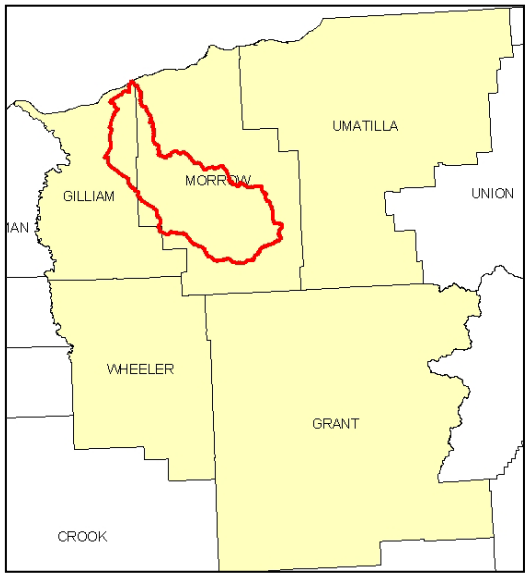
Willow - 17070104

8-Digit Hydrologic Unit Profile

FINAL

JANUARY 2005



Introduction

The Willow 8-Digit Hydrologic Unit Code (HUC) subbasin is comprised of 555,903 acres. Over eighty percent of the subbasin is in Morrow County, and the remainder is in Gilliam County. Ninety-six percent of the land is privately owned. The subbasin has 112 farms, of which fifty-five percent are very large and well over 1,000 acres in size.

Sixty-seven percent of the subbasin is used for grain crops and as rangeland, fourteen percent has been removed from production through government programs, twelve percent is used as pastureland, and seven percent is private and public forest land.

Conservation assistance is provided by six soil and water conservation districts, one soil survey office, the Columbia Blue Mountain Resource Conservation and Development (RC&D) office, and the Mission satellite office serving the Umatilla Indian Reservation.

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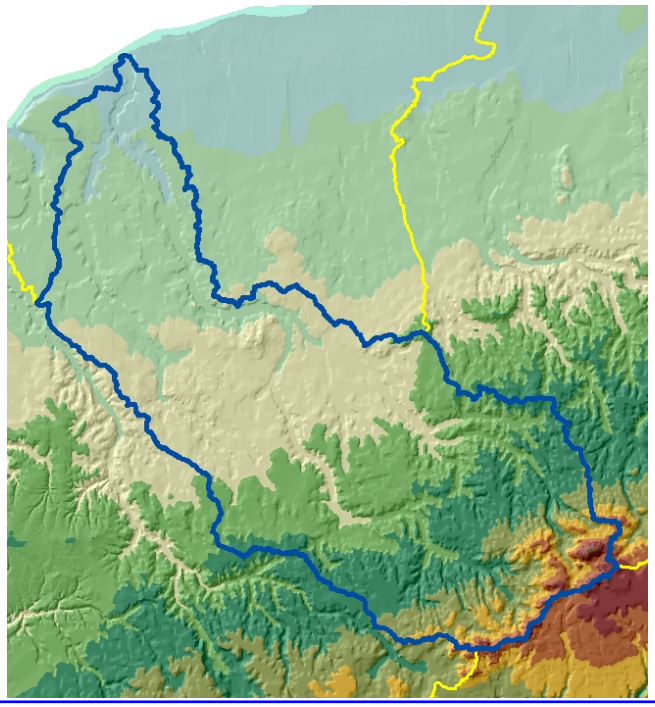

