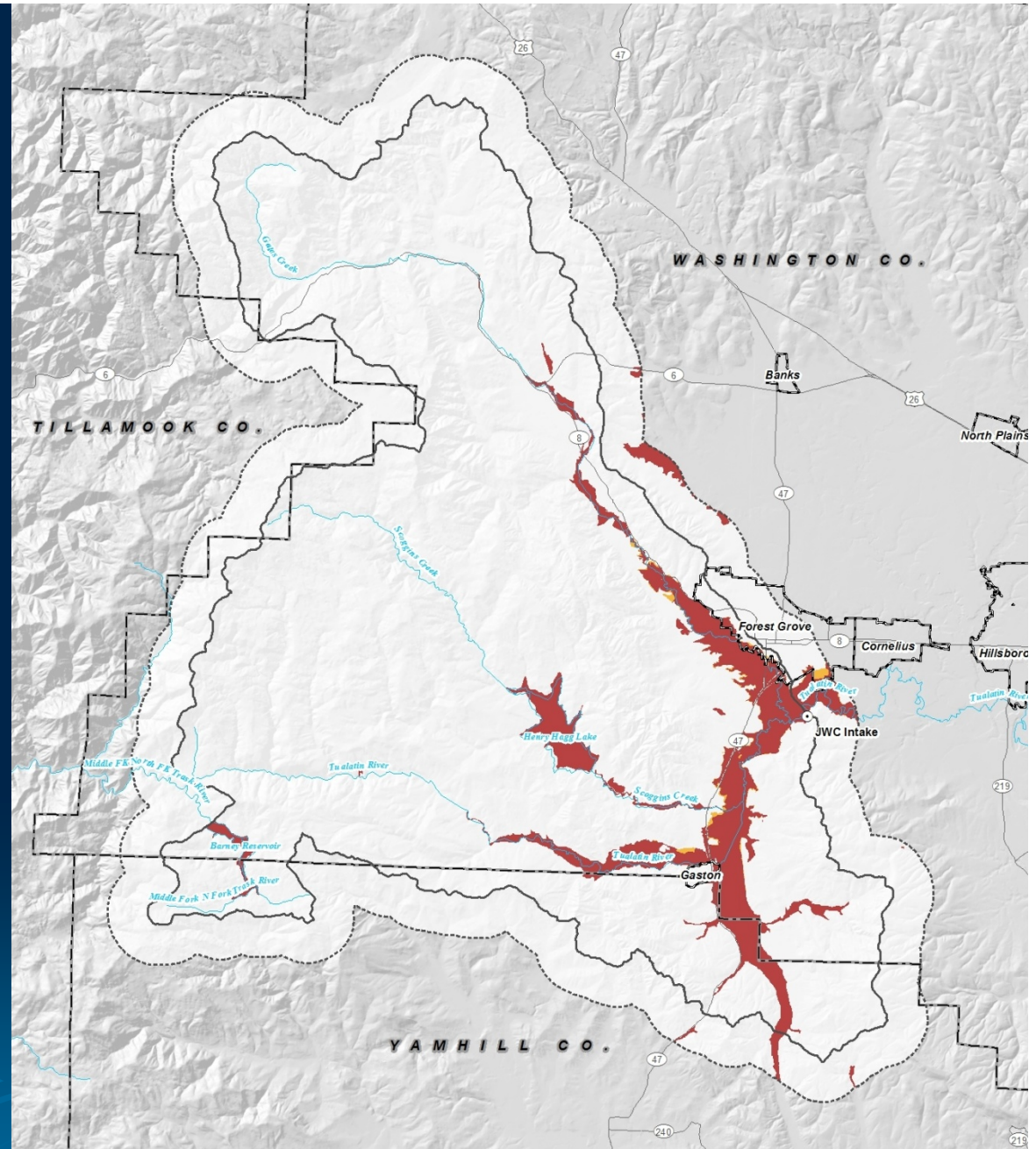
Soils

- Majority of the watershed has soils that erode easily
- Other areas are identified as highly permeable
 - water moves quickly through the soil due to high water table



Flood Zones

- Used FEMA 100 and 500 year flood zones
- Area very similar to most sensitive soils, and contains most rivers within the 8-hr time of travel

