THIRTYMILE CREEK WATERSHED ASSESSMENT

Prepared for the
Gilliam-East John Day Watershed Council

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Statement of Purpose

The Thirtymile Creek watershed assessment was written for the Gilliam-East John Day Watershed Council and the Gilliam Soil and Water Conservation District with the intended audience of the board of directors of these two councils, watershed residents, and the general public. A watershed assessment evaluates how well a watershed is functioning. This assessment will serve as a baseline for the intended audience to identify restoration opportunities.

Methods/Guidelines

The Oregon Watershed Enhancement Board's Oregon Watershed Assessment Manual was used as the guideline for this assessment. The manual provides background information on watershed functions in Oregon and resources for conducting the assessment. It provides step-by-step instruction for completing each chapter of the assessment. Copies of the manual can be downloaded from OWEB's website, http://www.oweb.state.or.us. The Thirtymile Creek watershed assessment encompasses the entire watershed, with a focus on private lands.

Data Collection

Information was collected from a variety of sources. Sources are cited in the text of the document and referenced at the end of each chapter.

Glossary

Bolded words in the text of this document are compiled in the glossary found at the end of the document.

Maps

Maps were created using ArcGIS and ArcView 8.3 which is software for viewing and creating Geographical Information System (GIS) data. GIS data has been used when calculating acreage, mileages, and other information included in this document. Copies of all maps and GIS data included in this document can be obtained at the Gilliam-East John Day Watershed Council office.

Appendices

Appendices pertinent to each chapter are referenced in the text and are found at the end of each chapter.

Landowner Participation

Landowner meetings were held in the winter of 2004 in the High School in the City of Condon. Issues of concern and general information identified from these meetings were addressed in this document. Interviews were held with local landowners where further information was collected both for historical data, restoration needs, and watershed concerns.

List of Abbreviations and Acronyms

Acre Foot	AF
Bureau of Land Management	BLM
Channel Habitat Types	CHTs
Conservation Reserve Program	CRP
Cubic Feet per Second	CFS
Department of Environmental Quality	DEQ
Department of Geology and Mining Industries	DOGAMI
Dissolved Oxygen	DO
Division of State Lands	DSL
Environmental Protection Agency (U.S.)	EPA
Geographical Information Systems	GIS
Large Woody Debris	LWD
National Wetland Inventory	NWI
Natural Resources Conservation Service	NRCS
Oregon Department of Fish and Wildlife	ODFW
Oregon Department of Forestry	ODF
Oregon Water Resources Department	OWRD
Oregon Watershed Assessment manual	OWAM
Oregon Watershed Enhancement Board	OWEB
Riparian Condition Unit	RCU
Soil and Water Conservation District	SWCD
Total Maximum Daily Load	TMDL
Umatilla National Forest	UNF
United States Forest Service	USFS
United States Geological Survey	USGS
Water Availability Basin	WAB
Water Availability RS	WARS
Watershed Professionals Network	WPN

Watershed Conditions Summary

Introduction

This section summarizes the findings of the Thirtymile Creek Watershed Assessment. Data gaps are included. **Figure 1** details the watershed conditions by sub-watershed. Recommendations for improving watershed conditions were generated through the coordinated effort of several agencies that form the Thirtymile Creek Watershed Assessment Group. These recommendations will be attached in a separate document that will be provided after the completion of the assessment.

Historical Conditions

There have been many changes to the Thirtymile Creek watershed since the early 1700s when the horse was introduced by Native Americans. Numbers of horses owned by Native American families was a sign of their wealth. Some tribes owned literally thousands of head of horses. Since then fur trappers have come and gone, taking the beaver with them. Settlers have passed through and many stayed or returned. Land has been cleared; farms have been cultivated. Wetlands have been drained. Roads have been built. Noxious weeds have entered the landscape. Humans have changed the landscape, through extracting resources and putting the land into agricultural production.

We cannot entirely return the watershed to its original, pristine state, as the land is now a livelihood for many people. We do not fully understand or know what its "original" state was. Some changes that may have impacted the watershed the most occurred when there was little documentation of their effects, such as removal of the beaver in the mid 1800s. As things currently stand, we can try to restore aspects of the watershed that benefit the habitat of aquatic and terrestrial species that we share the land with, while maintaining a viable economy.

Channel Habitat Types (CHTs)

In this chapter, streams were classified as various channel habitat types, in order to understand how land uses and environmental factors affect stream channel form and how channel habitat types can be expected to respond to restoration activities. The following channel habitat types were present in the Thirtymile Creek watershed.

