

Drinking Water Information in the Goose and Summer Lakes Agricultural Water Quality Management Area

Oregon Department of Environmental Quality, Drinking Water Protection Program

5/18/2020

- Public drinking water systems in the Goose and Summer Lakes Agricultural Water Quality Management Area utilize groundwater sources to serve approximately 3,700 persons regularly.
- Recent alerts for fecal coliform bacteria are common, including all three community water systems. Christmas Valley had a violation of the *E. coli* maximum contaminant limit (MCL).
- One water system had an alert for elevated nitrate concentration with no MCL violations. Nine of the tested private wells in the area also had elevated nitrate concentrations.
- Contaminants in water supplies potentially related to agriculture co-occur with human populations, agricultural land uses, and aquifers susceptible to contaminant infiltration.

Twenty active public water systems obtain domestic drinking water from groundwater sources in the Goose and Summer Lakes Agricultural Water Quality Management Area. Drinking water is an important beneficial use under the federal Clean Water Act. When CWA 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 three active community public water systems in the plan area using only groundwater wells to serve approximately 3,400 people on a regular basis, in addition to visitors at recreation sites. There are two active non-transient, non-community workplace or school public water systems using groundwater, serving 300 persons regularly. The remaining fifteen active public water systems are transient non-community systems and non-public, state-regulated systems with an estimated service population of 550. See Table 1 below for a list of public water systems, their classifications, sources and activity status, and populations served.

Agricultural land uses (e.g. hay/pasture, alfalfa, rangeland) are present near many of the public water system wells and springs in the area. The agricultural areas in the southern part of the area around Goose Lake, combined with the north-central area, have the majority of both intensive agriculture area and human population. Forestland is prevalent in the uplands in the west side of the area and around Goose Lake, providing the contributing areas for numerous streams (many used for private domestic water supply) in the WQMA.

All three community public water systems in the management area have recent alerts for detections of total coliform. OPRD's Goose Lake and USFS's China Hat Campground have *E. coli* detections in their distribution systems. These PWSs with bacterial detections are marked in **Bold** text in Table 1. Only the Christmas Valley Domestic Water System had a violation of the contaminant limit for total coliform or *E. coli*.

Nitrate alerts (generated when nitrate exceeds 5 mg/L) exist only for the Silver Lake Mercantile (four alerts in 10 years @ a range of 5.43-5.79mg/L. The drinking water MCL for nitrates is 10 mg/L. These contaminants are often related to animal and cropland agriculture. The locations of nitrate contamination of private domestic wells (see below) and public drinking water sources is near to agricultural land use such as row crops, southwest of Christmas Valley and near Lakeview. The soils through most of the Ag WQMA have high or very high nitrate leaching potential, according to the

Natural Resources Conservation Service. Some of the soils just north of Goose Lake have very low and low nitrate leaching potential, but are surrounded by higher leaching potential soils. The private wells with elevated nitrate (see below) are in high leaching potential soils, as is the well for Silver Lake Mercantile. Nitrate from fertilizers 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 not additional contaminants that could be possibly related to agriculture within the agricultural management area. Three water systems have arsenic alerts: City of Paisley (includes violations—treatment now installed), Lakeview Suburban (also fluorine and nickel alerts, system now inactive), and the BLM Highway well (system now inactive). Other non-agricultural toxics detected include toluene (Christmas Valley Water System), phthalate (from plastics—Union Elementary School), and TCE (a solvent—USFS Silver Lake Ranger Station).

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 Lakeview has a mix of moderate and high susceptibility wells. The remainder of evaluated PWS wells rate as high 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 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 42 private domestic water rights in the Goose and Summer Lakes 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 9 significant detections of nitrate (>7mg/L) in private wells out of 132 total wells included in the database for this area. Of those private wells, 7 had nitrate concentrations ≥ 10 mg/L, including one near Lakeview with a measurement of 29.4mg/L nitrate. The private wells with high nitrate are primarily concentrated in the flats north and northwest of Goose Lake. 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 Middle Willamette 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 bacteria alerts.**

