Rickreall Watershed Management Strategies Assessment

2013

Description of inventories and methods that the Polk Soil and Water Conservation District used to conduct a natural resources inventory for the City of Dallas, Oregon for determining the best management strategies to protect its sole source of water and improving the overall health of the Rickreall Watershed

Project Summary

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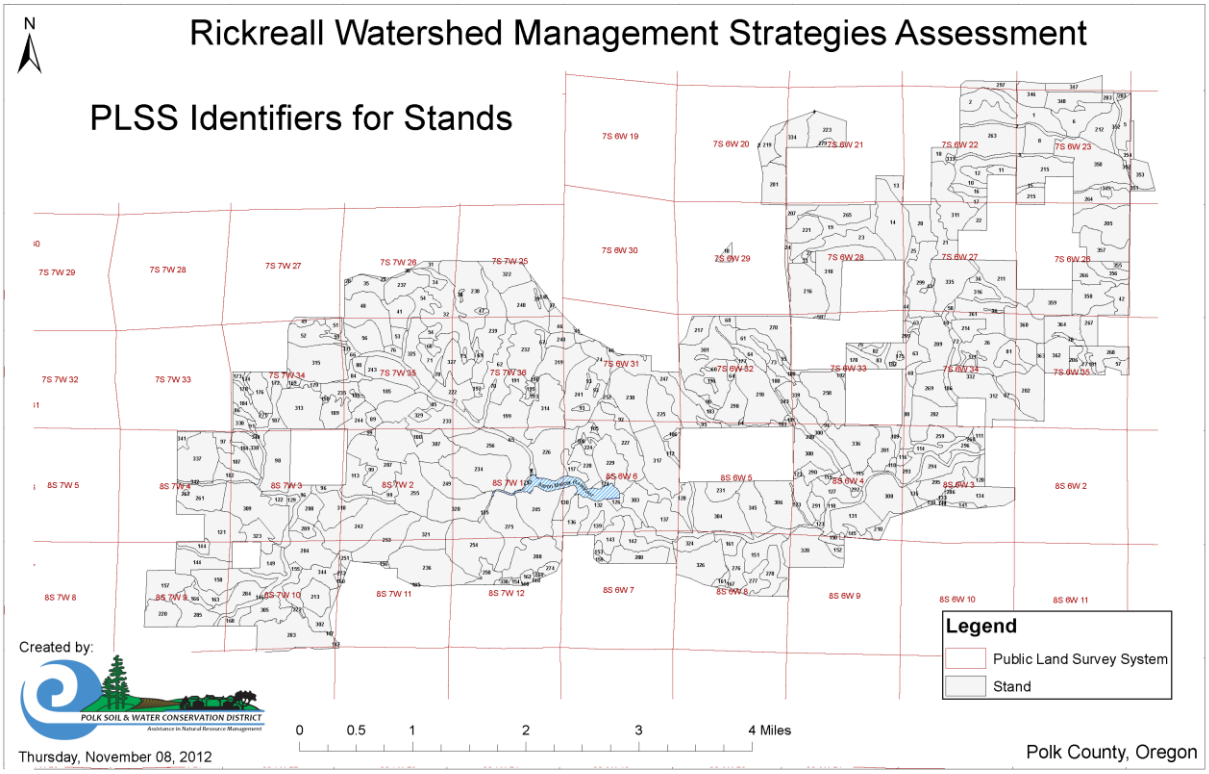
Natural Resources Inventory

The Polk Soil and Water Conservation District (Polk SWCD) conducted an in-depth inventory of the current natural resources within the project area from August 1st, 2011 through October 30th, 2012. Polk SWCD evaluated the ecological condition of Rickreall Creek Watershed using inventory results and gathered data including resource identification, monetary and environmental valuation, water quantity and quality, fish and wildlife habitat, roads, conservation and recreation opportunities. This evaluation was based on current conditions. Certain stands have since been logged and others replanted. Three areas have experienced major slides due to acts of nature.

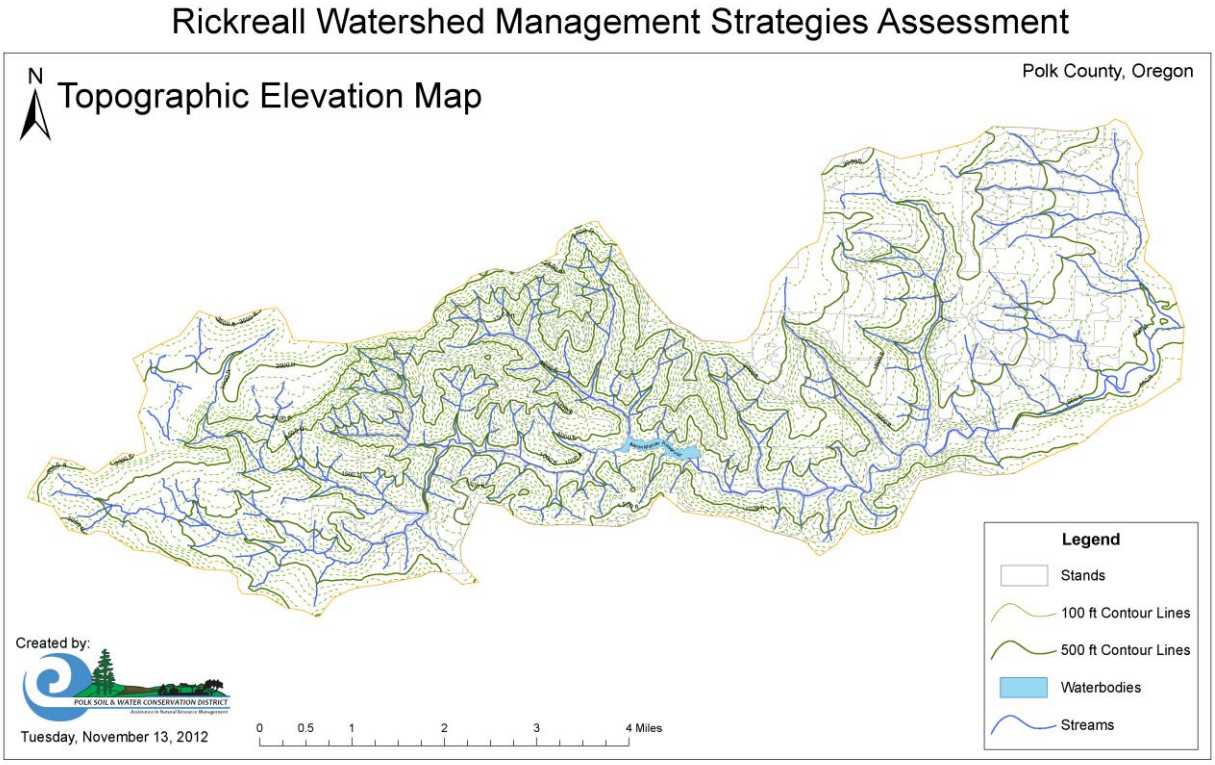
The goal of the Rickreall Watershed Management Strategies Assessment (RWMSA), referred to as "WATERS", project was to identify and prioritize beneficial uses of the watershed while understanding the current condition and functioning level of the major ecological systems present in the watershed. The inventory can be used to identify opportunities to influence management strategies. These strategies can result in improved conditions in the watershed while maintaining and/or improving commercial productivity. It can also be used to identify opportunities for commercial use of natural resources. It is almost impossible to estimate a dollar value for all the natural resources in the watershed, but the WATERS inventory compiles known values and includes the intrinsic value of non-market resources including recreational use and wildlife.

Natural resource inventories are an essential element of resource management planning. A traditional forest inventory, or *timber cruise*, was conducted by the Polk SWCD to determine the location of timber and its quantity by species and product potential. Forest inventories are often conducted not only to determine the location and value of timber, but also to provide a foundation for other forest management decisions. An inventory can help you evaluate non-timber forest values such as wildlife habitat (food sources, snags, wetlands, den trees, nests, etc.), recreational opportunities, and soil characteristics. This summary of present economic and biological conditions provides the basis for management plans that utilize, protect and enhance all natural resources.

Polk SWCD used a "whole watershed" approach to this project. To have a successful management strategy the watershed as a whole must be inventoried and ecological relationships identified before a management plan can be developed. An example of these ecological relationships is the effect that trees play in increasing the water holding capacity of the watershed through the drier summer months. Whereas mature forests develop layers on the soil surface that have high water holding capacities which greatly reduce peak flows in the watershed. Mature forests slow raindrop fall rates changing the "time of concentration" which slows water velocity and promotes infiltration. This process increases water retention and the holding capacity of the watershed without increasing the size of the reservoir. It will also decrease sedimentation in the watershed which will decrease the rate at which the reservoir is filling in.



Example PLSS map, a larger version can be found within the Map packet.



Example PLSS map, a larger version can be found within the Map packet.

