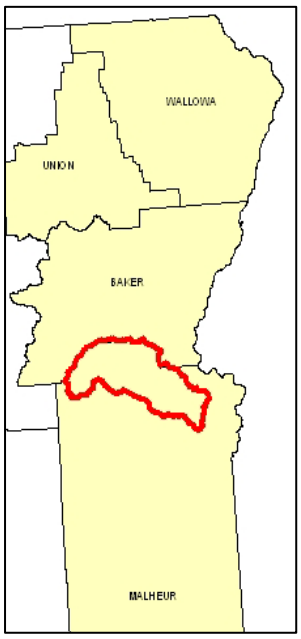
Willow – 17050119

8-Digit Hydrologic Unit Profile

SWCD	Acres
Malheur	478,593
Morrow	462,767
Gilliam	93,305
Burnt River	8,936



Introduction

The Willow 8-Digit Hydrologic Unit Code (HUC) subbasin is comprised of 487,300 acres in Malheur County. Seventy-three percent of the subbasin is rangeland, nineteen percent is hayland and pastureland, and the remainder includes some forest and areas used for grain crops. There are 21 permitted Confined Animal Feeding Operations (CAFOs) and over 25,000 permitted animals in the subbasin. Major resource concerns include concentrated flow, streambank, and irrigation-induced erosion; invasive and noxious weeds; insufficient water to meet livestock, wildlife, and irrigation needs; impaired water quality; and loss of wildlife habitat. High costs, unreliable markets, and inadequate incentives limit conservation adoption among the farmers and ranchers in the Willow subbasin.

There are 172 operations and 283 farmers and ranchers in the subbasin. Most operators are well educated, aware of local resource concerns, and good stewards of the natural resources. Unfortunately, the perceived expense and risk of implementing conservation limit its adoption. Additional risk-reducing incentives and greater community support of conservation are needed to increase the diffusion of conservation in the Willow subbasin.

The Ontario NRCS Service Center, Malheur County Soil and Water Conservation District, and Malheur Watershed Council provide much of the conservation assistance in the subbasin.

Profile Contents

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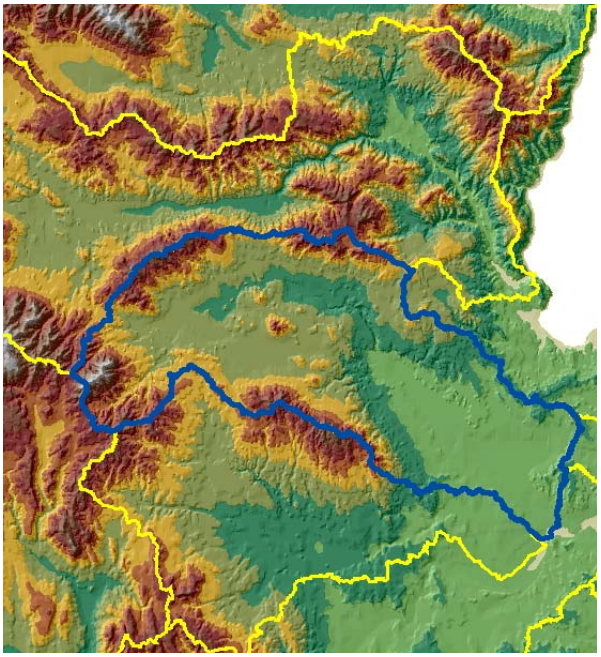
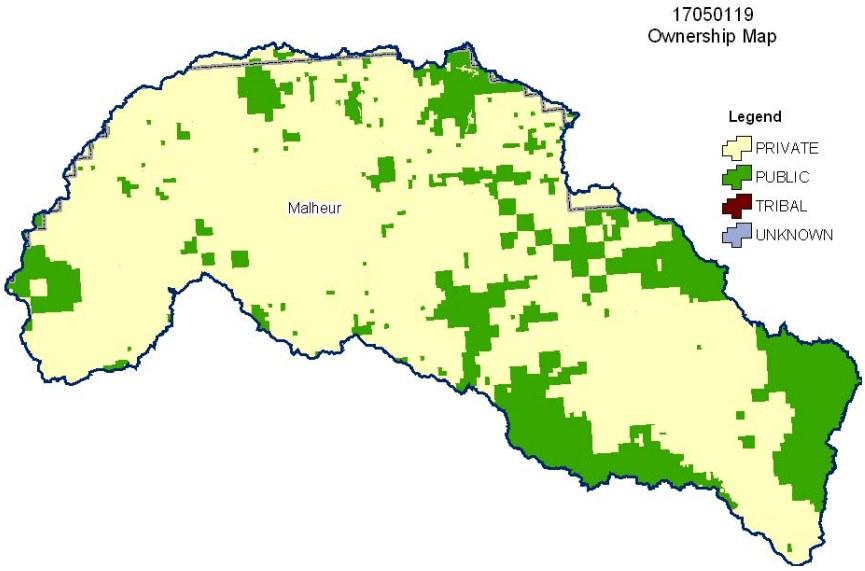
Physical Description
Land Use Map & Precipitation Map
Common Resource Area
Resource Concerns
Census and Social Data
Progress/Status
Footnotes/Bibliography

