

Drinking Water Information Crooked River

Agricultural Water Quality Management Area

Oregon Department of Environmental Quality, Drinking Water Protection Program

7/15/2020

- Public drinking water systems in the Crooked River Agricultural Water Quality Management Area utilize groundwater sources to serve approximately 22,000 persons regularly.
- Recent alerts for the *E. coli* bacteria maximum contaminant limit (MCL) were found for four water systems. *E. coli* MCL violations were found for two water systems, Westridge Subdivision and OPRD Smith Rock State Park.
- Six water systems had alerts for elevated nitrate concentration with no MCL violations. Two systems had violations for nitrate MCL: Lakeshore RV Park and Prineville Mobile Home Park.
- 72 of 647 (11%) of tested private wells in the area had elevated nitrate concentrations.
- Potential sources of water quality contaminants from agricultural practices may include fertilizer and/or pesticide use, grazing, streamside management, and manure management. Aquifers in the area northwest of Prineville are especially vulnerable to contaminants leaching to groundwater due to high geologic permeability and infiltration rates.
- Measures to reduce the movement of bacteria and leachable nitrate in soils and managing irrigation to prevent leaching in this area would reduce risk to groundwater sources of drinking water, reducing treatment costs for communities and protecting public health. Resources for addressing risks to drinking water supplies can be found in the [Groundwater Resource Guide](#)
- Local partners may consider further evaluating agricultural land uses in these areas and their potential to impact drinking water sources.

Fifty-nine active public water systems obtain domestic drinking water from groundwater sources in the Crooked Agricultural Water Quality Management Area. Drinking water is an important beneficial use under the federal Clean Water Act. When Clean Water Act standards are met in source waters, a drinking water treatment plant using standard technology can generate water meeting the Safe Drinking Water Act maximum contaminant limits (MCLs). There are 28 active community public water systems in the plan area using only groundwater wells to serve approximately 14,900 people on a regular basis, in addition to visitors at recreation sites. There are four active non-transient, non-community workplace or school public water systems using groundwater, serving 300 persons regularly. The remaining 22 active public water systems are transient non-community systems and non-public, state-regulated systems with an estimated service population of 7,400. See Table 1 below for a list of public water systems, their classifications, sources and activity status, and populations served.

Agricultural land uses (primarily alfalfa, hay/pasture, and livestock) are present near many of the public water system wells and springs in the area. The agricultural areas in Prineville and northwest of town have the majority of both intensive agriculture area and human population. Forestland is prevalent in

the uplands on the north side and a smaller section in the middle of the management area, providing the contributing areas for numerous streams (many used for private domestic water supply). Much of the management area is federally owned and managed by the US Forest Service Ochoco National Forest or the Bureau of Land Management.

Some of the community public water systems in the management area have had recent (within the last 10 years) alerts for detections of *E. coli* or violations for total coliform bacteria; these are marked in bold text in Table 1. Systems with recent *E. coli* violations include Westridge Subdivision and OPRD Smith Rock State Park.

Nitrate alerts are generated when nitrate exceeds 5 mg/L. The following PWSs had alerts in the last 10 years (number of alerts): City of Prineville (1), Ochoco RV/Trailer Park (1), Prineville Mobile Home Park (17), Westridge Subdivision (1), Lakeshore RV Park/Store (28), and OPRD Prineville Reservoir Park (16).

The drinking water MCL for nitrates is 10 mg/L. These contaminants are often related to animal and cropland agriculture as well as on-site septic systems. The locations of nitrate contamination of private domestic wells (see below) and public drinking water sources is near to agricultural land use such as alfalfa and hay crops, close to and northwest of Prineville. The soils through most of the Ag WQMA have high or very high nitrate leaching potential, according to the Natural Resources Conservation Service.

The private wells with elevated nitrate (see below) are in high leaching potential soils. Nitrate from fertilizers, manure, and septic systems can readily penetrate to the aquifers used for drinking water when leaching potential is high or very high, and bacteria removal through soil filtration can be less effective in sandy soils.

