

Rock Watershed

HUC: 17060109

Rapid Watershed Assessment Profile



This assessment involves the collection of quantitative and qualitative information to develop a watershed profile, sufficient analysis of that information to make qualitative statements as to resource concerns and conditions, and the generation of information with which to make decisions about conservation needs and recommendations. These assessments are conducted through the use of Geographic Information System (GIS) technology and by conservation planning teams working within the watershed, meeting with landowners and conservation groups, inventorying agricultural areas, assessing current levels of resource management, identifying conservation recommendations and, making qualitative estimates of the impacts of conservation on local resource concerns.

October 24, 2006

The profile content for the Rapid Watershed Assessments in Washington is outlined in the following five categories:

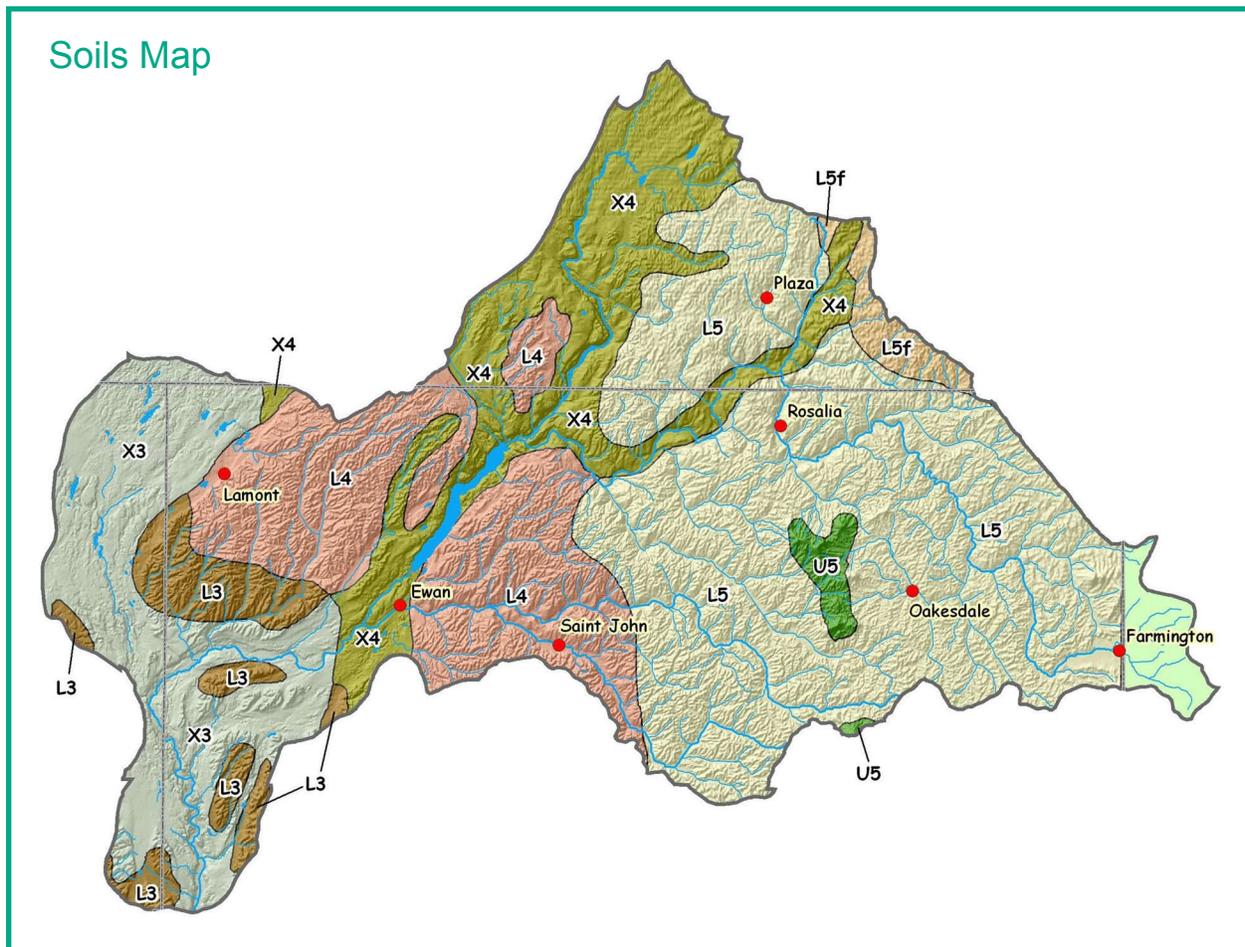
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Physical Descriptions

Soils ²

Rock Watershed
610,323 Total Acres
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The soils in this watershed are dominantly formed in very deep loess deposits and loess deposits over varying depths of basalt bedrock on rolling loessal hills. The surface textures of these soils are silt loams. The majority of the area is cropland with native rangeland found on the steeper drainageway and canyons sideslopes and some of the steeper hillslopes units. Soils of the Channeled Scablands are in the western and northern part of the watershed. These areas are dominated by shallow soils formed in loess over flood scoured basalt in complex with moderately deep soils formed in loess over silty, sandy or cobbly flood sediments. The climate pattern in this watershed provides a low to moderate risk of wind erosion but water erosion can be a concern on steeper slopes and when surface residue is removed by intensive crop management practices or wildfire.



(Soils information continued on next page.)



L3 – Coarse-silty loessial soils that formed under steppe or shrub-steppe vegetation and have lime at a depth of 44-70 inches; these soils have moderately-dark, humus-enriched topsoils except where severely eroded. Xeric/Mesic; Walla Walla-Bagdad-Endicott.

L4 – Fine-silty loessial soils; many have exceptionally thick, dark-colored, humus-rich topsoils except where severely eroded; some have subsoil accumulations of lime and/or clay; these soils have formed under meadow-steppe or steppe vegetation. Xeric/Mesic; Athena-Broadax.

L5 – Fine-silty loessial soils, many have exceptionally thick, dark-colored, humus-rich topsoils; soils on hilltops have thin topsoils and clay subsoils near the surface due to erosion; concave north slopes have thick topsoils underlain by white, leached horizon. Xeric/Mesic; Palouse-Thatuna.

L5f – Fine-silty, somewhat cool loessial soils that have clay-enriched subsoils; these soils in old, deeply-weathered loess; those formed under conifers have light-colored topsoils; those formed under steppe vegetation have dark-colored, humus-rich topsoils. Xeric/Mesic to Frigid; Freeman-Larkin-Naff-Dearyton-Cloverland-Teanaway.

U5 – Soils on unglaciated hills; loess-influenced, but primarily derived from weathered granitic rocks, andesite, sandstone or schist; soils have dark-colored, humus-rich topsoils; many have clay-enriched subsoils. Xeric/Mesic; Spokane-Tekoa-Dragoon-Schumacher.