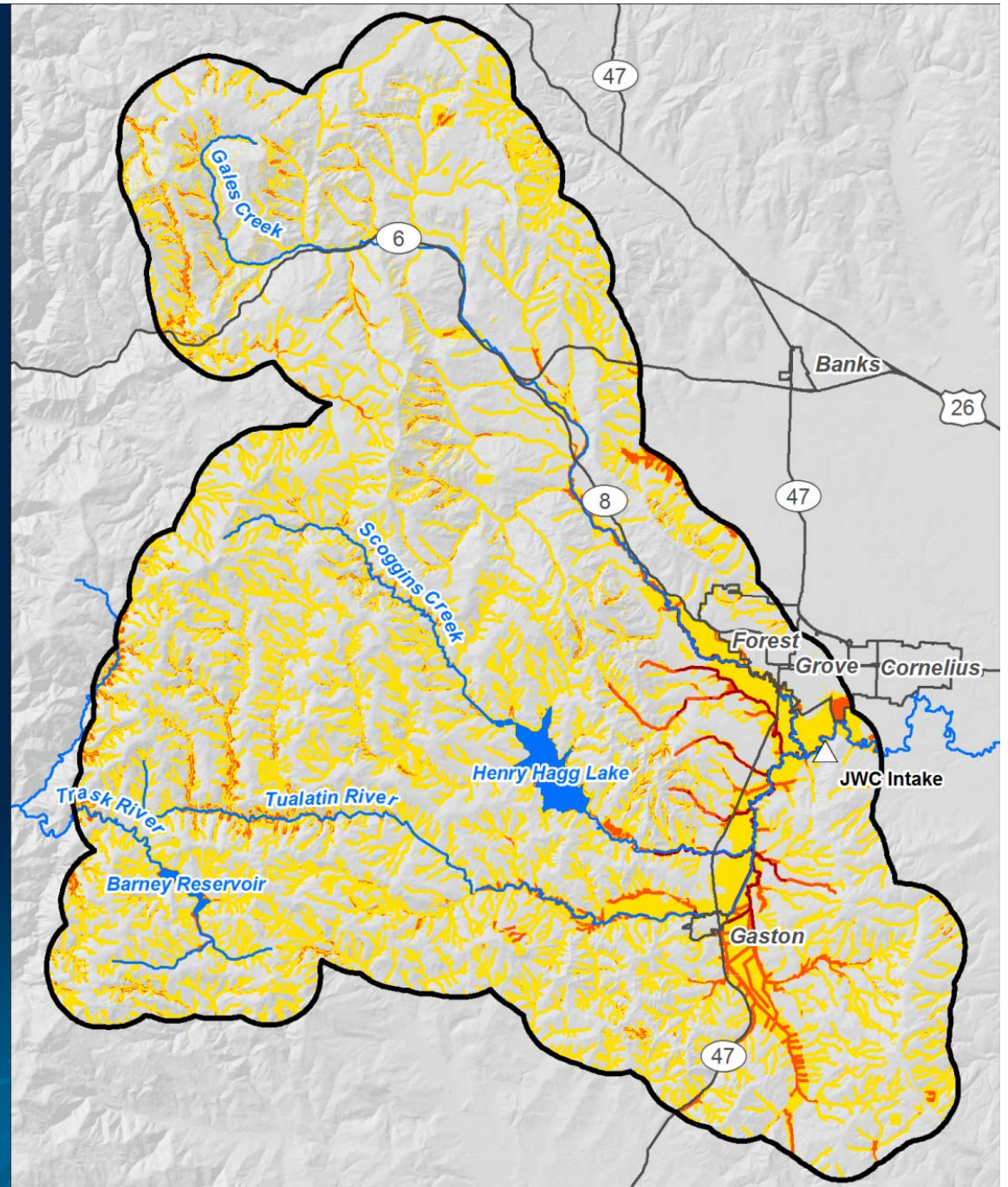


Weighted Overlay for Sensitivity

- 20% - Flood Zones
 - 10% - Forestry Activities
 - 25% - Time of Travel
 - 20% - Unstable & Vulnerable Soils
 - 5% - Wetlands
 - 20% - Waterways
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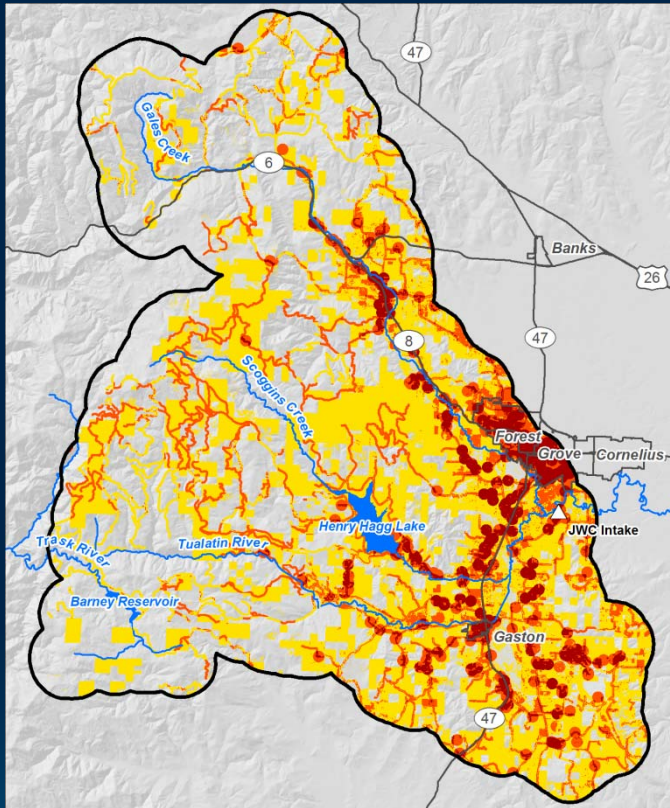
Sensitivity Results

- High (1%)
 - Areas of High Permeable Soils near Rivers with a short time of travel in flood zones
- Medium (3%)
 - Areas of High Permeable Soils near in flood zones
- Low (31%)
 - Upstream Waterways
- None (65%)

