



Introduction

The Tualatin 8-Digit Hydrologic Unit Code (HUC) subbasin is comprised of 453,300 acres, most of which is in Washington County. Forty-nine percent of the subbasin is forestland. Twenty-three percent is under hay and pasture, which includes dairy and beef operations and most of the small farms. Other areas are used for small grain, grass seed, orchards, vineyards, nursery stock, caneberries, blueberries, strawberries, cannery crops, and nuts. Resource concerns associated with these land uses include streambank erosion, surface water contamination, undesirable odors from CAFOs, and increasing land use restrictions. There are 27 permitted CAFOs in the subbasin.

There are 2,163 farms in the subbasin and 3,473 operators. Three-fourths of the operations are relatively small, commonly less than 50 acres. The greatest obstacle to the diffusion of conservation among small acreage landowners is that they have little experience implementing conservation and managing natural resources

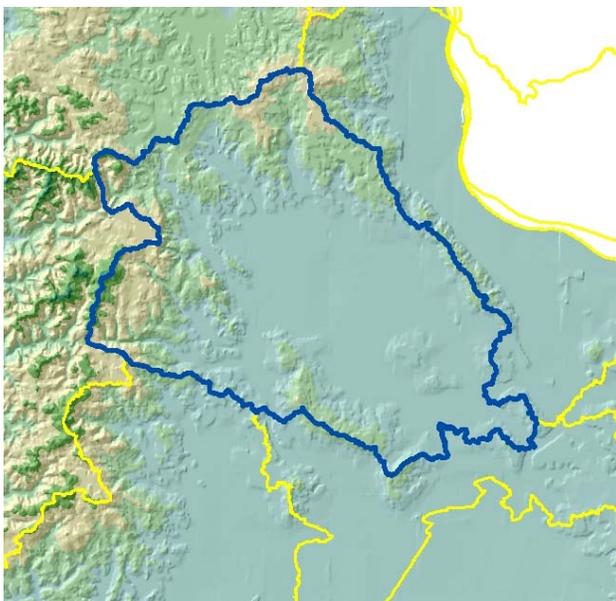
One NRCS service center, the Tualatin Soil and Water Conservation District, the Northwest Resource Conservation & Development (RC&D) office, and other local conservation organizations provide conservation assistance in the Tualatin subbasin.

Profile Contents

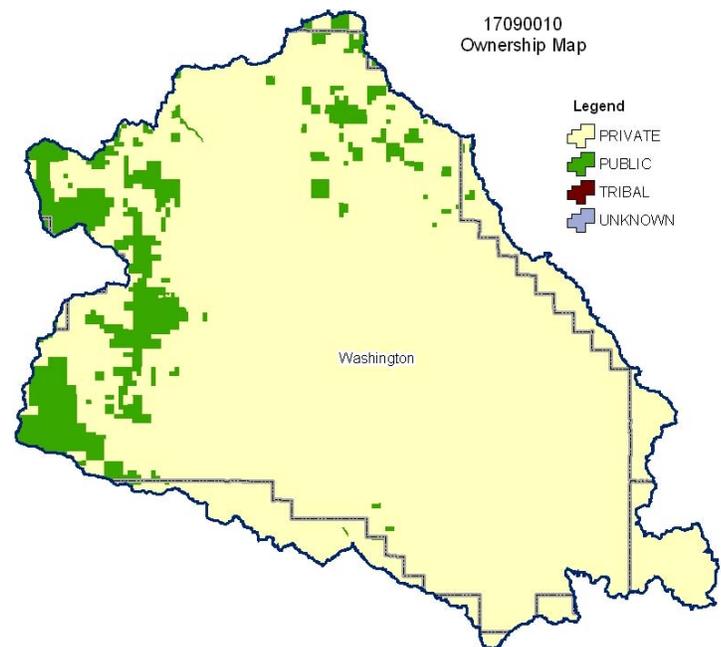
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Relief Map



17090010
Ownership Map



Physical Description

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ALL NUMBERS IN THIS PROFILE ARE FOR OREGON ONLY

Land Cover/Land Use (NLCD ²)	Ownership - (2003 Draft BLM Surface Map Set ¹)						Totals	%
	Public		Private		Tribal			
	Acres	%	Acres	%	Acres	%		
Forest	42,200	9%	180,000	40%	0	0%	222,200	49%
Grain Crops	*	---	25,500	6%	0	0%	25,500	6%
Conservation Reserve Program Land ^a	0	0%	*	---	0	0%	*	---
Grass/Pasture/Hay	*	---	105,400	23%	0	0%	105,400	23%
Orchards/Vineyards	*	---	48,800	11%	0	0%	48,800	11%
Row Crops	*	---	3,300	1%	0	0%	3,300	1%
Shrub/Rangelands	*	---	5,600	1%	0	0%	5,600	1%
Water/Wetlands/Developed/Barren	*	---	42,400	9%	0	0%	42,400	9%
Oregon HUC Totals ^b	42,200	9%	411,100	91%	0	0%	453,300	100%

*: Less than 1 percent of total acres. See below for special considerations.

a: Estimate from Farm Service Agency records and includes CRP/CREP.

b: Totals are approximate due to rounding and small unknown acreages.