Relief Map





Produced by the Water Resources Planning Team Portland, OR

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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	*	---	16,000	3%	0	0%	**22,700**	**5%**
Grain Crops	*	---	12,000	2%	0	0%	**12,100**	**2%**
Conservation Reserve Program Land [a]	0	0%	0	0%	0	0%	**0**	**0%**
Grass/Pasture/Hay	22,900	5%	69,000	14%	0	0%	**91,900**	**19%**
Orchards/Vineyards	0	0%	0	0%	0	0%	**0**	**0%**
Row Crops	0	0%	*	---	0	0%	*****	**---**
Shrub/Rangelands	87,800	18%	269,400	55%	0	0%	**357,200**	**73%**
Water/Wetlands/Developed/Barren	*	---	*	---	0	0%	*****	**---**
Oregon HUC Totals [b]	**117,600**	**24%**	**369,700**	**76%**	**0**	**0%**	**487,300**	**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:

- Private forestland is primarily used for livestock grazing.

Irrigated Lands (1997 NRI[13] Estimates for Non-Federal Lands Only)	Type of Land	ACRES	% of Irrigated Lands	% of HUC
	Cultivated Cropland	43,700	77%	9%
	Uncultivated Cropland	9,400	17%	2%
	Pastureland	3,600	6%	<1%
	Total Irrigated Lands	**56,700**	**100%**	**12%**

(Continued on the following pages)

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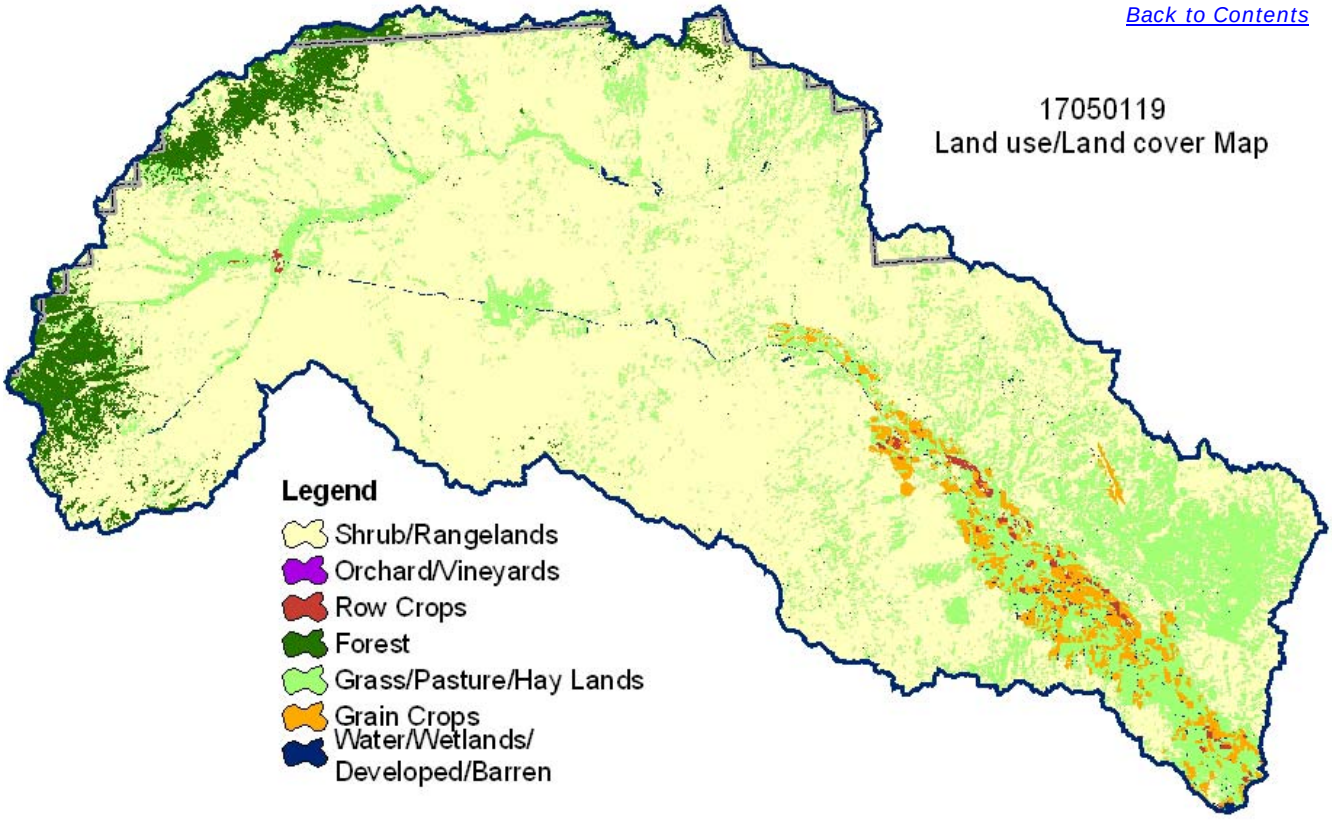