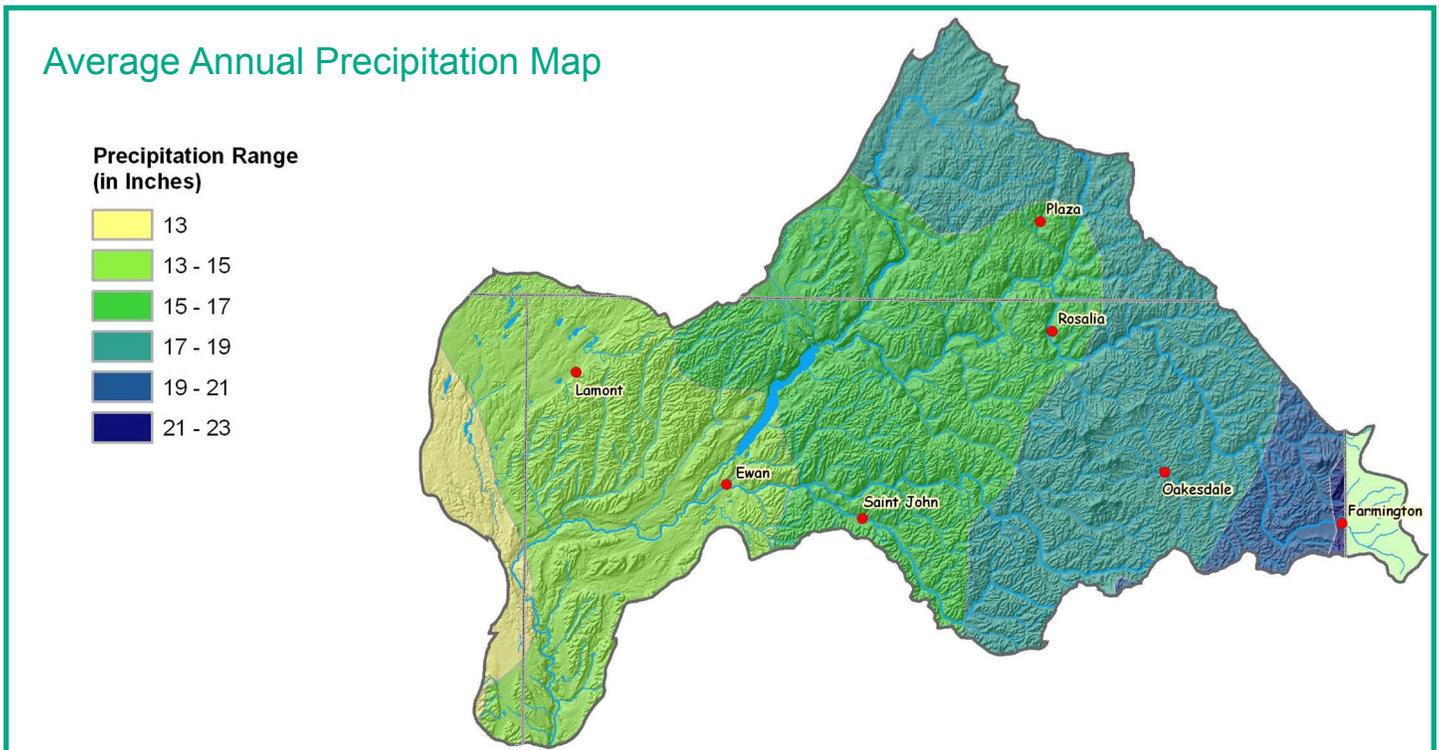
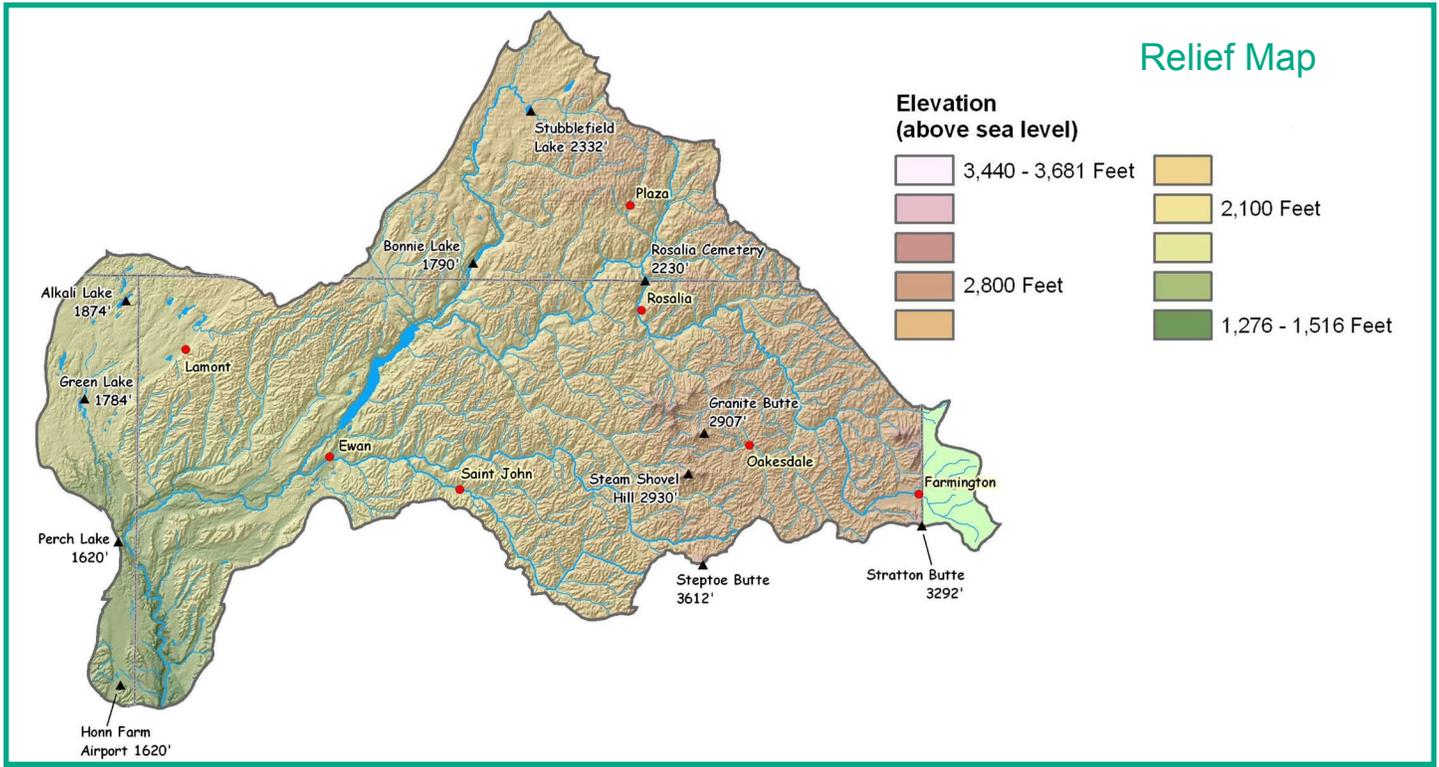
X3 – Soils of the Channeled Scablands: shallow, stony soils formed in loess over cataclysmic glacial outburst flood-scoured basalt occur in complex landscape patterns with moderately deep soils formed in loess over silty, sandy, or cobbly flood sediment; includes small areas of very deep loessial soils and poorly drained salt-affected alluvial soils. Aridic/Mesic; Anders-Bakeoven-Benge-Lickskillet.

X4 – Soils of the Channeled Scablands: shallow, stony soils formed in loess over cataclysmic glacial outburst flood-scoured basalt occur in complex landscape patterns with moderately deep soils formed in loess over silty, sandy, or cobbly flood sediment; includes small areas of very deep loessial soils and poorly drained salt-affected alluvial soils; X3, X4 and X5 have dark topsoils. Xeric/Mesic; Uhlig-Rockly-Tucannon-Kuhl-Cheney.

Physical Descriptions

Relief ³ and Precipitation ⁴

Rock Watershed
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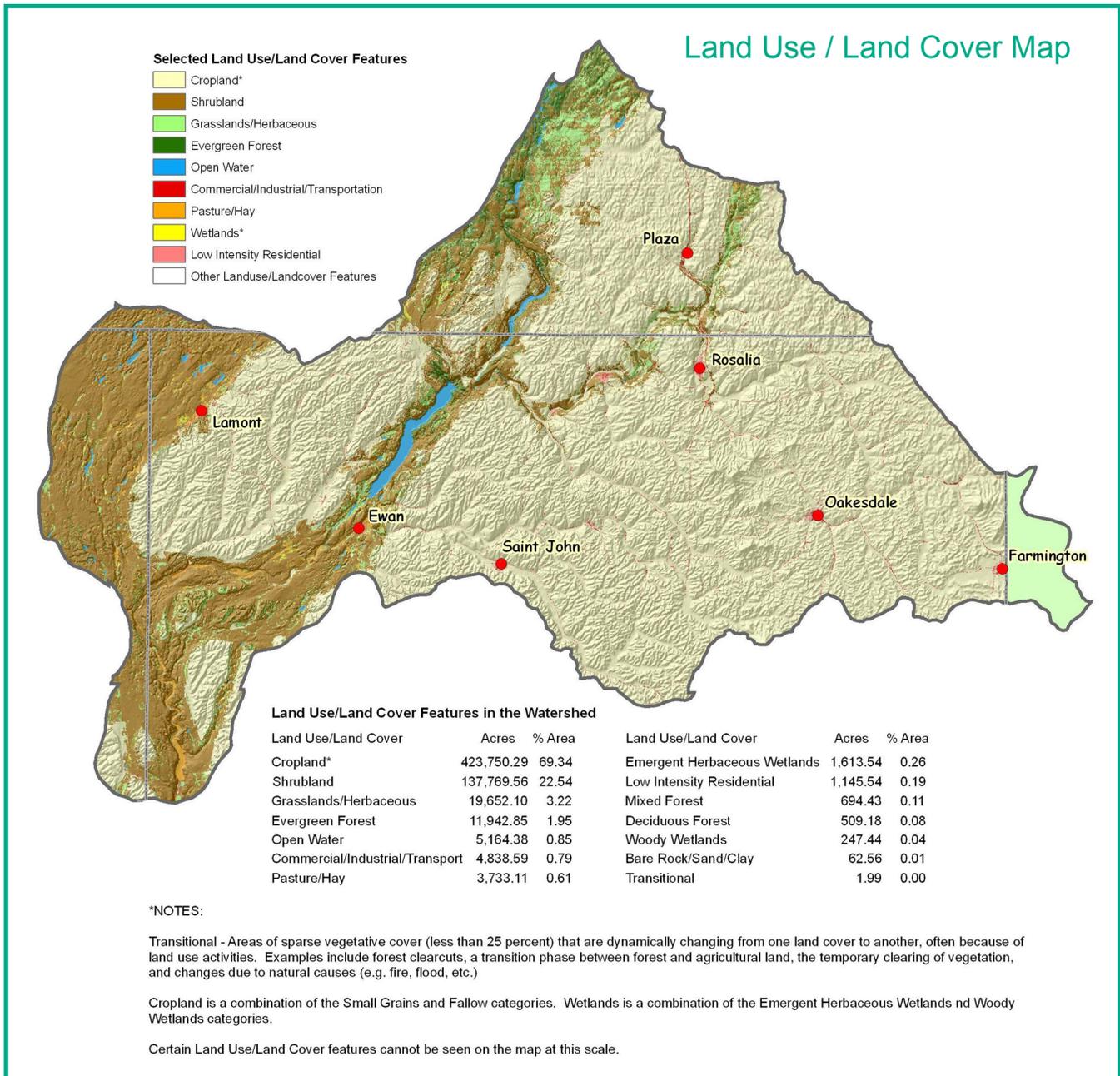