Special Considerations for this 8-Digit HUC:

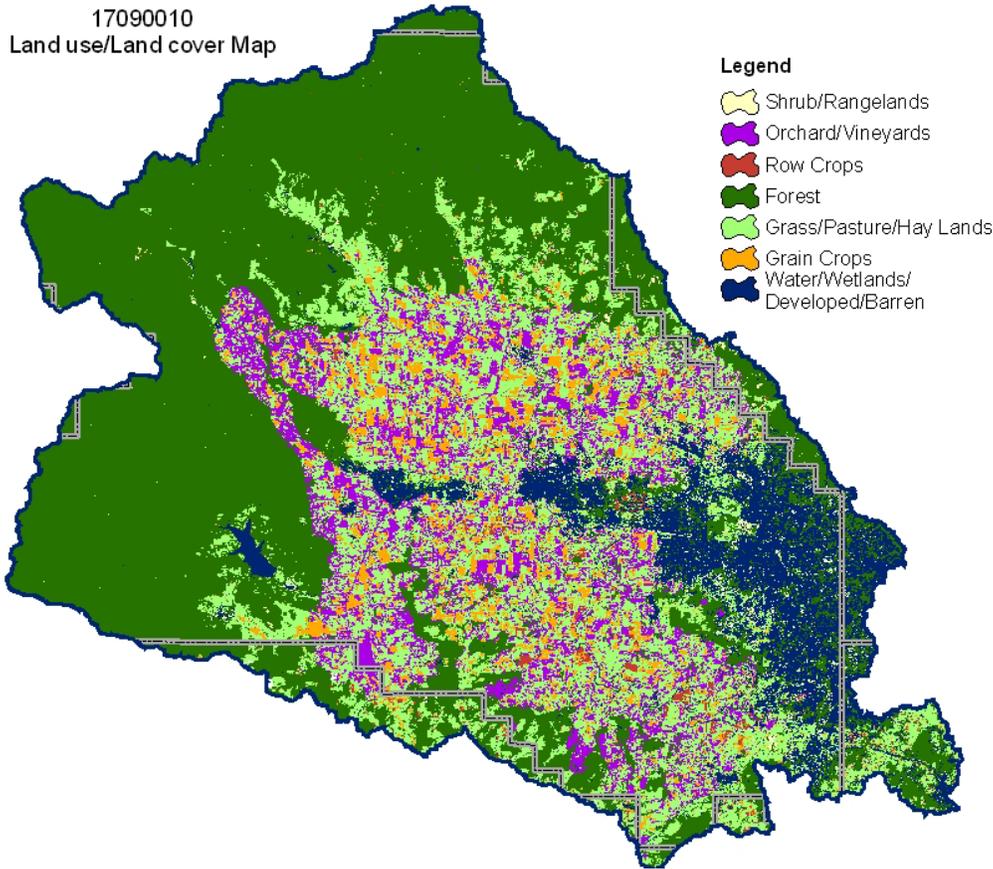
- Thirty-eight percent of private forestland is under industrial forest ownership (OSU, Forestry Sciences Laboratory).
- Grain is commonly grown in rotation with grass seed and other crops.
- Orchards/Vineyards/Berries includes other perennial crops, such as filberts, nursery stock, and Christmas trees (Pacific Northwest Ecosystem Research Consortium).
 - ~ Orchards/vineyards - 11,200 acres
 - ~ Nursery stock - 800 acres
 - ~ Christmas trees - 5,900 acres
- Grass/Pasture/Hay includes approximately:
 - ~ 12,600 acres of grass seed (field office estimate)
 - ~ 24,200 acres of pasture (Pacific Northwest Ecosystem Research Consortium)
 - ~ 25,600 acres of hay (Pacific Northwest Ecosystem Research Consortium)
- Pasture includes commercial dairy and beef operations as well as small farms and ranches.
- Row crops primarily consist of corn, beans, and cole crops grown for cannery processing or fresh market.
- Urban land use makes up 53,500 acres.

Irrigated Lands (1997 NRI ³ Estimates for Non-Federal Lands Only)	Type of Land	ACRES	% of Irrigated Lands	% of HUC
	Cultivated Cropland	9,200	50%	2%
	Uncultivated Cropland	8,400	45%	2%
	Pastureland	900	5%	0%
	Total Irrigated Lands	18,500	100%	4%

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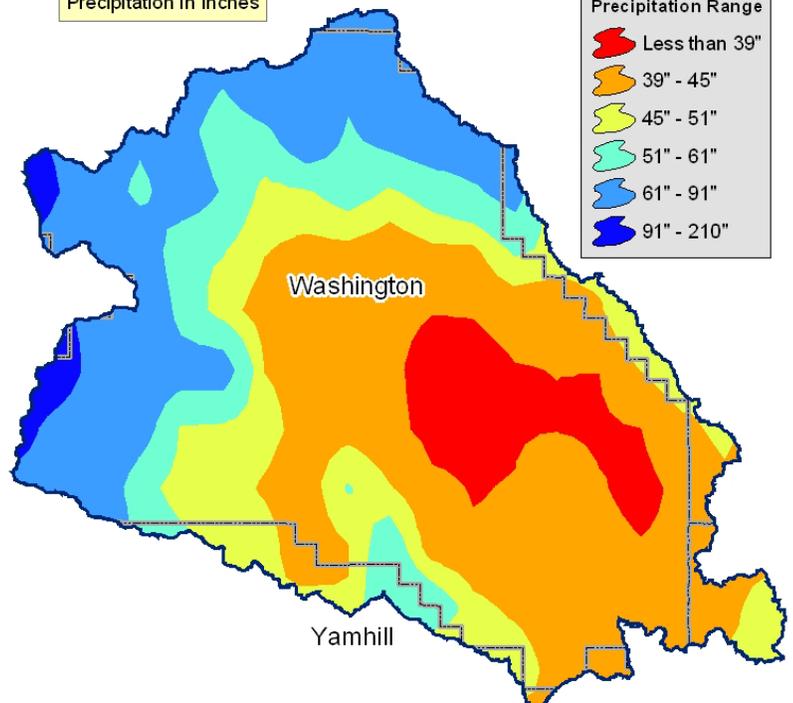
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Land use/Land cover Map



