Willow - 17070104

8 Digit Hydrologic Unit Profile

FINAL

JANUARY 2005

Introduction

The Willow 8-Digit Hydrologic Unit Code (HUC) subbasin is 555,903 acres. Over eighty percent of the subbasin is in Morrow County, and the remainder is in Gilliam County. Land in the Willow subbasin is 96 percent privately owned. There are only 112 farms in the subbasin, but 55 percent are very large, well over 1,000 acres.

Sixty-seven percent of the subbasin is in grain crops and rangeland, 14 percent of the land has been removed from production through government programs, 12 percent is pasture land, and 7 percent is private and public forestlands.

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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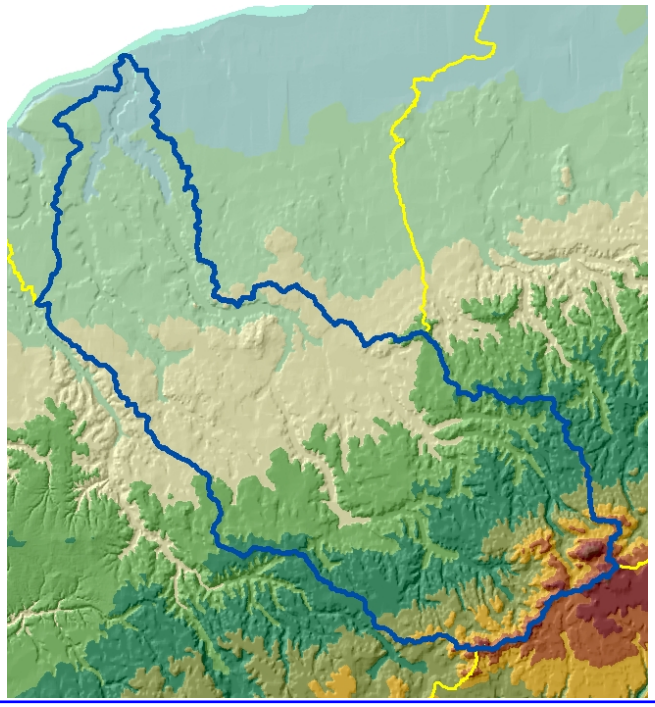

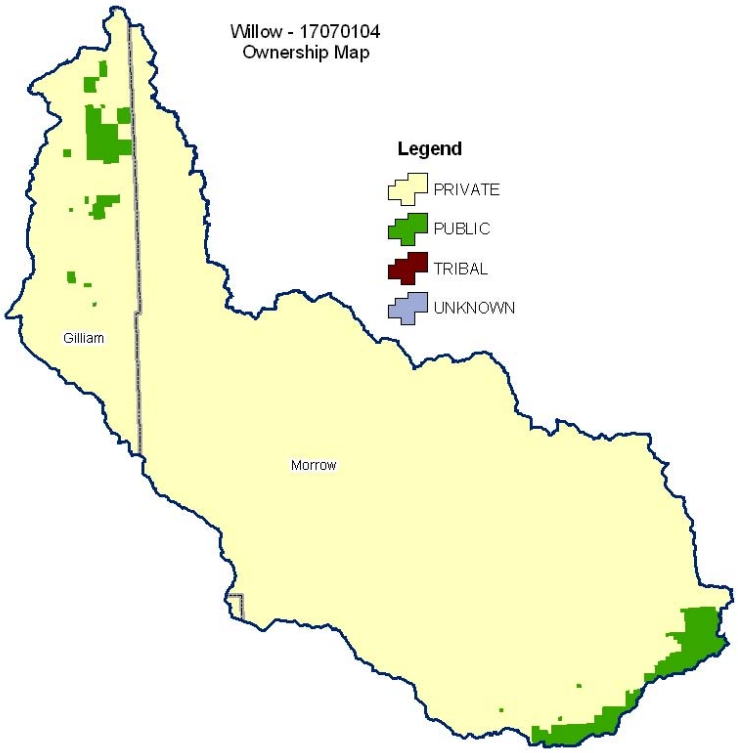

Produced by the Water Resources Planning Team Portland, OR

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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 Lands	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 include CRP/CREP.
b: Totals may not add due to rounding and small unknown acreages.