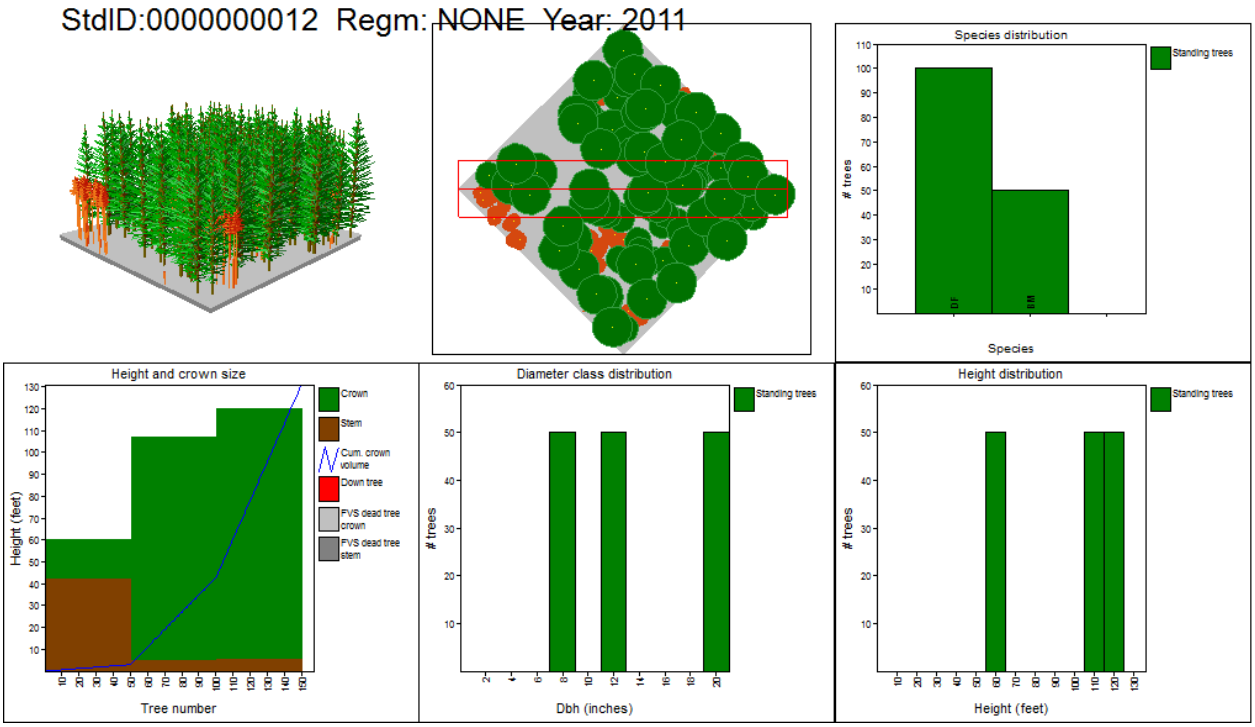
Timber

The Forest Inventory provides up-to-date stand information in order to provide necessary data for planning and management needs on forested lands in the Rickreall Watershed Management Strategies Assessment (RWMSA) area. Currently the project area contains 364 stands; these are a mix of even-aged plantations, managed mature stands, and un-managed natural origin older stands. It is central to obtain a large enough sample to provide a reliable, cost effective estimate of the current natural resources on-site. Approximately 20% of a population must be sampled to produce accurate, repeatable conclusions regarding the variability within the forest (plant species, sizes, density, etc.). To determine sampling density, a 10 chain by 4 chain (660 ft. by 264 ft.) grid was overlaid on a stand map of the entire watershed. Minimum required plot intensities were established based on the overlay: one plot for every five acres, with no less than three per stand, regardless of stand size.

Polk SWCD Staff were trained in and followed the standards and guidelines for natural resource inventories provided by the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS), Oregon Department Fish and Wildlife (ODF&W), Oregon Department of Forestry (ODF), Department of Environmental Quality (DEQ), and United States Forest Service (USFS). An adaptation of the Polk SWCD Timber Inventory Procedures Manual (Appendix A) was created and employed as the standard operating procedure for forest inventory plot establishment for the RWMSA project. This efficient sampling system uses a series of nested variable-radius and fixed-radius plots (see Appendices B and C, respectively) with a 100ft. line-transect emanating from each established plot center. At each plot live tree, snag, downed woody debris, and vegetative cover data was inventoried. Appendix A describes the methods for establishing plot centers, the procedures and protocol for measuring components, and a description of each data collection field used in the handheld application developed specifically for this system.

The Forest Biometrics Research Institute (FBRI) Forest Projection and Planning System (FPS) software was used to import and compile all timber inventory data. Stocking and volume data were calculated for 2011 and then projected for the years 2061 and 2111 using built-in FPS growth models and parameters. To improve the accessibility of this data Polk SWCD staff used the United States Forest Service (USFS) Stand Visualization Software (SVS) to create graphic reports for each stand, at each age. Appendix D provides a list of canopy cover values associated with these outputs. In accordance with the agreement with the City of Dallas Polk SWCD has included a summary of current tree sizes, stocking, and volumes in this report. Appendix E contains the collected FPS data, organized by stand and species, for all merchantable species with a diameter at breast height (DBH, measured at 4.5 feet from the base of the tree) greater than the 4-inch minimum merchantable DBH assigned by FPS. This appendix is designed to allow easy, rapid access to data required for basic valuation forms. Appendix F presents the same size, stocking, and volume data, listed by stand, species, and diameter class. It includes all tree diameters and thus provides a more complete understanding of species diversity and

stand structure than Appendix E. In addition to this master report, Polk SWCD has assembled a collection of individual stand summaries, which are detailed, stand-by-stand accounts of the natural resource assessments mentioned here. These stand summaries contain the SVS graphic reports.



Example of SVS graphic reports for stand 12.

Forest inventory data was collected and calculated for this project at an 80% confidence level. In other words, four out of five repeated cruises would return inventory data within the listed standard error of the mean, or between the upper and lower confidence intervals presented in Appendix G. This appendix lists statistical summary information by stand for each measured or calculated size, stocking, and volume data attribute presented in this report. The individual stand summaries also contain stand respective statistical information. Certain stands in Appendix G and the individual summaries will report a mean for collected timber inventory attributes, lack a standard error value. The inventory data for this subset of stands was provided by Hancock Natural Resource Group (HNRG) who were, at the time, Forest Capital Partners, LLC. Due to a difference in data format, FPS was unable to report the statistical accuracy of the provided cruise data. Appendix H provides further discussion and a comprehensive list of the concerned stands.

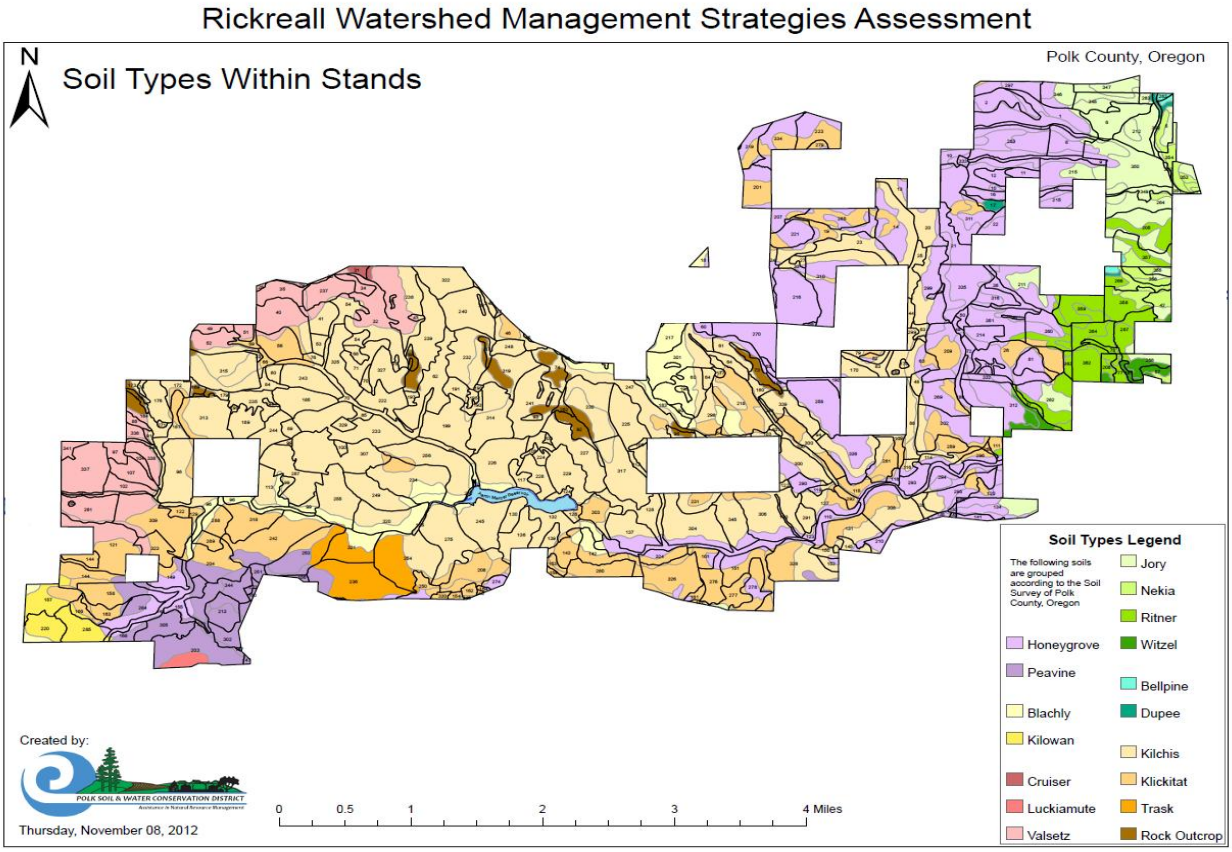
Stands that had been recently harvested, newly planted, or fell within areas of the watershed damaged by the 1987 Rockhouse Creek Fire[1] will contain null information in certain FPS reports. It is important

[1] See Chapter 6, page 93 of the Rickreall Watershed Assessment (Mattson and Gallagher 2001)

to understand that while field data was collected for these stands, the FPS program does not accurately project data for small young seedlings. A study commissioned by ODF to recommend a growth model and volume estimation system for its northwest districts reported encountering similar problems while growing seedling stands using FPS Mason, Bruce and Girard, Inc., 2004). Consequently, stands that are missing FPS report entries are also missing SVS "grow-out" projections for the years of 2061 and 2111. A list of these stands is included in Appendix H.

Soil

Soil capability and stability is vital to managing land. Although not usually a part of a regular forest inventory, it is important to identify soil types for long-term planning. Soil types vary greatly in productive capacity and erosion potential. Identifying their locations in the Watershed facilitates future management decisions. Polk SWCD used the NRCS Web Soil Survey application (WSS) to map existing soil types and locations by stand. This data can be found in each of the individual stand summaries, along with a WSS-generated report. The soil survey report includes descriptions of the soils and a discussion of their suitability for tree farms, engineering applications, wildlife habitat, and a variety of other uses. The online application draws its information from the NRCS Polk County Soil Survey. Polk SWCD technicians sampled soils in random locations to confirm NRCS soil maps.