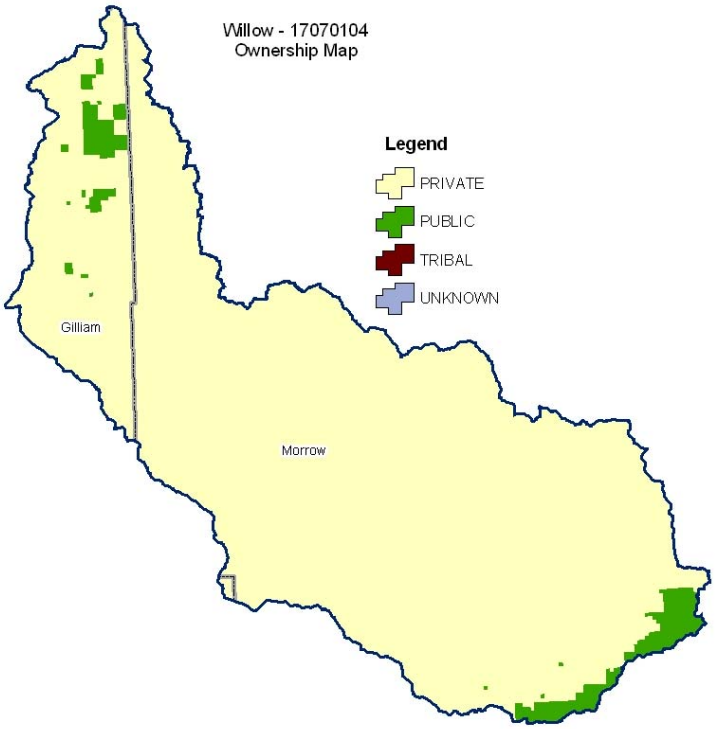

Produced by the Water Resources Planning Team Portland, OR

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Physical Description

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Land Cover/Land Use (NLCD[12])	Ownership - (2003 Draft BLM Surface Map Set[11])							
	Public		Private		Tribal		Totals [b]	%
	Acres	%	Acres	%	Acres	%		
Forest	11,400	2%	26,600	5%	0	0%	38,000	7%
Grain Crops	*	---	128,500	23%	0	0%	128,500	23%
Conservation Reserve Program Land [a]	0	0%	75,900	14%	0	0%	75,900	14%
Grass/Pasture/Hay	4,000	1%	65,200	12%	0	0%	69,200	13%
Orchards/Vineyards	0	0%	0	0%	0	0%	0	0%
Row Crops	0	0%	0	0%	0	0%	0	0%
Shrub/Rangelands	4,300	1%	237,700	43%	0	0%	242,000	44%
Water/Wetlands/Developed/Barren	*	---	*	---	0	0%	*	---
Oregon HUC Totals [b]	**19,700**	**4%**	**536,100**	**96%**	**0**	**---**	**555,800**	**100%**

**: Less than one 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:

- Over 50 percent of the private forest land is under industrial ownership and is managed for timber production.
- Most of cereal grain is grown in the less than 14-inch precipitation zone under a grain-fallow rotation. In the more than 14-inch precipitation zone, grain can be annually cropped.
- Much of the highly erodible cropland has been converted to permanent plant cover through the Conservation Reserve Program.
- Most pasture and range units are associated with large ranching operations; only a few small ranches are in this hydrologic unit. Generally, pasture on the bottom land consists of small irrigated units.

Irrigated Lands (1997 NRI[13] Estimates for Non-Federal Lands Only)	Type of Land	ACRES	% of Irrigated Lands	% of HUC
	Cultivated Cropland	4,300	16%	<1%
	Uncultivated Cropland	11,000	41%	2%
	Pastureland	11,500	43%	2%
	Total Irrigated Lands	**26,800**	**100%**	**5%**

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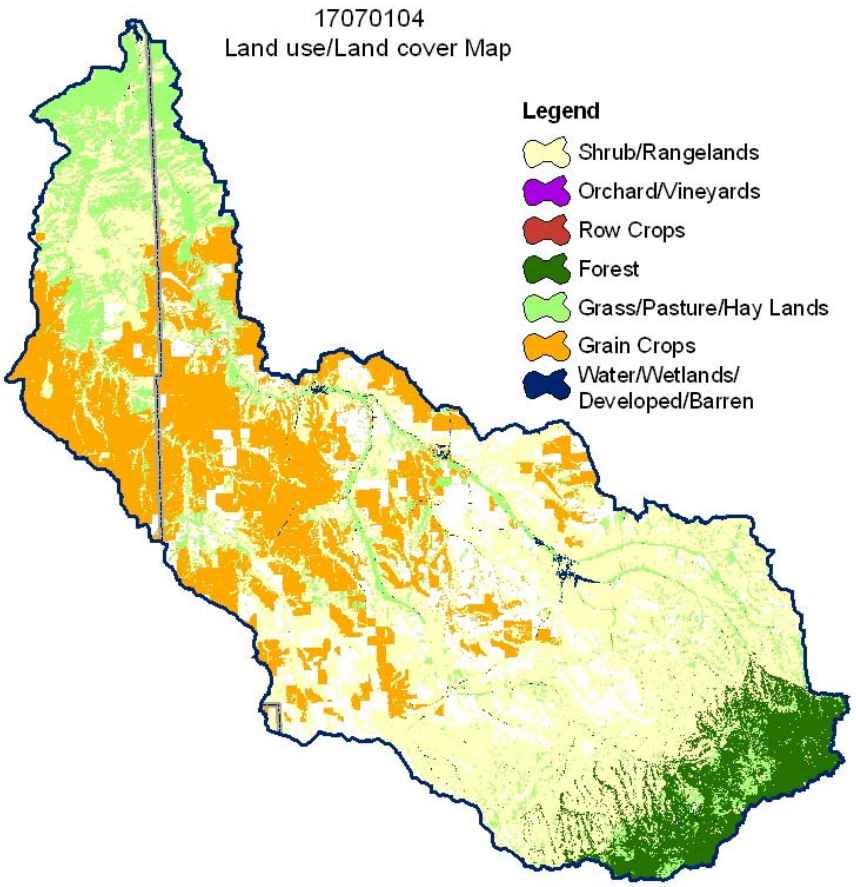