Special Considerations for this 8 Digit HUC:

- Over 50% of the private forestland is in industrial ownership, managed for timber production.
- Most of cereal grain is grown in the less than 14 inch precipitation zone in grain-fallow rotation. Where there is more than 14 inches of precipitation, grain can be annual cropped.
- Much of the highly erodiable cropland has been converted to permanent vegetative cover through the Conservation Reserve Program.
- Most pasture and range units are associated with large ranching operations, there are only a few small ranches in this hydrologic unit. Usually, pasture in the bottom lands are 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%
	Non-Cultivated Cropland	11,000	41%	2%
	Pastureland	11,500	43%	2%
	Total Irrigated Lands	26,800	100%	5%

(Continued on following pages)

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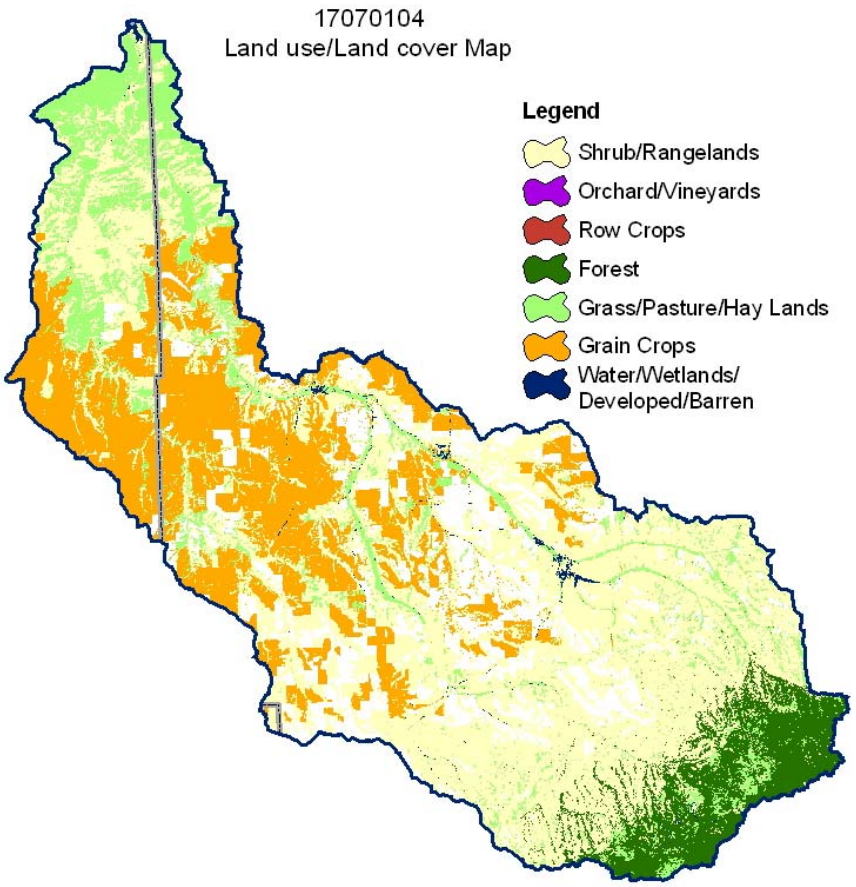