PWS ID	Public Water System Name	Drinking Water Source	System Type	Population
Groundwater Systems				
4100186	Christmas Valley Domestic Water Sys.	3 wells	C	860
4100464	City of Lakeview	6 wells (3 active, 3 inactive), 2 springs	C	2,300
4100611	City of Paisley	3 wells	C	245
4101090	USFS Silver Lake Ranger Station	1 well	NC	30
4101487	Lakeview Suburban Water District	Inactive system	NP	0
4105975	Cowboy Dinner Tree	1 well	NC	45
4190644	BLM Highway Well Rec Site	Inactive system	NC	0
4191039	OPRD Goose Lake Recreation	1 well	NC	10
4191040	OPRD Fort Rock State Park	1 well	NC	60
4191041	OPRD Chandler State Wayside	1 well	NC	100
4191042	OPRD Booth State Wayside	Inactive system	NC	0
4191131	Hunters Hot Springs Resort	1 well	NP	10
4191133	Silver Lake Mercantile	1 well	NC	30
4191134	Silver Lake Trailer Park	2 wells	NP	20
4191135	Summer Lake Wildlife Management	1 spring	NC	30
4191138	Valley Falls Store	Inactive system	NC	0
4192544	USFS China Hat Campground	1 well	NP	12
4192570	USFS Lakeview Ranger Station	Inactive system	NTNC	0
4193529	ODOT HD Summer Lake Rest Area	Inactive system	NC	0
4193736	Union Elementary SD 5	1 well	NTNC	43
4194295	Five Corners Store	Inactive system	NC	0
4194362	Juniper Reservoir RV Resort	1 well	NC	40
4194384	Silver Lake Cafe & Bar	1 well	NC	80
4194576	Westside Country Store	Inactive system	NC	0
4194875	North Lake School SD 14	1 well	NTNC	245
4195004	Hart Mountain Store	1 well	NC	35
4195313	Fort Rock Restaurant & Pub	1 well	NP	20
4195502	Lakeview LDS Chapel	1 well	NC	25

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.

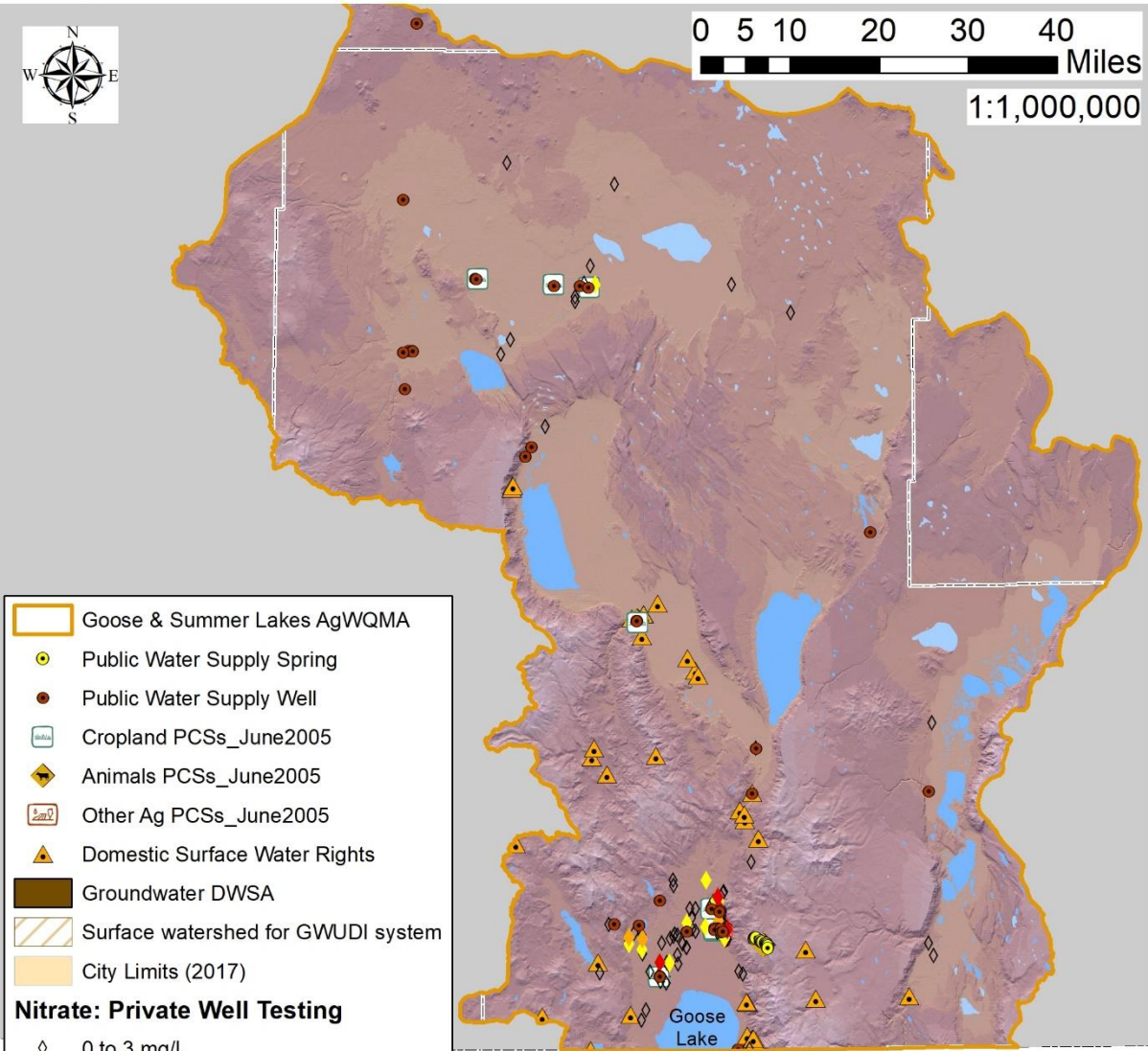
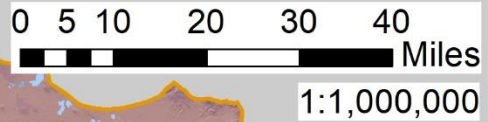
NTNC - "Non-Transient Non-Community Water System (NTNC)" means a public water system that is not a Community Water System and that regularly serves at least 25 of the same persons over 6 months per year.

