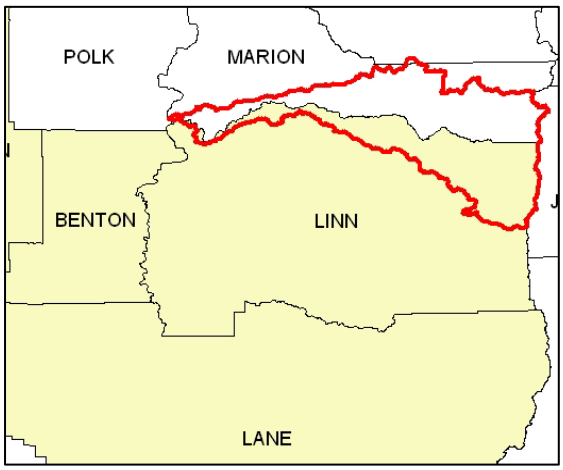
North Santiam – 17090005

8-Digit Hydrologic Unit Profile

FINAL

MARCH 2006



Introduction

The North Santiam 8-Digit Hydrologic Unit Code (HUC) subbasin is comprised of 488,200 acres in Linn and Marion Counties. Eighty-two percent of the subbasin is forestland, and nine percent is used for pasture, hay, and grass seed. Pasture is included on commercial dairies, beef operations, and many small acreage farms. There are seven permitted CAFOs and over 8,000 permitted animals in the subbasin.

Resource concerns are numerous in the subbasin; they include, but are not limited to, soil and streambank erosion, deteriorating soil condition, diminishing water and air quality, loss of fish and wildlife habitat, and poor management of non-industrial forestland. Economic, political, and social issues, such as the high capital costs, unreliable profits, and perceived land use constraints, impede the diffusion of conservation on agricultural lands in the subbasin.

There are 471 farms and 765 operators in the North Santiam subbasin. Sixty-seven percent of the farms are less than 50 acres in size. Many owners of the small-acreage operations have little experience with natural resource management; they are in the area for the rural lifestyle. Social capital is minimal in the subbasin, and local communities cannot be expected to actively support natural resource management. Marketing and technical assistance will need to be substantially enhanced to increase the diffusion of conservation throughout the North Santiam subbasin.

Conservation assistance in the subbasin is provided by two NRCS service centers, two soil and water conservation districts, the Cascade Pacific Resource Conservation and Development (RC&D) office, and the North Santiam Watershed Council.

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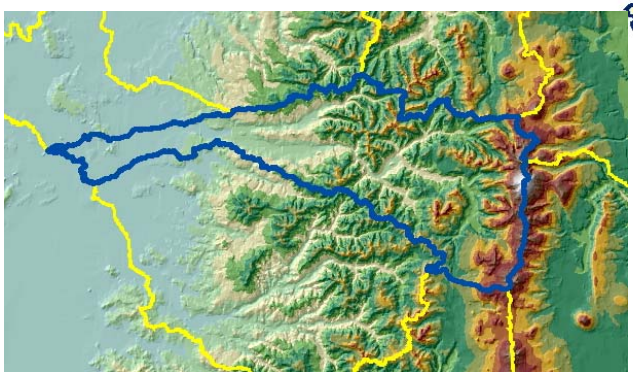
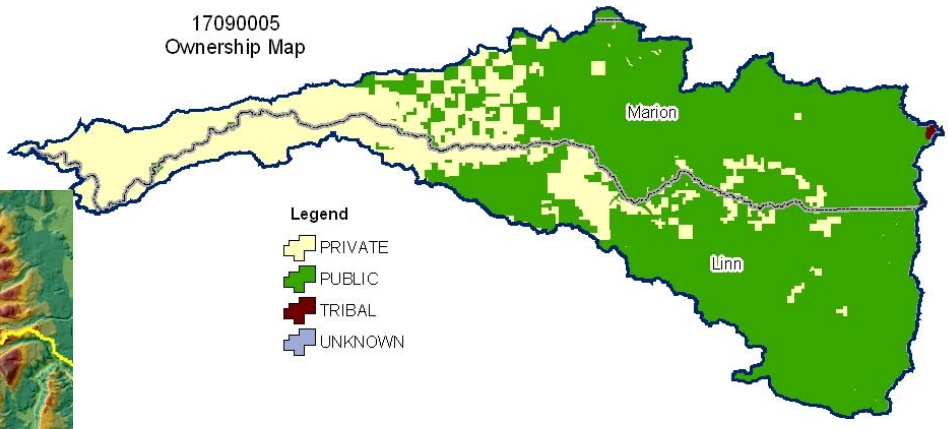