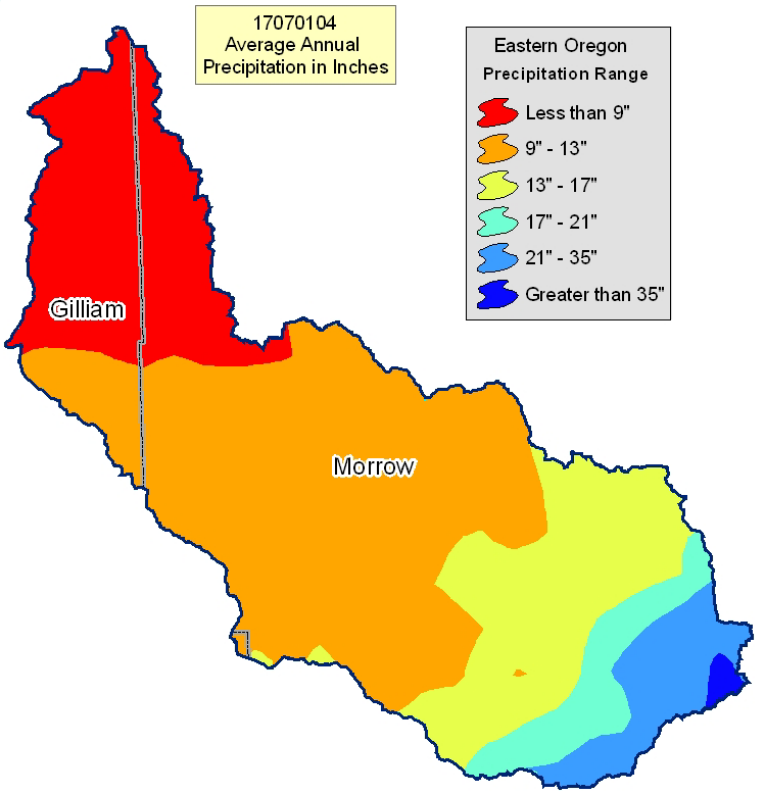

Common Resource Area Map

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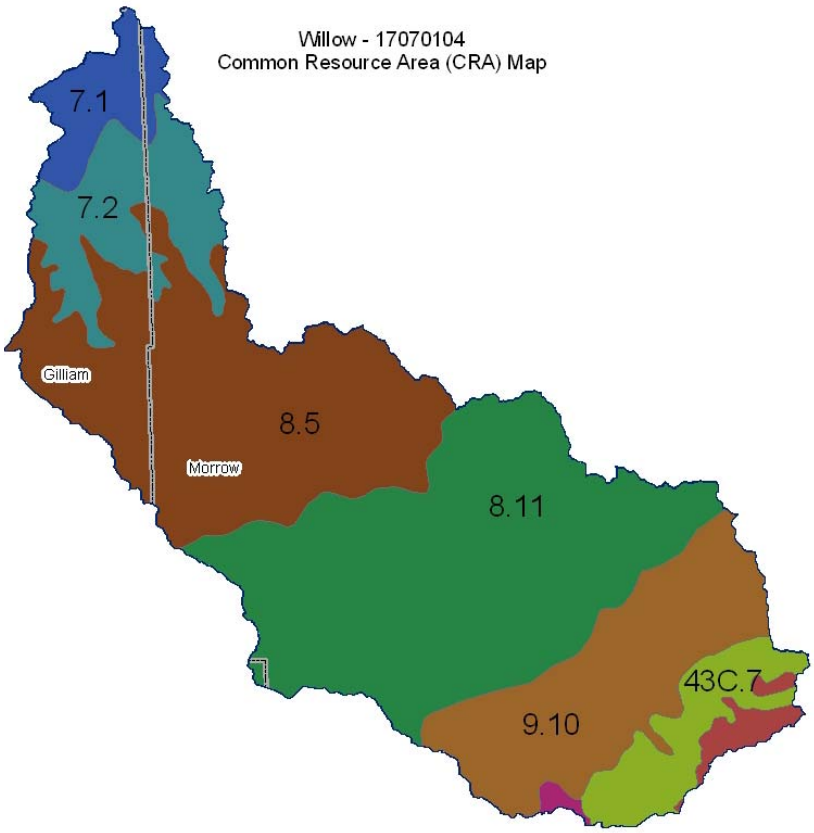
Only the major units are described below - for descriptions of all units within the HUC, go to: http://ice.or.nrcs.usda.gov/website/cra/viewer.htm