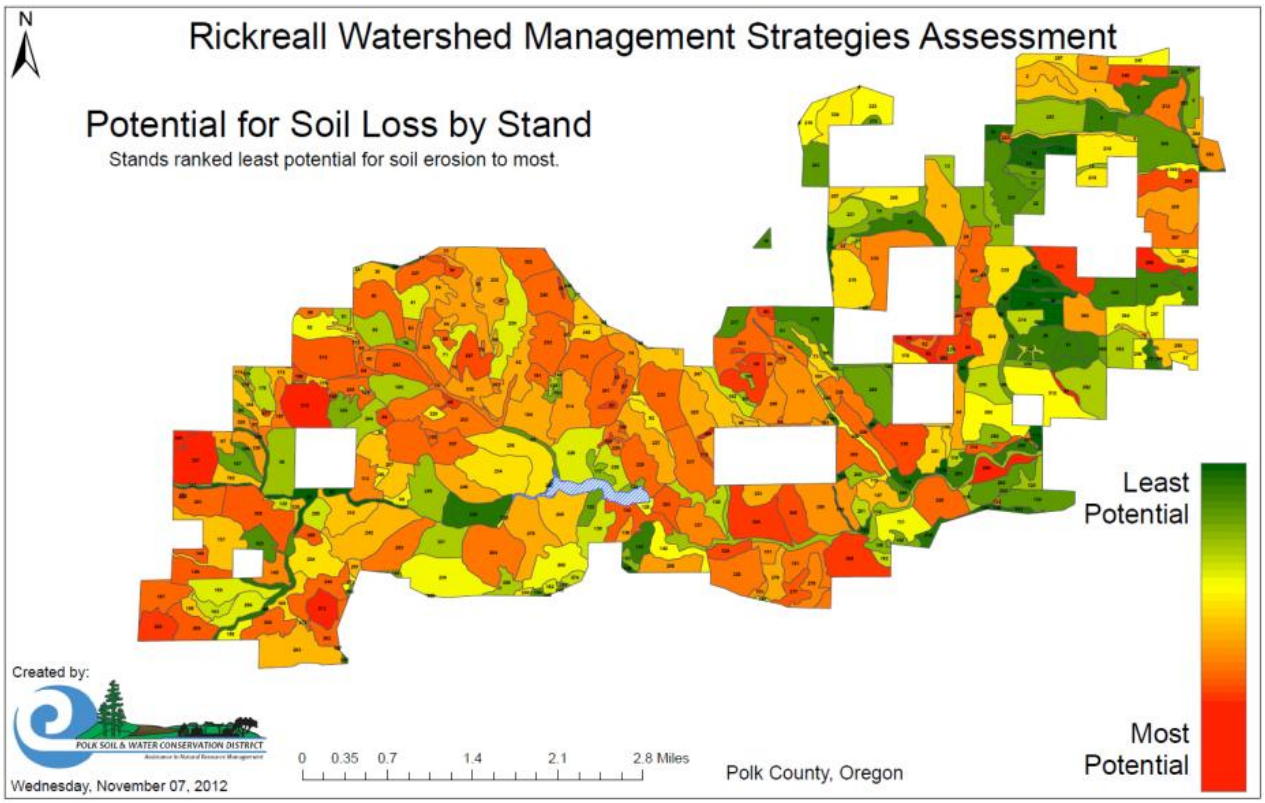


Soil Type overlaid on stands, a larger version can be found within the Map packet

Table 1: RUSLE2 Daily Factors

1. Rainfall/Runoff	2. Slope length	3. Soil Erodibility
4. Slope steepness	5. Cover management	6. Supporting practices

Based on the WSS reported soil types Polk SWCD staff evaluated erosion potential for each stand using the Revised Universal Soil Loss Equation, Version 2 (RUSLE2) computer program created for the NRCS by the USDA Agricultural Resource Service. The RUSLE2 equation evaluates soil loss as a product of six different daily factors (Table 1), and time. The wheat and agricultural crops the program is designed for returns organic material to the soil at a much higher rate than trees and shrubs do on forest sites. The Polk SWCD staff modified the organic matter component of the RUSLE2 equation to reflect erosion conditions on forestland more accurately. The program generates a soil loss report (located in the individual stand summaries) that includes a value for total estimated soil erosion (in tons, by stand). Staff used this value to assign a weighted rank to each of the 364 stands in the watershed. A rank of 1 represents the highest erosion potential, and a rank of 364 represents the lowest erosion potential. A list of erosion potential and weighted rank sorted by stand is located in Appendix I. In addition, please refer to the Soil Erosion Potential by Stand map included with this master report.



Soil Loss determined by soil type, slope and other surveyed factors; a larger version can be found within the Map packet.

An important consideration when interpreting data from any erosion risk metric is that the on-site conditions the metric depends on (RUSLE2 factors 1-4) are highly variable and difficult to predict. For

example, a very erodible soil with good vegetative cover on it may report as a low-risk site according to the metric, while a soil with great structure but no vegetative cover may be reported as a high-risk site. In order to be successful, erosion reduction efforts in future management plans will need to focus on the factors of the RUSLE2 equation that can be controlled. This may mean including careful analysis of soil type and expected impacts from management activities during the planning phase of future timber harvest programs conducted in the Watershed.

Fish and Wildlife Habitat

The animals present varied by the type and quality of food sources and cover present in each location. To determine the location and quantity of understory vegetation used by animals for food or shelter, Polk SWCD technicians placed 1/100th acre sample plots to record the percent cover of different species. Observations of animals, scat, tracks, burrows, remains, and nests within this plot were also recorded. Observations are listed in each stand summary. Elk, mountain beaver, coyote, cougar, bear, owls, birds, snakes, insects, and a variety of other wildlife documented utilizing the area. A list of Threated and Endangered (T&E) Wildlife species, that may be present, is also included for each stand.

More wildlife could be visually documented but would require a more intense study over a longer period of time and seasons. Fish species that are known to occur throughout Rickreall Creek and its tributaries are listed in the table below. This information was provided by ODF&W and the Fishes of Rickreall Creek (Appendix R).

Native species:		**Introduced species:**	
Common name	**Scientific name**	**Common name**	**Scientific name**
cutthroat trout	*Oncorhynchus clarki*	Coho salmon [1]	*Oncorhynchus kisutch*
Steelhead	*O. mykiss*	Brown trout [1]	*Salmo trutta*
Chinook salmon [1]	*O. tshawytscha*	Warmouth sunfish [1]	*Lepomis gulosus*
Pacific lamprey [1]	*Lampetra tridentata*	Bluegill sunfish [1]	*L. macrochirus*
western brook lamprey	*L. richardsoni*	Pumpkinseed [1]	*L. gibbosus*
speckled dace	*Rhinichthys osculus*	Brown bullhead [1]	*Ameiurus nebullosus*
northern pike minnow	*Ptychocheilus oregonensis*	Mosquitofish [1]	*Gambusia affinis*
largescale sucker	*Catostomus macrocheilus*	Yellow perch [1]	*Perca flavescens*
redside shiner	*Richardsonius balteatus*	Smallmouth bass	*Micropterus dolomieu*
reticulate sculpin	*Cottus perplexus*	Largemouth bass	*M. salmoides*
torrent sculpin	*C. rhotheus*	White crappie [1]	*Pomoxis annularis*
sandroller [1]	*Percopsis transmontana*	Black crappie [1]	*P. nigromaculatus*
Oregon chub [1]	*Oregonichthys crameri*		

Table 2: Fish Species Known to Occur in Rickreall Creek

The NRCS Stream Habitat Evaluation Guide (Appendix J) was used to inventory fish and other aquatic species and their associated habitats. This information was then used by Polk SWCD to evaluate fish

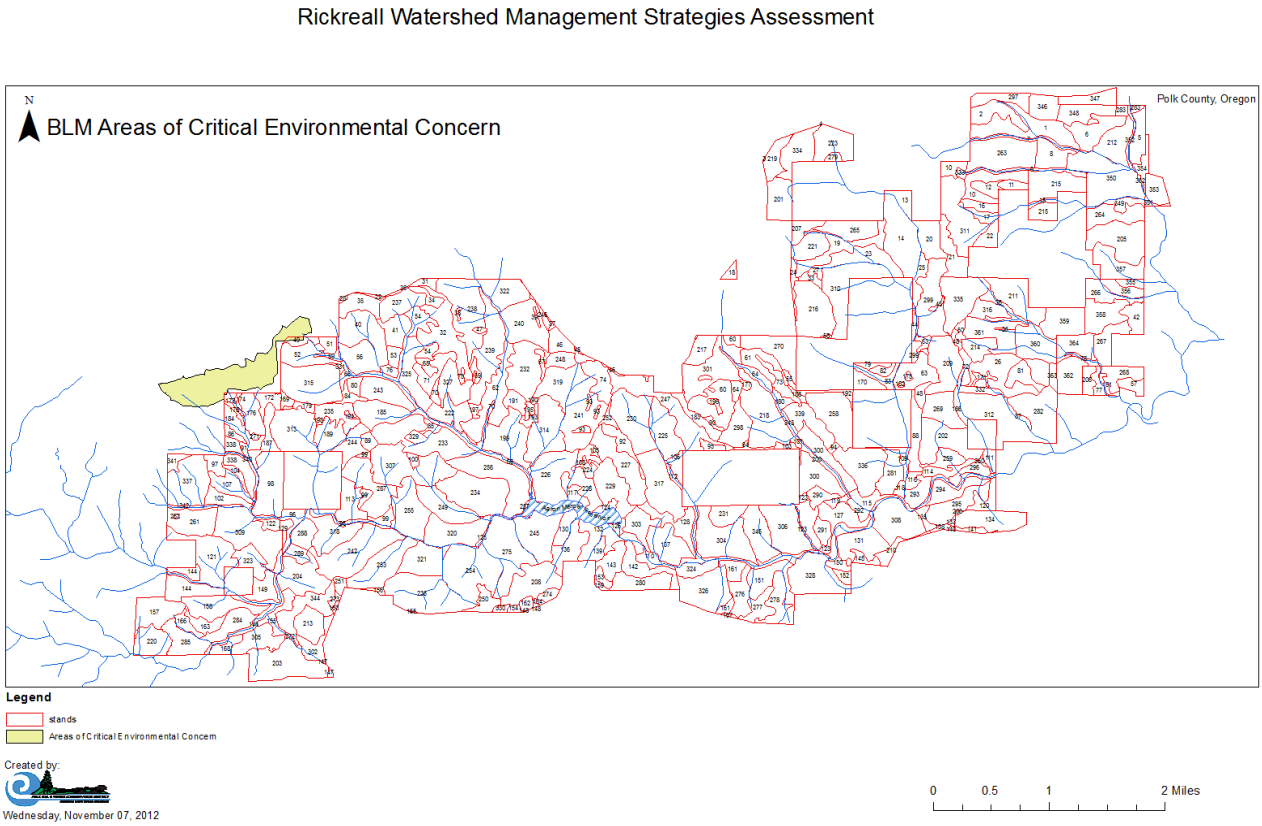
and wildlife habitat conditions using the NRCS Wildlife Habitat Evaluation Guide for Forestland Habitat (Appendix K). Forestry wildlife needs a diverse mix of trees, snags, openings in vegetation, sources of water, and minimal human disturbance. Each stand was evaluated for present condition and scored for future potential. Forests can be managed in a method which benefits wildlife while creating a healthy habitat with timber revenue.