Legend

-  Shrub/Rangelands
-  Orchard/Vineyards
-  Row Crops
-  Forest
-  Grass/Pasture/Hay Lands
-  Grain Crops
-  Water/Wetlands/Developed/Barren

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Average Annual
Precipitation in Inches

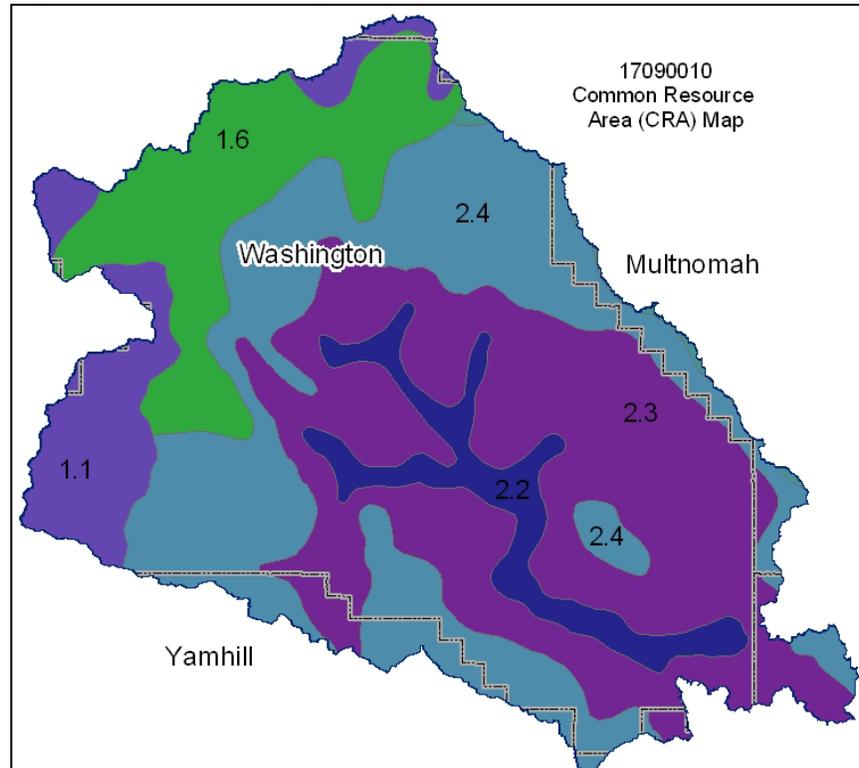


- Willamette Valley
Precipitation Range**
-  Less than 39"
 -  39" - 45"
 -  45" - 51"
 -  51" - 61"
 -  61" - 91"
 -  91" - 210"

Common Resource Area Map

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Only the major units are described below - for descriptions of all units within the HUC, go to: <http://ice.or.nrcs.usda.gov/website/cra/viewer.htm>



1.1 – Northern Pacific Coast Range, Foothills, and Valleys – Volcanics: This unit is comprised of mountains that consist of basalt and are outside of the "fogbelt." The temperature regime is mesic or frigid with small area of cryic, and the moisture regime is udic. The vegetation is Douglas fir and western hemlock.

1.6 – Northern Pacific Coast Range, Foothills, and Valleys - Mid-Coastal Sedimentary: This unit is comprised of mountains that consist of sedimentary rock and are outside of the "fogbelt." The temperature regime is mesic, and the moisture regime is udic. Sitka spruce is typically absent. The dominant vegetation is Douglas fir and western hemlock. The unit includes narrow inland flood plains and terraces.

2.2 – Willamette and Puget Valleys - Willamette River Flood Plains and Tributaries: This unit is comprised of the flood plain of the Willamette River and its major tributaries. It includes historic riparian areas and areas used for intensive row crops. The temperature regime is mesic, and the moisture regime is xeric.

2.3 – Willamette and Puget Valleys - Prairie Terraces: This unit is comprised of the terraces in the Willamette Valley. The soils are well drained to poorly drained. Land use is variable. The temperature regime is mesic, and the moisture regime is xeric. There are numerous ponded seasonal wetlands.

2.4 – Willamette and Puget Valleys - Valley Foothills: This unit is comprised of the foothills of the Willamette Valley. The soils are underlain by basalt and sedimentary rock and are typically red and clayey. The vegetation is Douglas fir and Oregon white oak. The temperature regime is mesic, and the moisture regime is xeric. The unit does not support western hemlock, which is characteristic of the adjacent units in the Coast and Cascade MLRA's.