Physical Descriptions

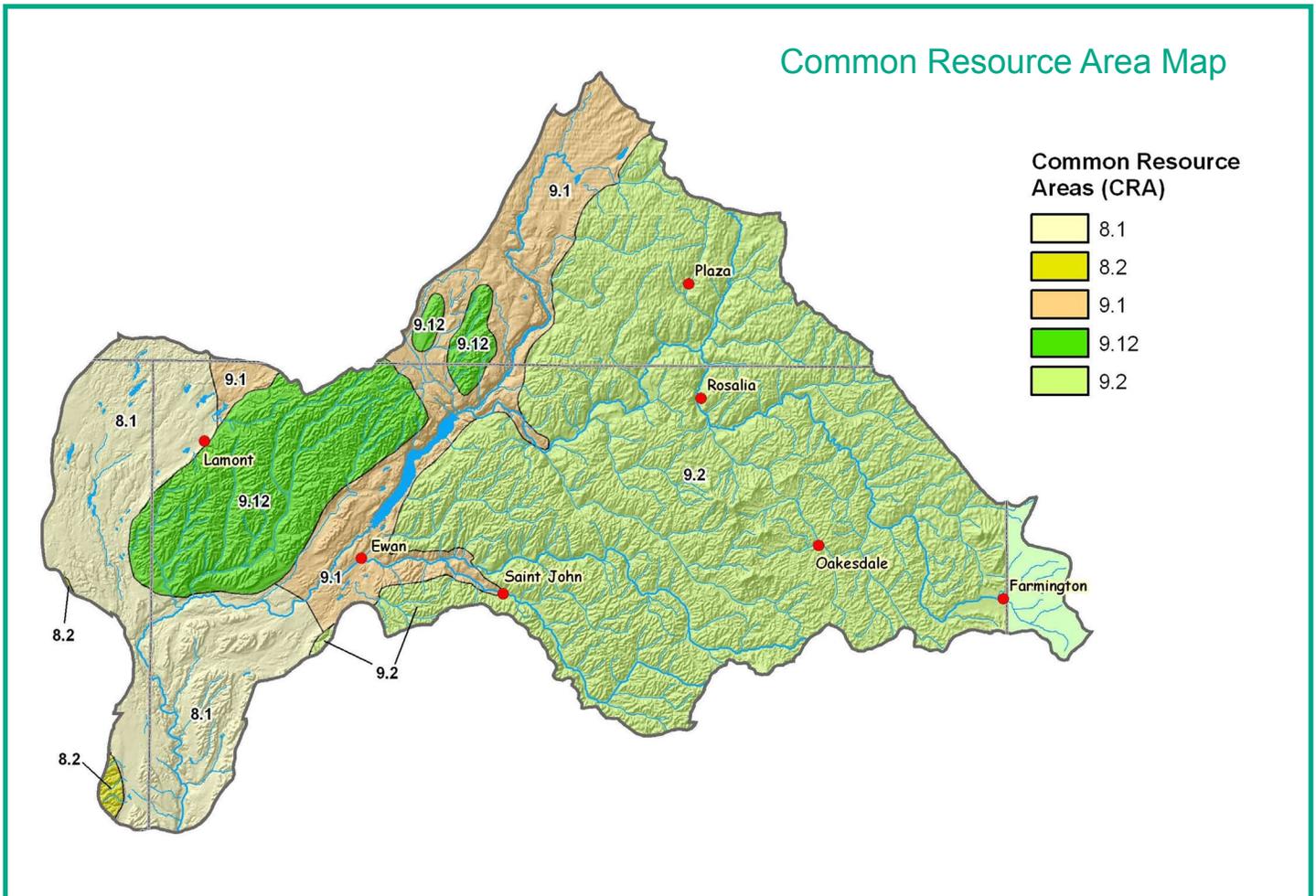
Land Use / Land Cover ⁵

Rock Watershed
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Landuse is a term used for a designation of a land area. NRCS uses official designations, based on use, such as cropland, forestland and rangeland. The Rock watershed map shows the primary landuse designations; Cropland, Shrubland, Grasslands/Herbaceous, Evergreen Forest, and Open Water. These 5 major landuses make up 98% of the watershed. Minor landuses are displayed in the table.



Common Resource Area Map



8.1 – Columbia Plateau - Channeled Scablands. This unit was formed by glacial Lake Missoula flood waters during the Pleistocene. The flood waters scoured away the thick loess soil covering the Columbia Plateau and exposed the basalt bedrock. The basalt plateaus bordering the main flood channels are patterned by ‘scabs’ (mounds of loess) surrounded by rock fragments. The scablands (mounds) are too dry to support trees. The most common native vegetation on the scabland channels is the stiff sage-Sandberg’s bluegrass association.

8.2 – Columbia Plateau - Loess Islands. This unit is the remnant of the once unbroken mantle of wind-deposited loess that covered the entire Columbia Plateau. The unit is surrounded by eroded Pleistocene flood channels. Mean annual precipitation is 9 to 15 inches, increasing from west to east. Temperature regime is mesic and the moisture regime is aridic and xeric. The big sage-bluebunch wheatgrass association is the predominant vegetation. Three tip sage and Idaho fescue grow in a band around the northern perimeter of the CRA. Present-day land use has transformed the loess islands into wheat fields. Because of the low annual precipitation, crop rotations generally include a fallow period.

(Common Resource Area descriptions continued on next page.)

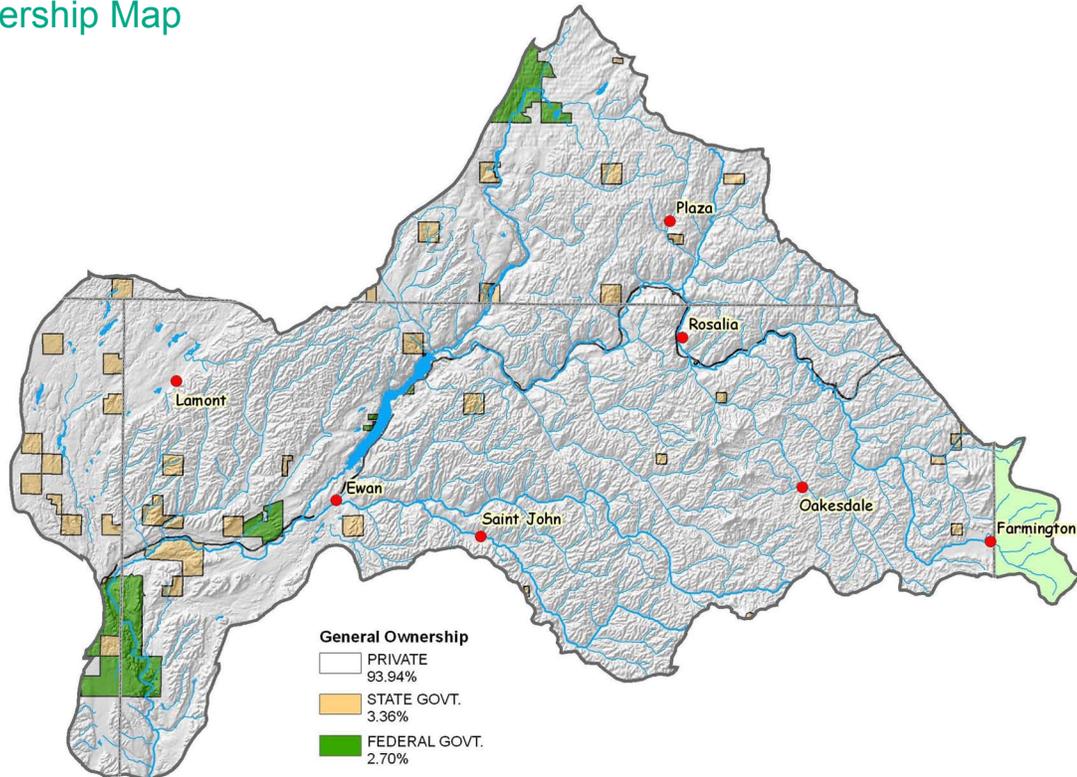


9.1 – Palouse and Nez Perce Prairies - Channeled Scablands. This unit was formed by glacial Lake Missoula flood waters during the Pleistocene. The flood waters scoured away the thick loess soil covering the plateau and exposed portions of the basalt bedrock. The basalt plateaus bordering the main flood channels are patterned by ‘scabs’ (mounds of loess) surrounded by rock fragments. The scablands (or mounds) generally support trees. The most common native vegetation on the scabland channels is the stiff sage-Sandberg’s bluegrass association.

9.1.2 – Palouse and Nez Perce Prairies - Moist Loess Islands. This unit is the remnant of the once unbroken mantle of wind-deposited loess that covered the entire Columbia Plateau. It is surrounded by eroded Pleistocene flood channels (Channeled Scablands CRA). Mean annual precipitation is 15 to 18 inches, increasing from west to east. The big sage-bluebunch wheatgrass association of MLRA 8 is replaced by bluebunch wheatgrass-Idaho fescue with a shrub component of rose and snowberry. Present-day land use has transformed the loess islands into wheat fields. Because of the limitations in moisture, crop rotations generally include a fallow period.

9.2 – Palouse and Nez Perce Prairies - Palouse Hills. This unit is the western foothills of the Northern Rocky Mountains. This unit is characterized by a non-forested, loess-covered area with greater than 15 inches of precipitation. The highly productive soil has a higher organic matter and clay content. Original plant cover has been almost entirely supplanted by wheat farms. Water erosion is the major management issue. Perennial streams originate from the mountains to the east. Smaller, loess-bottomed streams rise within the CRA and are intermittent. Many of these intermittent streams are plowed and tilled. Extensive farming including small grains, peas, lentils, hay and pastureland.