Threatened and Endangered Species

Wildlife management on all stands within the RWMSA area met or exceeded state and federal regulations. Polk SWCD constructed a wildlife biological evaluation for the project area and created a list of species known or likely to be found in each stand. Each stand summary also includes a list of wildlife species observed during visual assessment. The assessments were non-invasive in nature to prevent disturbance of the natural routines of fragile populations of threatened and endangered species in the Rickreall Watershed. Future management practices should utilize the federal and state endangered species lists to prevent any harm to these species or its associated habitats.

Two stands (49 & 173) on Rickreall Ridge are listed as Critical and Environmental Concern (ACECs) with the BLM. According to BLM, Rickreall Ridge is particularly distinctive in supporting a wide diversity of plant species within a relatively small area. Several Willamette Valley species reach their upper elevation limits here and typical Coast Range plants can also be found. The area harbors some plants and animals that are more characteristic of southwestern Oregon and it appears to be a disjunct refugium for species that had spread northward during a past warmer and drier climatic period. One moss species found on the ridge, an arctic/boreal species, has not been found anywhere else in the Oregon Coast Range. Dr. D. V. McCorkle studied six unique strains of butterflies and the unusual food/plant relationship required for survival on the ridge. Dr. J. M. Johnson studied two populations of Indian paintbrush in an effort to relate their genetics their ability to form pigments. He and his students studied a population of dwarf Oregon white oak on Rickreall Ridge which may be important as an indicator of past climatic events in the area.

Spring Chinook and Winter Steelhead Trout are known to occur within the RWMSA creeks. ODF&W designated salmonid spawning, incubation and rearing designation. Winter Steelhead Trout are threatened status under the ESA for the Willamette River Evolutionary Significant Unit (ESU). ODF&W surveyed the upper portions of Rickreall Creek and including Rockhouse Creek and two smaller tributaries. The surveys were generally above Rickreall River Mile 20.



Example of BLM Areas of Critical Environmental Concern, a larger version can be found within the Map packet.

Common Name	Fed. status	Notes:
winter steelhead	LT	Known to be introduced and now reproducing naturally. Presumed likely to have occurred as native fish at low numbers. Current population is likely a mix of the original native and introduced fish.
cutthroat trout	--	Fluvial cutthroat, a variety that travels to larger rivers, is a stock of concern to ODFW due to suspected low populations.
spring chinook	LT	Juveniles observed in west side basins by ODFW. Not thought to have supported spawning runs, but see discussion below.
coho	--	Introduced to the Upper Willamette and therefore not considered to be part of natural range.
Oregon chub	LE	Reportedly in Baskett Slough NWR according to BLM records.
Pacific lamprey	SoC	Amocytes, a juvenile stage, were observed in Rickreall Creek (C. Hazel pers. comm.)
sandroller	--	Stock of concern to ODFW due to suspected low populations.

SoC=Species of Concern, C=Candidate Species, LT=Listed Threatened, LE=Listed Endangered

Table 3: Fish Species in the Rickreall Creek with some level of sensitive status

Stream Inventory

Conducting a stream inventory provided valuable baseline data from which natural resource managers can launch plans and strategies for the watershed, as well as outline possible monitoring plans. The

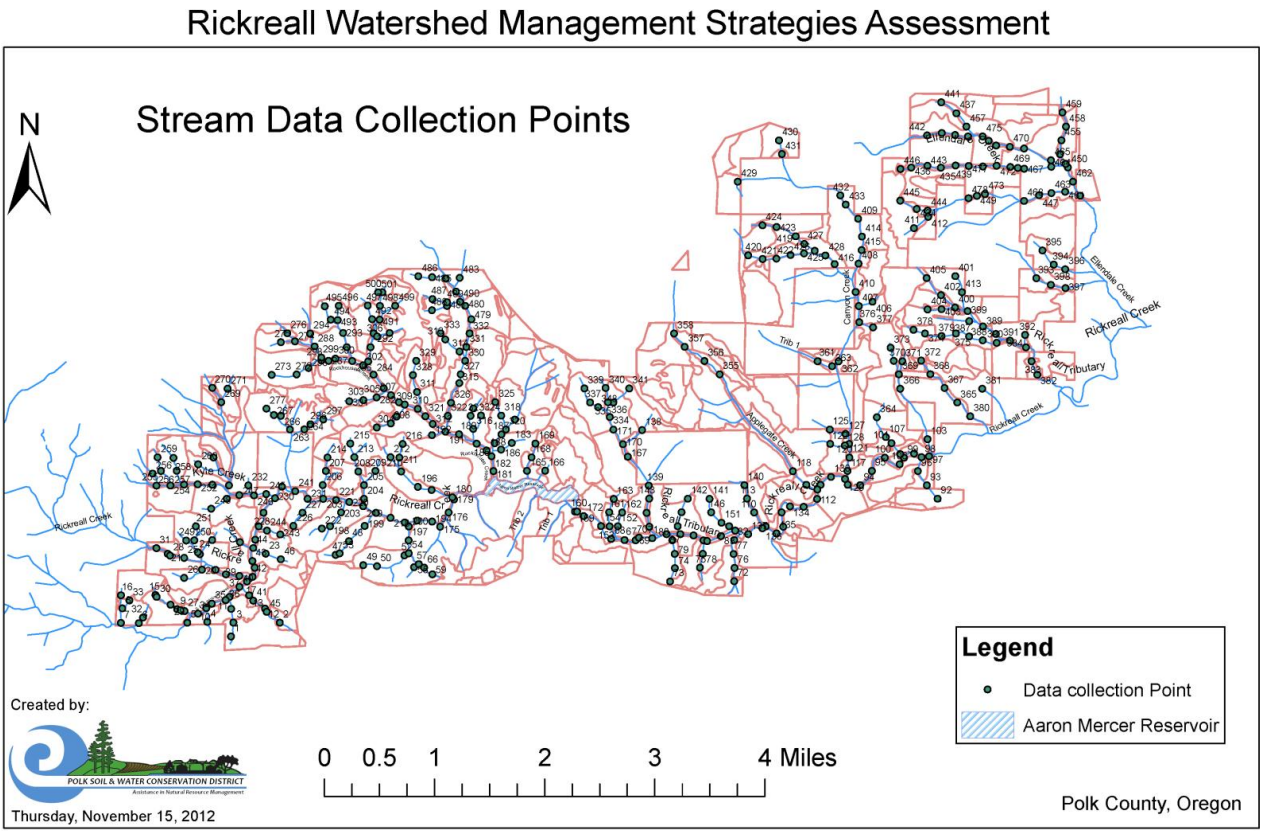
stream inventory provided information about the function of physical and biological habitat parameters and the relative significance for the parameters within the watershed system. This data can be compared to surveys conducted by ODF&W starting in 1997.

Polk SWCD used standard methods for assessing proper functioning condition (PFC) of the stream and stream interfaces. Such parameters as vegetation, erosion/deposition, soils, and change in water quality are fundamental to understanding the condition of the stream. During the stream inventory, Polk SWCD staff followed the NRCS Stream Visual Assessment Protocol in use by the USDA (Appendix J, Technical Notes). Staff measured the following:

- Bank full width (BF_WIDTH): Measured using indicators such as point bars, small benches, rock staining, and level of established alders, ash, or conifers.
- Bank full depth (BF_DEPTH): A measure of depth from the BF_WIDTH transect to the streambed.
- Current depth (CU_DEPTH): Is the measure of the current water depth at the time of the survey.
- Flood depth (FL_DEPTH): Twice the BF_DEPTH.
- Flood width (FL_WIDTH): Measured as the width associated with FL_DEPTH.
- Left buffer (BUFFER_L): The length from the edge of the BF_WIDTH to the end of a riparian buffer on the left hand side when facing down the channel.
- Right buffer (BUFFER_R): The length from the edge of the BF_WIDTH to the end of a riparian buffer on the right hand side when facing down the channel.
- Canopy cover (CANOPY_COV): A measure of the percentage of the amount of canopy over the active stream channel.
- Stream bed substrate (STREAMBED): The substrate for the channel to determine channel complexity.
- Pool habitat (PHAB): Defined as pools present offering habitat within the channel.
- Off channel habitat (OCH): The presence of off channel habitat.
- Macroinvertebrates (MI): Documents the presence of these organisms.
- Stable bank (SB): Measure of the percent of stable bank.

According to the inventory, stream buffers were found to be in compliance with the Forest Practices Act. (Logan Robert, 2002)

ODF&F collected data on stream reach, riparian characteristics and condition, and in-stream habitat on some of the mainstreams. Their information was used in fish management and planning activities. This data can be compared with current data which includes vegetation cover to identify areas of improvement and decline.