17090005
Ownership Map



Produced by the Water Resources Planning Team Portland, OR

Physical Description

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ALL NUMBERS IN THIS PROFILE ARE FOR OREGON ONLY

Land Cover/Land Use (NLCD[12])	Ownership - (2003 Draft BLM Surface Map Set[11])							
	Public		Private		Tribal		Totals	%
	Acres	%	Acres	%	Acres	%		
Forest	327,400	67%	74,100	15%	*	---	**401,900**	**82%**
Grain Crops	*	---	7,400	2%	0	0%	**7,400**	**2%**
Conservation Reserve Program Land [a]	0	0%	*	---	0	0%	**	**---**
Grass/Pasture/Hay	8,000	2%	37,800	8%	*	---	**45,800**	**9%**
Orchards/Vineyards	0	0%	*	---	0	0%	**	**---**
Row Crops	*	---	11,400	2%	0	0%	**11,400**	**2%**
Shrub/Rangelands	3,900	1%	*	---	*	---	**5,000**	**1%**
Water/Wetlands/Developed/Barren	10,100	2%	5,500	1%	*	---	**15,900**	**3%**
Oregon HUC Totals [b]	**349,400**	**72%**	**138,100**	**28%**	**	**---**	**488,200**	**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:

- Fifty-nine percent of the private forestland is under industrial forest ownership (OSU, Forestry Sciences Laboratory).
- Grain commonly is grown in rotation with grass seed and other crops.
- Orchards/Vineyards/Berries includes other perennial crops such as mint, nursery stock, and Christmas trees. (Pacific Northwest Ecosystem Research Consortium)
  - ~ Orchards/Vineyards/Berries - 1,200 acres
  - ~ Nursery stock - 600 acres
  - ~ Christmas trees - 900 acres
- Grass/Pasture/Hay includes approximately:
  - ~ 6,300 acres of grass seed and turf(Pacific Northwest Ecosystem Research Consortium)
  - ~ 13,000 acres of pasture (Pacific Northwest Ecosystem Research Consortium)
  - ~ 5,000 acres of hay (Pacific Northwest Ecosystem Research Consortium)
- Pasture is included on commercial dairy and beef operations as well as small farms and ranches.
- Urban land comprises 11,200 acres.

Irrigated Lands (1997 NRI[13] Estimates for Non-Federal Lands Only)	Type of Land	ACRES	% of Irrigated Lands	% of HUC
	Cultivated Cropland	27,000	95%	6%
	Uncultivated Cropland	1,400	5%	0%
	Pastureland	0	0%	0%
	Total Irrigated Lands	**28,600**	**100%**	**6%**