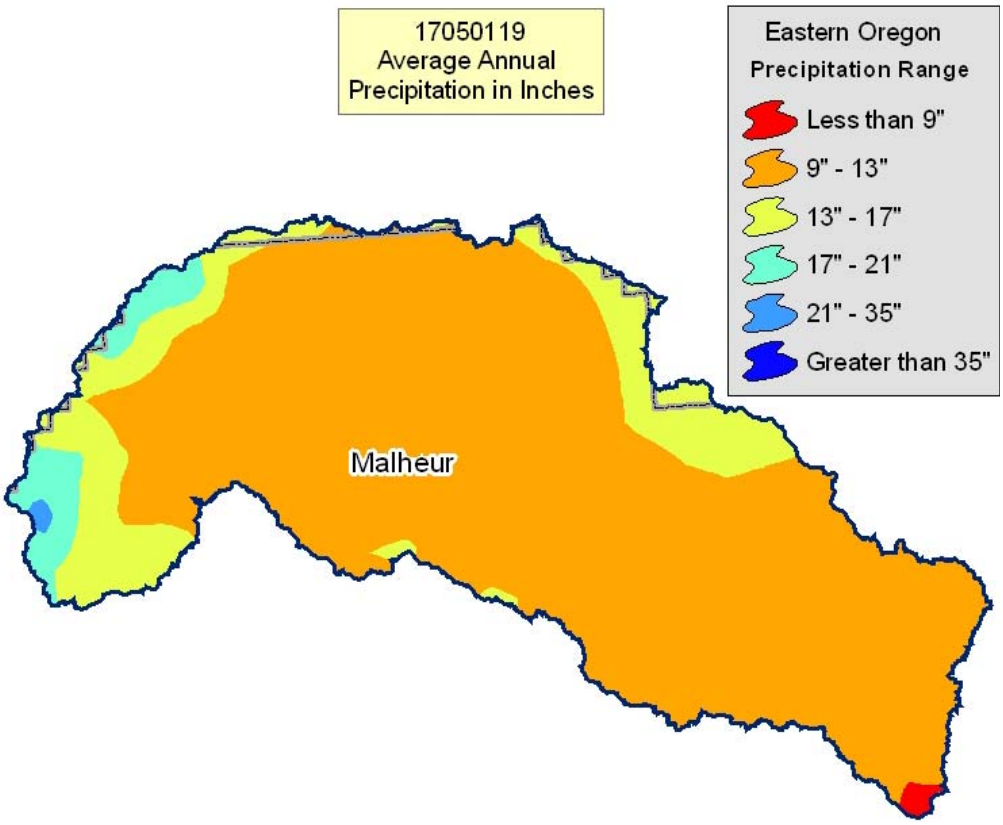

Common Resource Area Map

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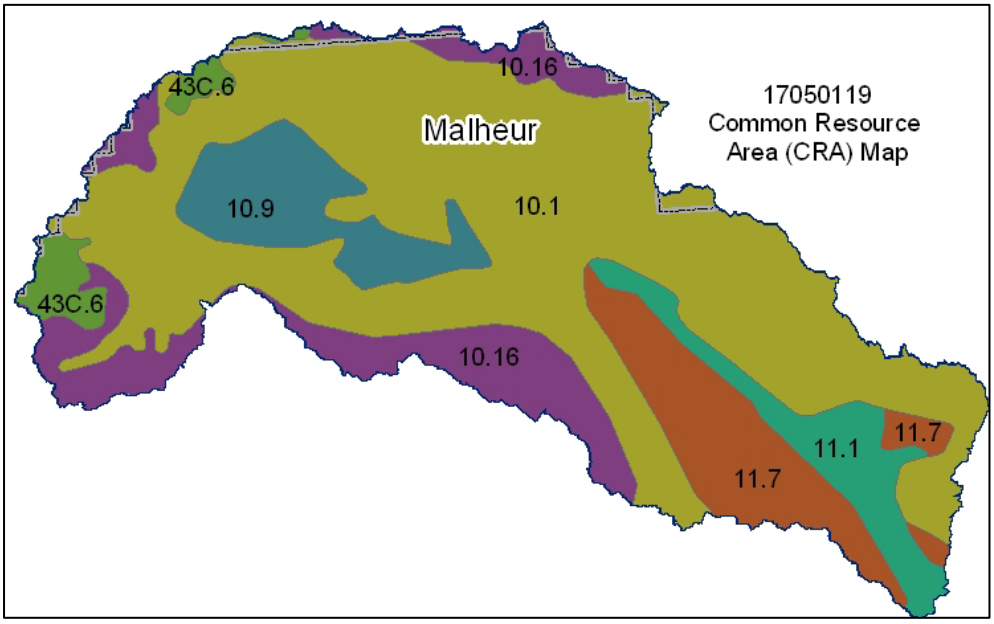
Only the major units are described below - for descriptions of all units within the HUC, go to: http://ice.or.nrcs.usda.gov/website/cra/viewer.htm