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 Goose & Summer Lakes Agricultural Water Quality Management Area



- Goose & Summer Lakes AgWQMA
 - Public Water Supply Spring
 - Public Water Supply Well
 - Cropland PCSs_June2005
 - Animals PCSs_June2005
 - Other Ag PCSs_June2005
 - Domestic Surface Water Rights
 - Groundwater DWSA
 - Surface watershed for GWUDI system
 - City Limits (2017)
- 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

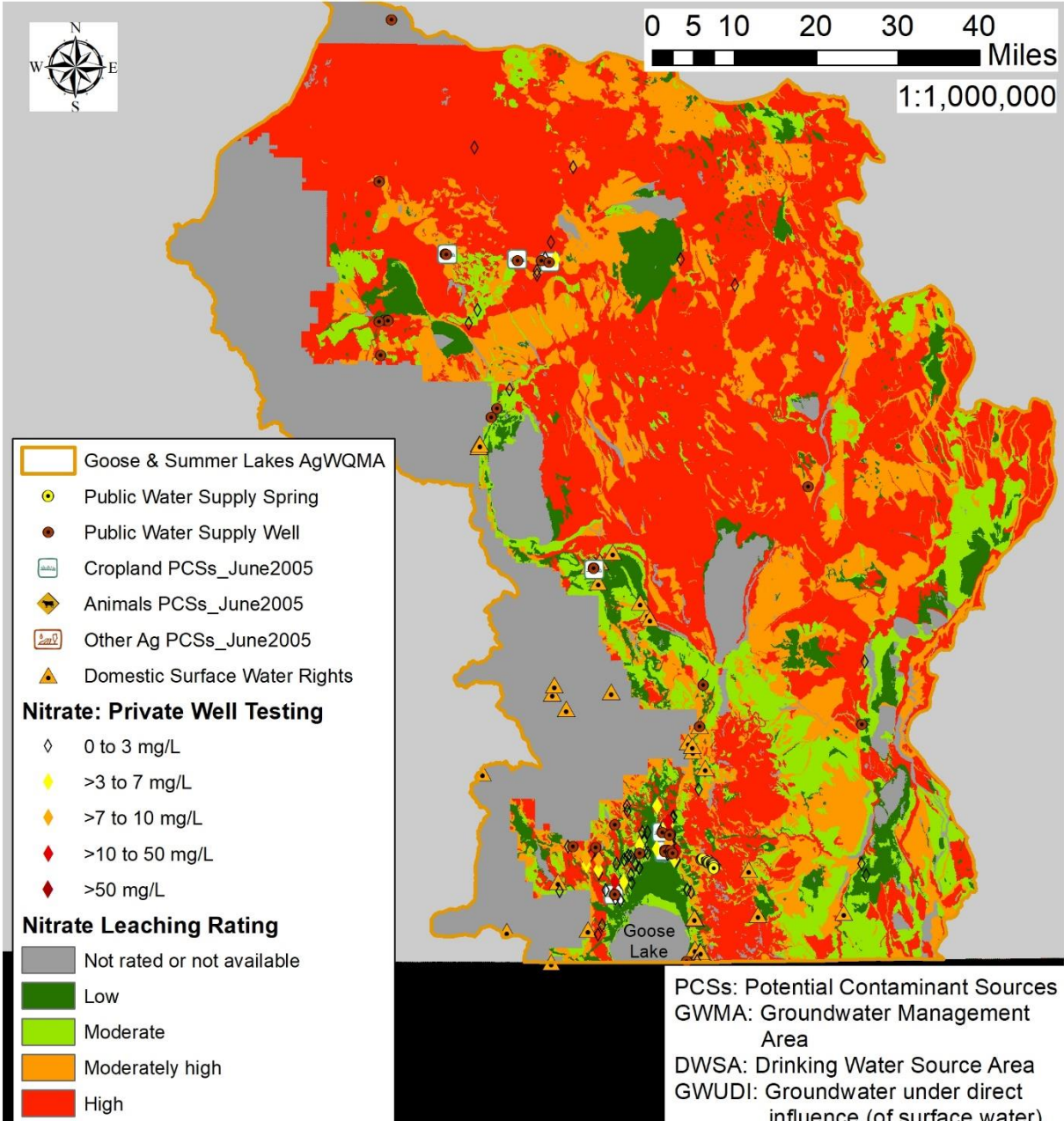
PCSs: Potential Contaminant Sources
 GWMA: Groundwater Management Area
 DWSA: Drinking Water Source Area
 GWUDI: Groundwater under direct influence (of surface water)