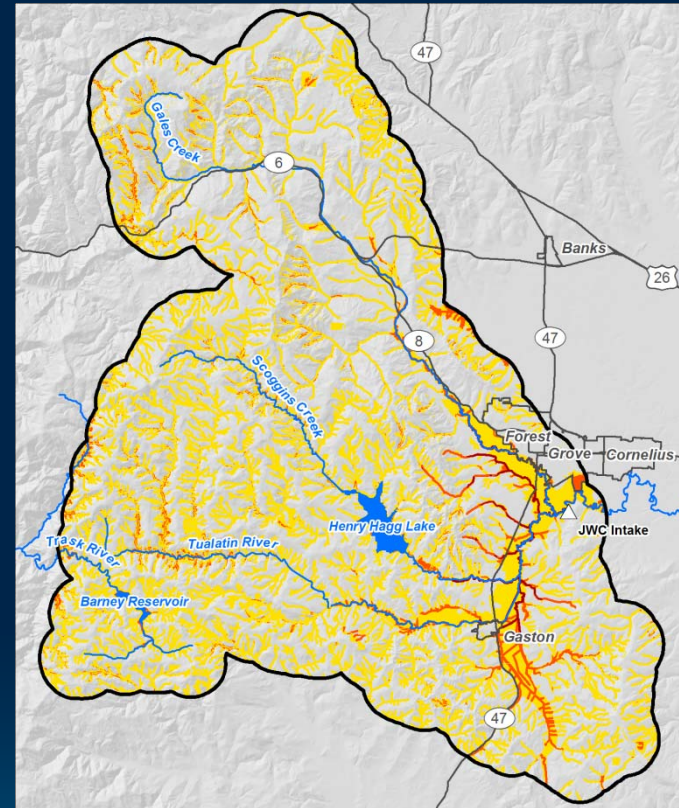


Susceptibility Analysis Inputs

Risk



Sensitivity

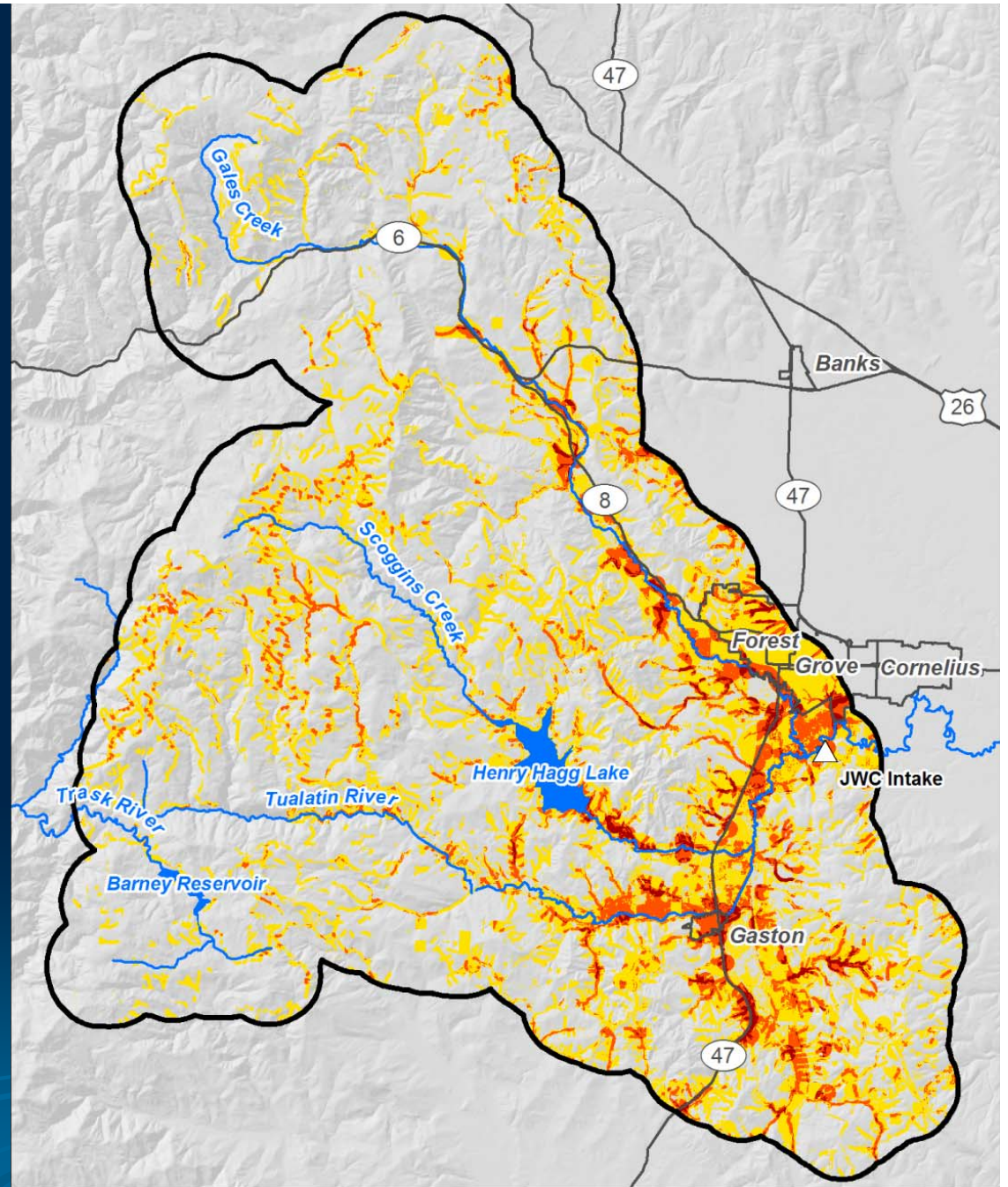


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For a location in the watershed to be susceptible to contamination, a risk must be present and the location must be sensitive to contamination

Susceptibility Results

- High Risk (1%)
 - Point Sources in Flood zones and near waterways
- Medium Risk (7%)
 - Where Roads cross waterways
- Low Risk (22%)
 - Upstream rivers
- None (70%)



Next Steps for Geodatabase & Analysis

- Improving some select datasets of poorer quality
- Utilize as a tool to perform detailed analysis to target future programs
- Utilize as a tool to stay current of watershed activities



Drinking Water Protection Plan

- Included a 5-year program plan
 - Hit high priorities first
 - Build up to more difficult concerns
- Coordinate with and support watershed partners



Implementation

- Monitoring for specific chemicals identified in Assessment
- Water Quality small grant for local agencies
- Public Outreach
- Support Agricultural trainings and pesticide collections
- Research on and support restoration of known area contributing to poor source water quality

Feedback & Questions

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Joint Water Commission