Sample stream data collection map, a larger version can be found within the Map packet

Invasive Plant Species

Invasive plants negatively impact watersheds in a multitude of ways. Invasives reduce land value, water quality and biodiversity while increasing erosion as well as fire frequency and severity. Therefore, identifying invasive plants plays a crucial role of the management of the watershed. As of 1998, according to BLM's *Rowell Creek/Mill Creek/Rickreall Creek/Luckiamute River Watershed Analysis* (Appendix L) the following species were identified in the Marys Peak Resource Area:

- Canada thistle (*Cirsium arvense*) – Class B weed
- Bull thistle (*Cirsium vulgare*) - Class B weed
- Scotch broom (*Cytisus scoparius*) - Class B weed
- St. Johnswort (*Hypericum perforatum*) - Class B weed
- Meadow knapweed (*Centaurea pratensis*) - Class B weed
- Spotted knapweed (*Centaurea maculosa*) – Targeted Class B weed
- Purple loosestrife (*Lythrum salicaria*) - Class B weed

Polk SWCD identified invasive species classified by the Oregon Department of Agriculture in the Noxious Weed Control Policy and Classification System (Appendix M); Polk SWCD also identified

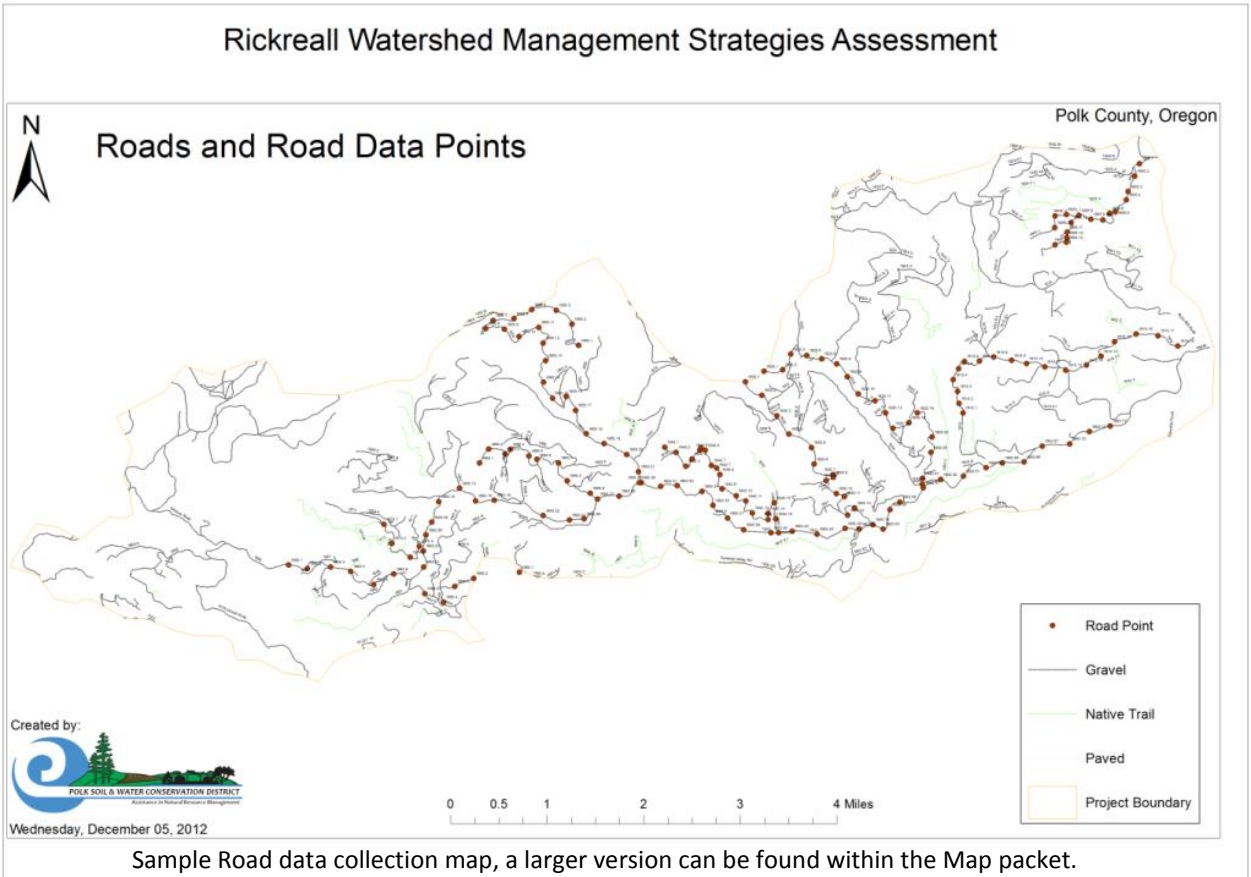
nuisance species. Polk SWCD identified the following species within the Upper Rickreall Watershed from August 1st, 2011 to July 11th, 2012:

- Scotch broom (*Cytisus scoparius*) – Class B invasive weed
- Slender false brome (*Brachypodium sylvaticum*) - Class B invasive weed
- Himalayan blackberry(*Rubis armeniacus*) - Class B invasive weed
- Canada thistle (*Cirsium arvense*) Class B invasive weed
- Bull thistle (*Cirsium vulgare*) - Class B invasive weed
- Poison oak (*Toxicodendron diversilobum*) – No designation

Each of the invasive/nuisance plants has unique growing tendencies and distribution within the watershed. The lack of canopy cover and recent disturbance events (harvesting) in young stands allows Scotch broom to establish. False brome was most commonly sighted in established stands or near water as seeds are spread via wildlife activity. Poison oak is widespread and has established throughout the watershed in both young and established stands. Blackberry and thistles tend to thrive along roadsides and disturbed sites where they can out-compete natives. Overall the Rickreall is a fairly pristine system and does not have many of the invasive species issues that exist throughout the regional (e.g. knotweeds). . This is due in large part to Forest Capital managing stands to be weed free. Forest Capital leaves riparian buffers out of management practices to ensure they meet Forest Practices act regarding stream buffers. Specific locations for many of these plants can be located within the 'Comments' column in the *Stream Data* tab of the Summary & Data Binder.

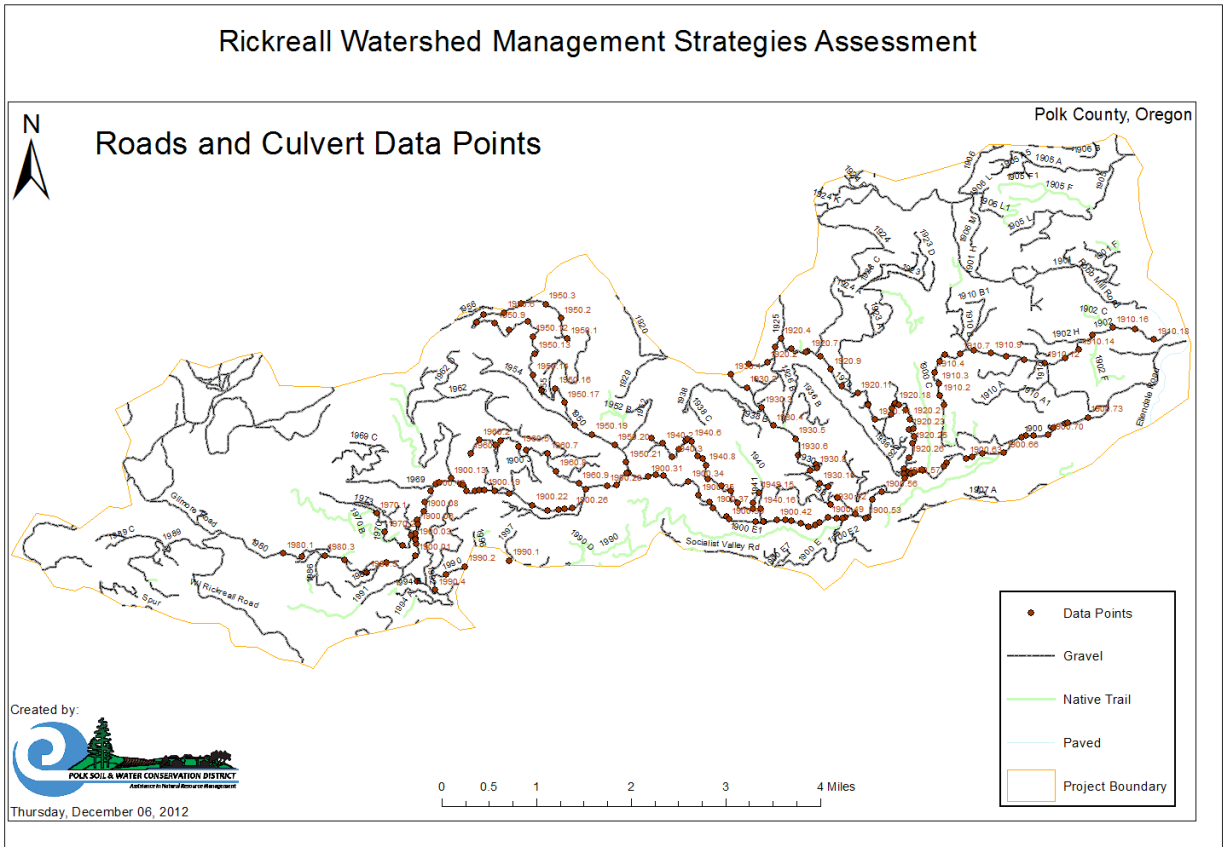
Road and Culvert Inventory

The Road and Culvert Inventory were not originally within the proposed scope of the assessment project but provides essential data to shaping achievable management objectives. Roadways and culvert locations, along with a record of the physical attributes of those roads and culverts, affect precipitation runoff patterns, erosion potential, soil loss, stream health, and the locations of point sources of sediment. Major roadways and secondary roads within the project area were measured approximately every quarter mile; every observable culvert was recorded during road surveys. Road width, along with the width and depth of the ditch beside the road, were assessed with a tape measure. The angle of the slope adjacent to the road was measured with a clinometer. Two photos were also taken at each road point, the first facing further down the road; the second was oriented backwards towards the previously observed data point.



Sample Road data collection map, a larger version can be found within the Map packet.

Culverts: Culverts data was collected using a tape measure. Culverts were measured for length, shape type and diameter, material (usually plastic or steel), the height difference from the culvert surface to the ground, and the surface material below the culvert opening. Photos of the culvert were taken as well. If a culvert was observed near a road point, measurements and photos were taken together at a common data point location. All sampling locations were recorded using handheld GPS units (Nautiz X7). These data points were reviewed for accuracy by technical staff. All data collected has been compiled into tables (See the *Road & Culvert Data* tab within the Summary & Data Binder) and large format maps were developed (See the Map Packet for large Road and Culvert maps) based on the data set to illustrate the locations of individual data points.