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 Goose & Summer Lakes

Agricultural WQMA: Nitrate Leaching Potential



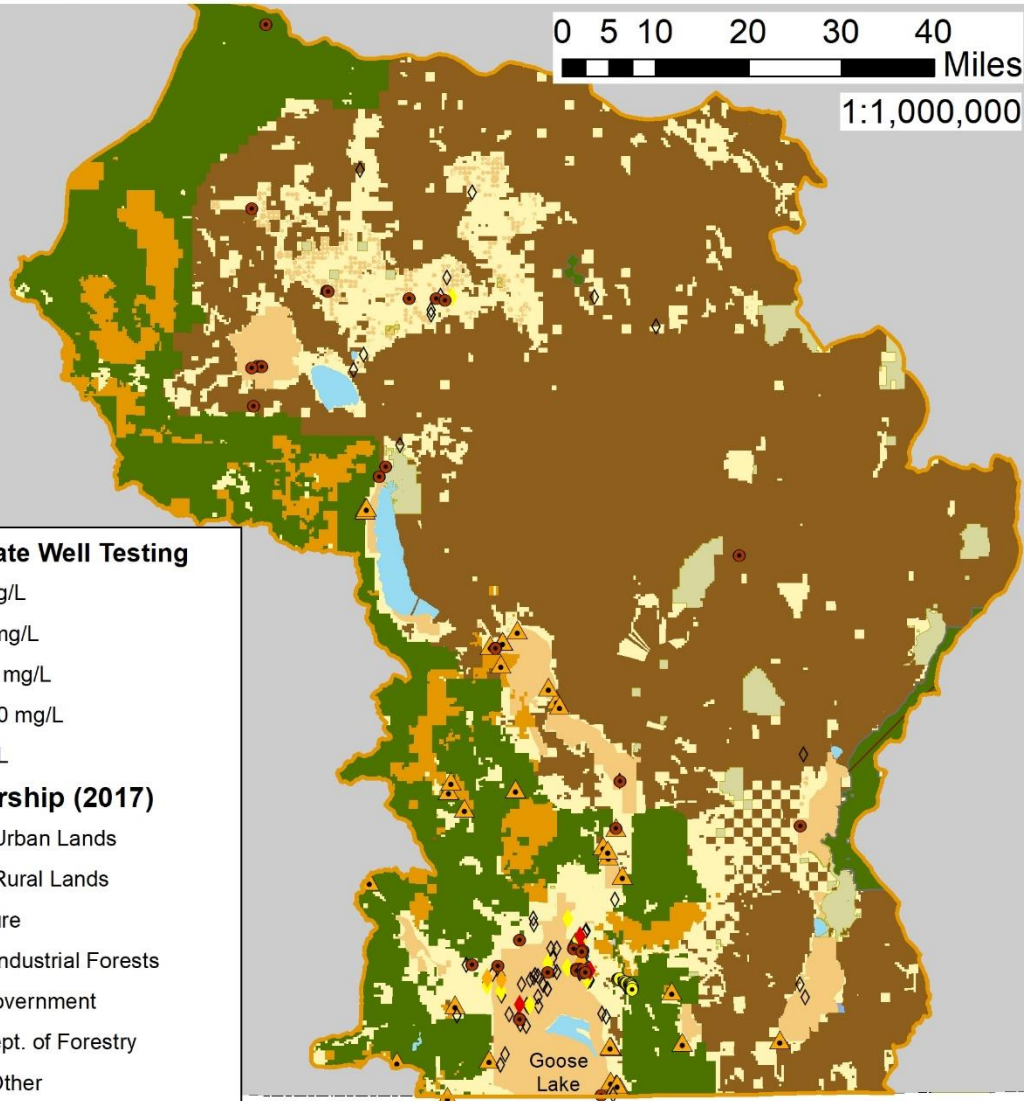
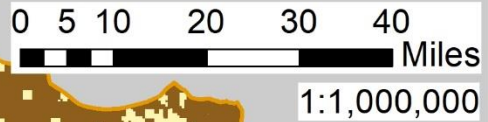
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State of Oregon
Department of
Environmental
Quality