10.1 – Central Rocky and Blue Mountain Foothills - Warm Dry Blue and Seven Devils Mountain Foothills: This unit is between the Blue and Wallowa Mountains in Oregon and the northwestern part of the Snake River Plain. It is characterized by rangeland soils on hills and mountains associated with basalt and exposed tuffaceous sediment. The Cascade Range and the Blue and Wallowa Mountains block any maritime influence, creating a continental climate. As a result, plants are subject to wide temperature ranges, a high rate of evapotranspiration, and high early-season moisture stress. The dominant soils are those of the Brogan, Simas, Ruckles, and Ruclick series. The temperature regime is mesic, and the moisture regime is aridic. The mean annual precipitation is 9 to 12 inches. The vegetation is Wyoming big sagebrush and bluebunch wheatgrass (warm, dry climate).

10.9 - Central Rocky and Blue Mountains Foothills - Blue Mountains Valleys: This unit is characterized by terraces, flood plains, and fans in the Powder River and Burnt River Valleys. The dominant soils are those of the Baker, Wingville, Powder, and Jett series. The temperature regime is mesic, and the moisture regime is aridic. Precipitation is about 9 to 12 inches.

10.16 – Central Rocky and Blue Mountains Foothills – Cool, Moist Blue Mountains Foothills: This unit is characterized by rangeland soils on hills and mountains associated with basalt. It is similar to the Lava Fields unit except that this unit has higher precipitation and a xeric soil moisture regime. The temperature regime is frigid. The mean annual precipitation is 12 to 20 inches. The dominant soils are those of the Ateron, Durkee, Menbo, Merlin, and Observation series. The vegetation is dominantly mountain big sagebrush and Idaho fescue (cool, moist climate).

11.1 – Snake River Plains - Treasure Valley: This unit is characterized by irrigated cropland, pastureland, and rapidly growing cities, suburbs, and industries. Many canals, reservoirs, and diversions are present. Aridic soils are dominant; irrigation is required to grow commercial crops. Surface water quality has been significantly affected by channel alteration, dams, irrigation return flow, and urban, industrial, and agricultural pollution. Crops include wheat, barley, alfalfa, sugar beets, potatoes, and beans. Crop diversity is greater, temperatures are warmer, and the mean frost free season is longer in this unit than in other units. Population density is much greater in this unit than in the nearby rangeland-dominated units.

11.7 – Snake River Plains - Dry Unwooded Alkaline Foothills: This shrub- and grass-covered unit is higher and more rugged than adjacent valley units. Unlike other units, this unit consists of terrace deposits of alkaline lacustrine and supports a unique flora. Shallow and moderately deep soils over a cemented pan are common. The potential natural vegetation is saltbush-greasewood and sagebrush steppe. Presently, cheatgrass and crested wheatgrass are also common and the unit is used for livestock grazing.

Physical Description – Continued

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		ACRES	ACRE-FEET
Irrigated Adjudicated Water Rights *(OWRD[4])*	Surface	14,850	44,481
	Well	15,099	45,147
	Total Irrigated Adjudicated Water Rights	29,949	89,628
Stream Flow Data	OWRD 13233100 WILLOW CREEK, NEAR JAMIESON, OR	**Total Avg. Yield**	4,198
		May – Sept. Yield	2,516
		MILES	**PERCENT**
Stream Data[5] **Percent of Total Miles of Streams in HUC*	Total Miles – Major (100K Hydro GIS Layer)	291	---
	303d/TMDL Listed Streams (DEQ)	36	12%
	Anadromous Fish Presence (StreamNet)	0	0%
	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	1,285	5%
	Grain Crops	834	3%
	Grass/Pasture/Hay	5,595	21%
	Orchards/Vineyards	0	0%
	Row Crops	158	0%
	Shrub/Rangelands – Includes CRP Lands	18,752	70%
	Water/Wetlands/Developed/Barren	215	1%
	Total Acres of 100-foot Stream Buffers	**26,839**	**---**
Land Capability Class *(Croplands & Pasturelands Only)* *(1997 NRI[3] Estimates for Non-Federal Lands Only)*	**1** – slight limitations	0	0%
	2 – moderate limitations	18,200	31%
	3 – severe limitations	24,700	43%
	4 – very severe limitations	8,400	14%
	5 – no erosion hazard, but other limitations	0	0%
	6 – severe limitations; unsuitable for cultivation; limited to pasture, range, forest	6,800	12%
	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	**58,100**	**---**