There are additional contaminants identified for public water supply wells that are not likely related to agriculture in the management area. Three water systems have arsenic alerts: Jasper Knolls Water District, Sun Rocks RV Park, and Kingdom Hall JWC. Other non-agricultural toxics detected include radium (Ochoco Christian Conference Center) and lead (Oregon Youth Challenge Program).

Oregon Health Authority rated some of the public water system wells in the Ag WQMA for contaminant susceptibility for land use impacts to drinking water sources based on Source Water Assessments, aquifer characteristics, and well locations and construction. The City of Prineville has a mix of low, moderate, and high susceptibility wells. The remainder of evaluated PWS wells rate as high or medium susceptibility. The nitrate and other contamination issues described above and the ready movement of nitrogen into aquifers in the area verify this susceptibility. Measures to reduce leachable nitrate in soils and managing irrigation to prevent leaching would reduce risk to groundwater sources of drinking water.

DEQ only addresses drinking water issues identified for PUBLIC water systems. A query of Oregon Water Resources' water rights database for private domestic points of diversion (using a threshold of 0.005 cfs for domestic surface water rights that are household use only, not irrigation) identified 62 private domestic water rights in the Crooked River WQMA. There are also numerous private groundwater wells for domestic use. The Domestic Well Testing Act database (real estate transaction testing data) for 1989-2018 indicates 72 significant detections of nitrate (>7mg/L) in private wells out of 647 total wells included in the database for this area. Of those private wells, 31 had nitrate concentrations ≥ 10 mg/L, including one near Prineville with a measurement of 23 mg/L nitrate. The highest nitrate levels

northwest of Prineville are data values from 15 to 20 years ago with recent testing levels unavailable. High levels reported in the past five years are at locations south of Prineville. Given that most tests were <7mg/L in this same area, attention may be needed to well depth, well construction, nitrate leaching potential of local soils, and proximity to nutrient sources such as septic systems, fertilizer use sites, and high concentrations of livestock.

Drinking Water Protection staff are happy to provide additional details, maps, and recommendations upon request.

Table 1. Public Water Systems in the Crooked River Ag WQMA

Note: Table 1 does not include public water systems which purchase drinking water from these water systems but does include the population served by wholesale customers in the Total Population. **Bold text indicates PWSs w/ recent *E. coli* alerts or total coliform bacteria violations.** *An asterisk after the PWS name indicates recent nitrate alert or violation.

PWS ID	Public Water System Name	Drinking Water Source	System Type	Population
<u>Groundwater Systems</u>				
4100112	Cimmarron City Water System	2 wells	C	450
4100114	Sunset Acres Water Co-Op, Inc.	1 well	C	70
4100121	Wallace Acres Water Company	1 well	C	80
4100122	Avion Water Co - Cinder Butte Estates	2 wells	C	110
4100193	Terrace Mobile Plaza	1 well	C	144
4100671	Powell Butte View Estates	1 well - Inactive system	C	200
4100675	Crystal Corral RV Park	1 well	NC	50
4100678	Jasper Knolls Water District	3 wells (2 active, 1 inactive)	NC	25
4100680	Ochoco Valley Home Improvement District	1 well	C	60
4100681	Ochoco West Water District	5 springs	C	428
4100682	City of Prineville*	12 wells (11 active, 1 inactive)	C	9,645
4100683	Quail Valley Homeowners Assn	2 wells (1 active, 1 inactive)	C	125
4100685	Ochoco RV/Trailer Park*	2 wells (1 active, 1 inactive)	NP	22
4100686	Green Acres Mobile Home Park - Crook Co	1 well	NP	24
4100860	Terrebonne Domestic Water District	4 wells (3 active, 1 inactive)	C	1,400
4100861	Circle C Improvement District	4 wells	C	150
4100863	Smith Rock Mobile Estates	2 wells	C	60