Sample Road data collection map with culvert locations, a larger version can be found within the Map packet.

Recreational and Aesthetic Resources

A recreation assessment provided a basis for selecting the most strategic locations for access roads, trails, bridges, wildlife observation stands, or other facilities. The Polk SWCD created a map to record the presence of unique ecosystems, wildlife habitat, unique trees, historic features, panoramic views, hazards, and unsightly land uses that are of interest to future development of recreational opportunities in the Rickreall Watershed.

Hunting and fishing are allowed during certain seasons in accordance with Oregon Department of Fish and Wildlife ODF&W. A list of rules, regulations, and licenses available can be found at http://www.dfw.state.or.us/resources. Vehicle traffic is restricted throughout the most of the year. Access must be done on foot or by other non-motorized means.

Bureau of Land Management (BLM) owns parcels within the RWMSA area. According to BLM's Rowell Creek/Mill Creek/Rickreall Creek/Luckiamute River Watershed Analysis (Appendix L) as logging roads opened up the area, a number of minor uses have developed over time. The harvesting of special forest products such as firewood, salal, mushrooms, moss, and edibles/medicinals occurs throughout the analysis area. Hunting, primarily for deer and elk, and fishing are the major recreational activities. BLM allows mountain bikes, hiking, and scenic viewing on their property. Some recreational uses may result in conflicts with other resources, between different types of recreation users, and between

recreationists and local landowners. There are no physical borders outlining BLM lands and private timber owners, resulting in non-permitted use on private land. Blackrock Mountain Biking Association has multiple trail systems on public lands outside of the watershed, south of Mercer Reservoir (Appendix N). There are obvious signs mountain bikers and others have been utilizing non-permitted areas in the NE (TRS 7S 6W 22 and 7S 6W 15) and the Southern (TRS 8S 7W 1 and 8S 7W 12) reaches. Efforts are being taken to prevent non-permitted use. Efforts are being taken to prevent non-permitted use.

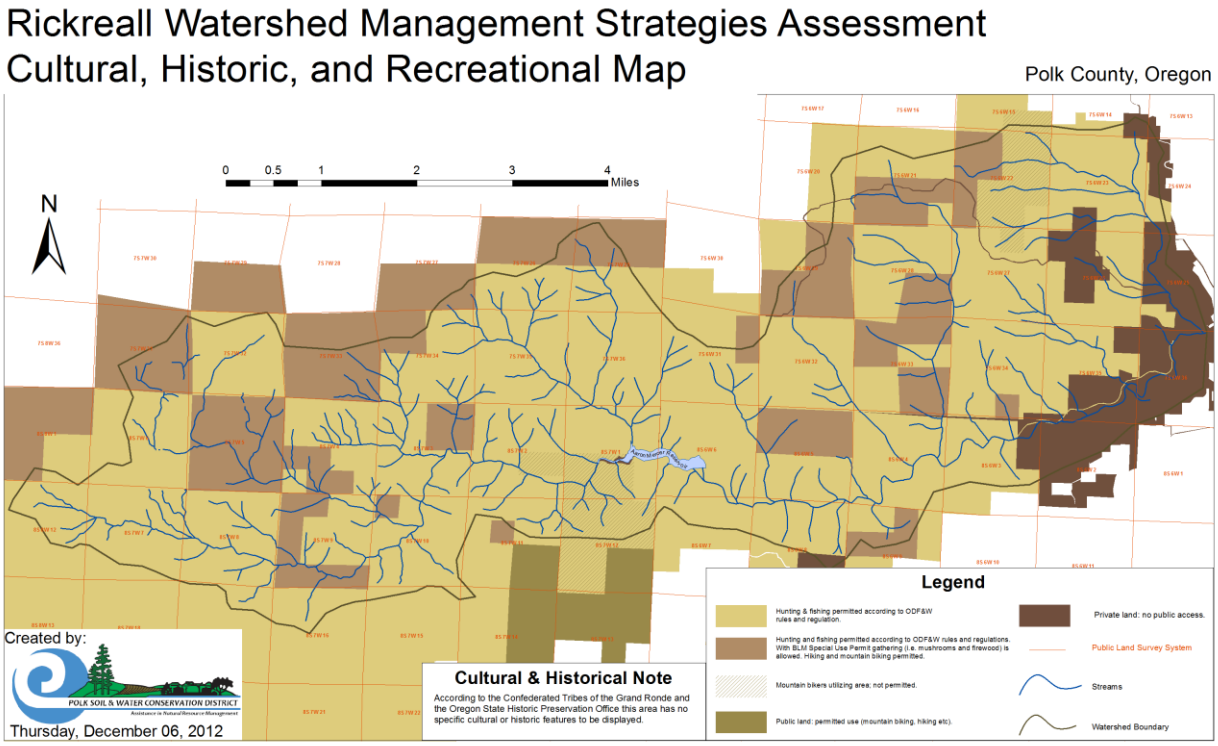
Cultural/Historical Resources

Historical and cultural surveys were conducted to determine the presence of historical buildings and cultural uses within the area. Oregon State Historic Preservation Office (Appendix O) shows no historical structures in the RWMSA area. On 11/29/1979 the Pumping Station Bridge was listed but was delisted in 5/18/1987.

Cultural data was provided by the Confederated Tribes of Grand Ronde (Appendix P). The people who lived along the Dallas (Rickreall Creek) called themselves the *tchampikler ami'm.* They hunted and gathered resources from the area. Many resources used by their ancestors are still an important part of their culture today. The Confederated Tribes of the Grand Ronde would be willing to partner in developing a management plan for the RWMSA area to enhance resources and cultural plants.

The Rickreall Watershed Assessment details the history and use of Rickreall Creek. Logging activities began at Mercer Reservoir in 1890 and continued for a decade. The creek was used to float logs to mills in Ellendale (Dallas). As a result, Rickreall was classed as "navigable waters". As many as 5 million board feet of logs were in the river in February of 1901. In 1906 one company reportedly drove 6 million board feet of timber in the Rickreall. Railroads began transporting logs around this time and splashdams were ended in Oregon soon afterwards by lawsuits. Railroads were never built up into the upper Rickreall Watershed, postponing logging until roads were developed in 1940's.

Rickreall Creek has been an important source of water for Dallas since settlement in 1903. The City of Dallas purchased it 1931. According to the Rickreall Watershed Assessment, water was obtained from Rockhouse Creek and other resources in Canyon Creek and Applegate Creek. The water fed a reservoir downstream. In 1940 the city built a pumping station and in 1959 Mercer Reservoir was constructed. In 1972 the capacity was doubled by adding a lift to the reservoir.



Cultural, Historic and Recreation Map, larger version can be found within the Map packet

Water Quantity Modeling

Understanding how water flows through a watershed is critical to protecting water resources. Rickreall Creek has hundreds of permitted surface and ground water users. Mercer Reservoir, owned and operated by the City of Dallas, provides stream flows sufficient for municipal water intake downstream and additional water to continue past. Polk SWCD staff is experienced in developing and understanding precipitation-runoff models, using such software as the United States Army Corp of Engineers' HEC-HMS. Polk SWCD staff reviewed the City of Dallas reports and studies. (CH2MHill, 2009)

Polk SWCD staff has worked with the City of Dallas on various water quality projects and provided technical support. Future water quantity recommendations would be based on existing water quantity models and current flow conditions. Operational precipitation-runoff model can be used to evaluate "what-if" scenarios to gauge how various management strategies could affect water resources. Models offer valuable insight into how a system works. The availability of water is crucial in developing a RWMSA Management Plan.

Water Quality Monitoring

Rickreall Creek is designated for 14 beneficial uses in accordance with the Clean Water Act. Department of Environmental Quality (1993) 303(d) list includes Rickreall Creek for flow modification and temperature. (DEQ, 1993) The beneficial uses affected by these parameters are resident fish, aquatic life, and salmonid spawning and rearing. Meeting water quality standards is a priority for Polk SWCD, City of Dallas, private timber owner, and partners. The amount of water which flowed through

Rickreall Creek, especially during summer months, is unknown. The City of Dallas completed the Endangered Species Act Compliance Assessment and Strategy Development Project, which evaluated the City's program, practices, and activities for potential impact to environment. (CH2MHill, 2004) The City evaluated potential strategies to limit potential liability, adverse impacts to the environment and to winter steelhead trout.

The Oregon Forest Practices Act and Rules set standards for any commercial activity involving the establishment, management or harvesting of trees on Oregon's forestlands. They regulate these forest operations on all non-federal lands (private, state-owned and county- or city owned). The Act protects fish, wildlife and water quality when forest management activities occur near waters of the state and within riparian management areas. Logging/harvesting and roads may not cause damage to water quality and aquatic habitat. Protection measures are based on how the water body near and operation is classified. (Logan Robert, 2002)

Polk SWCD staff found water protection requirements for fish, wildlife and water quality along fish bearing streams, to be incompliance. However, some non-fish bearing streams were lacking vegetation but not out of compliance. Large amounts of invasive plants were documented in the buffers. This could cause a decrease in water quality. Stream buffer, roads, and invasive plants must be controlled in order to ensure long term water quality stability. Polk SWCD will continue to work with the City of Dallas, Rickreall Watershed Council, and partners for water quality monitoring and make recommendations to ensure water quality meets DEQ standards.