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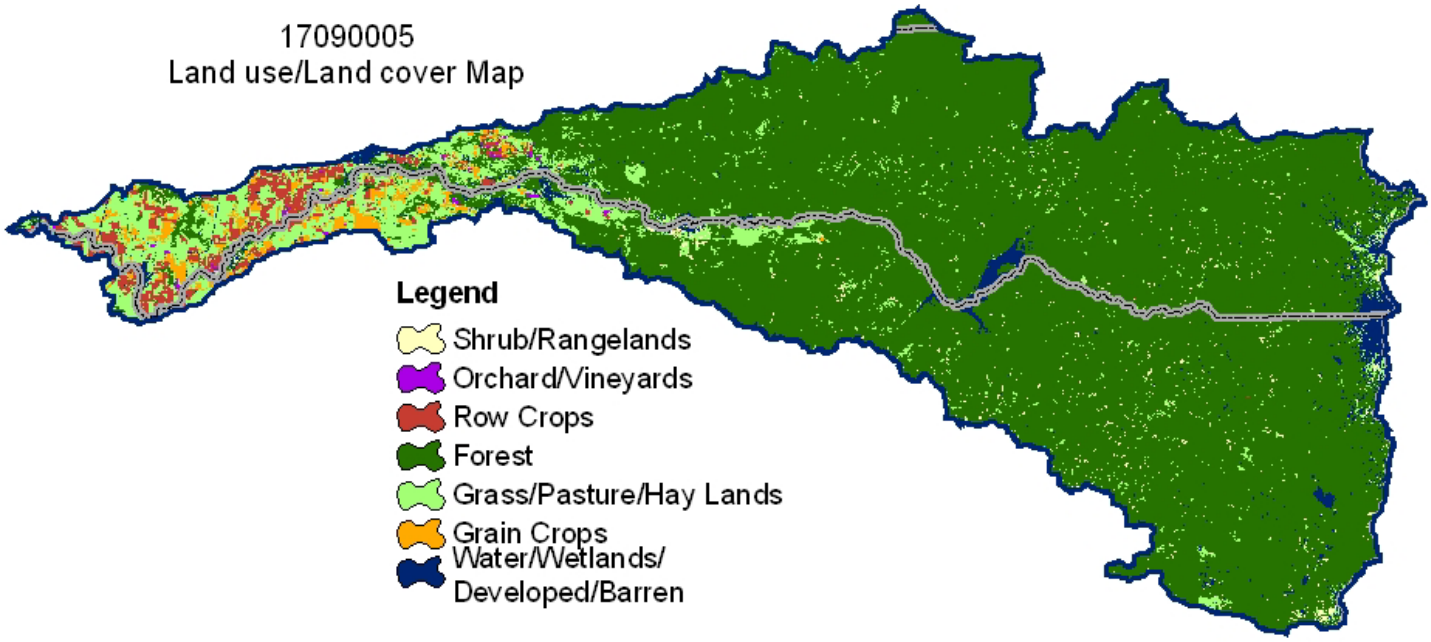
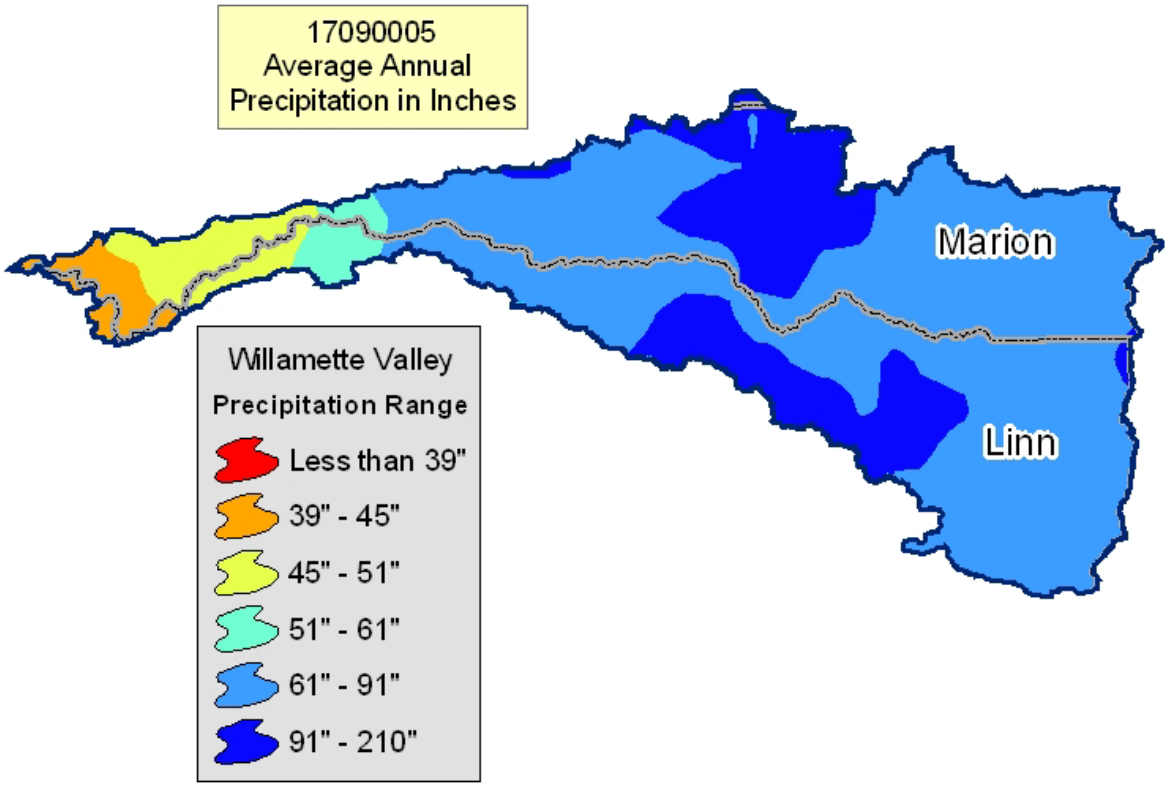

17090005
Land use/Land cover Map
Legend
Shrub/Rangelands
Orchard/Vineyards
Row Crops
Forest
Grass/Pasture/Hay Lands
Grain Crops
Water/Wetlands/
Developed/Barren