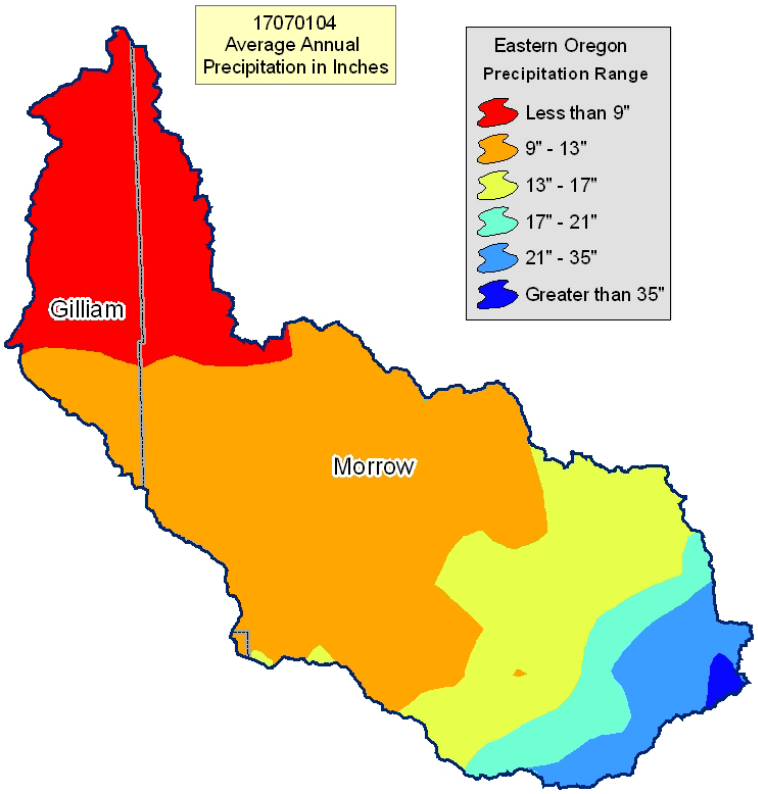

Common Resource Area Map

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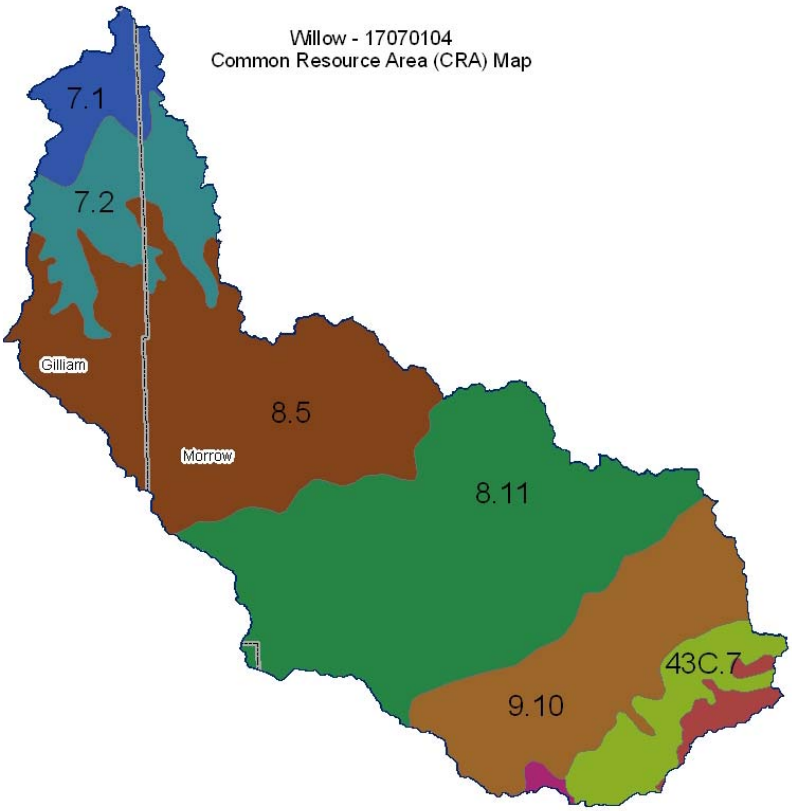
CRA Map - areas with a majority are listed below - for descriptions of every class within the HUC, go to: http://ice.or.nrcs.usda.gov/website/cra/viewer.htm