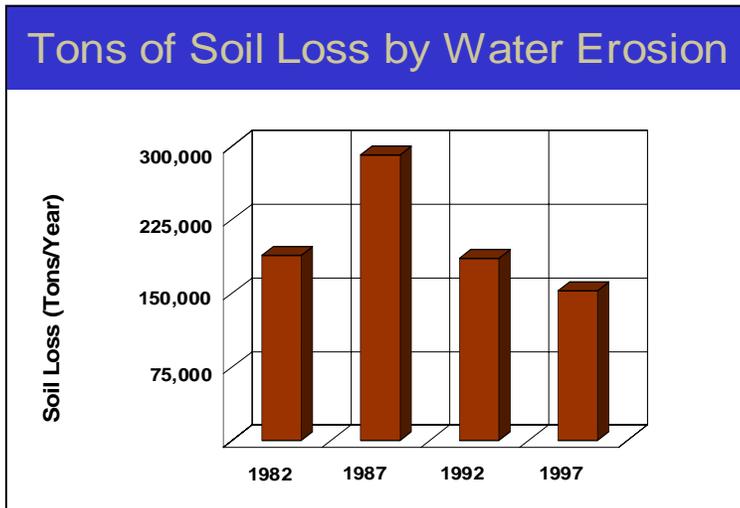
Physical Description – Continued

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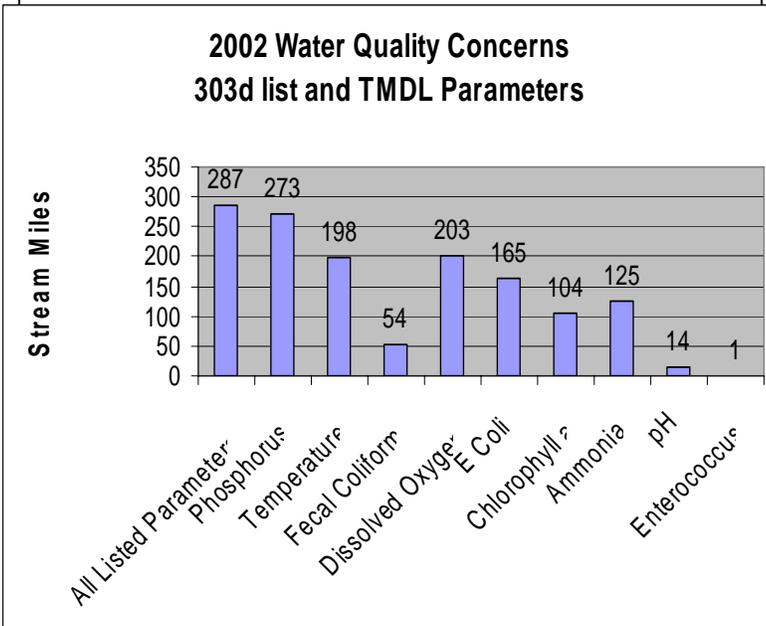
		ACRES	ACRE-FEET			
Irrigated Adjudicated Water Rights (OWRD ⁴)	Surface	70,696	177,186			
	Well	10,543	26,423			
	Total Irrigated Adjudicated Water Rights	81,239	203,609			
Stream Flow Data	USGS 14207500 TUALATIN RIVER AT WEST LINN, OR	Total Avg. Yield	1,063,865			
		May – Sept. Yield	77,125			
		MILES	PERCENT			
Stream Data ⁵ <i>*Percent of Total Miles of Streams in HUC</i>	Total Miles – Major (100K Hydro GIS Layer)	712	---			
	303d/TMDL Listed Streams (DEQ)	287	40%			
	Anadromous Fish Presence (StreamNet)	90	13%			
	Bull Trout Presence (StreamNet)	0	0%			
		ACRES	PERCENT			
Land Cover/Use ² Based on a 100-foot stretch on both sides of all streams in the 100K Hydro GIS Layer	Forest	10,536	47%			
	Grain Crops	930	4%			
	Grass/Pasture/Hay	5,545	25%			
	Orchards/Vineyards	2,859	13%			
	Row Crops	157	<1%			
	Shrub/Rangelands – Includes CRP Lands	277	1%			
	Water/Wetlands/Developed/Barren	1,905	9%			
	Total Acres of 100-foot Stream Buffers	22,209	---			
Land Capability Class <i>(Croplands & Pasturelands Only)</i> <i>(1997 NRI³ Estimates for Non-Federal Lands Only)</i>	1 – slight limitations	3,200	3%			
	2 – moderate limitations	51,400	50%			
	3 – severe limitations	37,100	36%			
	4 – very severe limitations	10,500	10%			
	5 – no erosion hazard, but other limitations	0	0%			
	6 – severe limitations; unsuitable for cultivation; limited to pasture, range, forest	0	0%			
	7 – very severe limitations; unsuitable for cultivation; limited to grazing, forest, wildlife habitat	0	0%			
	8 – miscellaneous areas; limited to recreation, wildlife habitat, water supply	0	0%			
	Total Croplands & Pasturelands	102,200	---			
Confined Animal Feeding Operations – Oregon CAFO Permit – 12/2004						
Animal Type	Dairy	Feedlot	Poultry	Swine	Mink	Other
No. of Permitted Farms	22	1	2	2	0	0
No. of Permitted Animals	7,299	437	135,000	1,435	0	0