17090005
Average Annual
Precipitation in Inches
Marion
Linn
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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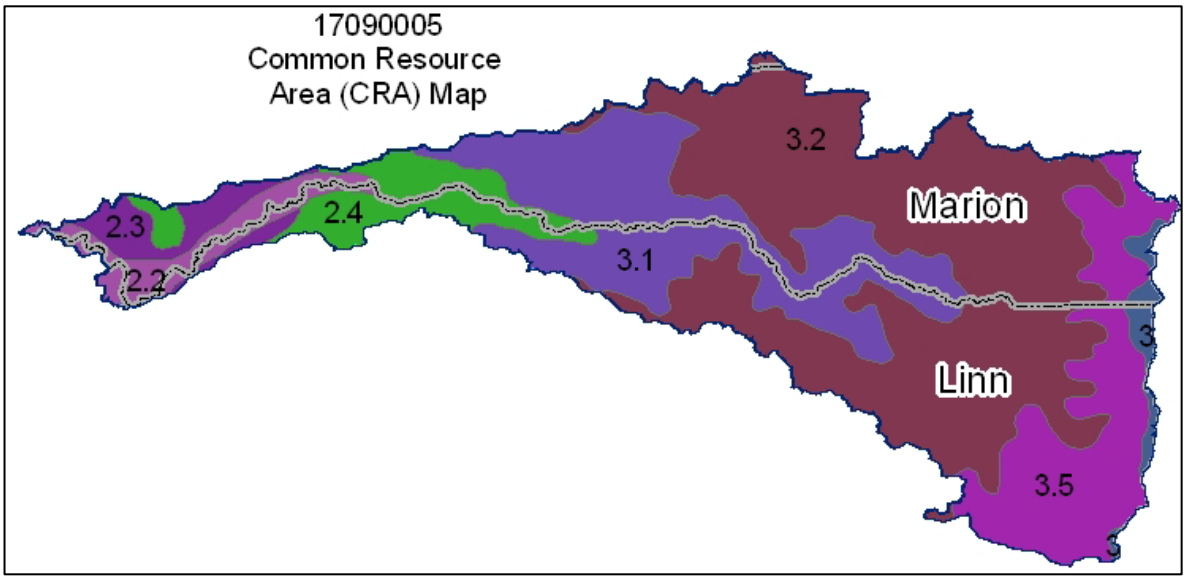
Only the major units are described below - for descriptions of all units within the HUC, go to: http://ice.or.nrcs.usda.gov/website/cra/viewer.htm



2.2 - Willamette and Puget Valleys - Willamette River Floodplains 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 of 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 bedrock 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.

3.1 - Olympic and Cascade Mountains - Western Cascades Lowlands and Valleys: This unit comprises the lower elevations of the Cascade Mountains, adjacent to the Valley Foothills unit (2.4). The bedrock is basalt, andesite, and rhyolite. The vegetation is Douglas-fir and western hemlock. This unit is one of the most important timber-producing areas in the Northwest. The temperature regime is mesic, and the moisture regime is udic.

3.2 - Olympic and Cascade Mountains - Western Cascades Montane Highlands: This unit comprises the middle to high elevations of the Cascades. The vegetation is Douglas-fir, western hemlock, mountain hemlock, Pacific silver fir, and noble fir. Elevation typically is above about 3,000 feet. The mountains are highly dissected with steep slopes. The temperature regime is frigid and "warm" cryic, and the moisture regime is udic. This unit normally has a deep annual snowpack.

3.5 - Olympic and Cascade Mountains - Northern Cascade Crest Montane Forest: This unit consists of an undulating plateau punctuated by volcanic buttes and cones that reach a maximum elevation of about 6,500 feet. The unit is extensively forested with mountain hemlock and Pacific silver fir. The temperature regime is cryic, and the moisture regime is udic. Although this unit has the same moisture and temperature regimes as unit 3.3, this unit is noticeably more moist and the break between units 3.3 and 3.5 is transitional.

Physical Description – Continued

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		ACRES	ACRE-FEET
Irrigated Adjudicated Water Rights *(OWRD[4])*	Surface	16,767	42,111
	Well	11,161	28,030
	Total Irrigated Adjudicated Water Rights	27,928	70,141
Stream Flow Data	USGS 14189000 SANTIAM RIVER AT JEFFERSON, OR	**Total Avg. Yield**	5,599,139
		May – Sept. Yield	1,051,924
		MILES	**PERCENT**
Stream Data[5] **Percent of Total Miles of Streams in HUC*	Total Miles – Major (100K Hydro GIS Layer)	808	---
	303d/TMDL Listed Streams (DEQ)	120	15%
	Anadromous Fish Presence (StreamNet)	42	5%
	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	18,103	80%
	Grain Crops	248	1%
	Grass/Pasture/Hay	2,127	9%
	Orchards/Vineyards	36	0%
	Row Crops	595	3%
	Shrub/Rangelands – Includes CRP Lands	164	1%
	Water/Wetlands/Developed/Barren	1,396	6%
	Total Acres of 100-foot Stream Buffers	**22,668**	**---**
Land Capability Class *(Croplands & Pasturelands Only)* *(1997 NRI[3] Estimates for Non-Federal Lands Only)*	**1** – slight limitations	900	2%
	2 – moderate limitations	30,000	62%
	3 – severe limitations	17,200	36%
	4 – very severe limitations	0	0%
	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	**48,100**	**---**

Confined Animal Feeding Operations – Oregon CAFO Permit – 12/2004

Animal Type	Dairy	Feedlot	Poultry	Swine	Mink	Other
No. of Permitted Farms	5	0	0	0	2	0
No. of Permitted Animals	3,389	0	0	0	77,000	0