7.2 - Columbia Basin - Silty Missoula Flood Deposits: This unit occurs as a transition between the Sandy Missoula Flood Deposits CRA and MLRA 8. The soils are dominated by silt loam or silt textures. Soil series are Warden and Shano. 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 up to 12,000 feet thick. Loess blankets the south-facing slopes and supports dryland wheat farming, while grazing occurs on steep, rocky north slopes. Located in the rainshadow of the Cascade Range, it receives 9 to 15 inches of precipitation. Temperature regime is mesic and the moisture regime is aridic. Sagebrush and bunchgrass associations dominate plant communities outside of 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 the moderately deep silt loam Condon and Morrow soils series. Temperature regime is mesic; moisture regime is xeric. Precipitation is about 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 to steeply sloping hills and mountains adjacent to forestland. The dominant soils are Gwin, Gwinly, Gurdane and Waha. Temperature regime is mesic; moisture regime is xeric. 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 NR ARLINGTON, OREG.	**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 (DEQ Water Quality Limited Streams)	82	33%
	Anadramous Fish Presence (Streamnet)	0	--
	Bull Trout Presence (Streamnet)	0	--
		ACRES	**PERCENT**
Land Cover/Use[2] based on a 100 ft. stretch on both sides of all streams in the 100K Hydro Layer	Forest	1,126	19%
	Grain Crops	132	2%
	Grass/Pasture/Hay Lands	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 ft stream buffers	**5,974**	**--**
Land Capability Class *(Croplands & Pasturelands Only)* *(1997 NRI[3] Estimates for Non-Federal Lands Only)*	**I** – slight limitations	13,300	9%
	II – moderate limitations	9,000	6%
	III – severe limitations	95,900	65%
	IV – very severe limitations	23,600	16%
	V – no erosion hazard, but other limitations	0	--
	VI – severe limitations, unsuited for cultivation, limited to pasture, range, forest	6,700	5%
	VII – very severe limitations, unsuited for cultivation, limited to grazing, forest, wildlife	0	--
	VIII – misc areas have limitations, limited to recreation, wildlife, and water supply	0	--
	Total Crop & Pasture Lands	**148,500**	**--**

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

Animal Type	Dairy	Feed Lot	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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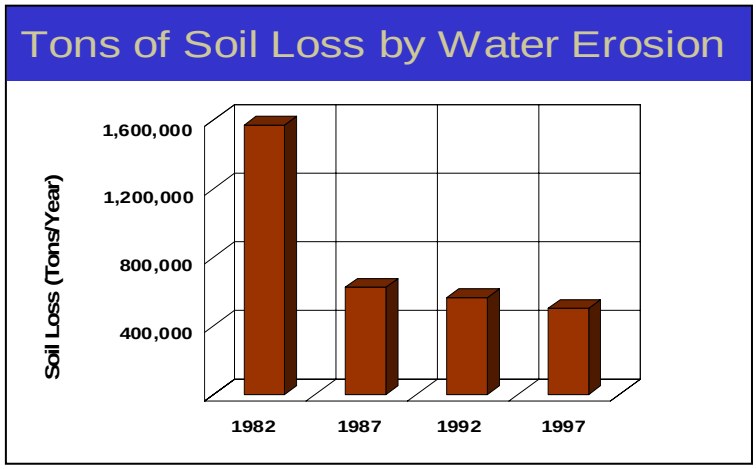
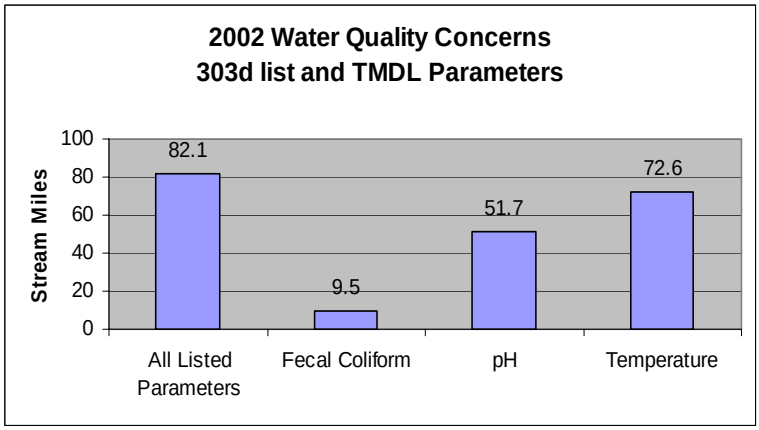