Resource Concerns

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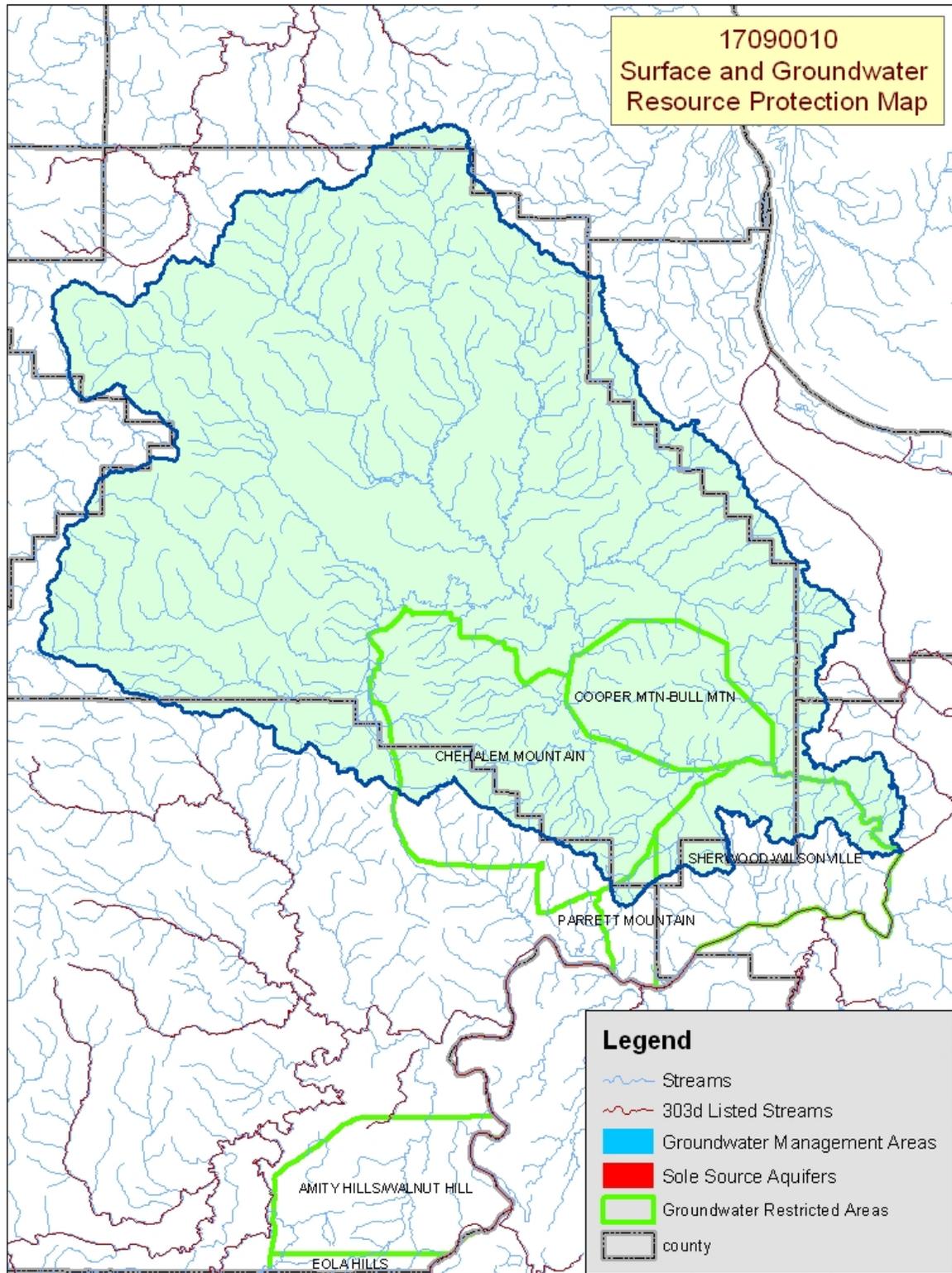
- ❖ Sheet and rill erosion by water on the croplands and pasturelands have been reduced more than 36,000 tons of soil per year from 1982 to 1997.
- ❖ NRI estimates indicate that 11,400 acres of the agricultural lands still had water erosion rates above a sustainable level in 1997.
- ❖ Controlling erosion not only sustains the long-term productivity of the land, but it also affects the amount of soil, pesticides, fertilizer, and other substances that move into the Nation's waters.



- ❖ More than 80 percent of the listed stream miles exceed State water quality standards for temperature. Elevated stream temperatures may be due to inadequate riparian shade, stream channel widening, and other anthropogenic or natural causes.
- ❖ Fecal coliform and E coli can be indications of livestock waste runoff, but they also are typical of poorly functioning onsite sewage disposal systems and urban runoff.
- ❖ Phosphorus may be related to agriculture or residential use, and the area is known to have high background levels.
- ❖ Conservation practices that can be used to address these water quality issues include grazing management, nutrient and pest management, and use of riparian buffers.

Watershed Projects, Plans, Studies, and Assessments			
NRCS Watershed Projects ⁶		NRCS Watershed Plans, Studies, and Assessments ⁷	
Name	Status	Name	Status
None		McKay-Rock Creek	Deauthorized - 1970
ODEQ TMDL's ⁸		ODA Agricultural Water Quality Management Plans ⁹	
Name	Status	Name	Status
Tualatin River Willamette Basin	Completed Draft for Review	Tualatin	Completed
OWEB Watershed Council ¹⁰	Watershed Council Assessments ¹¹		NWPCC Subbasin Plans & Assessments ¹⁸
Tualatin Watershed Council	Gales Creek Watershed Assessment, Lower Tualatin Watershed Analysis, Upper Tualatin-Scoggins Watershed Analysis, Dairy-McKay Watershed Analysis, Middle Tualatin-Rock Creek Watershed Analysis		Willamette Subbasin Plan

(Continued on page 8)



Map Footnote [17](#)

Resource Concerns - Continued

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Resource Concerns/Issues by Land Use							
SWAPA +H Concerns	Specific Resource Concern/Issue	Pasture\Hay	Grain and Grass Seed Crops	Row Crops	Perennial Crops (Orch/Vine/Berry/Nursery/Xmas)	Shrub/Range	Forest
Soil Erosion	Sheet & Rill		X	X	X		
	Concentrated Flow or Gully		X	X	X		X
	Streambank	X	X	X	X		
Soil Condition	Tilth, Crusting, Infiltration, Organic Matter				X		
	Soil Compaction				X		
Water Quantity	Water Management For Irrigated Land			X	X		
Water Quality, Surface	Nutrients & Organics	X	X	X	X		
	Suspended Sediments & Turbidity	X	X	X	X		
	Temperature	X	X	X	X		
	Pathogens	X		X			
	Aquatic Habitat Suitability	X	X	X	X		
Air Quality	Undesirable Odors from Agricultural Sources	X	X	X	X		
Plant Suitability	Site & Intended Use Suitability	X			X		
Plant Condition	Productivity, Health, & Vigor				X		
Human Economics	Land Use Constraints/Restrictions	X	X	X	X		

Pasture/Hay

- Forage and grazing management on pastureland on small farms and ranches sometimes is inadequate, resulting in resource concerns of streambank erosion and water quality.
- Proper waste management is needed for livestock operations to maintain water quality and avoid soil contamination associated with nutrients and pathogens, especially around the livestock headquarters.
- Odor is commonly a problem around CAFO headquarters or fields where manure is being applied.