Resource Concerns

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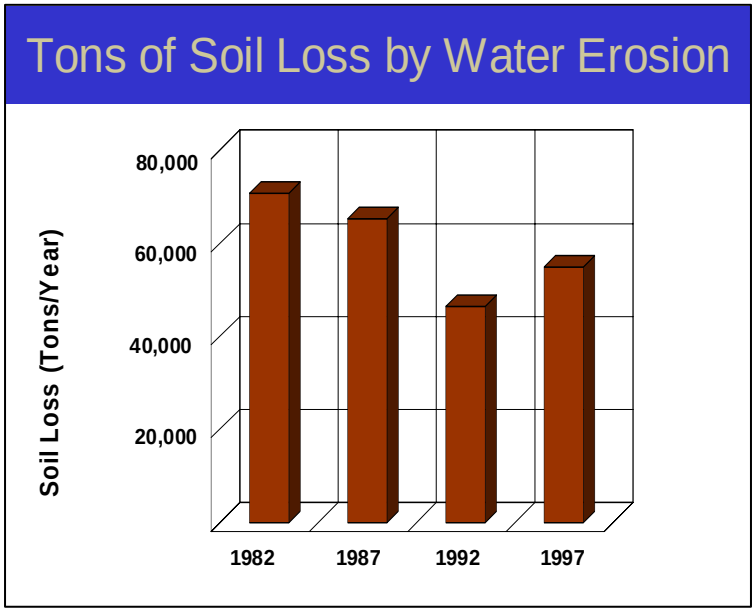
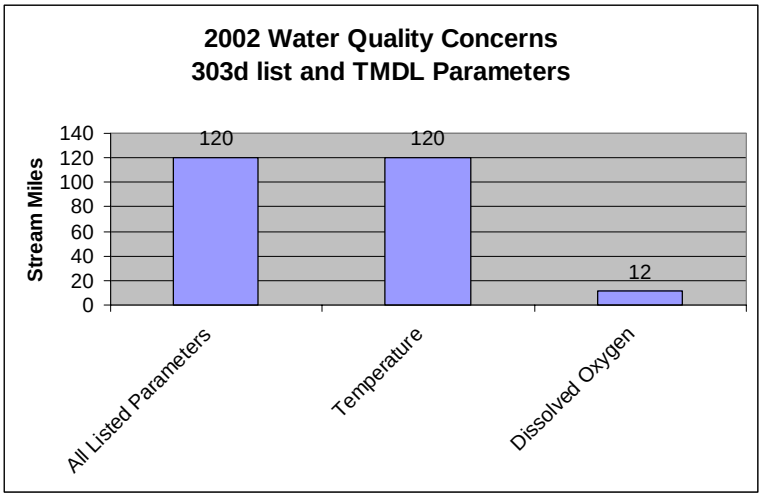


- Sheet and rill erosion by water on the cropland and pastureland have been reduced by nearly 16,000 tons of soil per year from 1982 to 1997.
- NRI estimates indicate that 4,500 acres of the agricultural lands still had water erosion rates above a sustainable level in 1997.
- Controlling erosion not 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.
- Through NRCS programs, many farmers and ranchers have applied conservation practices to reduce the effects of erosion by water. As a result, erosion rates on cropland and pastureland fell 14 percent, from 1.3 to 1.1 tons/acre/year, from 1982 to 1997.