- Sheet and rill erosion by water on the subbasin croplands and pasturelands have been reduced by more than 1 million tons of soil per year from 1982 to 1997.
- NRI estimates indicate 54,900 acres of the subbasin agricultural lands still had water erosion rates above a sustainable level in 1997.
- Controlling erosion not only sustains the long-term productivity of the land, but 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 7.0 to 4.0 tons/acre/year from 1982 to 1997.

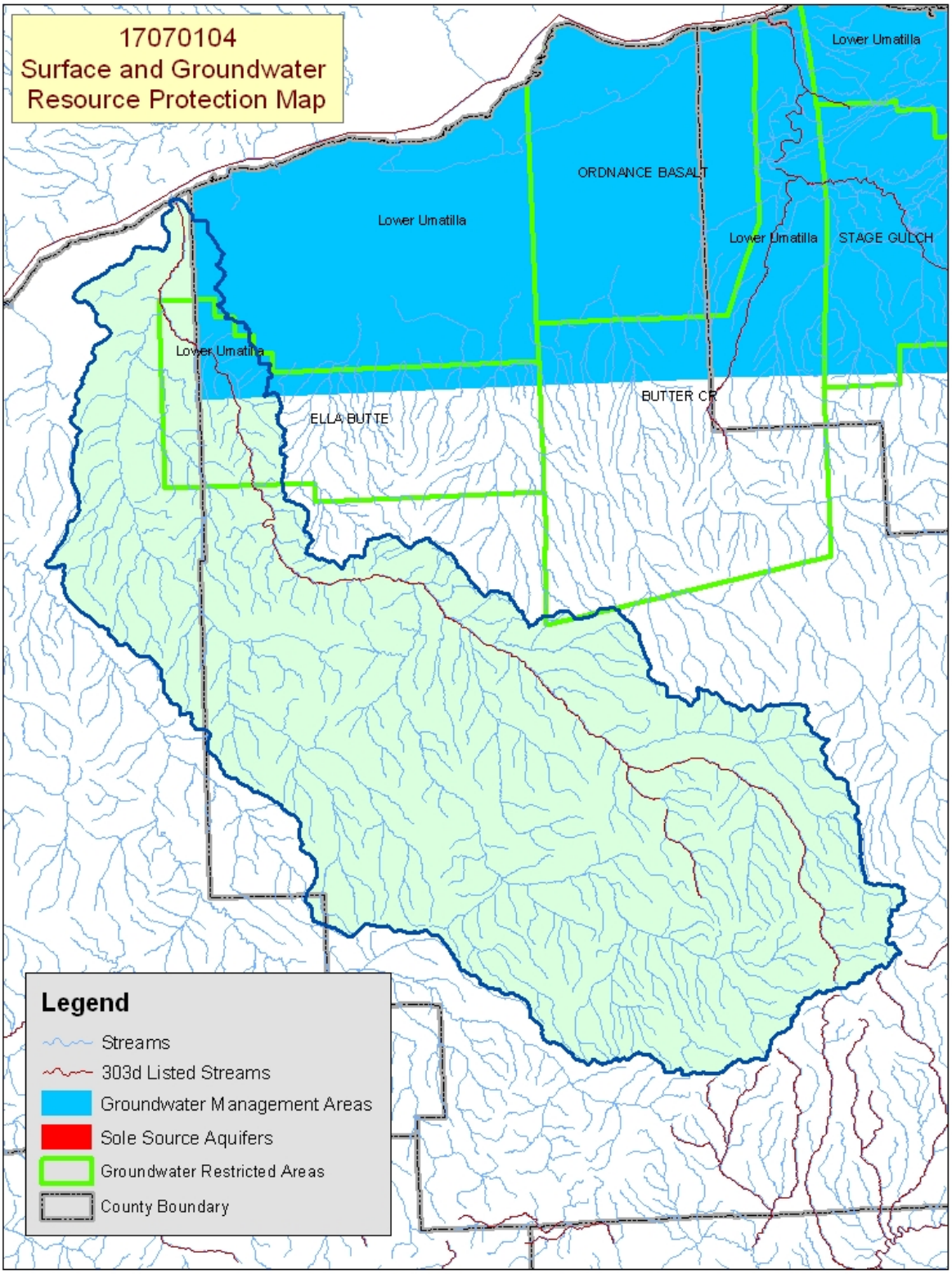


- Almost 90 percent of the listed stream miles exceed state water quality standards for stream temperatures. Elevated stream temperatures may be due to inadequate riparian shade, stream channel widening, warm irrigation return flows, and other anthropogenic or natural sources.
- Conservation practices that can be used to address these water quality issues include erosion control, grazing management, irrigation water management and riparian buffers.

Watershed Projects, Plans, Studies and Assessments			
NRCS Watershed Projects[6]		NRCS Watershed Plans, Studies & Assessments[7]	
Name	Status	Name	Status
None		None	
ODEQ TMDL's[8]		ODA Agricultural Water Quality Management Plans[9]	
Name	Status	Name	Status
None		Willow Creek	Completed

OWEB Watershed Council[10]	Watershed Council Assessments[11]	NWPCC Subbasin Plans & Assessments[18]
Gilliam-East John Day and Willow Creek Watershed Councils	To Be Completed Later	John Day 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 Crops**	**Row Crops**	**Orchards / Vnyrd**	**Shrub / Range**	**Forest**