7.2 - Columbia Basin - Silty Missoula Flood Deposits: This unit occurs as a transitional area between the Sandy Missoula Flood Deposits CRA and MLRA 8. The soils are dominantly silt loam or silt of the Warden and Shano series. The temperature regime is mesic, and the moisture regime is aridic.

8.5 – Columbia Plateau - Moist Yakima Folds: This unit is a series of anticlinal ridges and synclinal valleys covering the western Columbia Plateau. The far eastern end of the unit enters Oregon east of Wallula Gap, on the Columbia River. The ridges are composed of basalt layers as much as 12,000 feet thick. Loess blankets the south-facing slopes that support dryland wheat farming, and grazing occurs on the steep, rocky, north-facing slopes. This unit is in the rainshadow of the Cascade Range, and it receives 9 to 15 inches of precipitation annually. The temperature regime is mesic, and the moisture regime is aridic. Sagebrush and bunchgrass plant associations are dominant outside of the heavily farmed or grazed areas.

8.11 - Columbia Plateau - Umatilla Plateau: This is the major unit within the MLRA. It consists of loess-mantled basalt plateaus. The soils are moderately deep silt loam of the Condon and Morrow series. The temperature regime is mesic, and the moisture regime is xeric. The mean annual precipitation is 12 to 15 inches.

9.10 - Palouse and Nez Perce Prairies - Umatilla Dissected Uplands: This unit is characterized by shallow and moderately deep soils on gently sloping to steep hills and mountains adjacent to forest land. The dominant soils are those of the Gwin, Gwinly, Gurdane, and Waha series. The temperature regime is mesic, and the moisture regime is xeric. The mean annual precipitation is about 16 to 25 inches. Most areas are used for livestock grazing.

Physical Description – Continued

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		ACRES	ACRE-FEET
Irrigated Adjudicated Water Rights *(OWRD[4])*	Surface	10,464	33,876
	Well	9,567	30,974
	Total Irrigated Adjudicated Water Rights	20,031	64,850
Stream Flow Data	USGS 14036000 WILLOW CREEK, NEAR ARLINGTON, OR	**Total Avg. Yield**	22,683
		May – Sept. Yield	3,697
		MILES	**PERCENT**
Stream Data[5] **Percent of Total Miles of Streams in HUC*	Total Miles – Major (100K Hydro GIS Layer)	248	---
	303d/TMDL Listed Streams (DEQ)	82	33%
	Anadromous Fish Presence (StreamNet)	0	---
	Bull Trout Presence (StreamNet)	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	1,126	19%
	Grain Crops	132	2%
	Grass/Pasture/Hay	1,965	33%
	Orchards/Vineyards	0	---
	Row Crops	0	---
	Shrub/Rangelands – Includes CRP Lands	2,498	42%
	Water/Wetlands/Developed/Barren	253	4%
	Total Acres of 100-foot Stream Buffers	**5,974**	**---**
Land Capability Class *(Croplands & Pasturelands Only)* *(1997 NRI[3] Estimates for Non-Federal Lands Only)*	**1** – slight limitations	13,300	9%
	2 – moderate limitations	9,000	6%
	3 – severe limitations	95,900	65%
	4 – very severe limitations	23,600	16%
	5 – no erosion hazard, but other limitations	0	---
	6 – severe limitations; unsuitable for cultivation; limited to pasture, range, forest	6,700	5%
	7 – very severe limitations; unsuitable for cultivation; limited to grazing, forest, wildlife habitat	0	---
	8 – miscellaneous areas; limited to recreation, wildlife habitat, water supply	0	---
	Total Croplands & Pasturelands	**148,500**	**---**

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

Animal Type	Dairy	Feedlot	Poultry	Swine	Mink	Other
No. of Permitted Farms	1	1	0	0	0	0
No. of Permitted Animals	7,200	5,000	0	0	0	0