Fire Potential

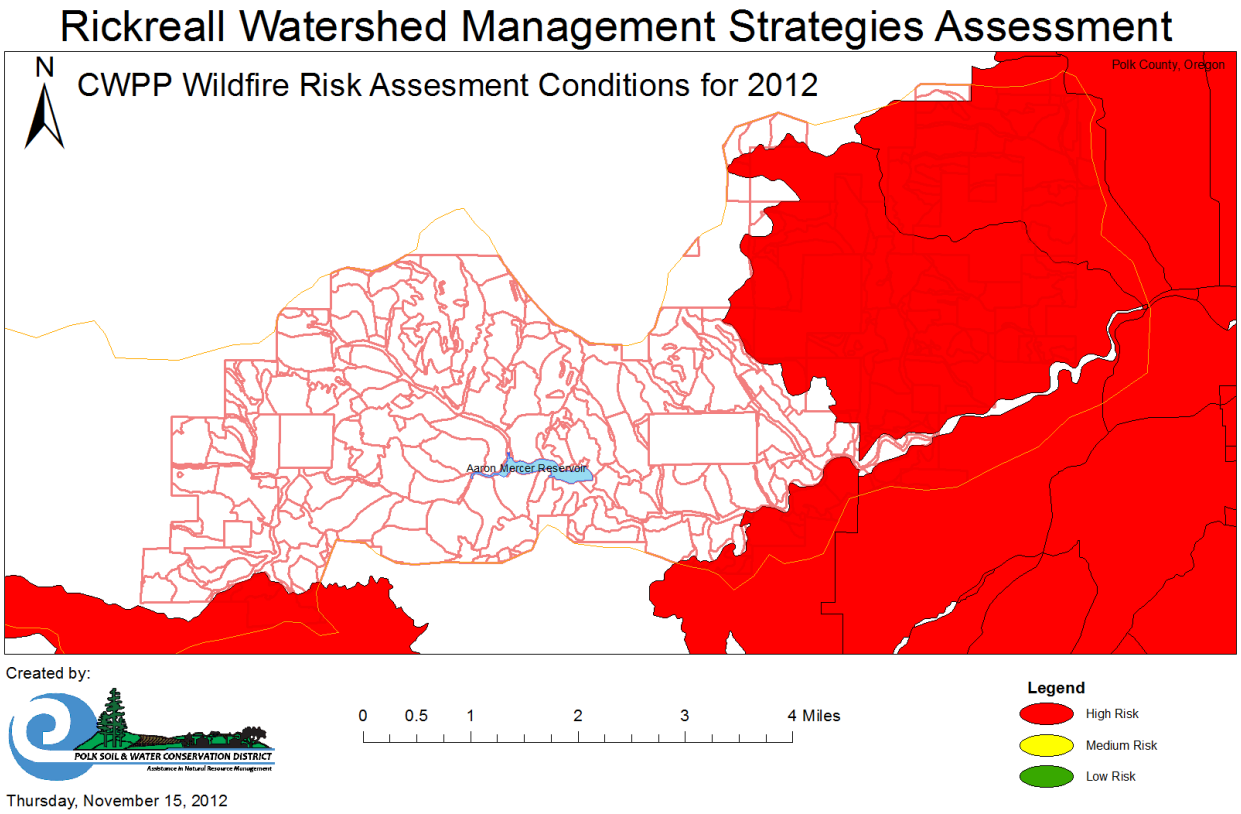
Polk County adopted a Community Wildfire Protection Plan (CWPP) in 2009 (Appendix Q). Polk SWCD staff partnered in the plan development. The purpose of the plan was:

> "This Community Wildfire Protection Plan addresses wildfire risks in Polk County and identifies measures which will reduce the risk of property loss and the threat to human lives from wildfires. The plan was developed collaboratively with community and agency partners interested in reducing wildfire risk. It identifies and prioritizes areas for hazardous fuel reduction treatments, and recommends methods of treatments that will protect at-risk communities and essential infrastructure. Further, the plan recommends measures that homeowners and communities can take to reduce ignitability of structures throughout the county." (Hulbert 2004)

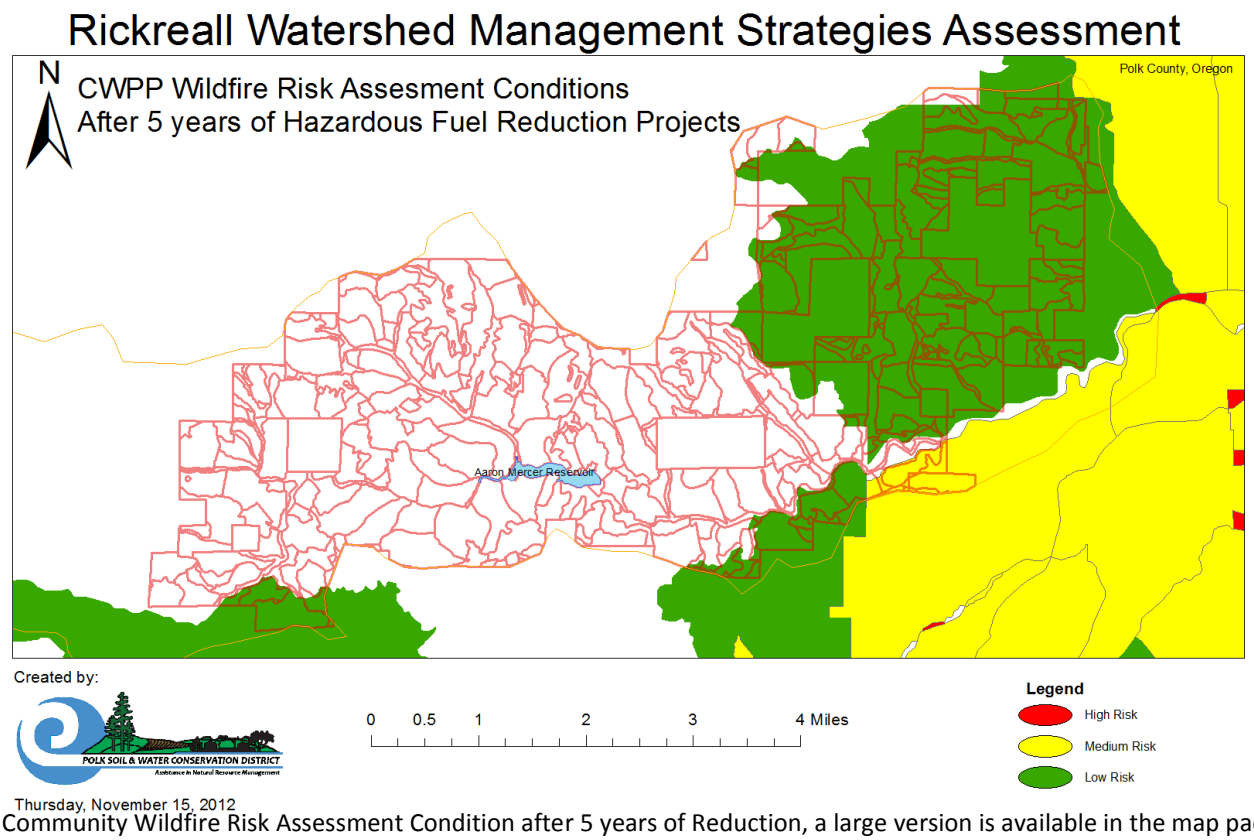
The Rickreall Watershed is addressed in the report as an individual area at high risk for wildfire, and high priority for fuel reduction projects. Polk SWCD staff was able to verify the planning team's evaluation during their timber inventory. A visual assessment of stand density and vegetation cover was conducted at a random location in each stand. Overstocked stands garnered an automatic classification as high risk, as did any medium stocked stand with 100% canopy closure and large numbers of trees having limbs present on at least 50% of their bole.

Three maps showing fire hazard conditions in the Watershed have been included. The Maps show current conditions, conditions following five (5) years of fuel reduction focused management, and conditions following ten (10) years of fuel reduction focused management. If five (5) years of fuel reduction projects were implemented, the treated area would move down a category in fire risk potential. Ten (10) years of hazardous fuel reduction projects would reduce the fire risk potential in the Watershed to low and very low levels.

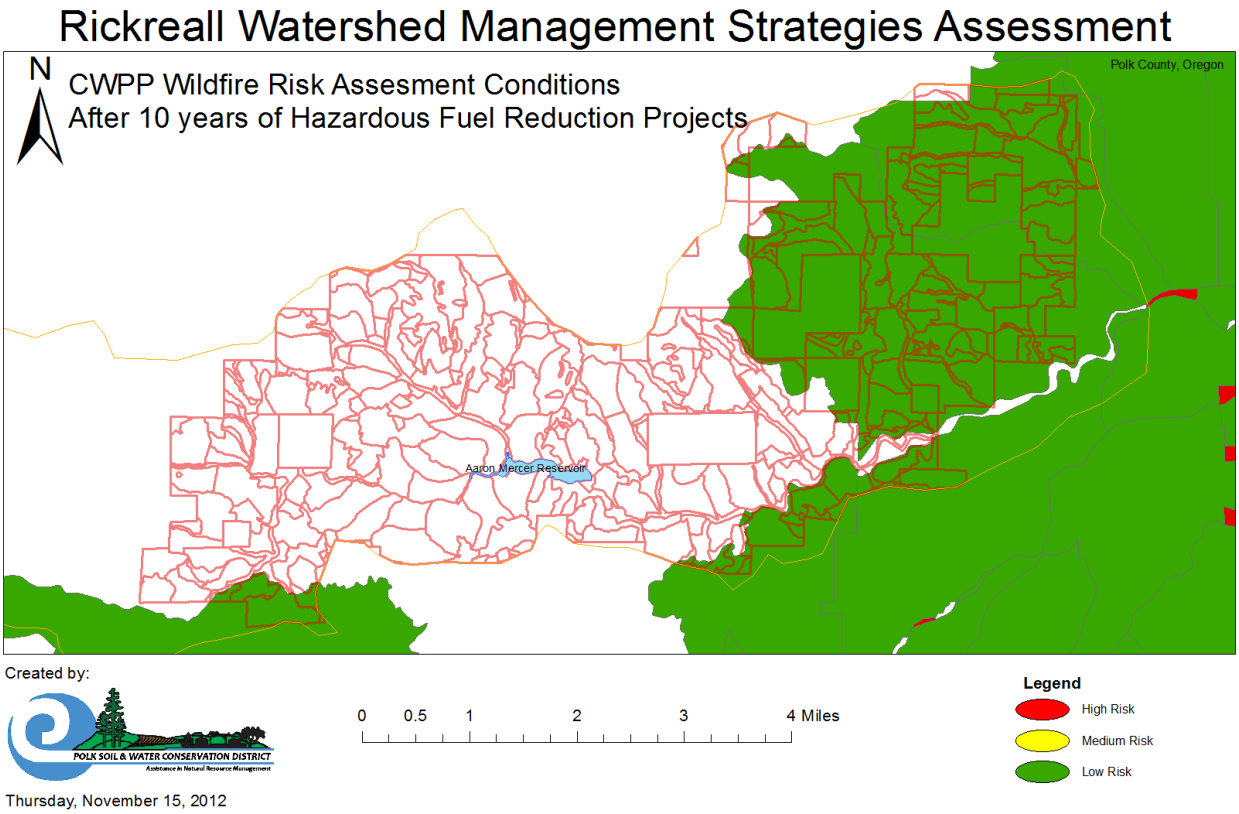
While it may not be economically feasible, or physically possible to treat the entire upper Rickreall Watershed in ten (10) years, building appropriate management practices into forest management programs in the future will result in a gradual transition to healthier forests with lower hazardous fuel loads. Management practices to accomplish this include commercial thinning operations, selective harvests, and patch cuts in problem areas. Wildfires can often start on adjacent, higher-risk private properties and move into healthy, treated stands. To reduce the threat of wildfire around adjacent, higher-risk properties, and/or adjacent landowner education and projects can be done focusing on fuel reduction. , BLM has expressed interest in a collaborative fuel reduction treatment project in and around their Upper Rickreall lands.