Soil Erosion	Sheet & Rill		X				
	Wind	X	X				
Soil Condition	Tilth, Crusting, Infiltration, Organic Matter		X				
Water Quantity	Water Mgt. for Irrigated Land	X					
Water Quality, Surface	Suspended Sediments & Turbidity		X				
	Aquatic Habitat Suitability	X					
Plant Suitability	To Site & Intended Use					X	X
Plant Condition	Productivity, Health & Vigor	X				X	X
Plant Management	Establishment, Growth & Harvest						X
Animal Habitat, Domestic	Water - Quantity & Quality					X	
Animal Habitat, Wildlife	Water - Quantity & Quality					X	
Human, Economics	Land Use Constraints/Restrictions						
	High Risk & Uncertainty	X	X				
	High Capital/Financial Costs						X
	High Labor Costs or Availability						X
	Low or Unreliable Profitability	X	X			X	
Human, Political	Inadequate Availability of Cost Share Programs					X	

Grass / Pasture / Hay Lands

- Major concerns are with conserving water, maintaining good pasture condition, and reducing impacts to riparian areas.
- Poor economic returns discourage conservation activities.

Grain Crops

- Fields without adequate residues are subject to both sheet & rill and wind erosion which leads to sediment delivery to streams and ditches.
- Low profit margins hinder conservation adoption.

Shrub / Rangelands

- Noxious weeds and poor range condition reduce productivity for livestock and wildlife.
- Rangelands lying adjacent to watershed streams result in concerns about impacts (habitat and temperature) to fisheries.
- Lack of funding hinders conservation adoption.