Resource Concerns

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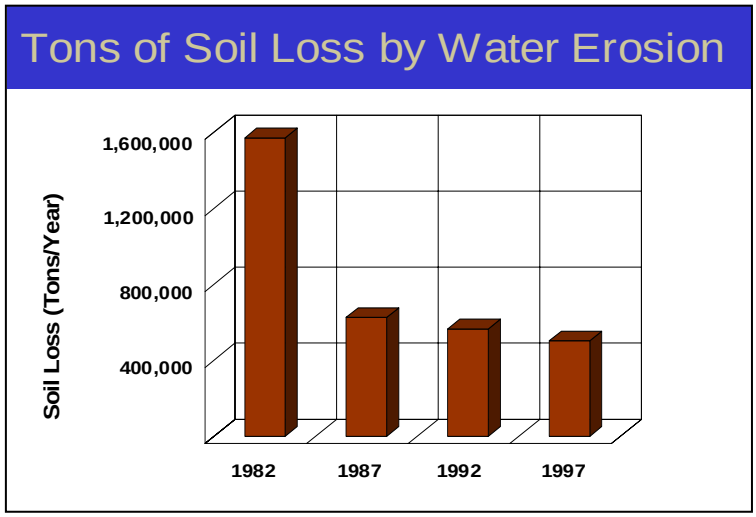
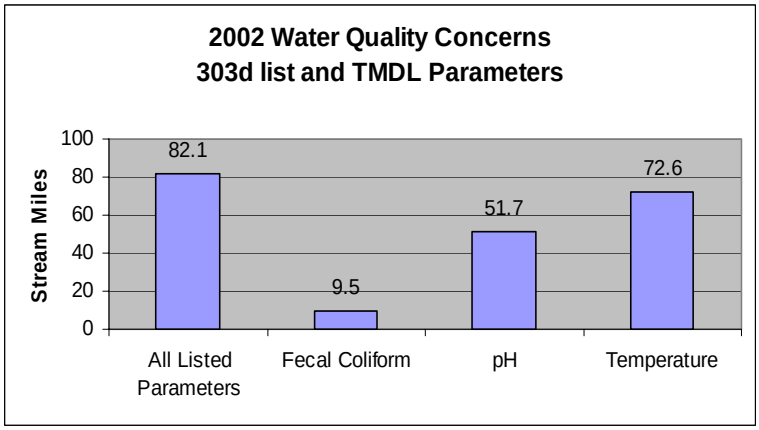


- Sheet and rill erosion by water in areas of croplands and pasturelands has been reduced by more than 1 million tons of soil per year from 1982 to 1997.
- NRI estimates indicate that 54,900 acres of the agricultural lands still had water erosion rates above a sustainable level in 1997.
- Controlling 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 cultivated cropland fell 43 percent, from 7 tons/acre/year to 4 tons/acre/year, from 1982 to 1997.



- Almost 90 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, warm irrigation return flows, and other anthropogenic or natural causes.
- Conservation practices that can be used to address these water quality issues include erosion control, grazing management, irrigation water 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		Umatilla/Willow Subbasin Plans	Completed
ODEQ TMDL's[8]		ODA Agricultural Water Quality Management Plans[9]	
Name	Status	Name	Status
None		Willow Creek	Completed

OWEB Watershed Councils[10]	Watershed Council Assessments[11]	NWPCC Subbasin Plans & Assessments[18]
Gilliam-East John Day and Willow Creek Watershed Councils	None	John Day Subbasin Plan