4101086	USFS Ochoco Ranger Station	2 wells (1 active, 1 inactive)	NTNC	15
4101088	USFS Rager Ranger Station	Inactive	NC	50
4101169	Barnes Butte Homeowners Water Assn	1 well	C	145
4101195	Highland Subdivision Water District	3 wells	C	335
4101203	Avion Water Co - Red Cloud	3 wells (2 active, 1 inactive)	C	442
4101208	Idleway Improvement District	2 wells	C	178
4101315	Bottero Park Improvement District	1 well	NC	40
4101317	Prineville Mobile Home Park*	1 well	C	130
4101353	Happy Hollow Water Company	1 well	C	42
4101367	Deer Trail Water System	1 well	C	45
4101378	Cascade Pines Mobile Home Park	2 wells	C	100
4101386	Storlie Water Company	1 well	C	50
4101457	High Desert Estates	5 wells (4 active, 1 inactive)	C	380
4105239	Shoun Crossroads	1 well	C	41
4105258	Sunset Hills Domestic Water Association	3 wells (2 active, 1 inactive)	C	34
4105879	McDougal Water System	1 well	C	60
4105998	Westridge Subdivision*	1 well	C	76
4190475	Lakeshore RV Park/Store*	2 wells	NC	130
4190518	Prineville Reservoir Resort	3 wells – Inactive system	NC	128
4190647	BLM Chimney Rock Rec Site	1 well	NC	35
4190775	OPRD Jasper Point CG	1 well	NC	75
4191015	OPRD Prineville Reservoir Park*	4 wells (1 active, 3 inactive)	NC	135
4191016	Ochoco Lake Co Park	2 wells (1 active, 1 inactive)	NC	90
4191023	OPRD Smith Rock State Park	1 well	NC	2,328
4191024	OPRD Peter Ogden State Wayside	1 well	NC	2,000
4191100	ODOT HD Brothers Oasis Rest Area	2 wells - Inactive system	NC	1,000
4192154	Prineville Golf & Country Club	1 well	NP	22
4192653	USFS Walton Lake-North Side	1 well - Inactive system	NC	40

4193727	Paulina Elementary Co Unit	1 well	NTNC	34
4193728	Powell Butte Community Charter School	1 well	NTNC	159
4193965	Ochoco Christian Conference Center	4 wells (1 active, 3 inactive)	NC	35
4194172	Brothers Stage Stop	1 well	NC	30
4194381	USFS Walton Lake	1 well	NC	50
4194404	Powell Butte Country Store Inc	1 well	NC	150
4194695	Juniper Grove RV Park	1 well	NC	50
4194816	Missionary Baptist Church	1 well	NC	40
4194818	Powell Butte Christian Church	1 well	NC	300
4194836	Sun Rocks RV Park	3 wells (2 active, 1 inactive)	NC	58
4194971	Oregon Youth Challenge Program	1 well	NTNC	200
4195065	Alfalfa Store	1 well	NC	400
4195307	Cooler Bar	1 well – Inactive system	NC	30
4195346	Kingdom Hall/JWC	1 well	NC	75

System Type

C - "Community Water System (C)" means a public water system that has 15 or more service connections used by year-round residents or that regularly serves 25 or more year-round residents.