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

Animal Type	Dairy	Feedlot	Poultry	Swine	Mink	Other
No. of Permitted Farms	9	12	0	0	0	0
No. of Permitted Animals	2,655	24,290	0	0	0	0

Resource Concerns

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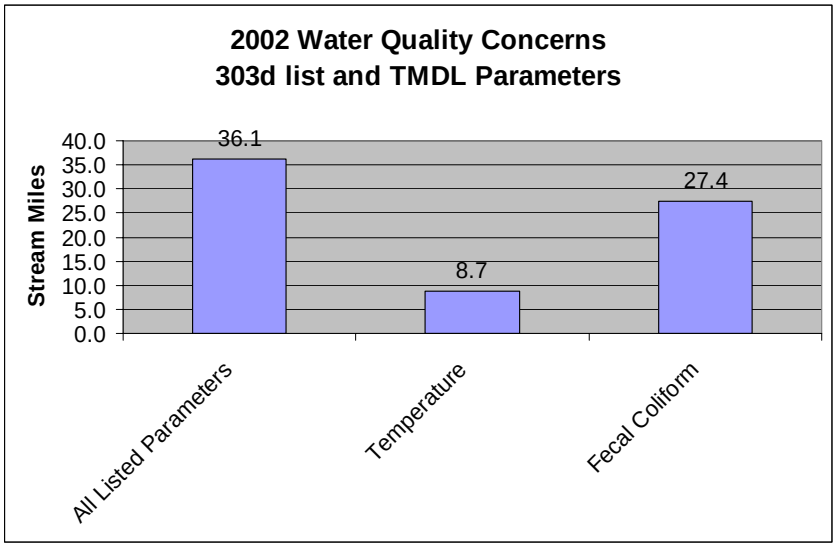
Tons of Soil Loss by Water Erosion: Due to the limited amount of non-Federal cropland and pastureland within this HUC, no reliable NRI soil loss estimates are available.