Grass Seed\Grain

- Grass seed is commonly produced under contract and in rotation with grain. Erosion is the primary concern, especially during the years when the grass seed is becoming established.
- Smoke from burning stubble after harvesting sometimes creates issues for health and safety.

Row & Perennial Crops

- Management of residue, nutrients, and pests and use of filter strips and buffers are needed to control erosion and maintain water quality. Irrigation water management is an issue for irrigated crops.
- Filberts and Christmas trees can be difficult to manage to avoid erosion.

Forest

- Non-industrial forestland owners commonly are concerned with aesthetic value, not timber production.
- Concentrated flow erosion from roads and landings and overstocking are the main issues in areas of private forestland that is used for timber production.

General

- Land use constraints and pressure to develop hinder investment in conservation. Viable production agriculture in the watershed is diminishing.
- Increasing land values and conflicting urban-rural land use raise serious social, political, and economic concerns for resource management in the watershed.

FEDERALLY LISTED THREATENED AND ENDANGERED SPECIES ¹²	
THREATENED SPECIES	CANDIDATE SPECIES
Birds – Bald eagle, Northern spotted owl, Marbled murrelet Fish – Chum salmon, Steelhead, Chinook salmon Plants – Golden paintbrush, Willamette daisy, Howellia, Bradshaw's lomatium, Kincaid's lupine, Nelson's checker-mallow	Birds – Yellow-billed cuckoo, Streaked horned lark Amphibians and Reptiles – Oregon spotted frog Fish – Coho salmon
PROPOSED SPECIES - None	
ESSENTIAL FISH HABITAT¹³ - Chinook	

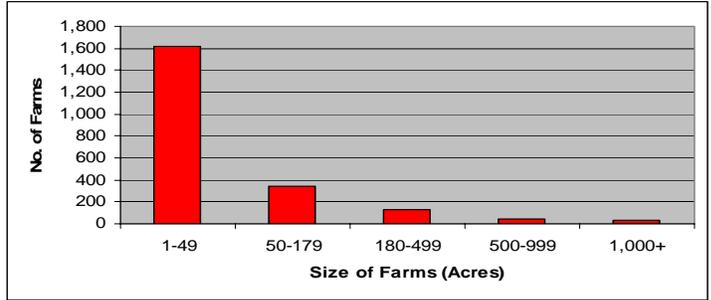
Census and Social Data ^{/14}

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Number of Farms: 2,163

Number of Operators: 3,473

- Full-Time Operators: **648**
- Part-Time Operators: **2,825**



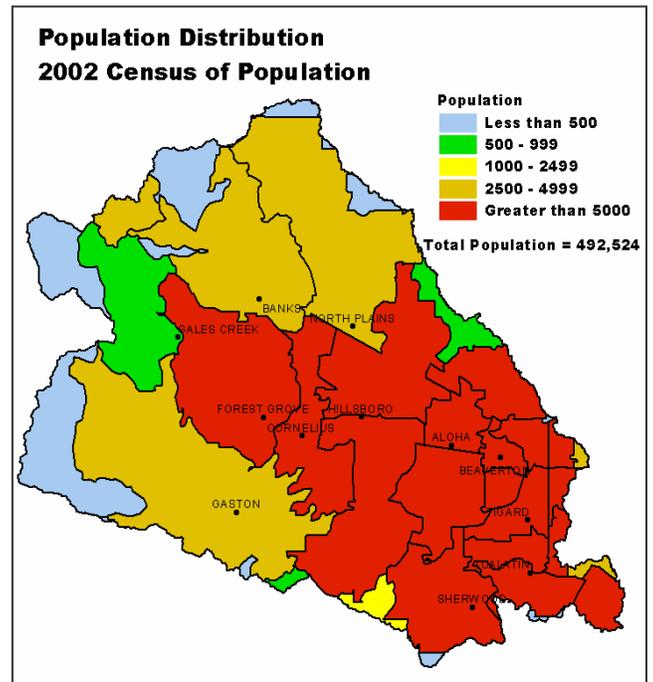
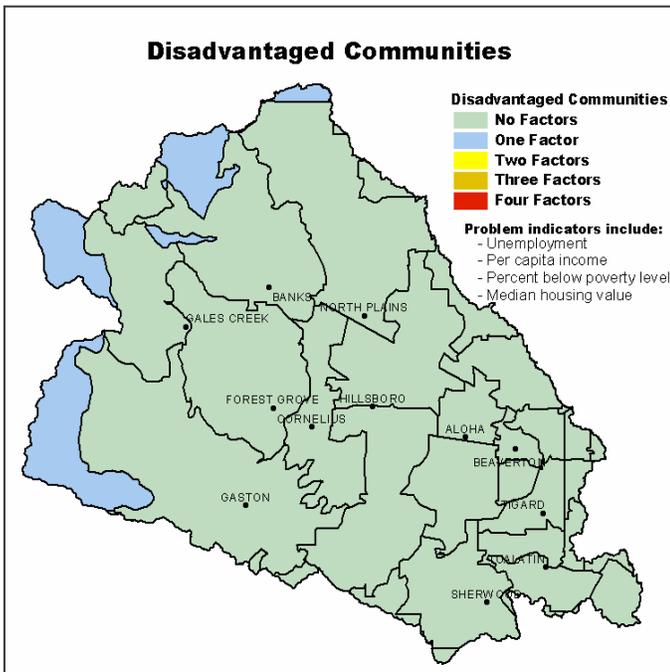
Estimated Level of Willingness and Ability to Participate in Conservation ^{/15}: **Moderate**

Overall, landowners in the Tualatin subbasin tend to be amenable to conservation and natural resource management. As a group, they exhibit a positive stewardship attitude, are well educated, and have a fair understanding of the local resource concerns.