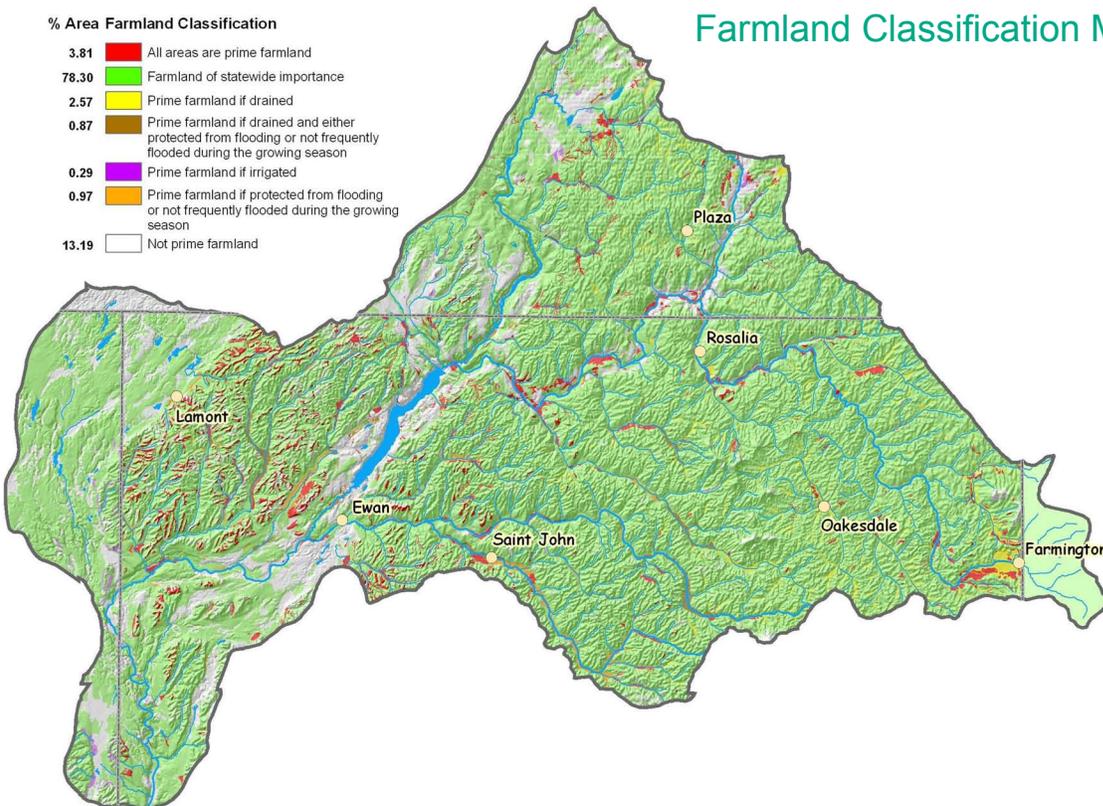
Ownership Map



% Area Farmland Classification

- 3.81 All areas are prime farmland
- 78.30 Farmland of statewide importance
- 2.57 Prime farmland if drained
- 0.87 Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season
- 0.29 Prime farmland if irrigated
- 0.97 Prime farmland if protected from flooding or not frequently flooded during the growing season
- 13.19 Not prime farmland

Farmland Classification Map

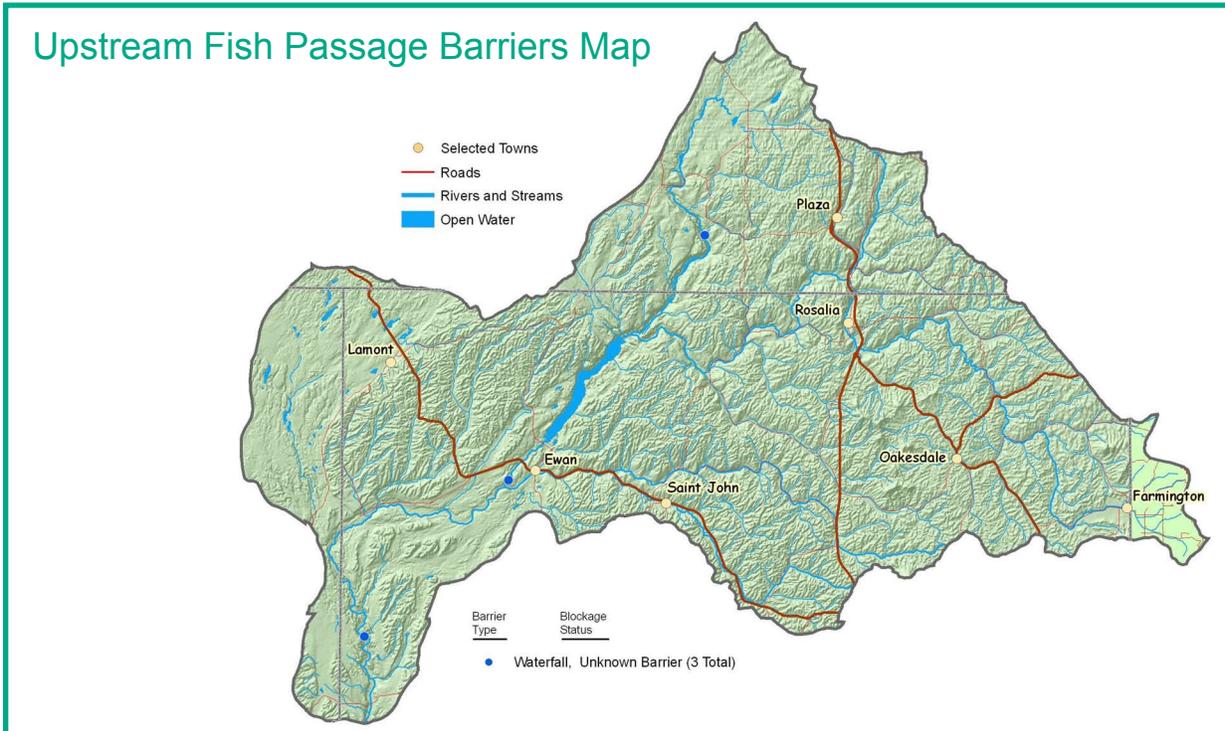


Physical Descriptions

Streams, Fish Species and Passage Barriers ^{7,8,9,19,20}

Rock Watershed
610,323 Total Acres
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Statewide - these fish groups are exotic (introduced): catfish, spiny-rays (perch, sunfish, bass), pike, shad, mosquitofish, killifish, weatherfish, striped bass and goby.



| Fish Species Found in the Rock Watershed | | |
|--|-----------|-----------|
| Fish Group | Native | Exotic |
| Catfish | | 4 |
| Minnow, carp | 6 | 4 |
| Perch, walleye | | 2 |
| Salmonid (resident) | 2 | 1 |
| Sculpin | 1 | |
| Stickleback | | 1 |
| Sucker | 3 | |
| Sunfish, bass, crappie | | 4 |
| Watershed Total | 12 | 16 |
| Statewide Total | 53 | 41 |

| Stream Statistics for the Rock Watershed | |
|--|-----|
| Total streams | 288 |
| Named streams | 27 |
| Total stream miles | 905 |
| Intermittent miles | 687 |
| Intermittent % | 76% |

Rock Watershed - Salmonid (resident)
native: rainbow trout; mountain whitefish;
exotic: brown trout.

The Rock Creek drainage and a New Mexico stream are the only places west of the Rockies where brook stickleback have been found.

Physical Descriptions

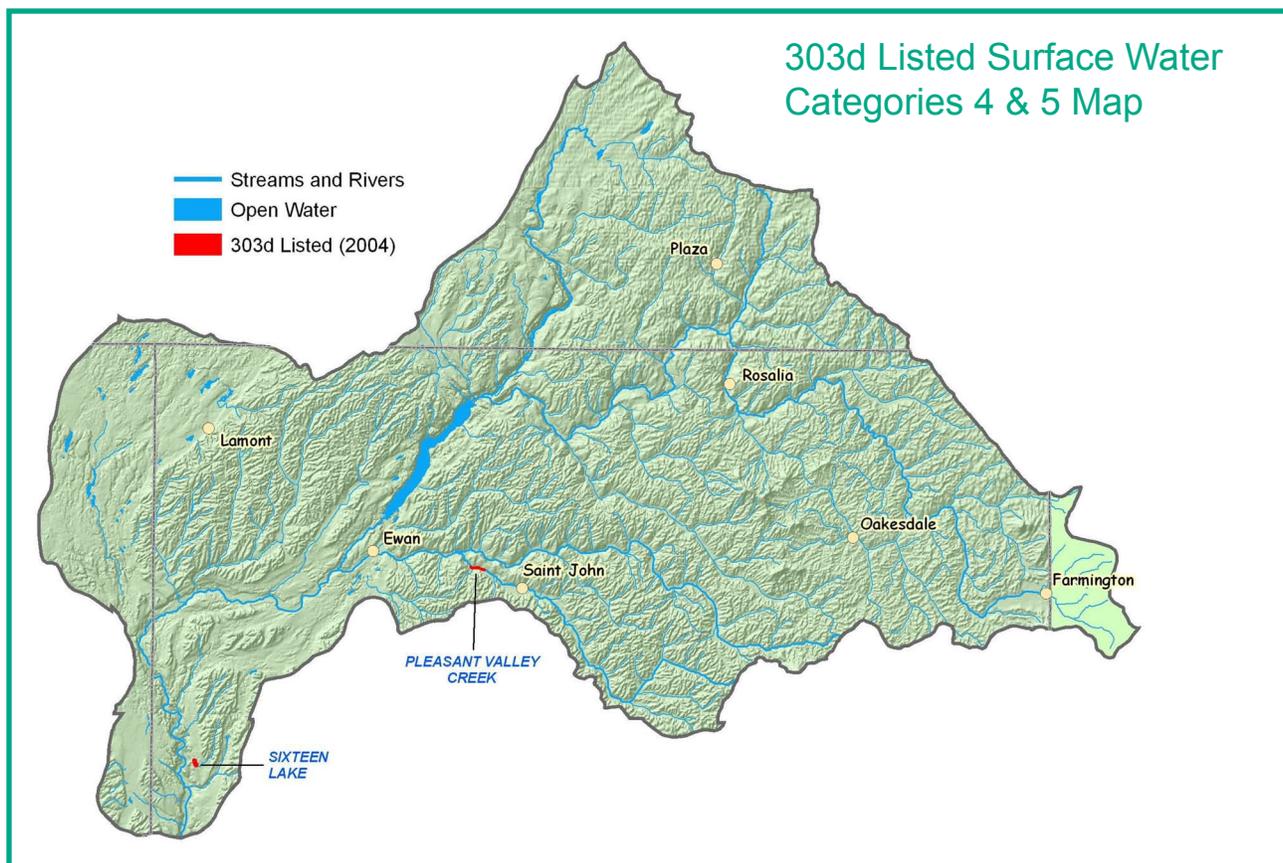
303d Listed Surface Water ¹²

Rock Watershed
610,323 Total Acres
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Section 303(d) of the federal Clean Water Act requires each state periodically to prepare a list of all surface waters in the state for which beneficial uses of the water – such as for drinking, recreation, aquatic habitat, and industrial use – are impaired by pollutants. These are water quality limited estuaries, lakes, and streams that fall short of state surface water quality standards and are not expected to improve within the next two years.