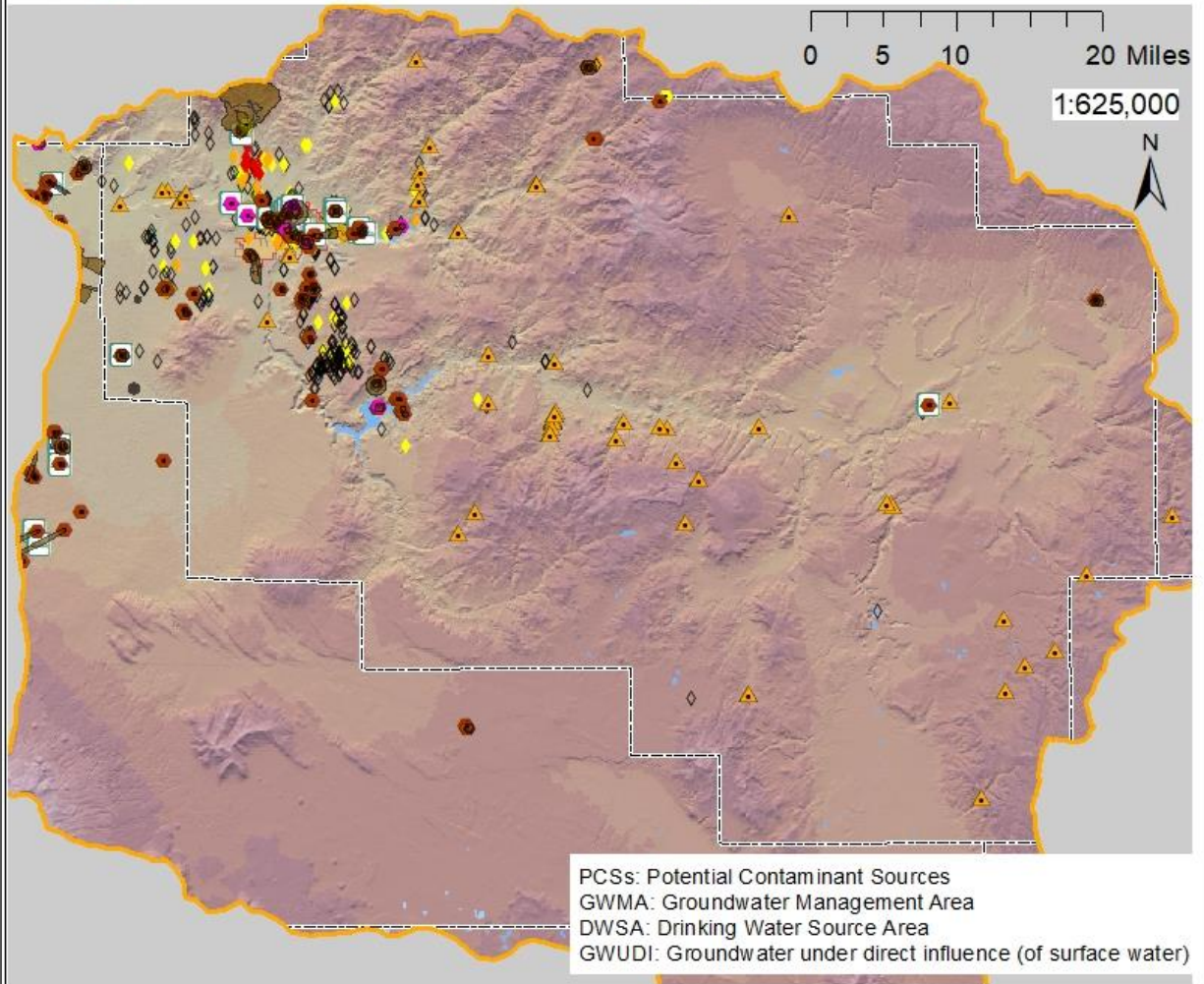
NTNC - "Non-Transient Non-Community Water System (NTNC)" means a public water system that is not a Community Water System and that regularly serves at least 25 of the same persons over 6 months per year.

NC - "Transient Non-Community Water System (NC)" means a public water system that serves a transient population of 25 or more persons.

NP - "State Regulated Water System (NP)" means a public water system, which serves 4 to 14 service connections or serves 10 to 24 people. Monitoring requirements for these systems are the same as those for Transient Non-Community water systems.



Drinking Water Source Areas for Public Water Systems in Crooked River Agricultural Water Quality Management Area