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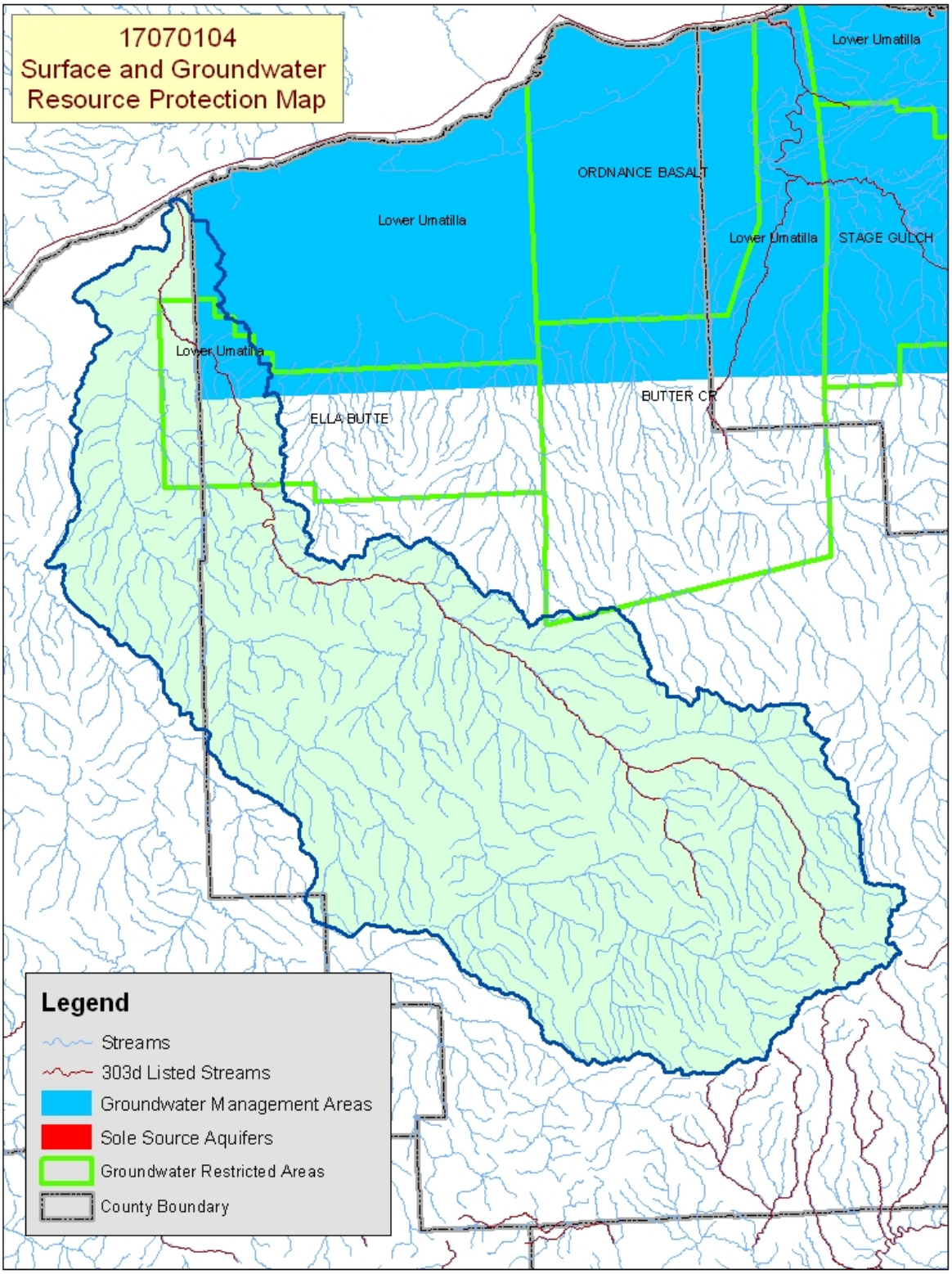

Map Footnote [17]

Resource Concerns - Continued

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Resource Concerns / Issues by Land Use							
SWAPA +H Concerns	**Specific Resource Concern / Issue**	**Pasture \ Hay**	**Grain Crops**	**Row Crops**	**Orchards / Vnyrd**	**Shrub / Range**	**Forest**
Soil Erosion	Sheet and Rill		X				
	Wind	X	X				
Soil Condition	Tilth, Crusting, Infiltration, Organic Matter		X				
Water Quantity	Water Management for Irrigated Land	X					
Water Quality, Surface	Suspended Sediments and Turbidity		X				
	Aquatic Habitat Suitability	X					
Plant Suitability	Site and Intended Use Suitability					X	X
Plant Condition	Productivity, Health, and Vigor	X				X	X
Plant Management	Establishment, Growth, and Harvest						X
Animal Habitat, Domestic	Water - Quantity and Quality					X	
Animal Habitat, Wildlife	Water - Quantity and Quality					X	
Human, Economics	Land Use Constraints/Restrictions						
	High Risk and Uncertainty	X	X				
	High Capital/Financial Cost						X
	High Labor Cost or Availability						X
	Low or Unreliable Profitability	X	X			X	
Human, Political	Inadequate Availability of Cost Share Programs					X	

Grass / Pasture / Hay

- Major concerns involve conserving water, maintaining good pasture condition, and reducing the impact on riparian areas.
- Poor economic return discourages conservation activities.

Grain Crops

- Fields that do not have adequate residue are subject to sheet and rill erosion and wind erosion, which leads to delivery of sediment to streams and ditches.
- Low profit margin hinders adoption of conservation practices.

Shrub / Rangelands

- Noxious weeds and poor range condition reduce productivity for livestock grazing and wildlife habitat.
- Rangelands adjacent to watershed streams can pose concerns about the impact (habitat and temperature) on fisheries.
- Lack of funding hinders the adoption of conservation practices.

Forest Land

- Thinning of forests is needed to improve the health and vigor of the vegetation as well as to provide more forage and browse for livestock and wildlife.
- The cost of implementation and high labor cost discourage use of improvements.