Waters placed on the 303(d) list require the preparation of Total Maximum Daily Loads (TMDLs), a key tool in the work to clean up polluted waters. TMDLs identify the maximum amount of a pollutant that can be released into a waterbody without impairing the uses of the water. TMDL's can be allocated amount among various pollution sources. In addition, even before a TMDL is completed, the inclusion of a water body on the 303(d) list can reduce the amount of pollutants allowed to be released under permits issued by Ecology.



Washington State's Water Quality Assessment lists the status of water quality for a particular location in one of 5 categories recommended by EPA. Categories 1 – 4 represent the status of waters for the 305(b) Report, while Category 5 represents those waters placed on the 303(d) list.

(303d listed surface water information continued on next page.)

Physical Descriptions

303d Listed Surface Water ¹³

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Category 4: Polluted waters that do not require a TMDL is for waters that have pollution problems that are being solved in one of three ways.



Category 4a: **“has a TMDL”** is for water bodies that have an approved TMDL in place and are actively being implemented.

Category 4b: **“has a pollution control plan”** is for water bodies that have a plan in place that is expected to solve the pollution problems. While pollution control plans are not TMDLs, they must have many of the same features and there must be some legal or financial guarantee that they will be implemented.

Category 4c: **“is impaired by a non-pollutant”** is for water bodies impaired by causes that cannot be addressed through a TMDL. These impairments include low water flow, stream channelization, and dams. These problems require complex solutions to help restore streams to more natural conditions.

Category 5: Polluted waters that require a TMDL. The 303(d) list is the traditional list of impaired water bodies. Placement in this category means that Washington State Department of Ecology has data showing that the water quality standards have been violated for one or more pollutants, and there is no TMDL or pollution control plan. TMDLs are required for the water bodies in this category.

| Water Body | Fecal Coliform | Total Phosphorus | Invasive Exotic Species | pH |
|-----------------------|----------------|------------------|-------------------------|----|
| Pleasant Valley Creek | x | | | x |
| Sixteen Lake | | x | x | |

Physical Descriptions

Riparian Land Use / Land Cover ⁵

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The current condition and quality of riparian areas adjacent to water bodies is often times dependent on the land use and land cover characteristics.



This data set is based on a riparian width of 100 feet on each side of all streams in the watershed.

| Land Cover/Use | | |
|--|---------------|------------------|
| Based on a 100-foot stretch on both sides of all streams in the 100K Hydro GIS Layer | ACRES | % of Buffer Area |
| Bare Rock/Sand/Clay | 2 | 0.0% |
| Commercial/Industrial/Transportation | 453 | 2.1% |
| Deciduous Forest | 35 | 0.2% |
| Emergent Herbaceous | 74 | 0.3% |
| Evergreen Forest | 365 | 1.7% |
| Fallow | 4,634 | 20.9% |
| Grasslands/Herbaceous | 599 | 2.7% |
| Low Intensity Residential | 100 | 0.5% |
| Mixed Forest | 32 | 0.2% |
| Open Water | 633 | 2.9% |
| Pasture/Hay | 420 | 1.9% |
| Shrubland | 1,980 | 8.9% |
| Small Grains | 12,339 | 55.7% |
| Woody Wetlands | 25 | 0.1% |
| Grand Total | 22,148 | 100.0% |

Physical Descriptions

Irrigated Cropland, Hayland and Pastureland ¹⁴

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The Natural Resource Inventory (NRI) of 1997 was used to estimate acres of irrigated and cultivated cropland, uncultivated cropland (hayland) and pastureland in the watershed.

There are no irrigated cropland, hayland or pastureland areas identified by the St. John office staffs.





Cultural resources are important to most residents in the watershed. Cultural Resources are considered equivalent to “historic properties” as defined in the National Historic Preservation Act. They include any prehistoric or historic district, site, building, structure or object listed in or eligible for listing in the National Register of Historic Places (maintained by the Secretary of the Interior). They also include all records, artifacts and physical remains associated with the historic properties. They may consist of the traces of all of the past activities and accomplishments of people.

Cultural resources that are also protected under other authorities (such as the American Indian Religious Freedom Act) include:

- (1) tangible traces such as districts, sites, buildings, structures and objects;
- (2) less tangible traces such as dance forms, aspects of folk life, landscapes, vistas, cultural or religious practices;
- (3) historical documents;
- (4) and some landscapes, vistas, cemeteries (if they have historic or cultural value) and life ways.

Native Americans have inhabited the area for thousands of years. Members of Nez Perce, Umatilla, Yakama, Coeur d’ Alene and Spokane Tribes were the primary inhabitants of this area. Many cultural resource sites have been located and recorded in this area. These sites are protected through provisions of federal and state laws. Many sites from European settlers are also located in the watershed. The type of sites found are from, homestead cabins, cemeteries and early farming equipment storage or dump sites.

Activities carried out in the watershed by Federal agencies, where the agency has control of the outcome, is subject to provisions of the National Historic and Preservation Act. The Act requires Federal agencies to take into account the effects of their undertakings on any cultural resources or historic properties that meet the National Register of Historic Places criteria. Part of this process involves taking action to avoid or minimize harm to eligible resources.

Physical Descriptions

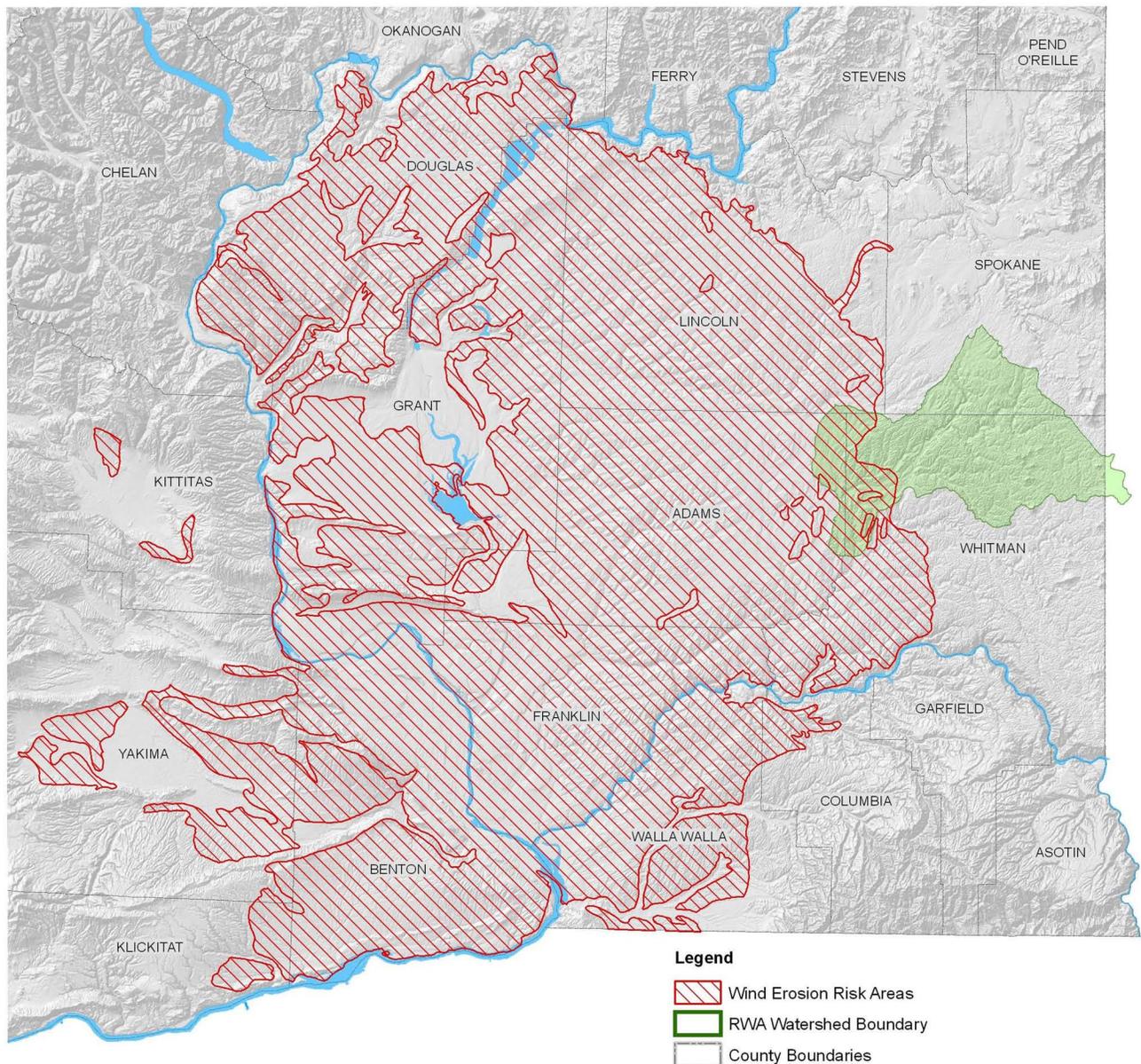
Air Quality, Ground Water and Wind Erosion ¹⁶

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Risk of wind erosion is determined by the erodibility and erosivity at a site. Erodibility is affected by soil texture, surface cover and landscape position. Erosivity refers to wind speed, duration, direction and moisture pattern. The soils that are mapped in the wind erosion risk area formed in loess parent material of various depths over Basalt and mixed sediments in an area classified as Channeled Scablands. Surface textures are generally silt loam. The climate in the area is not normally highly erosive yet certain critical periods occur during fall and spring in most years. The area mapped is conducive to wind erosion when the amount vegetation or residue is unable to protect the soil surface during these potential critical periods.