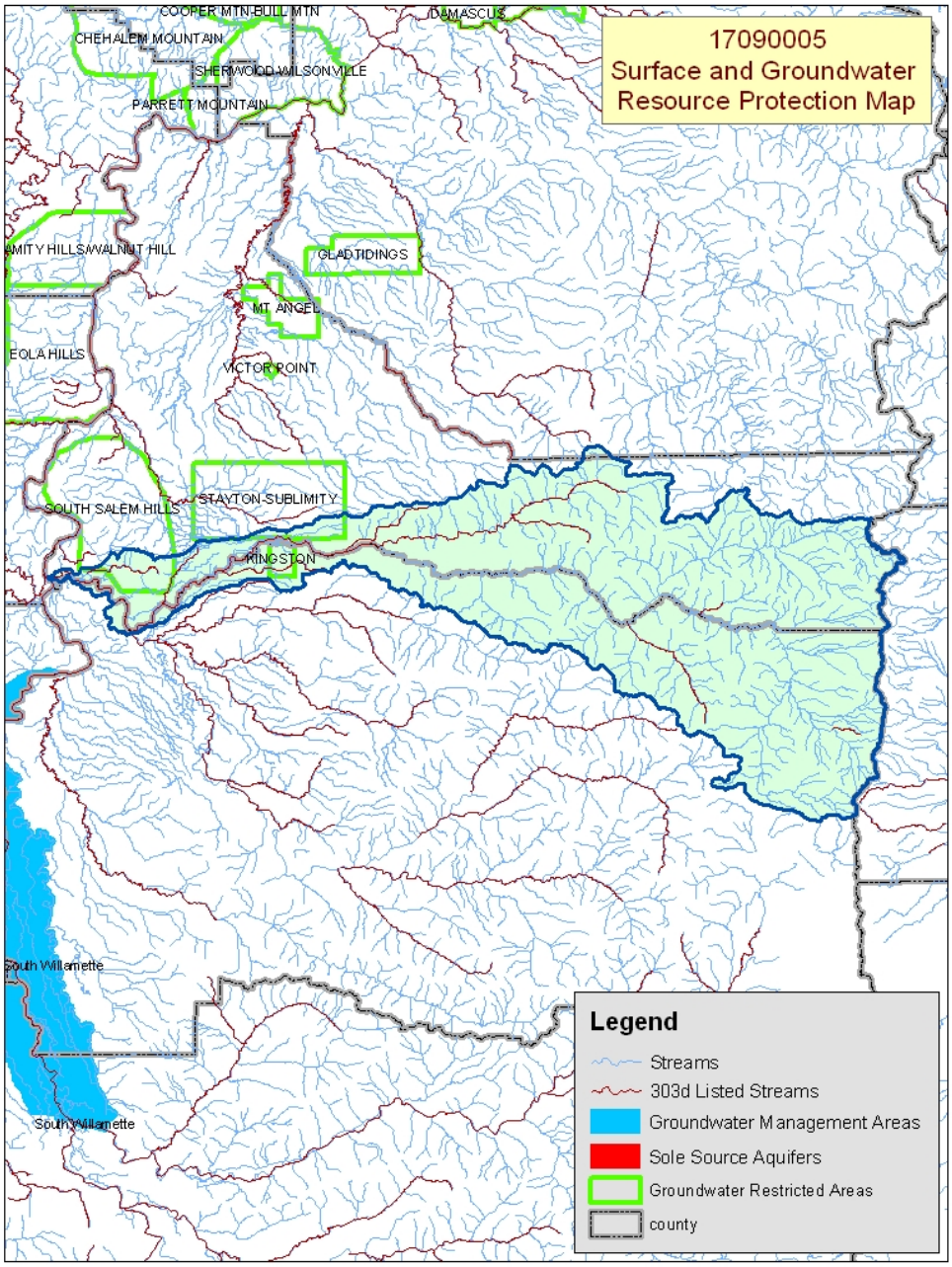
- All of the listed stream miles exceed State water quality standards for temperature. Elevated stream temperatures may be due to inadequate riparian shade, stream channel widening, and other anthropogenic or natural causes.
- Conservation practices that can be used to address these water quality issues include livestock waste management, 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	None	None	None
ODEQ TMDL's[8]		**ODA Agricultural Water Quality Management Plans**[9]	
Name	**Status**	**Name**	**Status**
Willamette Basin	Completed	Molalla-Pudding/North Santiam	Completed

OWEB Watershed Council[10]	**Watershed Council Assessments**[11]	**NWPCC Subbasin Plans and Assessments**[18]
North Santiam Watershed Council	North Santiam River Watershed Assessment (Lower and Middle Subwatersheds)	Willamette Subbasin Plan

(Continued on page 8)



Map Footnote [17]

FEDERALLY LISTED THREATENED AND ENDANGERED SPECIES[12]	
THREATENED SPECIES	**CANDIDATE SPECIES**
Mammals- Canada lynx, Columbian white-tailed deer **Birds –** Bald eagle, Northern spotted owl **Fish –** Coho salmon, Steelhead, Chinook salmon, Oregon chub, Bull trout **Invertebrates –** Fender's blue butterfly **Plants –** Golden Indian paintbrush, Willamette daisy, Water howellia, Bradshaw's lomatium, Kincaid's lupine, Nelson's checker-mallow	**Fish** – Steelhead **Birds –** Yellow-billed cuckoo Streaked horned lark **Amphibians and Reptiles –** Oregon spotted frog **Invertebrates-** Taylor's checkerspot
	PROPOSED SPECIES - None
ESSENTIAL FISH HABITAT[13] **-** Chinook	