The current Community Wildfire Risk Assessment Condition, a larger version is available in the map packet



The Community Wildfire Risk Assessment Condition after 5 years of Reduction, a large version is available in the map packet



The Community Wildfire Risk Assessment Condition after 10 years of Reduction, a large version is available in the map packet.

Considerations & Recommendations for the Future

The Rickreall Watershed Management Strategies Assessment identified and provided a tool to identify the beneficial uses of the Upper Rickreall Watershed. The current condition and functioning level of the major ecological systems present in the watershed, as they stand today, are understood.

Forest Management Plan and Watershed Plan

This data can be used to identify opportunities to influence management strategies would result in improved conditions in the watershed while maintaining and/or improving commercial productivity. It can be used to identify opportunities for commercial use of natural resources in the watershed and give an estimate value of natural resources in the watershed. A site specific Forest Conservation/Management Plan could be developed which would identify and describe in detail management actions and conservation practices. A Forest Management Plan would help the City of Dallas meet their objectives, maintain or improve production, meet regulatory requirements, and enhance soil, water, air, plant, fish, and wildlife resources.

Recreational Opportunities

Minimal recreation opportunities currently exist. Many people would like to have more access. A plan would address where and when recreation could exist with minimal impacts. Maintaining or decreasing current opportunities may protect resources but could anger the public. Surrounding agencies have expressed an interest in partnering.

Education Opportunities

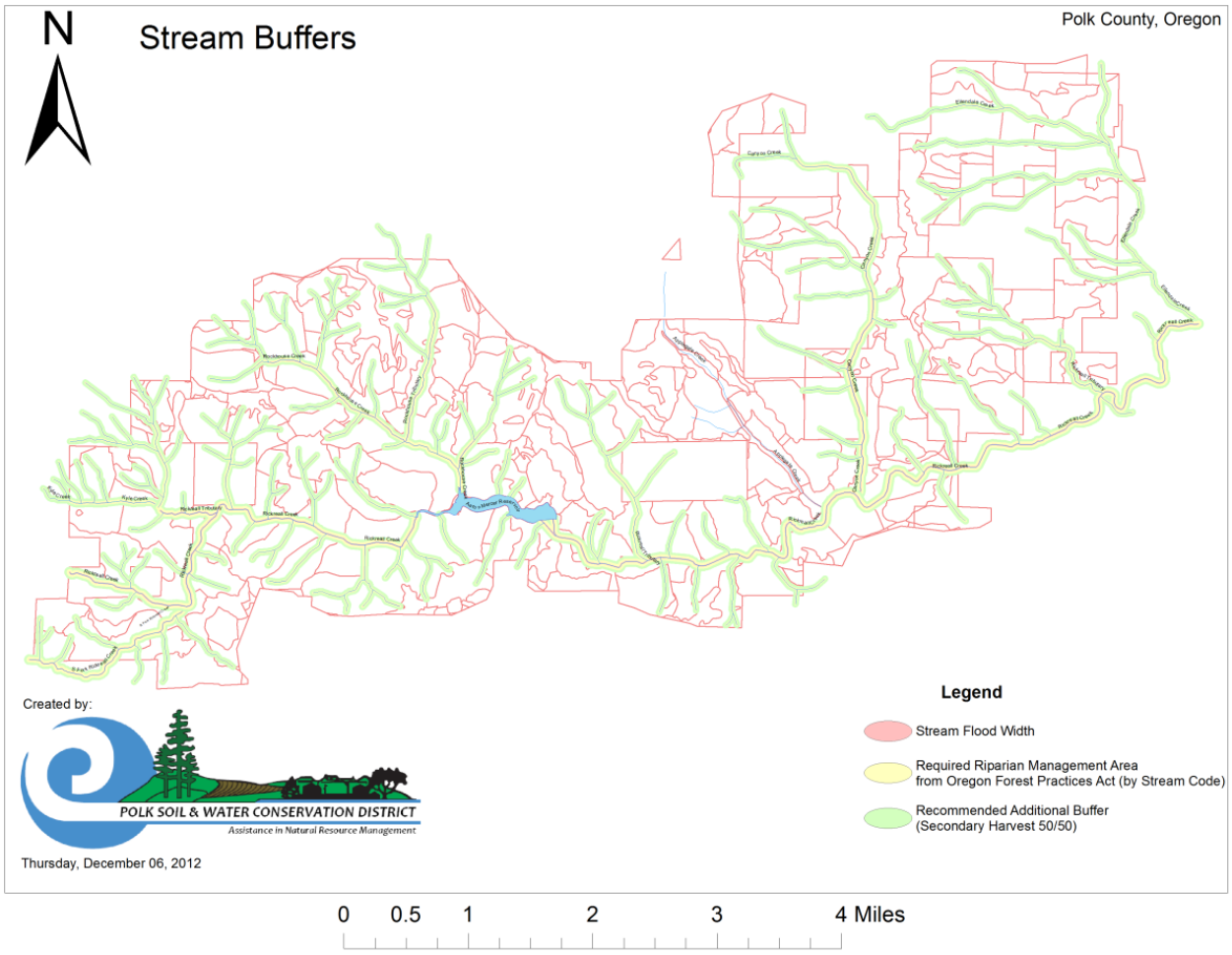
There are little to no current educational activities in and around the upper watershed. A list of potential partners and activities would benefit all. Maintenance could be carried out by a local association. The area may be of better use for something other than softwood production. Management practices would be carried out by local schools following Forest Capital Partners; Forest Management Plan

Roads

Roads should be wide enough to allow sufficient sunlight to reach the edges so that native vegetation can grow which provides for a sediment filter before runoff enters the ditch and ultimately the creek. These planted roadsides can lead to larger planted areas such as old log decks or established food plots. If planting the roadsides is not an option the natural vegetation can be maintained at different stages of succession through rotational mowing. This will also provide feed for quail, grouse, deer, elk, and other species of wildlife.

Forested Riparian Buffers

Buffers should meet current forest practices laws. Our recommendation is to establish permanent buffers along all streams at 35’ minimum up to width stated by forest practices laws. A secondary harvest buffer should be established that extends 100’ from the edge of the recommended permanent buffer. Within the secondary buffer, forest practices could still be implemented but no more than 50% of mature trees would be removed during each harvest cycle.



Stream Buffers built from Stream Inventory data, a larger version can be found within the Map packet

Fallow Openings

Openings in the woods left unplanted are very beneficial to many wildlife species. These openings can be maintained with fire, harrowing, or mowing. In fairly large openings the Polk SWCD recommends keeping different sections of the openings at different stages of successional development. Mowing half of the opening every other year is recommended. This type of mowing regime works well if done in irregular shapes throughout the opening. Animals prefer fields of two acres in size that had three-fourths of the field mowed annually or semi-annually with one-fourth left as cover.

Planted Food Plots

Food plots should be irregularly shaped and situated in areas where wildlife will feel secure when using them. They work well when placed in areas where two different cover types come together. Combination plantings should be used to extend the life of the food plot and insure production.

Forest Management Practices

In many cases forest management practices benefit wildlife. Thinning young stands is one such practice. Thinning allows sunlight to penetrate to the ground enhancing growth and production of natural vegetation. Burning is another common forest management tool that is beneficial to wildlife.

Print Resources & References

CH2MHill, comp. City of Dallas Wastewater System Data Summary: October 2007 to July 2009. Prepared Following Implementation of: Sampling and Analysis Plan for City of Dallas: Industrial Pretreatment Program, October 2007. Rep. no. WBG020410133108CVO. N.p.: CH2MHill, 2009. Print.

Fairweather SE. (2004). *Recommendation of Growth Model and Tree Volume Estimation System To the H&H Core Team for the Tillamook, Forest Grove, Astoria, West Oregon, And Western Lane Districts*. Portland, OR: Mason, Bruce and Girard, Inc. Retrieved from: http://www.odf.state.or.us/DIVISIONS/Management/Asset_Management/HH/21_NW_GrowthModel_Report.pdf

Logan, Robert. Oregon's Forest Protection Laws. Rep. Comp. Oregon Forest Resources Institute. N.p.: n.p., 2002. Print.

Mattson K, Gallhager A. (2001). *Rickreall Watershed Assessment*. Mt. Shasta, CA: Ecosystems Northwest. To obtain a copy, please contact the Rickreall Watershed Council for more information, 503-623-9680 Ext. 112.

Meriwether Northwest Oregon Land & Timber LLC GIS Data and Inventory (Confidential Data)

CH2MHill. (2004). Endangered Species Act Compliance Assessment Report. Portland, OR: CH2MHill.

DEQ. (1993). Rickreall Creek Water Quality Report Total Maximum Daily Load Program. Portland, OR: Department of Environmental Quality.

Computer Programs & Electronic Resources

Meriwether Northwest Oregon Land & Timber, LLC GIS Data and Inventory (Confidential Data not Included)

Forest Biometrics Research Institute's (FBRI) Forest Projection and Planning System (FPS)

United States Forest Service Stand Visualization System (SVS)

USDA NRCS Web Soil Survey Application

USDA NRCS Revised Universal Soil Loss Equation, Version 2 (RUSLE2)