Wind Erosion Risk Area Map



Resource Concerns

Resource Concerns

Rock Watershed
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The Local Work Group (LWG) has identified the following resource concerns as being the top priority for cost share assistance:



| |
|---|
| SOIL |
| RKLS is > 60 |
| Soil condition concern |
| Ephemeral gullies |
| Conventional tillage |
| Burning on cropland |
| Grass buffer, stripcropping, or terrace system needed |
| No-Till/Direct Seed needed |
| WATER |
| Irrigation System improved &/or IWM |
| 303(d) listed stream or tributary |
| CNMP |
| Livestock Confinement or feeding areas adjacent to streams or other bodies of water |
| Road related problems |
| Storage - animal manure |
| PLANT |
| Forest diseases, pests, or overstocking problems |
| Forest stand improvement |
| Forest Tree Pruning |
| Livestock have uncontrolled access to riparian areas |
| Livestock water Development for proper grazing distribution |
| Noxious weeds and/or woody vegetation |
| ANIMAL |
| Habitat for terrestrial species |

Resource Concerns

Threatened and Endangered List ^{17,18}

Rock Watershed
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The following Chart shows the listed plant and animal species under the Endangered Species Act (ESA). These species are a resource concern that must be addressed during the planning process. For additional information contact the United States Fish & Wildlife Service (USF&W) and/or the National Marine Fisheries Service (NMFS).



If planned practices will be applied in an area where potential listed species or its designated critical habitat may be affected either positively or negatively, than a Biological Assessment (BA) must be conducted.

| Animal and Plant Species Included in the Endangered Species Act for the Rock Watershed | | |
|---|---------------------------------|--------------|
| Common Name | Scientific Name | Type |
| <i>Endangered Species</i> | | |
| None | | |
| <i>Threatened Species</i> | | |
| Bald Eagle | <i>Haliaeetus leucocephalus</i> | <i>Bird</i> |
| Spalding's Catchfly | <i>Silene spaldingii</i> | <i>Plant</i> |
| Water Howellia | <i>Howellia aquatillis</i> | <i>Plant</i> |

Farm Bill Programs

Performance Results ²¹

Rock Watershed
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This section highlights the conservation application that has been reported from FY 2001 through FY 2006. Performance Results System (PRS) data was extracted from PRS reports by year, conservation systems by Hydrologic Unit Code (HUC). HUC reports were not available where NA. For additional information and other performance reports visit <http://ias.sc.egov.usda.gov/prshome/>.

| | FY02 | FY03 | FY04 | FY05 | FY06 | Total |
|--|------|------|------|------|------|-------|
| Conservation Systems | | | | | | |
| Total Conservation Systems Planned (acres) | 12 | 0 | NA | 0 | 22 | 881 |
| Total Conservation Systems Applied (acres) | 0 | 6 | NA | 0 | 17 | 61 |
| Conservation Treatments | | | | | | |
| Waste Management (no.) | 0 | 0 | 0 | 0 | 0 | 0 |
| Buffers (acres) | 0 | 0 | 0 | 0 | 0 | 0 |
| Erosion Control (tons/year) | 0 | 0 | NA | 0 | 0 | 0 |
| Erosion Control (acres) | 0 | 6 | NA | 0 | 0 | 6 |
| Irrigation Management (acres) | 0 | 12 | 0 | 0 | 17 | 29 |
| Nutrient Management (acres) | 0 | 0 | 0 | 0 | 0 | 0 |
| Pest Management (acres) | 0 | 0 | 0 | 0 | 0 | 0 |
| Prescribed Grazing (acres) | 0 | 0 | 0 | 0 | 0 | 0 |
| Tree and Shrub Establishment (acres) | 0 | 0 | 0 | 0 | 0 | 0 |
| Wildlife Habitat (acres) | 0 | 0 | 0 | 40 | 0 | 40 |
| Wetlands (acres) | 0 | 0 | 0 | 0 | 0 | 0 |

This table lists the farm bill program participation in the watershed during the last five years. Data was collected from Conservation Systems Planned using Farm Bill Programs from PRS reports for the hydrologic unit area. NA indicates that the information was not available.

| | FY02 | FY03 | FY04 | FY05 | FY06 | Total |
|---|------|------|------|------|------|-------|
| Systems Planned Using Conservation Farm Bill Programs (acres) | | | | | | |
| Conservation Reserve Program (CRP) | 0 | 0 | 0 | 0 | 0 | 847 |
| Conservation Security Program (CSP) | NA | NA | NA | NA | 880 | 880 |
| Environmental Quality Incentives Program - Ground and Surface Water (EQIP-GSWC) | - | 0 | 0 | 0 | 0 | 0 |
| Environmental Quality Incentives Program (EQIP) | 12 | 0 | 765 | 0 | 22 | 799 |
| Farmland Protection Program (FPP) | 0 | 0 | 0 | 0 | 0 | 0 |
| Forestry Incentives Program (FIP) | 0 | 0 | 0 | 0 | 0 | 0 |
| Grassland Reserve Program (GRP) | - | 0 | 0 | 0 | 0 | 0 |
| Wetlands Reserve Program (WRP) | 0 | 0 | 0 | 0 | 0 | 0 |
| Wildlife Habitat Incentive Program (WHIP) | 0 | 0 | 232 | 0 | 0 | 232 |

There are 2,225 farms in Spokane County and 1,087 farms in Whitman County, the core counties comprising 90% of the agricultural operations in the watershed. An analysis of the 2002 Agricultural Census data by zip code suggests there are 404 agricultural operations in the watershed. Whitman County has 71% of the agricultural operations in the watershed. The county average farm size in the 2002 Census of Agriculture was 289 acres for Spokane and 1,222 acres for Whitman.



For Spokane County, the 2002 average market value of agricultural products sold was \$42,181 with a net cash farm income of \$11,041. The Spokane county net cash farm income was 33% of the statewide average. For Whitman County, the 2002 average market value of agricultural products sold was \$149,614 with a net cash farm income of \$49,037. The Whitman county net cash farm income was 145% of the statewide average.

The average farm size for Washington State in the 2002 Census of Agriculture was 426 acres with an average market value of agricultural products sold of \$148,327 and an average net cash farm income of \$33,925.

| Population Ethnicity by County | Spokane | Whitman | Washington |
|---|---------|---------|------------|
| White persons, percent, 2004 (a) | 92.1% | 88.6% | 85.3% |
| Black persons, percent, 2004 (a) | 1.7% | 1.8% | 3.5% |
| American Indian and Alaska Native persons, percent, 2004 (a) | 1.5% | 0.7% | 1.6% |
| Asian persons, percent, 2004 (a) | 2.1% | 6.6% | 6.3% |
| Native Hawaiian and Other Pacific Islander, percent, 2004 (a) | 0.2% | 0.3% | 0.5% |
| Persons reporting two or more races, percent, 2004 | 2.4% | 1.9% | 2.9% |
| Persons of Hispanic or Latino origin, percent, 2004 (b) | 3.2% | 3.3% | 8.5% |
| White persons, not Hispanic, percent, 2004 | 89.3% | 85.6% | 77.5% |

| Economic Characteristics by County | Spokane | | Whitman | | Washington | |
|------------------------------------|---------|-----|---------|-----|------------|-----|
| | Number | % | Number | % | Number | % |
| INCOME IN 1999 | | | | | | |
| Households | 163,826 | 100 | 15,247 | 100 | 2,272,261 | 100 |
| Less than \$10,000 | 16,348 | 10 | 2,659 | 17 | 171,863 | 8 |
| \$10,000 to \$14,999 | 11,797 | 7 | 1,846 | 12 | 124,848 | 6 |
| \$15,000 to \$24,999 | 24,590 | 15 | 2,310 | 15 | 265,131 | 12 |
| \$25,000 to \$34,999 | 23,847 | 15 | 2,001 | 13 | 284,630 | 13 |
| \$35,000 to \$49,999 | 28,727 | 18 | 2,110 | 14 | 389,434 | 17 |
| \$50,000 to \$74,999 | 31,619 | 19 | 2,329 | 15 | 486,392 | 21 |
| \$75,000 to \$99,999 | 13,943 | 9 | 1,033 | 7 | 264,498 | 12 |
| \$100,000 to \$149,999 | 8,917 | 5 | 678 | 4 | 188,513 | 8 |
| \$150,000 to \$199,999 | 1,961 | 1 | 181 | 1 | 47,615 | 2 |
| \$200,000 or more | 2,077 | 1 | 100 | 1 | 49,337 | 2 |
| Median household income (dollars) | 37,308 | 0 | 28,584 | 0 | 45,776 | 0 |