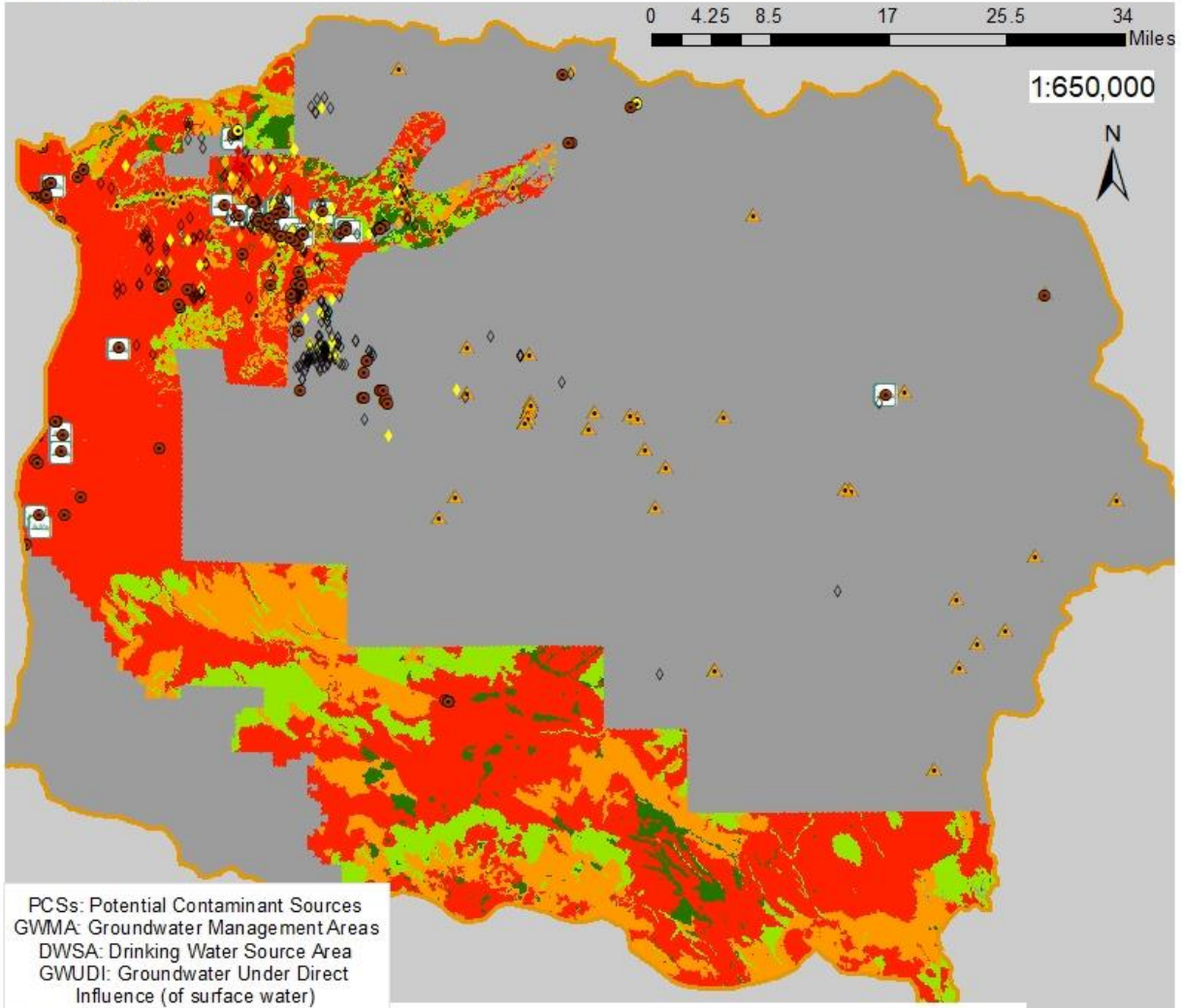


- | | | |
|--------------------------------|-------------------------------|-------------------------------|
| CrookedRiverAgWQMA | Cropland PCSs | Nitrate: Private Well Testing |
| Groundwater DWSA | Animals PCSs | 0 to 3 mg/L |
| Surface watershed for GWUDI | Other Ag PCSs | >3 to 7 mg/L |
| Public Water Supply Spring | Domestic Surface Water Rights | >7 to 10 mg/L |
| Public Water Supply Well | City Limits (2017) | >10 to 50 mg/L |
| PWS with recent nitrate alerts | | >50 mg/L |

The Drinking Water Source Area (DWSA) delineations define areas that supply the drinking water system. For groundwater this is defined as the area on the surface that overlies that portion of the aquifer that supplies water to a well or spring. DWSAs for wells typically show the 1-, 2-, 5-, and 10- or 15-yr time of travel zones that indicate the amount of time it takes groundwater to move to the wellhead. DWSAs for springs typically show area of short-, intermediate-, and long-term groundwater flow to the spring. DWSAs for surface water represents the watershed that supplies the waterbody where the intake is located.