FEDERALLY LISTED THREATENED AND ENDANGERED SPECIES[12]	
THREATENED SPECIES	**CANDIDATE SPECIES**
Mammals – Canada lynx **Birds -** Bald eagle **Fish –** Steelhead, Chinook salmon **Invertebrates –** None **Plants –** None	**Mammals –** Washington ground squirrel **Birds –** Yellow-billed cuckoo **Plants** – Northern wormwood **PROPOSED SPECIES** None
ESSENTIAL FISH HABITAT[13] – Chinook salmon	

Census and Social Data[14]

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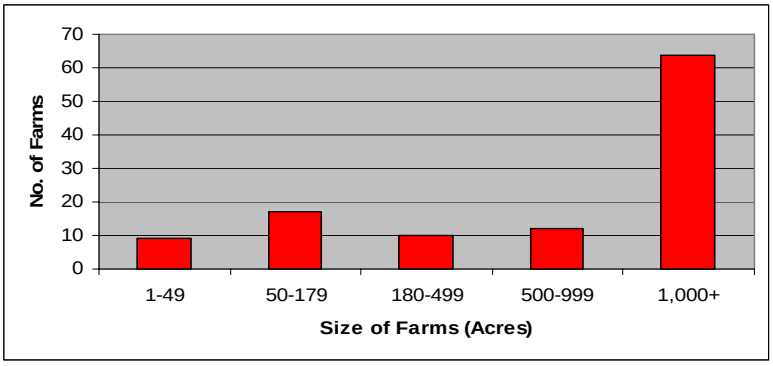
Number of Farms: 112

Number of Operators: 189

- Full-Time Operators: **78**
- Part-Time Operators: **111**

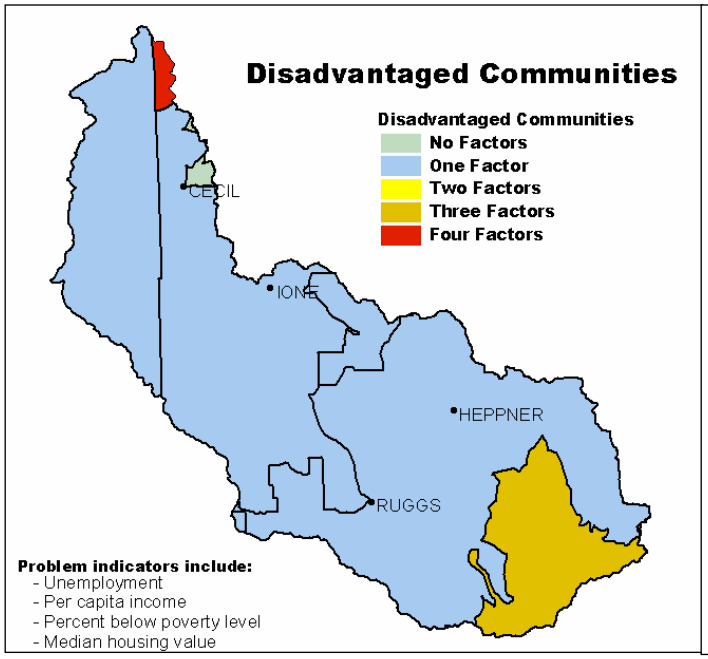
Estimated Level of Willingness and Ability to Participate in Conservation[15]: MODERATE