Forest

- Forest thinning needed to improve health and vigor as well as to provide more forage and browse for livestock and wildlife.
- The expense and high labor costs discourage forest stand 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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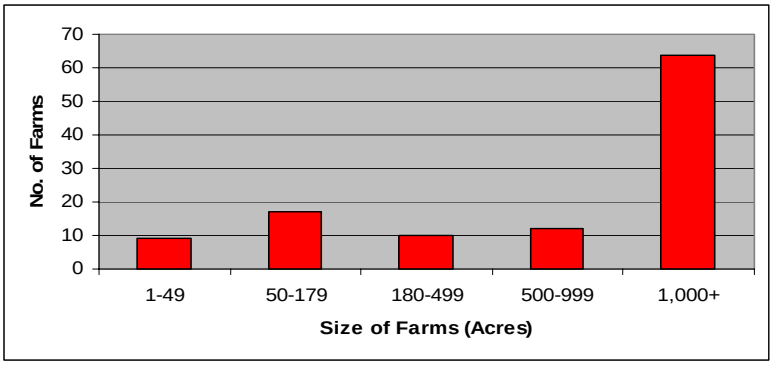
Number of Farms: 112

Number of Operators: 189

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

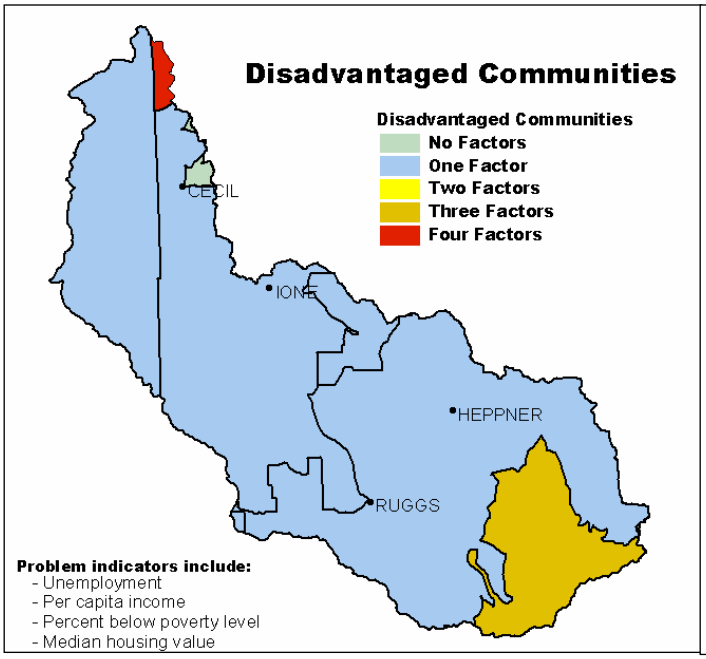
Estimated Level of Willingness and Ability to Participate in Conservation[15]: MODERATE

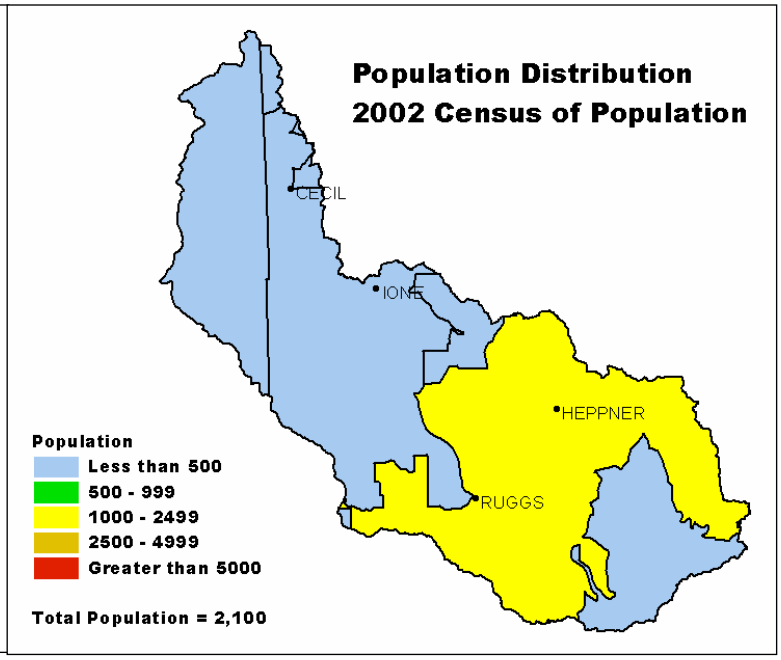


Evaluation of Social Capital[16]: LOW TO MODERATE

Farms and ranches in the Willow watershed are generally financially stable, family operations, and are expected to remain so. Many of the landowners are fairly well educated and have a positive stewardship attitude, though they neither associate with nor consider themselves environmentalists. Most of the farms and ranches have conservation plans, but they are not fully implemented. Individual conservation adoption 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 returns.