Drinking Water Source Areas for Public Water Systems in Crooked River Agricultural WQMA: Nitrate Leaching Potential



PCSS: Potential Contaminant Sources
 GWMA: Groundwater Management Areas
 DWSA: Drinking Water Source Area
 GWUDI: Groundwater Under Direct Influence (of surface water)

- | | | |
|-------------------------------|-------------------------------|--|
| Crooked River AgWQMA | Nitrate: Private Well Testing | Nitrate Leaching Potential Rating |
| Public Water Supply Spring | 0 to 3 mg/L | Not rated or not available |
| Public Water Supply Well | >3 to 7 mg/L | Low |
| Cropland PCSSs_June2005 | >7 to 10 mg/L | Moderate |
| Animals PCSSs_June2005 | >10 to 50 mg/L | Moderately high |
| Domestic Surface Water Rights | >50 to 100 mg/L | High |

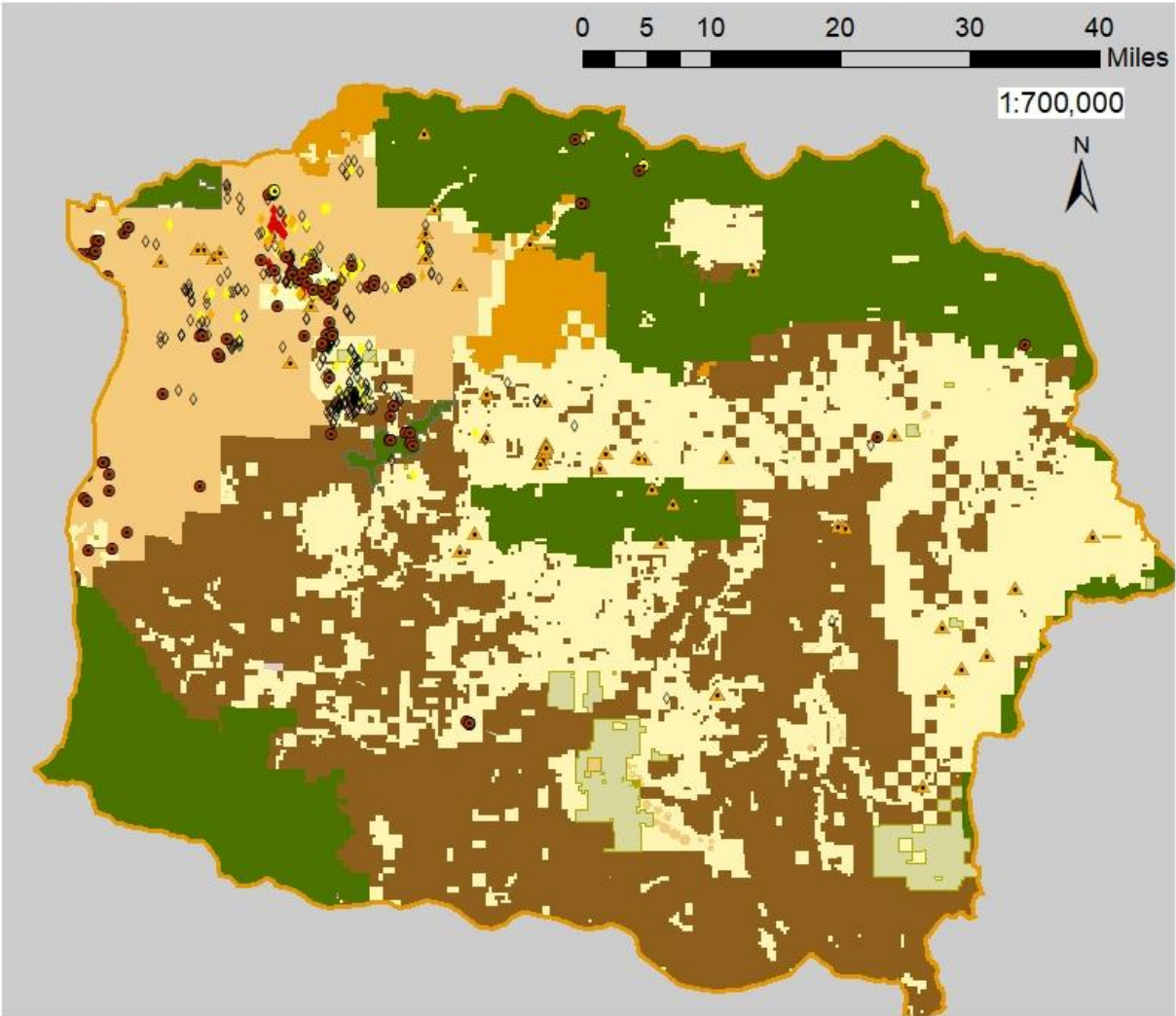
The Drinking Water Source Area (DWSA) delineations define areas that supply the drinking water system. For groundwater this is defined as the area on the surface that overlies that portion of the aquifer that supplies water to a well or spring. DWSAs for wells typically show the 1-, 2-, 5-, and 10- or 15-yr time of travel zones that indicate the amount of time it takes groundwater to move to the wellhead. DWSAs for springs typically show area of short-, intermediate-, and long-term groundwater flow to the spring. DWSAs for surface water represents the watershed that supplies the waterbody where the intake is located.