The greatest obstacle to the diffusion of conservation among small acreage (less than 50 acres) landowners is that they have little experience implementing conservation and managing natural resources. Additional technical and financial assistance may be necessary to encourage these landowners to adopt conservation systems on their land.

Evaluation of Social Capital ^{/16}: **Low to Moderate**

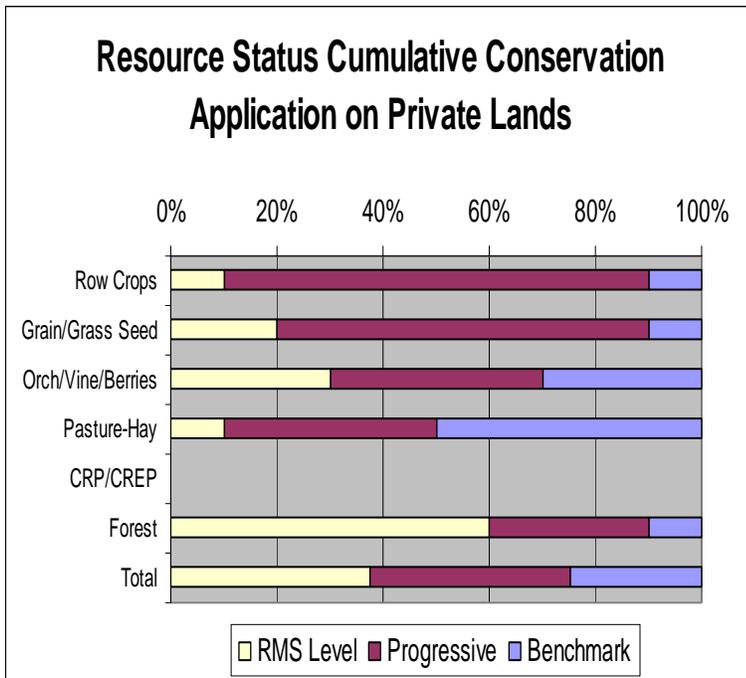
Social capital in the Tualatin subbasin and the ability of the communities to successfully address local resource concerns appears to be low to moderate. The greatest strengths of the communities are that they are well connected via the internet, residents are well educated, and community projects, once started, are usually completed. Communities in the subbasin may benefit by encouraging more participation in resource-based organizations, improving leadership effectiveness, and getting more widespread participation in community decisions from all residents, including minorities.



Progress/Status

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PRMS Data	FY99	FY00	FY01	FY02	FY03	Avg/Year	Total
Total Conservation Systems Planned (Acres)	456	1,588	2,307	1,129	1,175	1,331	6,655
Total Conservation Systems Applied (Acres)	599	553	1,509	609	1,704	995	4,974
Conservation Treatment Acres							
Waste Management (Number)	7	6	3	0	2	4	18
Buffers (Acres)	0	4	3	0	35	8	42
Erosion Control (Acres)	687	262	500	650	724	565	2,823
Irrigation Water Management (Acres)	266	341	0	456	202	253	1,265
Nutrient Management (Acres)	1,909	2,069	7	378	463	965	4,826
Pest Management (Acres)	1,441	680	6	87	225	488	2,439
Prescribed Grazing (Acres)	66	176	27	7	44	64	320
Trees & Shrubs (Acres)	2	15	8	13	146	37	184
Conservation Tillage (Acres)	0	822	121	265	14	244	1,222
Wildlife Habitat (Acres)	56	16	36	28	239	75	375
Wetlands (Acres)	0	0	0	0	175	35	175



Estimates are based on information received from local conservationists in the watershed.

- ❖ Progress over the last 5 years has been focused on:
 - ~ Nutrient, pest, and irrigation water management on CAFOs and cropland.
 - ~ Erosion control on cropland.
 - ~ Wildlife habitat management in riparian and wetland areas.
- ❖ Farmers producing row crops, such as corn, beans, and cole crops, commonly rely on cannery consultants and fertilizer dealers.
- ❖ Farmers producing perennial crops, such as nursery stock and Christmas trees, commonly do not seek assistance from NRCS or SWCDs.
- ❖ Much of the pasture that is at the benchmark level is on small farms.
- ❖ Private industrial forestland owners typically do not work with NRCS and SWCDs; however, their land commonly complies with State forest practice requirements.
- ❖ Much of private non-industrial forestland is on farms of less than 50 acres in size that are not managed for timber production. Frequently, this land does not comply with the State forest practice requirements.

Lands Removed from Production through Farm Bill Programs

- ❖ Conservation Reserve Program (CRP): **136 acres**
- ❖ Wetland Restoration Program (WRP): **None**
- ❖ Conservation Reserve Enhancement Program (CREP): **None**

Footnotes/Bibliography

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All data is provided "as is." There are no warranties, express or implied, including the warranty of fitness for a particular purpose, accompanying this document. Use for general planning purposes only.