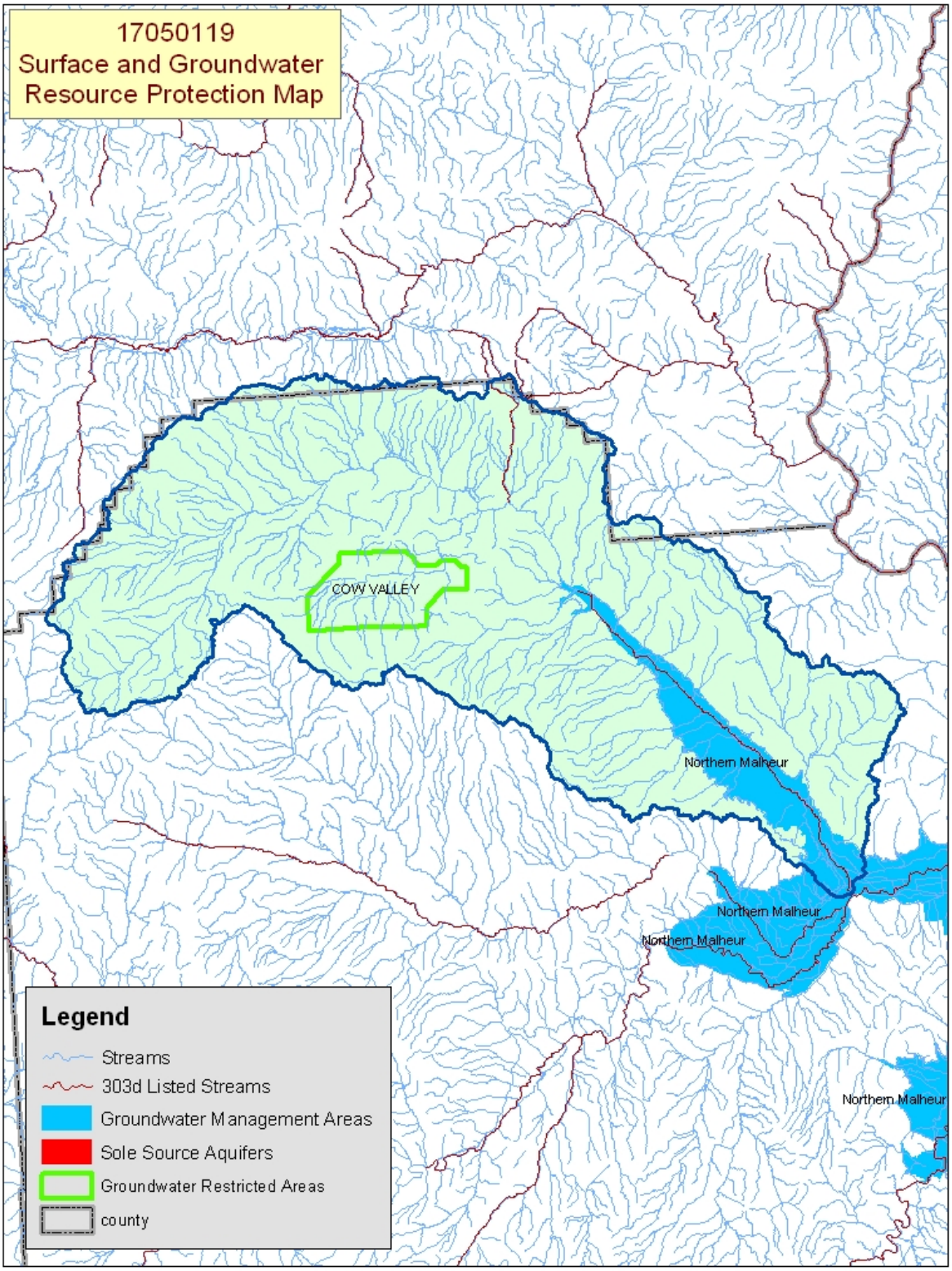


- About 25 percent of the listed stream miles exceed State water quality standards for temperature. Elevated stream temperatures may be due to inadequate riparian shade, stream channel widening, and other anthropogenic or natural causes.
- Fecal coliform can be indicative of livestock waste, but it also is associated with improperly operating onsite sewage disposal systems.
- Conservation practices that can be used to address these water quality issues include irrigation water management, nutrient management, livestock waste management, grazing 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
None	None	Malheur	Completed
OWEB Watershed Council[10]	Watershed Council Assessments[11]		NWPCC Subbasin Plans and Assessments[18]
Malheur Watershed Council	Malheur Basin Watershed Action Plan and Assessment		Malheur

FEDERALLY LISTED THREATENED AND ENDANGERED SPECIES[12]	
THREATENED SPECIES	CANDIDATE SPECIES
Mammals- Canada lynx **Birds –** Bald eagle **Fish –** Lahontan cutthroat trout **Plants –** Howell's spectacular thelypody, Malheur wire-lettuce	**Birds –** Yellow-billed cuckoo **Amphibians and Reptiles –** Columbia spotted frog **PROPOSED SPECIES** - None
ESSENTIAL FISH HABITAT[13] - None	

(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**	**Grass \ Pasture \ Hay**	**Grain Crops**	**Row Crops**	**Perennial Crops (Orch / Vine / Berries)**	**Shrub / Range**	**Forest**	**Confined Feeding Operations**
Soil Erosion	Concentrated Flow or Gully					X		
	Streambank					X		
	Irrigation Induced	X	X	X				
Soil Condition	Tilth, Crusting, Infiltration, Organic Matter		X	X				
Soil Contamination	Excess Fertilizers and Pesticides			X				X
Water Quantity	Water Management for Irrigated Land	X	X	X				
	Water Management for Nonirrigated Land					X		
Water Quality, Groundwater	Pesticides			X				
	Nutrients and Organics		X	X				
Water Quality, Surface	Pesticides			X				
	Nutrients and Organics		X	X				X
	Suspended Sediments and Turbidity	X	X	X		X		
	Pathogens		X	X				X
Air Quality	Undesirable Odors from Agricultural Sources							X
Plant Suitability	Site and Intended Use Suitability	X						
	Invasive and Noxious Weeds	X	X	X		X		
Plant Condition	Productivity, Health, and Vigor	X				X		
Plant Management	Establishment, Growth, and Harvest					X	X	
Animal Habitat, Domestic	Water - Quantity and Quality					X		
	Management						X	
Animal Habitat, Wildlife	Food, Cover and/or Shelter	X	X	X		X	X	
Human, Economics	Land Use Constraints/Restrictions							X
	High Risk and Uncertainty			X				X
	High Capital/Financial Costs	X	X	X		X	X	X
	High Management Level Required			X				X
	Low or Unreliable Profitability	X	X	X				
Human, Political	Inadequate Availability of Cost-Share Programs					X	X	
	High Degree of Controversy							X

Pasture / hay

- Better irrigation water management is practiced in areas used for alfalfa than in areas of pasture.
- In some areas of pasture, a lack of proper grazing management has lead to its poor condition.
- Areas of pasture commonly are adjacent to streams, which can contribute to streambank erosion and sedimentation as a result of loss of riparian vegetation.