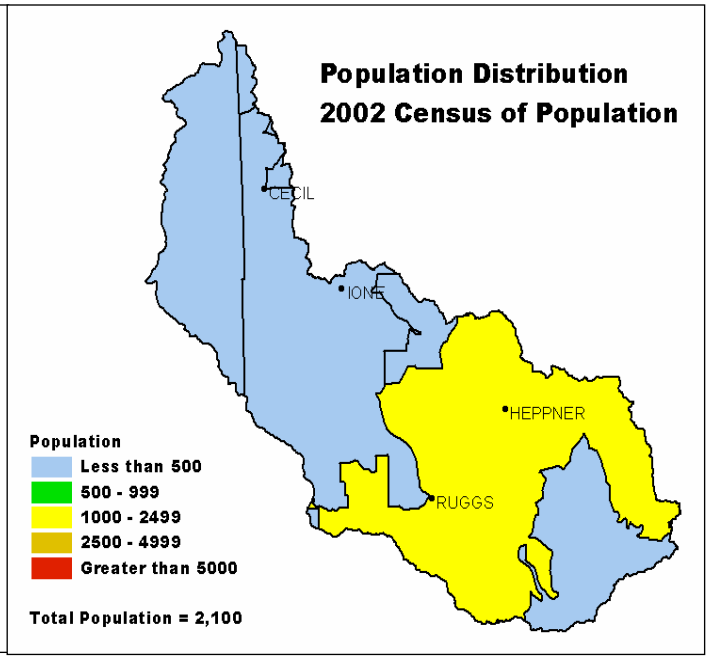


Evaluation of Social Capital[16]: LOW TO MODERATE

Farms and ranches in the Willow subbasin generally are financially stable family operations and are expected to remain so. Many of the landowners are fairly well educated and have a positive stewardship attitude, although they neither associate with nor consider themselves environmentalists. Most of the farms and ranches have conservation plans, but they are not fully implemented. Adoption of conservation practices by individuals could be increased by increasing financial assistance, improving technical assistance, and ensuring that operators are aware of the benefits of conservation to their operation's net return.

Participation in farm and ranch organizations is strong, but participation in other community-wide organizations is not. The diffusion of conservation throughout the subbasin might be accelerated by developing local leadership, expanding the awareness of natural resources issues throughout the community as a whole, and strengthening the ability and willingness of the community to work together to effectively address local resources issues.





Progress / Status

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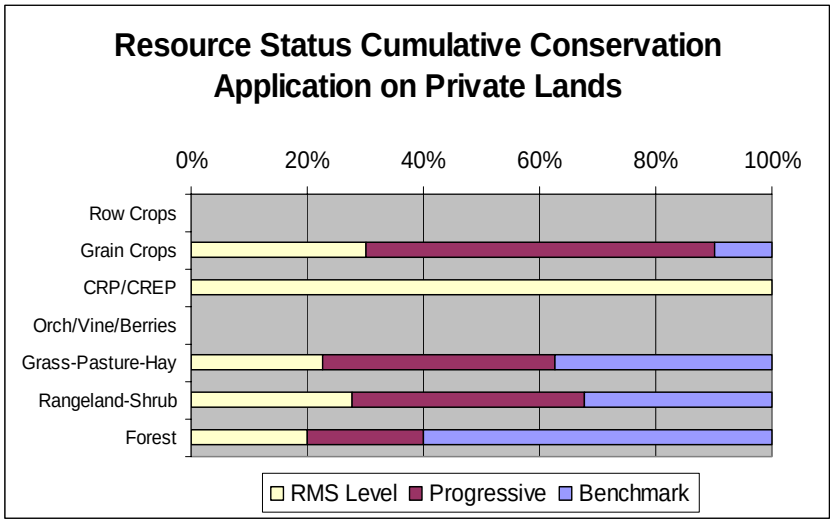
PRMS Data	FY99	FY00	FY01	FY02	FY03	Avg / Year	Total
Total Conservation Systems Planned (Acres)	12,174	12,790	3,336	16,415	5,031	9,949	49,746
Total Conservation Systems Applied (Acres)	11,320	32,324	26,522	15,246	41,574	25,397	126,986
Conservation Treatment							
Waste Management (Number)	0	0	0	0	0	0	0
Riparian Forest Buffers (Acres)	0	0	0	0	200	40	200
Erosion Control (Acres)	15,817	26,262	22,764	8,587	7,592	16,204	81,022
Irrigation Water Management (Acres)	0	0	0	0	0	0	0
Nutrient Management (Acres)	3946	2,938	1,465	4,964	3532	3,369	16,845
Pest Management (Acres)	0	0	0	72	0	674	72
Prescribed Grazing (Acres)	1438	680	0	722	5536	1675	8,376
Trees and Shrubs (Acres)	25	0	52	60	261	80	398
Conservation Tillage (Acres)	0	360	0	350	600	262	1,310
Wildlife Habitat (Acres)	819	3	504	155	1065	509	2,546
Wetlands (Acres)	0	0	0	0	0	0	0



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

Progress over the last five years has been focused on:

- ~ Erosion control and conservation tillage in areas used for grain.
- ~ Nutrient management on cropland.
- ~ Wildlife habitat management in riparian areas and on uplands.
- ~ Resource concerns have been or are being addressed on 85 percent of the grain crops.

- ❖ Poor economic return and lack of financial incentives hinder use of additional conservation practices on pastureland and rangeland.
- ❖ The cost of implementation and high labor cost discourage use of improvements on private non-industrial forest land.

Lands Removed from Production through Farm Bill Programs

- ❖ Conservation Reserve Program (CRP): **75,448 acres**
- ❖ Wetland Restoration Program (WRP): **none**
- ❖ Conservation Reserve Enhancement Program (CREP): **425 acres**

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.