1. Ownership Layer – Source: The 1:24,000 scale public ownership layer is the land ownership/management for public entities, including Federal, Tribal, State, and local entities. This is a seamless, statewide Oregon Public Ownership vector layer composed of fee ownership of lands by Federal, State, Tribal, county, and city agencies. The layer is comprised of the best available data compiled at 1:24,000 scale or larger, and the line work matches GCDB boundary locations and ORMAP standards where possible. The layer is available from the State of Oregon GIS Service Center: <http://www.gis.state.or.us/data/alphalist.html>. For current ownership status, consult official records at appropriate Federal, State, and county offices. Ownership classes grouped to calculate Federal ownership vs. non-Federal ownership by the Water Resources Planning Team.
2. National Land Cover Dataset (NLCD) - Originator: U.S. Geological Survey (USGS); Publication date: 19990631; Title: Oregon Land Cover Data Set, Edition: 1; Geospatial data presentation form: Raster digital data; Publisher: U.S. Geological Survey, Sioux Falls, SD, USA; Online linkage: <http://edcwww.cr.usgs.gov/programs/lccp/nationallandcover.html>; Abstract: These data can be used in a geographic information system (GIS) for any number of purposes, such as assessing wildlife habitat, water quality, pesticide runoff, land use change, etc. The State data sets are provided with a 300-meter buffer beyond the State border to facilitate combining the State files into larger regions.
3. ESTIMATES FROM THE 1997 NRI DATABASE (REVISED DECEMBER 2000) REPLACE ALL PREVIOUS REPORTS AND ESTIMATES. Comparisons made using data published for the 1982, 1987, or 1992 NRI may produce erroneous results. This is because of changes in statistical estimation protocols and because all data collected prior to 1997 were simultaneously reviewed (edited) as 1997 NRI data were collected. All definitions are available in the glossary. In addition, this December 2000 revision of the 1997 NRI data updates information released in December 1999 and corrects a computer error discovered in March 2000. For more information: <http://www.nrcs.usda.gov/technical/NRI/>
4. Irrigated Adjudicated Water Rights – Water Rights Information System (WRIS), Oregon Water Resources Department, <http://www.wrd.state.or.us/maps/wrlexport.shtml>
5. StreamNet is a cooperative venture of the Pacific Northwest's fish and wildlife agencies and tribes and is administered by the [Pacific States Marine Fisheries Commission](#). StreamNet provided data and data services in support of the region's fish and wildlife program and other efforts to manage and restore the region's aquatic resources. Official StreamNet website: <http://www.streamnet.org/>
6. Natural Resources Conservation Service, Watershed Projects Planned and Authorized, <http://www.nrcs.usda.gov/programs/watershed/Purpose>.
7. Natural Resources Conservation Service, Watershed Plans, Studies, and Assessments completed, http://www.nrcs.usda.gov/programs/watershed/Surveys_Plng.html#Watershed%20Surveys%20and%20Plan
8. Oregon Department of Environmental Quality Total Maximum Daily Loads, <http://www.deq.state.or.us/wq/TMDLs/TMDLs.htm>
9. Oregon Department of Agriculture, Agricultural Water Quality Management Plans, http://www.oregon.gov/ODA/NRD/water_agplans.shtml

Footnotes/Bibliography Continued

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10. Oregon Watershed Enhancement Board, <http://oregon.gov/OWEB/WSHEDS/index.shtml>
11. Watershed Assessments completed by local watershed councils following the Oregon Watershed Assessment Manual, http://oregon.gov/OWEB/docs/pubs/ws_assess_manual.shtml.
12. NRCS Field Office Technical Guide, Section II, Threatened and Endangered List.
13. Magnuson-Stevens Fishery Conservation and Management Act, Public Law 94-265. As amended through October 11, 1996.
14. Data were taken from the 2002 Agricultural Census and adjusted by percent of HUC in the county or by percent of zip code area in the HUC, depending on the level of data available. Data were also taken from the U.S. Population Census, 2000.
15. Conservation participation was estimated using NRCS Social Sciences Technical Note 1801, [Guide for Estimating Participation in Conservation](#), 2004. Four categories of indicators were evaluated: Personal characteristics, farm structural characteristics, perceptions of conservation, and community context. Estimates are based on information received from local conservationists in the watershed.
16. Social capital is an indicator of the community's ability and willingness to work together to solve problems. A high amount of social capital helps a community to be physically healthy, socially progressive, and economically vigorous. A low amount of social capital typically results in community conflict, lack of trust and respect, and unsuccessful attempts to solve problems. The evaluation is based on NRCS Technical Report Release 4.1, March, 2002: [Adding Up Social Capital: An Investment in Communities](#). Local conservationists provided information to measure social capital. Scores range from 0 to 76.
17. [Surface and Groundwater Resource Protection Map](#)
 - a. 2002 303d Listed Streams designated by Oregon Department of Environmental Quality and approved by the Environmental Protection Agency, Section 303d Clean Water Act, <http://www.deq.state.or.us/wq/303dlist/303dpage.htm>
 - b. Groundwater Management Areas designated by the Oregon Department of Environmental Quality, Oregon Revised Statutes – Ground Water ORS 468B.150 to ORS 468B.190, <http://www.deq.state.or.us/wq/groundwa/wqgw.htm>
 - c. Groundwater Restricted Areas designated by Oregon Water Resources Commission, Oregon Department of Water Resources, http://egov.oregon.gov/OWRD/PUBS/aquabook_protections.shtml
 - d. The Sole Source Aquifer (SSA) Protection Program is authorized by Section 1424(e) of the Safe Drinking Water Act of 1974 (Public Law 93-523, 42 U.S.C. 300 et. seq), <http://www.epa.gov/safewater/ssanp.html>
18. Subbasin assessments and plans are developed by local groups (SWCDs, watershed councils, tribes, and others) as part of the Northwest Power and Conservation Council's fish and wildlife program in the Columbia River Basin. This program is funded and implemented by the Bonneville Power Administration. <http://www.nwcouncil.org/fw/subbasinplanning/Default.htm>.