| ECONOMIC CHARACTERISTICS by County | Spokane | | Whitman | | Washington | |
|---|---------|----|---------|----|------------|----|
| | Number | % | Number | % | Number | % |
| Employed civilian population 16 years and over | 191,295 | | 18,870 | | 2,793,722 | |
| OCCUPATION | | | | | | |
| Management, professional, and related occupations | 63,121 | 33 | 8,593 | 46 | 993,198 | 36 |
| Service occupations | 32,322 | 17 | 3,292 | 17 | 416,056 | 15 |
| Sales and office occupations | 54,261 | 28 | 4,545 | 24 | 723,256 | 26 |
| Farming, fishing, and forestry occupations | 835 | 0 | 334 | 2 | 43,495 | 2 |
| Construction, extraction, and maintenance occupations | 16,538 | 9 | 919 | 5 | 263,767 | 9 |
| Production, transportation, and material moving occupations | 24,218 | 13 | 1,187 | 6 | 353,950 | 13 |
| INDUSTRY | | | | | | |
| Agriculture, forestry, fishing and hunting, and mining | 1,662 | 1 | 1,214 | 6 | 68,976 | 3 |
| Construction | 12,243 | 6 | 600 | 3 | 194,871 | 7 |
| Manufacturing | 19,416 | 10 | 506 | 3 | 348,646 | 13 |
| Wholesale trade | 8,792 | 5 | 401 | 2 | 113,526 | 4 |
| Retail trade | 24,333 | 13 | 1,545 | 8 | 338,772 | 12 |
| Transportation and warehousing, and utilities | 8,893 | 5 | 487 | 3 | 150,985 | 5 |
| Information | 4,403 | 2 | 396 | 2 | 95,669 | 3 |
| Finance, insurance, real estate, and rental and leasing | 13,581 | 7 | 568 | 3 | 170,622 | 6 |
| Professional, scientific, management, administrative, and waste management services | 16,697 | 9 | 1,033 | 6 | 272,466 | 10 |
| Educational, health and social services | 45,765 | 24 | 8,503 | 45 | 541,214 | 19 |
| Arts, entertainment, recreation, accommodation and food services | 15,677 | 8 | 1,918 | 10 | 221,656 | 8 |
| Other services (except public administration) | 10,822 | 6 | 895 | 5 | 135,379 | 5 |
| Public administration | 9,011 | 5 | 804 | 4 | 140,940 | 5 |
| CLASS OF WORKER | | | | | | |
| Private wage and salary workers | 147,443 | 77 | 8,786 | 47 | 2,125,029 | 76 |
| Government workers | 30,104 | 16 | 8,611 | 46 | 459,722 | 17 |
| Self-employed workers in own not incorporated business | 13,144 | 7 | 1,405 | 7 | 199,827 | 7 |
| Unpaid family workers | 604 | 0 | 68 | 0 | 9,144 | 0 |



| 2002 AG CENSUS DATA | Spokane | Whitman |
|---|----------------|----------------|
| Farms (number) | 2,225 | 1,087 |
| Land in farms (acres) | 643,377 | 1,328,337 |
| Total cropland (acres) | 421,846 | 1,087,988 |
| Irrigated land (acres) | 12,230 | 6,192 |
| Principal operator by primary occupation Farming (number) | 1,116 | 828 |
| Principal operator by place of residence On farm operated (number) | 1,930 | 785 |
| Farms by Size | | |
| Average size of farm (acres) | 289 | 1,222 |
| 1 to 9 acres | 267 | 47 |
| 10 to 49 acres | 894 | 110 |
| 50 to 69 acres | 115 | 27 |
| 70 to 99 acres | 141 | 33 |
| 100 to 139 acres | 136 | 45 |
| 140 to 179 acres | 115 | 33 |
| 180 to 219 acres | 66 | 24 |
| 220 to 259 acres | 66 | 14 |
| 260 to 499 acres | 156 | 120 |
| 500 to 999 acres | 119 | 160 |
| 1,000 to 1,999 acres | 68 | 282 |
| 2,000 acres or more | 82 | 192 |
| Livestock and Poultry | | |
| Inventory - Cattle and calves (farms) | 649 | 238 |
| Inventory - Cattle and calves - Beef cows (farms) | 506 | 196 |
| Inventory - Cattle and calves - Milk cows (farms) | 40 | 8 |
| Inventory - Hogs and pigs (farms) | 57 | 34 |
| Inventory - Sheep and lambs (farms) | 93 | 67 |
| Inventory - Layers 20 weeks old and older (farms) | 142 | 37 |
| Inventory - Broilers and other meat-type chickens (farms) | 20 | 5 |



| 2002 AG CENSUS DATA | Spokane | Whitman |
|--|---------|---------|
| Selected Crops Harvested (acres) | | |
| Harvested cropland (acres) | 315,228 | 761,565 |
| Harvested cropland - Irrigated (acres) | 10,612 | 5,056 |
| Corn for grain (acres) | 0 | 111 |
| Corn for grain - Irrigated (acres) | 0 | 0 |
| Corn for silage or greenchop (acres) | 398 | 0 |
| Corn for silage or greenchop - Irrigated (acres) | 398 | 0 |
| Wheat for grain, all (acres) | 143,897 | 486,853 |
| Wheat for grain, all - Irrigated (acres) | 1,543 | 1,420 |
| Wheat for grain, all - Winter wheat for grain (acres) | 95,388 | 348,572 |
| Wheat for grain, all - Spring wheat for grain (acres) | 0 | 138,281 |
| Barley for grain (acres) | 37,755 | 124,815 |
| Barley for grain - Irrigated (acres) | 192 | 55 |
| Oats for grain (acres) | 3,152 | 214 |
| Oats for grain - Irrigated (acres) | 0 | 0 |
| Potatoes (acres) | 192 | 0 |
| Sugarbeets for sugar (acres) | 0 | 0 |
| Forage - land used for all hay, haylage, grass silage, and greenchop (acres) | 64,247 | 13,538 |
| Forage - land used for all hay, haylage, grass silage, and greenchop - irrigated (acres) | 5,909 | 1,711 |
| Vegetables harvested for sale (acres) | 1,174 | 6,582 |
| Land in orchards (acres) | 796 | 58 |
| Land in orchards - Irrigated (acres) | 643 | 55 |



A limited number of natural resource and socio-economic studies have been conducted in the Rock watershed. Most of these studies are associated to Washington’s WRIA 34, Palouse. Many of these studies have focused on water quality issues and have been conducted in cooperation with Washington Department of Ecology.

In addition, to water quality studies, the following list and links are from the Washington Department of Ecology:

WRIA 34, Palouse

| Title | Number | Date |
|---|-----------|----------------|
| Quality Assurance Project Plan: South Fork Palouse River Fecal Coliform Bacteria Total Maximum Daily Load Study | 06-03-105 | June 2006 |
| Quality Assurance Project Plan: South Fork Palouse River Temperature Total Maximum Daily Load Study | 06-03-104 | June 2006 |
| Washington State Toxics Monitoring Program: Toxic Contaminants in Fish Tissue and Surface Water in Freshwater Environments, 2003 | 06-03-019 | May 2006 |
| North Fork Palouse River Fecal Coliform Total Maximum Daily Load: Water Quality Implementation Plan -- DRAFT | 06-10-028 | May 2006 |
| Palouse River Watershed | 06-10-002 | January 2006 |
| Progress on Watershed Planning and Setting Instream Flows | 05-11-038 | December 2005 |
| Quality Assurance Project Plan: South Fork Palouse River Pesticide, PCB, and Fecal Coliform Stormwater Pilot Study | 05-03-115 | November 2005 |
| Thermal Infrared Radiometry: Taking the Temperature of the North and South Fork Palouse Rivers | 05-10-065 | July 2005 |
| Quality Assurance Project Plan: Assessing Current Levels of 303(d) Listed Pesticides and PCBs in Palouse River Fish | 05-03-106 | May 2005 |
| A Comparison of Water Quality Data Collected from Two Washington Rivers by the Department of Ecology and the U.S. Geological Survey | 05-03-009 | April 2005 |
| North Fork Palouse River Fecal Coliform Total Maximum Daily Load: Submittal Report | 04-10-067 | February 2005 |
| North Fork Palouse River Fecal Coliform Bacteria Total Maximum Daily Load Recommendations | 04-03-022 | May 2004 |
| Results of Sampling to Verify 303(d) Metals Listings for Selected Washington State Rivers and Creeks | 02-03-039 | September 2002 |

(Socio-economic studies conducted on next page.)

Reports

Special Projects

Rock Watershed
610,323 Total Acres
HUC# 17060109



| Title | Number | Date |
|--|-----------|---------------|
| River and Stream Ambient Monitoring Report for Water Year 2000 | 01-03-042 | December 2001 |
| Water Quality Assessments of Selected Lakes within Washington State: 1998 | 00-03-039 | December 2000 |
| Water Quality Assessments of Selected Lakes within Washington State: 1997 | 00-03-009 | March 2000 |
| River and Stream Ambient Monitoring Report for Water Year 1997 | 99-332 | August 1999 |
| Aquatic Plants Technical Assistance Program 1998 Activity Report | 99-328 | June 1999 |
| Aquatic Plants Technical Assistance Program 1997 Activity Report | 98-311 | 1998 |
| River and Stream Ambient Monitoring Report for Wateryear 1996 | 98-317 | 1998 |
| River and Stream Ambient Monitoring Report for Wateryear 1995 | 96-355 | 1997 |
| Water Quality Assessments of Selected Lakes within Washington State - 1994 | 97-307 | 1997 |