Drinking Water Source Areas for Public Water Systems in Goose & Summer Lakes Agricultural WQMA: Land Use/Ownership



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

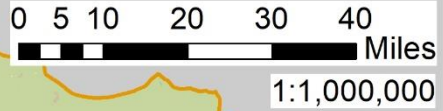
Land Ownership (2017)

- Private Urban Lands
- Private Rural Lands
- Agriculture
- Private Industrial Forests
- Local Government
- State Dept. of Forestry
- State - Other
- Bureau of Land Management
- U.S. Forest Service
- Federal - Other
- Bonneville Power Administration
- Bureau of Indian Affairs
- Undetermined
- Water

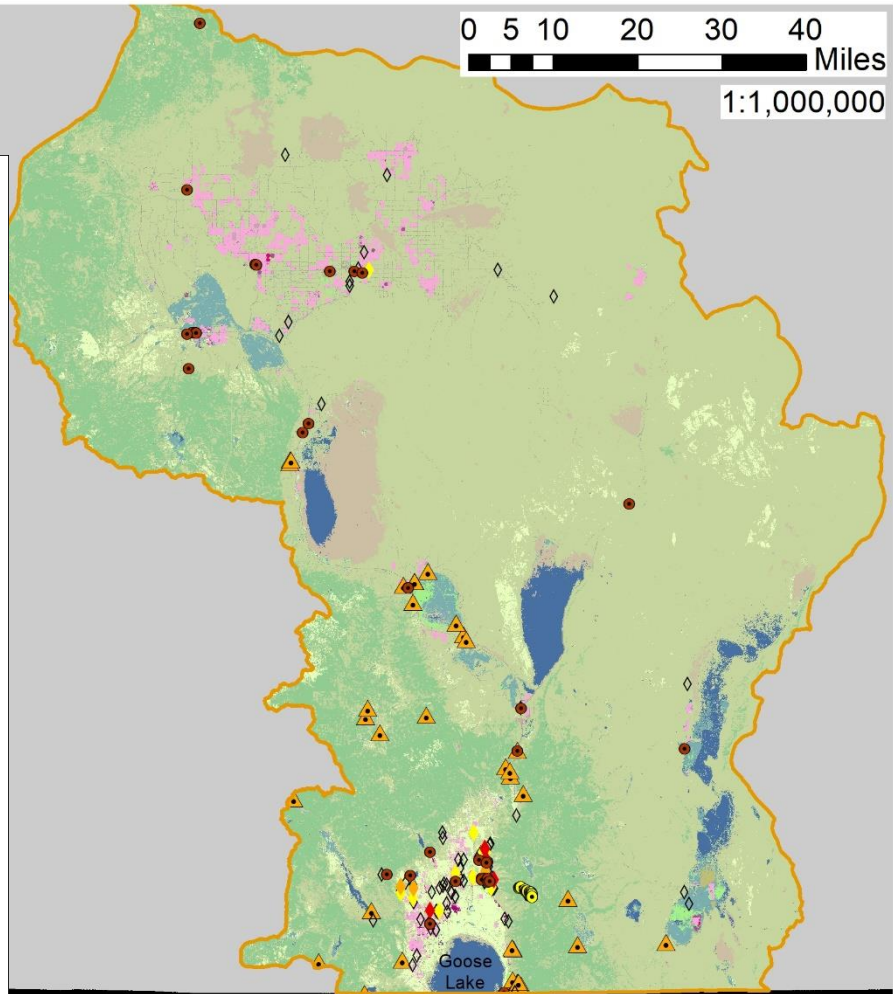
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Drinking Water Source Areas for Public Water Systems in Goose & Summer Lakes Agricultural WQMA: Crops (2015 NASS)



- Goose & Summer Lakes AgWQMA
 - 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



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

DWSA delineations define areas that supply the drinking water system. DWSAs are 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 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 short-, intermediate-, and long-term groundwater flow to the spring. GWUDI represents the watershed that supplies the waterbody where the intake is located.