Drinking Water Source Areas for Public Water Systems in Crooked River Agricultural WQMA: Land Use/Ownership

0 5 10 20 30 40 Miles

1:700,000



Nitrate: Private Well Testing	Land Ownership (2017)	Local Government	Federal - Other
◇ 0 to 3 mg/L	Private Urban Lands	State Dept. of Forestry	Bonneville Power Administration
● >3 to 7 mg/L	Private Rural Lands	State - Other	Bureau of Indian Affairs
● >7 to 10 mg/L	Agriculture	Bureau of Land Management	Undetermined
● >10 to 50 mg/L	Private Industrial Forests	U.S. Forest Service	Water
● >50 to 100 mg/L			

The Drinking Water Source Area (DWSA) delineations define areas that supply the drinking water system. For groundwater this is defined as the area on the surface that overlies that portion of the aquifer that supplies water to a well or spring. DWSAs for wells typically show the 1-, 2-, 5-, and 10- or 15-yr time of travel zones that indicate the amount of time it takes groundwater to move to the wellhead. DWSAs for springs typically show area of short-, intermediate-, and long-term groundwater flow to the spring. DWSAs for surface water represents the watershed that supplies the waterbody where the intake is located.



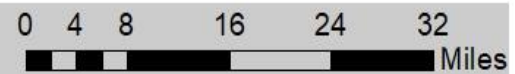
Drinking Water Source Areas for Public Water Systems in Crooked River Agricultural WQMA: Crops (2015 NASS)

- Public Water Supply Spring
- Public Water Supply Well
- ▲ Domestic Surface Water Rights