Footnotes and Bibliography



All information 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. Rapid Watershed Assessment (RWA) 8-digit Hydrologic Unit (HU) boundaries are from the U.S. Geological Survey huc250k vector data layer published in 1994. The data is based on the Hydrologic Unit Maps published by the U.S. Geological Survey Office of Water Data Coordination, together with the list descriptions and the name of the region, subregion, accounting unit, and cataloging unit. The hydrologic units are encoded with an eight-digit number that indicates the hydrologic region (first two digits), hydrologic subregion (second two digits), accounting unit (third two digits), and cataloging unit (fourth two digits). The HU data was downloaded from the NRCS Geospatial Data Gateway <http://datagateway.nrcs.usda.gov/>. Tribal reservation boundaries are from the Washington State Department of Ecology (WDOE) 1:100,000 scale State Tribal Lands vector data layer. This layer can be downloaded from <http://www.ecy.wa.gov/services/gis/data/data.htm#tribal>.
2. General Soils were derived from the General Soil Map, Washington (1:500,000 scale), by Maureen Boling, Bruce Frazier and Alan Busacca, Washington State University, 1998. The soil map is the product of the combined efforts of Washington State University and its National Cooperative Soil Survey Partners, the USDA Natural Resources Conservation Service and Forest Service. More information visit <http://remotesens.css.wsu.edu/washingtonsoil/index.htm>.
3. The Relief map was created using a seamless, statewide, 30-meter resolution USGS digital elevation model (DEM) raster clipped to the watershed boundary. This DEM was colored to represent relative relief and draped over a 30-meter hillshade grid derived from the statewide DEM to create a 3-D effect. The mountain peaks and town locations are from the 2004 USGS Geographic Names Information System (GNIS) Non-populated Places and Populated Places datasets. The GNIS data was downloaded from the NRCS Geospatial Data Gateway <http://datagateway.nrcs.usda.gov/>.
4. Average Annual Precipitation is from the Parameter-elevation Regressions on Independent Slopes Model (PRISM) raster data. This annual precipitation data is derived from the climatological period of 1961-1990. The PRISM raster data is the underlying dataset from which the polygons and vectors were created. For more information about PRISM visit http://www.ocs.orst.edu/prism/prism_new.html. Precipitation data was downloaded from the NRCS Geospatial Data Gateway <http://datagateway.nrcs.usda.gov/>.
5. The Land Use/Land Cover data was generated from the National Land Cover Dataset (NLCD) compiled from Landsat satellite TM imagery (circa 1992) with a spatial resolution of 30 meters and supplemented by various ancillary data (where available). The data was assembled by the USGS and published in June of 1999. The analysis and interpretation of the satellite imagery was conducted using very large, sometimes multi-state image mosaics. 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. For more information about NLCD visit <http://landcover.usgs.gov/natl/landcover.php>. Data was downloaded from the NRCS Geospatial Data Gateway <http://datagateway.nrcs.usda.gov/>. For more information on Land Use designations, refer to the NRCS Planning Procedures Handbook, March 2003.
6. Common Resource Area (CRA) Map delineations are defined as geographical areas where resource concerns, problems, or treatment needs are similar. It is considered a subdivision of an existing Major Land Resource Area (MLRA) map delineation or polygon. Landscape conditions, soil, climate, human considerations, and other natural resource information are used to determine the geographic boundaries of a CRA. For more information about a CRA visit <http://soils.usda.gov/survey/geography/cra.html>.

Footnotes and Bibliography



7. Fish species distribution for both streams and lakes was obtained by overlaying a clear plastic outline of Washington State, with the chosen watershed highlighted, onto a similar-sized fish-distribution map found for each fish species in the publication, "Inland Fishes of Washington". Wydoski, R. S. and R. R. Whitney. 2003. Inland Fishes of Washington (2nd edition). American Fisheries Society and University of Washington Press. 320 pp. Many fish species are shown as living only in the main stem Columbia or Snake Rivers. If one of these rivers runs through, or is a boundary of a target watershed, river-borne species were included in the watershed. Likewise, estuary-type fish such as starry flounders, that are often found well upstream from saltwater, are included in most watersheds that drain to salt water.
8. Fish barrier information was downloaded from the SalmonScape website at: <http://wdfw.wa.gov/mapping/salmonscape/>. This Washington Department of Fish and Wildlife website offers an online source of maps at the 1:24,000 scale for planners to identify and prioritize their stream restoration and protection activities. The site merges fish presence and habitat data collected by state, federal, tribal and local biologists and presents it in an integrated system that can be readily accessed by other agencies and the public. It is part of the larger StreamNet program for Northwestern States.
9. Stream statistics were obtained from 1:100,000 scale StreamNet data layers found at: <http://www.streamnet.org/pnwr/fileaccess.html>. StreamNet: <http://www.streamnet.org/> 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: <http://www.psmfc.org/>. It is recognized that a 100K map scale may show less streams and less stream miles than a 24K map, but it still gives a useful comparison between watersheds.
10. General Ownership is derived from the 1:100,000 scale Washington Public Lands (2005) layer. The layer is comprised of the best available data compiled at 1:100,000 scale. This data layer is a compilation of the Washington State Department of Natural Resources (WDNR) Managed Land Parcels layer and the Washington State Major Public Lands (Non-DNR or NDMPL) layer. The combination of these two data layers is intended to reflect the most current general ownership (and extent of public lands) digital data in Washington State at the 1:100,000 scale. These data layers were downloaded from the WDNR Available GIS Data website: <http://www3.wadnr.gov/dnrapp6/dataweb/dmmatrix.html>. The RWA map describes occurrences within the watershed of land ownership/management areas for federal, tribal, state, local and private entities. For current ownership status, consult official records at appropriate Federal, State, and county offices.
11. Farmland classifications were derived using the Natural Resources Conservation Service (NRCS) Soil Survey Geographic Database (SSURGO) tabular and spatial data. This information can be referenced through the NRCS Field Office Technical Guide, Section II, Soils: soils data and interpretation databases. The following surveys were used:
 - Adams County, WA (WA001) Published 2004 09 14
 - Lincoln County, WA (WA043) Published 2004 05 28
 - Spokane County, WA (WA063) Published 2006 05 03
 - Whitman County, WA (WA075) Published 2004 09 14

These surveys and tabular databases were downloaded from the NRCS Soil Data Mart at: <http://soildatamart.nrcs.usda.gov>. Farmland classification layers were created using the soil surveys in the NRCS Soil Data Viewer (SDV).

Footnotes and Bibliography



Visit the online Web Soil Survey at: <http://websoilsurvey.nrcs.usda.gov> for official and current USDA soil information as viewable maps and tables.

12. Washington Department of Ecology:
http://www.ecy.wa.gov/programs/wq/303d/wq_assessment_cats.html.
Washington State Water Quality Categories website:
<http://apps.ecy.wa.gov/wats/WATSQBHome.asp> .
13. 303d listed streams were derived from the Washington State Department of Ecology's (WDOE) 2004 Washington Water Quality Assessment/303(d) List. This information was downloaded from the WDOE Statewide Datasets website: <http://www.ecy.wa.gov/services/gis/data/data.htm>.
14. 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/> .
15. NRCS General Manual, Part 401 - Cultural Resources (Archeological and Historic Properties):
http://policy.nrcs.usda.gov/scripts/lpsis.dll/GM/GM_420_401_a.htm
16. The Wind Erosion Risk Areas of Washington State were derived by identifying cropland soils that contribute to air quality concerns. These soils are the Dq1, Dq2, Ds1, Ds2, L1, L2, L3, Lt2, X1, X2 and X3 soil types, and were extracted from the General Soil Map, Washington (1:500,000 scale), by Maureen Boling, Bruce Frazier and Alan Busacca, Washington State University, 1998. The General Soil Map is the product of the combined efforts of Washington State University and its National Cooperative Soil Survey Partners, the USDA Natural Resources Conservation Service and the US Forest Service. For more information regarding the General Soil Map please visit:
<http://remotesens.css.wsu.edu/washingtonsoil/index.htm> .
17. USFWS website for all federally listed animals and plants in Washington State.
http://ecos.fws.gov/tess_public/StateListing.do?state=WA&status=listed
18. Washington State's Rare Plant Species Populations and Endangered Ecosystems from the Washington Natural Heritage Program WNHP (Current and Historic) Data Set (September 2005). In designing the WNHP Data Set, Washington Natural Heritage Program sought to license and distribute a GIS data set for use in land use planning and management. In order to balance the interests of data users with species protection, the precise locations of rare plant populations are not included. These locations are instead represented by 'areas-of-concern'. Occurrences of species considered critically imperiled are generalized as larger areas-of-concern polygons. Some known element occurrences have been completely removed from this data set before distribution because information on these elements is considered sensitive at this time.
For more information please visit the WNHP website at www.dnr.wa.gov/nhp.

Footnotes and Bibliography



19. ESA-listed bull trout population delineations (termed by USFWS as a DPS, or Distinct Population Segment) were obtained from the following 1:100,000 scale StreamNet data layer: sp1498_Bulltrout_Icc. Similar information can be viewed in the Federal Register publication of the USFWS, 50 CFR Part 17, "Endangered And Threatened Wildlife Plants; Designation of Critical Habitat for the Bull Trout; Final Rule" September 26, 2005; page 56267: <http://www.fws.gov/pacific/bulltrout/final/pdf/Bull%20Trout%20CH%20FR%20notice.pdf> .
20. ESA-listed salmon and steelhead population delineations (termed by NMFS as an ESU, or Evolutionary Significant Unit) were obtained from data layers compiled by a GIS group from the Bonneville Power Administration, using written descriptions in National Marine Fisheries Service (NMFS) status reviews and mapping provided by NMFS. Drainage basin delineation and upstream barriers were based on 1:100,000 stream hydrography and available digital topography (1:250,000). General ESU maps can be found at the NMFS website: <http://www.nwr.noaa.gov/ESA-Salmon-Listings/Salmon-Populations/Maps/>.
21. Performance Results System (PRS) data was extracted from PRS reports by year, conservation systems, and practices by Hydrologic Unit Code (HUC) and Farm Bill Program. HUC level reports were not available where NA is listed. For additional information and other performance reports visit: <http://ias.sc.egov.usda.gov/prshome/> .
22. Ag Census data is from the National Agricultural Statistics Service (NASS) Website. For more information on individual census queries visit the NASS website at: <http://www.nass.usda.gov/>. HUC specific data was derived from the 2002 Agricultural Census and adjusted by percent of zip code area/ county in the HUC.
23. Population ethnicity data were extracted from the Census 2000 Summary File 3 compiled by the U.S. Census Bureau for Garfield and Whitman Counties and Washington State. For more information on census data and definitions visit: <http://www.census.gov/Press-Release/www/2002/sumfile3.html>.
24. Urban population and median household income data were derived from the American FactFinder assembled by the U.S. Census Bureau. American FactFinder is a quick source for population, housing, income and geographic data. For other census items and trends visit: http://factfinder.census.gov/home/saff/main.html?_lan .
25. Washington Department of Ecology website: <http://www.ecy.wa.gov/biblio/wria35.html> . Publications listed by a Watershed Resource Inventory Area, WRIA 34, Palouse

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