Resource Concerns - Continued

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Resource Concerns / Issues by Land Use							
SWAPA +H Concerns	**Specific Resource Concern / Issue**	**Pasture \ Hay**	**Grass Seed**	**Grain Crops**	**Row Crops**	**Perennial Crops (Vine / Berries / Nursery)**	**Forest**
Soil Erosion	Sheet and Rill		X	X	X	X	
	Concentrated Flow or Gully		X			X	
	Streambank	X	X	X	X	X	X
	Irrigation Induced				X		
Soil Condition	Tilth, Crusting, Infiltration, Organic Matter		X	X	X	X	
Water Quantity	Water Management for Irrigated Land				X	X	
Water Quality, Surface	Pesticides		X	X	X	X	
	Nutrients and Organics	X	X	X	X	X	
	Suspended Sediments and Turbidity	X	X	X	X	X	X
	Low Dissolved Oxygen	X	X	X	X	X	
	Temperature	X	X	X	X	X	
	Pathogens	X					
	Aquatic Habitat Suitability	X	X	X	X	X	
Air Quality	Airborne Sediment Causing Safety/Health Problems		X	X	X		
	Smoke Particulates Causing Safety/Health Problems		X				
	Undesirable Odors from Agricultural Sources	X					
Plant Condition	Productivity, Health, and Vigor	X					
Plant Management	Establishment, Growth, and Harvest	X					X
Animal Habitat, Wildlife	Food, Cover, and Shelter		X	X	X	X	
Human, Economic	High Risk and Uncertainty		X		X	X	
	High Capital/Financial Costs			X	X	X	
	High Labor Costs or Availability					X	
	High Management Level Required				X	X	
	Low or Unreliable Profitability	X	X	X	X	X	
Human, Political	Inadequate Availability of Cost-Share Programs		X				
	High Degree of Controversy		X				

Pasture / Hay

- Pastureland, especially on small farms and ranches, commonly is overgrazed, lacks needed fertility, and is affected by invasive weeds.
- Proper waste management is a concern in order for CAFOs to avoid water quality problems associated with nutrients and pathogens.

Grass Seed

- Grass seed commonly is produced under contract; however, pest management and erosion control are concerns during establishment.
- Smoke from burning stubble after harvest sometimes creates health and safety issues.

Grain, Row, and Perennial Crops

- Residue, nutrient, and pest management and use of filter strips and buffers are necessary to control erosion and protect water quality.
- Water management is an issue for irrigated crops in groundwater management areas.
- Sheet and rill erosion is higher on the steeper slopes used for Christmas trees, vineyards, or orchards.
- Adopting integrated pest management in lieu of use of chemicals is a risk on high-value orchards and vineyards.

Forestland

- Non-industrial forest landowner objectives commonly do not include actively managing for timber production.

General

- Land use constraints and pressure to develop hinder conservation efforts, jeopardizing the long-term future for agriculture.
- High land values and the conflict between agriculture and urban/suburban land uses increase the cost and social issues for farming.

Census and Social Data[/14]

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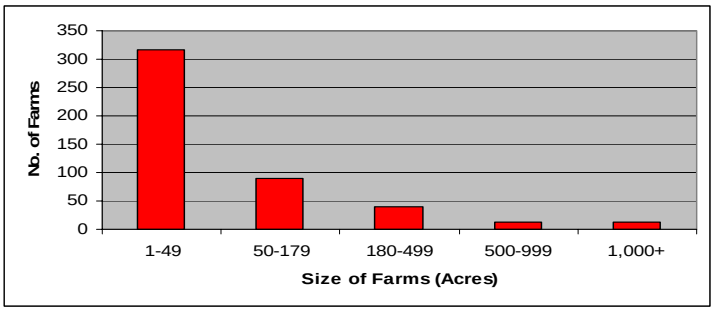


Number of Farms: 471

Number of Operators: 765

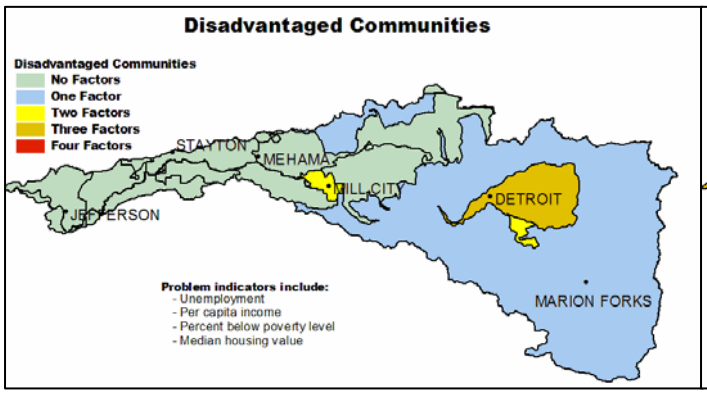
- Full-Time Operators: **265**
- Part-Time Operators: **500**

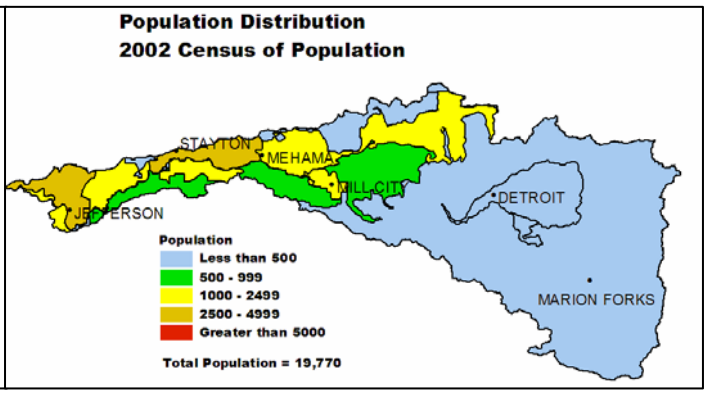
Estimated Level of Willingness and Ability to Participate in Conservation[/15]: LOW