Grain and Row Crops

- Most grain is produced in rotation with other crops (potatoes, onions, corn, alfalfa, etc.)
- Irrigation-induced erosion may occur on fields used for crops such as potatoes or corn.
- Surface-irrigated areas of grain are also prone to irrigation-induced erosion.
- Surface irrigation of crops generates tailwater returns to area streams and drains that are high in content of nutrients and sediment.
- Water conservation is always a concern with irrigated crops, but irrigation water management is better in areas used for row crops than it is in areas used as pasture.

Confined Animal Feeding Operations (CAFOs)

- Livestock manure, pathogens, and odors are continuing issues for CAFOs.
- Winter feeding of cow-calf herds can generate erosion and contribute to poor water quality.

Rangeland

- Rangeland can become infested with noxious weeds, annual grasses, and shrubs due to inadequate forage and grazing management.
- Loss of riparian vegetation contributes to the warming and nutrient-loading of streams.
- Private, non-industrial forestland commonly is associated with areas of grazed woodland.
- Private forests suffer from insect and disease damage and fuel buildup, requiring thinning to increase productivity and reduce the danger of catastrophic fire.
- High cost, unreliable markets, and inadequate incentive programs limit forest and management activities.

Census and Social Data[/14]

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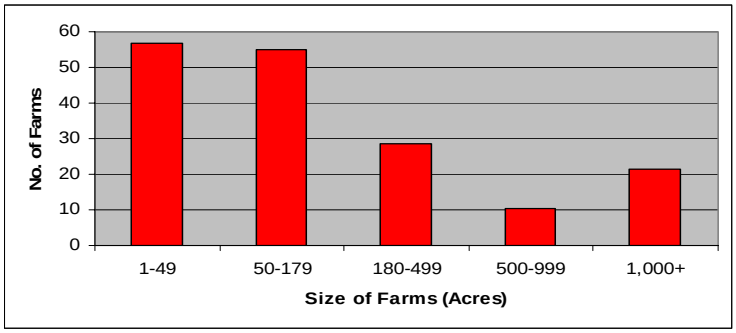


Number of Farms: 172

Number of Operators: 283

- Full-Time Operators: **102**
- Part-Time Operators: **181**

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

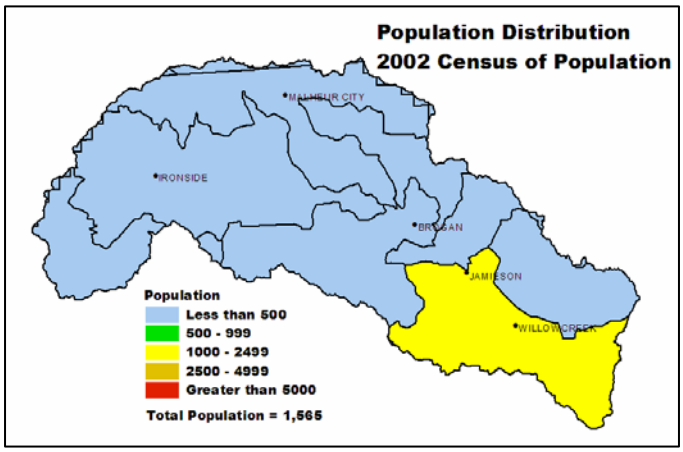
Most operators in the Willow subbasin are well educated, aware of local resource concerns, and likely to have conservation plans; have adopted some conservation practices; and understand the economic and environmental benefits of conservation. Most recommended conservation practices can be implemented incrementally and are compatible with local management systems and equipment. The perceived high capital costs of conservation and risks associated with intense irrigated agriculture discourage many from adopting conservation systems.

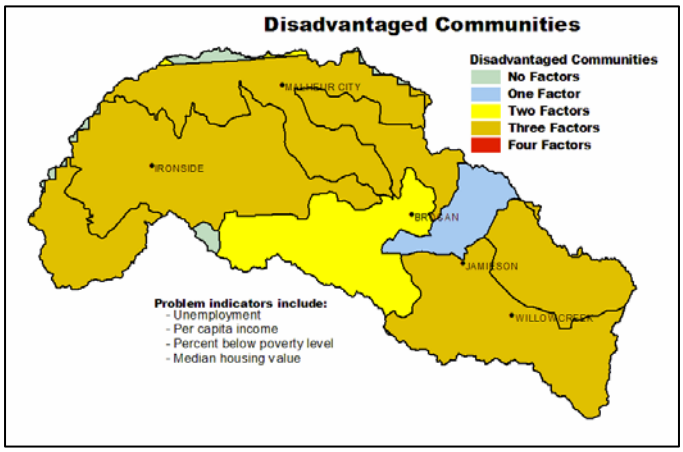
Additional financial incentives or other risk-reducing incentives may increase the adoption of conservation in the subbasin.