Participation in farm and ranch organizations is strong, but participation in other community-wide organizations is not. The diffusion of conservation throughout the watershed may be accelerated through local leadership development, expanding the awareness of natural resource issues throughout the community as a whole, and strengthening communities' ability and willingness to work together to effectively address local resource issues.





Progress / Status

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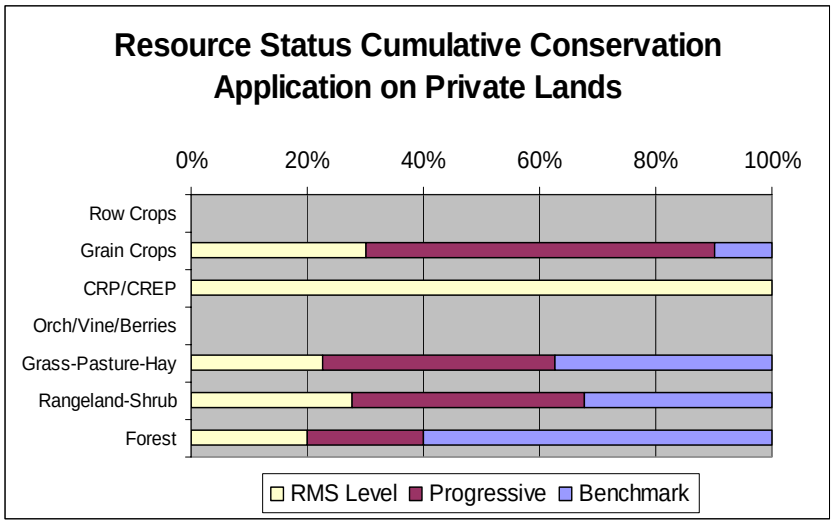
PRMS Data		FY99	FY00	FY01	FY02	FY03	Avg / Year	Total
Total Conservation Systems Planned (Acres)		12,174	12,790	3,336	16,415	5,031	9,949	49,746
Total Conservation Systems Applied (Acres)		11,320	32,324	26,522	15,246	41,574	25,397	126,986
Conservation Treatment Acres								
Waste Management	(number)	0	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 & 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 on grain.
  - Nutrient management on cropland
  - Wildlife habitat management on riparian areas and uplands.
- Resource concerns have or are being addressed on 85% of the grain crops.
- Poor economic return and lack of financial incentives hinders additional conservation on pasture and range.
- The expense and high labor costs discourage forest stand improvements on private non-industrial forest.

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, Federal, Tribal, State, and Local. This will be a seamless, statewide Oregon Public Ownership vector layer composed of fee ownership of lands by Federal, State, Tribal, County, and City agencies. The layer will be comprised of the best available data compiled at 1:24,000 scale or better and linework will match 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 or 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, Publication_Information: Publication_Place: Sioux Falls, SD USA, Publisher: U.S. Geological Survey, Online_Linkage: http://edcwww.cr.usgs.gov/programs/lccp/nationallandcover.html, Description: 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 faciliate 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 due to 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 Resource Conservation Service, Watershed Projects Planned and Authorized, http://www.nrcs.usda.gov/programs/watershed/Purpose.

7. Natural Resource 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 degree of social capital helps a community to be physically healthy, socially progressive, and economically vigorous. Low amounts of social capital typically result in community conflict, lack of trust and respect, and unsuccessful attempts to solve problems. The evaluation used 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.