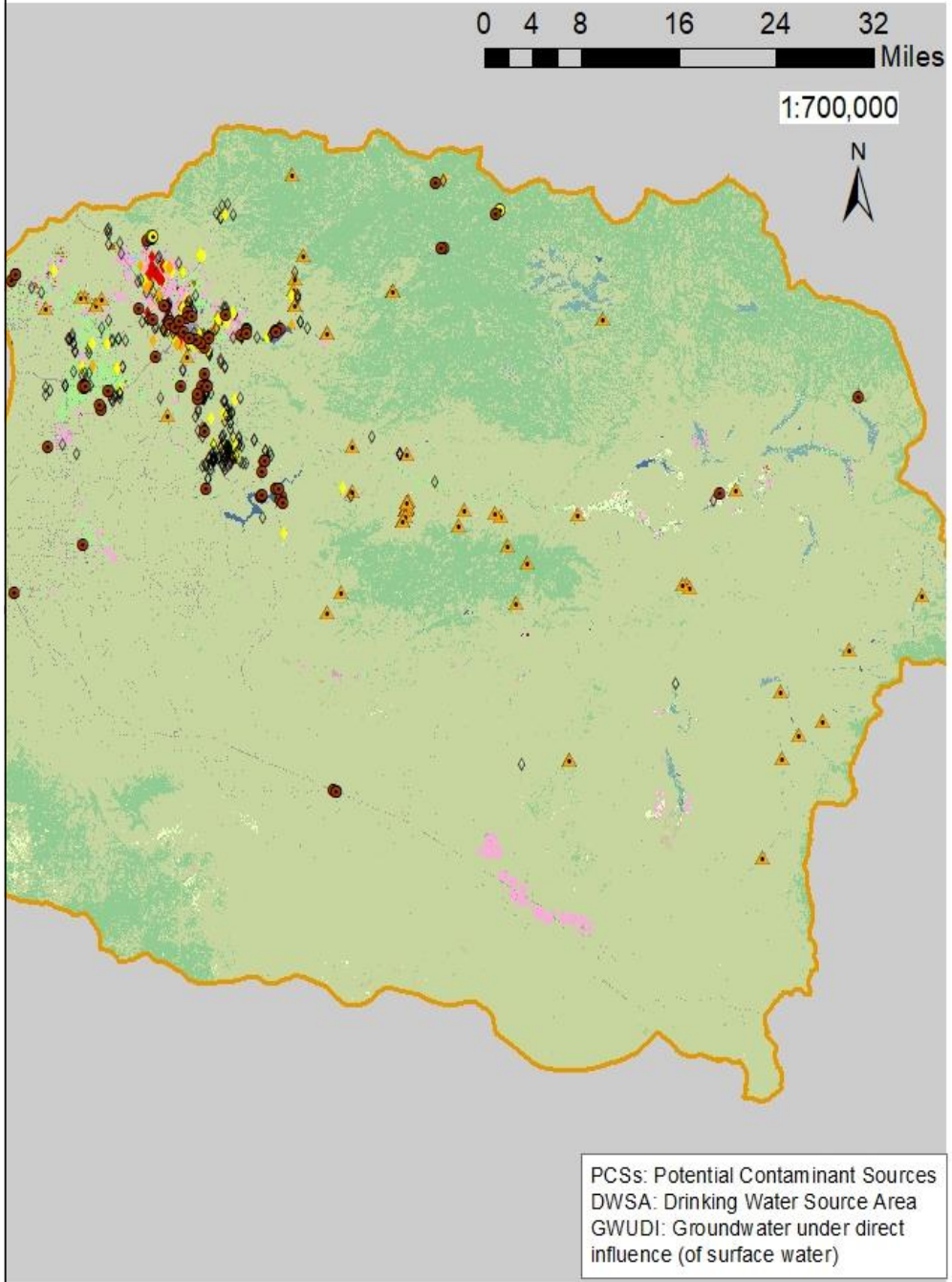
- Background
- Mint
- Barley
- Spring Wheat
- Winter Wheat
- Rye
- Oats
- Alfalfa
- Other Hay/Non Alfalfa
- Dry Beans
- Potatoes
- Onions
- Herbs
- Fallow/Idle Cropland
- Open Water
- Developed/Open Space
- Developed/Low Intensity
- Developed/Med Intensity
- Developed/High Intensity
- Barren
- Deciduous Forest
- Evergreen Forest
- Shrubland
- Grass/Pasture
- Woody Wetlands
- Herbaceous Wetlands
- Triticale
- Garlic

Nitrate: Private Well Testing

- ◇ 0 to 3 mg/L
- ◇ >3 to 7 mg/L
- ◇ >7 to 10 mg/L
- ◇ >10 to 50 mg/L
- ◇ >50 mg/L



1:700,000



PCSS: Potential Contaminant Sources
 DWSA: Drinking Water Source Area
 GWUDI: Groundwater under direct influence (of surface water)

Drinking Water Source Area (DWSA) delineations define areas that supply the drinking water system. A DWSA is defined as the area on the surface that overlies that portion of the aquifer that supplies water to a well or spring. DWSAs for wells are defined by 2-, 5-, and 10- or 15-yr time of travel zones that indicate the amount of time it takes groundwater to move to the wellhead. DWSAs for springs represent the area of short-, intermediate-, and long-term groundwater flow to the spring. DWSAs for surface water represents the watershed that supplies the waterbody where the intake is located.