Evaluation of Social Capital[/16]: Moderate

Social capital and the ability of the community to solve problems and support conservation are estimated to be moderate. Recent trends indicate that the population of the subbasin is increasing slightly. The primary occupation of new landowners commonly is non-agricultural and not resource based. People moving to the area commonly do so for the rural, high-quality lifestyle and relatively inexpensive housing and property. Newcomers to the area tend to look at the natural resources as recreational opportunities, not as a means for making a living. In part, this has resulted in community interest shifting from agricultural and natural resource concerns to issues related to improving schools, transportation, health services, and so on.

Until resource management and agriculture regain the attention of the community, it is unlikely the community will be a significant partner in the diffusion of conservation in the agricultural community.





Progress / Status

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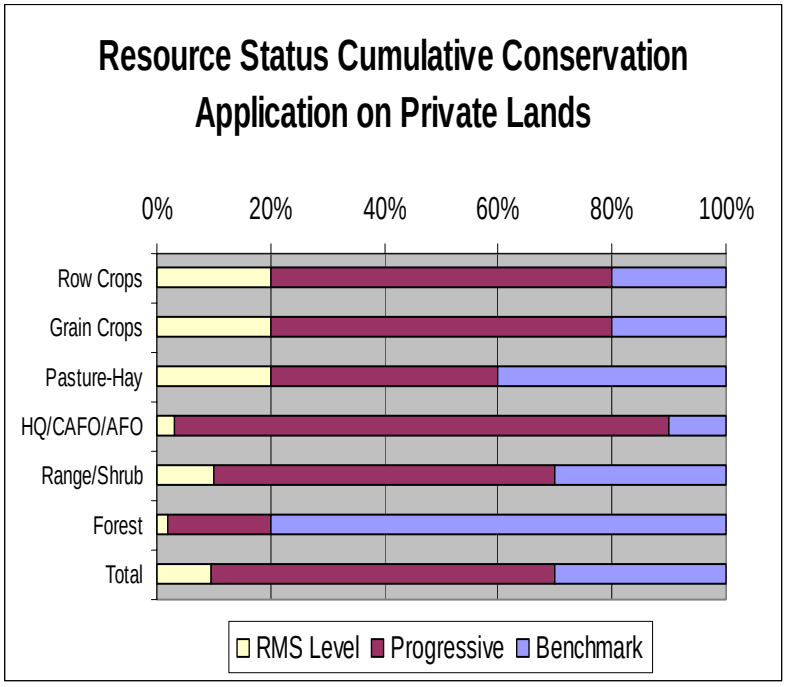
PRMS Data	FY99	FY00	FY01	FY02	FY03	Avg / Year	Total
Total Conservation Systems Planned (Acres)	524	7,959	2,142	427	1,198	2,450	12,250
Total Conservation Systems Applied (Acres)	6,011	3,230	3,795	291	1,091	2,884	14,418
Conservation Treatment (Acres)							
Waste Management	0	0	1	0	0	0	1
Buffers	0	0	0	0	0	0	0
Erosion Control	6,324	3,754	753	883	668	2,476	12,382
Irrigation Water Management	278	650	1,013	1,479	574	799	3,994
Nutrient Management	238	2,516	930	408	1,858	1,190	5,950
Pest Management	0	725	4	0	0	146	729
Prescribed Grazing	6,011	0	3,836	0	0	1,969	9,847
Trees & Shrubs	0	0	0	0	0	0	0
Conservation Tillage	0	0	0	0	0	0	0
Wildlife Habitat	0	0	888	40	0	186	928
Wetlands	0	0	1	0	0	0	1



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

- Progress over the last 5 years has been focused on:
  - Erosion control and irrigation water management in areas of grain and row crops.
  - Nutrient management.
  - Prescribed grazing on grazing land.
  - Wildlife habitat management, including buffers, trees, and shrubs in riparian areas.
- Most grain and row crop producers practice conservation cropping and residue management.
- Most hay producers practice good irrigation water management, but adequate grazing and water management commonly is lacking on pastures.
- Most private, industrial timber owners are doing good conservation work and are satisfying State forest practices act requirements.
- Most private, non-industrial woodlots are associated with forest grazing allotments that are not primarily managed for timber production.

Lands Removed from Production through Farm Bill Programs

- Conservation Reserve Program (CRP): **None**
- 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/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.