Many of the farmers in the North Santiam subbasin that are new to agriculture and resource management, operate small-acreage farms, are unaware of local resource concerns, and have little knowledge or appreciation of conservation systems. To increase the diffusion of conservation throughout the subbasin, substantial resources need to be dedicated to marketing conservation and increasing conservation technical assistance for the new, small-acreage landowners.

Evaluation of Social Capital[/16]: LOW

Communities in the North Santiam subbasin are reported to not be highly effective at solving problems. In the last decade or so, controversy over forest management and the spotted owl and its effect on labor and the economy is perceived by many to have caused a significant out-migration of residents and has left the remaining residents with a very low sense of community and individual well-being. Lately, however, some communities have been showing signs of economic recovery, especially as new landowners move into the area. If this continues and conflict between newcomers and long-time residents can effect positive changes, communities in the subbasin may increase their social capital and become a force behind increasing resource management and the well-being of the North Santiam subbasin.





Progress/Status

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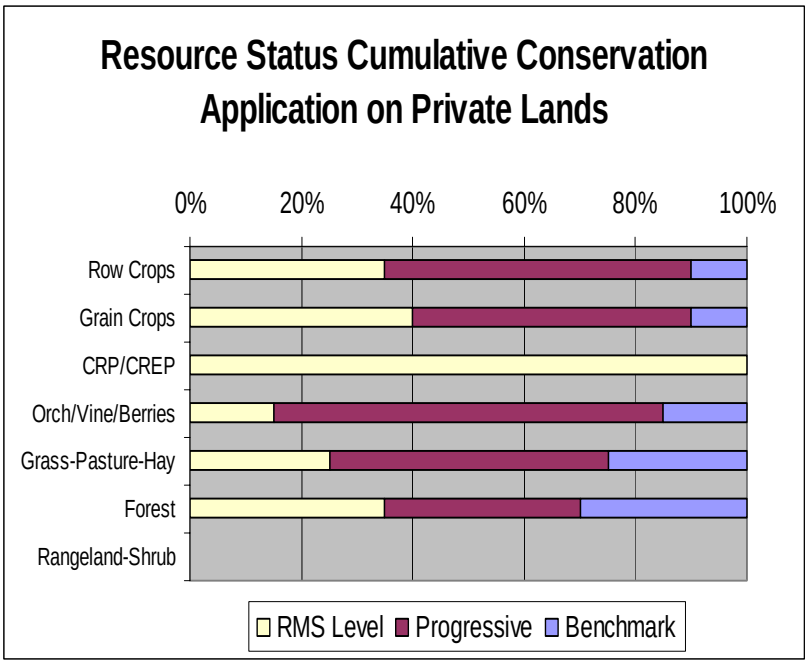
PRMS Data	FY99	FY00	FY01	FY02	FY03	Avg/Year	Total
Total Conservation Systems Planned (Acres)	40	300	75	674	945	407	2,034
Total Conservation Systems Applied (Acres)	40	110	75	780	2,442	689	3,447
Conservation Treatment (Acres)							
Waste Management	0	2	0	0	6	2	8
Buffers	0	2	0	0	28	6	30
Erosion Control	0	90	0	1,822	123	407	2,035
Irrigation Water Management	0	0	0	495	241	147	736
Nutrient Management	0	110	0	375	257	148	742
Pest Management	0	75	0	898	123	219	1,096
Prescribed Grazing	0	0	15	371	171	111	557
Trees & Shrubs	0	0	0	10	0	2	10
Conservation Tillage	0	0	0	0	0	0	0
Wildlife Habitat	4	114	15	506	0	128	639
Wetlands	0	0	0	0	0	0	0



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.
- Row crop (e.g. corn, beans, and cole crops) farmers often rely on crop consultants.
- Grain producers typically have not worked with NRCS, but they have adopted a high level of management.
- Farmers growing perennial crops generally operate at high level of management.
- Much of the pasture that is at the benchmark level is on small farms.
- Private, non-industrial forestland owners typically do not work with NRCS or SWCDs; however, their lands commonly comply with State forest practices act requirements.

Lands Removed from Production through Farm Bill Programs

- Conservation Reserve Program (CRP): **7 acres**
- Wetland Restoration Program (WRP): **None**
- Conservation Reserve Enhancement Program (CREP): **None**

Footnotes/Bibliography

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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/wrexport.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.