CHTs with Gradient less than 2%
Low Gradient Small Floodplain Channel: streams in broad valley bottoms with well-established floodplains 7%.
Low Gradient Moderately Confined Channel: low-gradient streams with variable confinement by low terraces and slopes 28%
Low Gradient Confined Channel: low-gradient streams confined by adjacent, gentle land forms 28%

CHTs with Gradient 2-4%
Moderate Gradient Moderately Confined Channel: moderately sloped streams with variable confinement and a narrow floodplain 16%

Moderate Gradient Confined Channel: moderately-sloped streams confined by adjacent land forms 9%

CHTs with Variable Gradients from 0-5%.
Alluvial Fan Channel: tributary streams located on foot-slope land forms in a transitional area between valley floodplains and steep mountain slopes 1%.
Moderate Gradient Headwater Channel: channels in open valleys with hillslope constraints occurring in upper reaches of watershed 11%.

Data Gaps

- **None**

Hydrology and Water Use

Climate, soils, and geology are major determinants of the natural hydrology of a watershed. As the majority of precipitation in the Thirtymile Creek watershed occurs as snow, snow melts are the cause of peak flows. The period of low flows occurs during summer months, when there is little precipitation.

Of the land uses assessed in this chapter (agriculture, grazing, forestry, roads, and rural residential), all but agriculture and grazing had low potentials to affect peak flows in the watershed. Agriculture and grazing had a low to medium potential. There are many historical wetlands in the bottomlands of Thirtymile Creek. Many of these were destroyed in the floods of 1964 and 1996. Loss of these wetlands has dramatically changed the length of time soils are saturated, thereby reducing groundwater recharging in the spring.

Peak flows and low flows in the Thirtymile Creek watershed are to some extent affected by human activities. Conservation measures can reduce some of these effects, to increase the amount of water stored in floodplains and soils, to restore stream structure, wetlands, and riparian areas.

Data Gaps

- Flow data
- Historical hydrological information
- Miles of private roads

Riparian Areas

Shade from riparian vegetation is important for maintaining cool water temperatures. As Thirtymile Creek has little shade for almost the entire length on the lower end of the stream, its high summer temperatures (see Chapter 7: Water Quality) are likely due, in part, to lack of shade. Seventy percent of the streams in Thirtymile Creek have little or no shade. If you take out Searcy and Little Searcy Creeks (which are forest streams) the percentage of the riparian areas in the Thirtymile Creek drainage haveing little or no shade increases to 91.5%.

Amounts of large woody debris in the Thirtymile Creek watershed were found to be low in number or nonexistent. This attribute was not studied in this evaluation but it should be noted that because of the lack of shade or the vegetation that produces shade it can be assumed that woody vegetation is also severely lacking. As large woody debris plays an integral role in pool creation, this lack of in-stream wood and a lowered potential for future recruitment can have far reaching effects on stream structure and fish habitat.

Lack of riparian vegetation or vegetation without large and deep root systems also can contribute to bank instability. Bank instability is quantified as bank erosion, which can contribute to sediment problems. It also widens streams, which can make the vegetation present less effective for maintaining cool water temperatures.

Data Gaps:

- Woody debris amounts/values/needs within watershed
- Erosion measurements comparing existing status with proper functioning

Wetlands

Historically, wetlands were more widespread in the Thirtymile Creek watershed than they are today. Over time wetlands have been farmed over, disconnected from nearby streams, drained, and leveled. Removal of beavers may have also been responsible for diminishing wetlands, as land flooded, above beaver dams was no longer flooded.

Currently, the NWI shows less than one percent of the watershed as being wetlands. As this inventory was done on a large scale with no field checking, the actual amount of wetlands currently present in the watershed is higher. If you are interested in inventorying wetlands on your property, contact the local Natural Resources Conservation Service office.

There are funding opportunities for wetland restoration. While not possible on a large scale, due to the agricultural nature of the watershed, selected restoration of wetlands can improve the hydrology and water quality of the area. As wetlands play a role in groundwater charging, increasing wetlands can improve late season low flows.

Data Gaps

- Hydric soil mapping
- Compilation of soil survey characteristics that indicate areas of historical wetlands
- Wetland plant community information

Water Quality

Water quality is a difficult topic to adequately address with minimal data. The existing data shows Thirtymile Creek's impact on the water quality of the John Day River, but is too limited to show what portions are natural and human caused. To summarize the data, temperature exceeds the seven day moving average maximum temperature of 64°F a good portion of the summer months on all three sites that were tested the summer of 2005. Nutrient levels in Thirtymile Creek did not exceed the **assumed** TMDL standards of 33µg/L (Dissolved Inorganic Nitrogen) or 7µg/L (orthophosphates) for the John Day River. pH levels are recorded at slightly below 9.0 (8.7 to 8.9) and dissolved oxygen has not dropped below the standard of 8.0 mg/L but some grab

samples have been right at that level throughout the length of the stream. Although there is very limited flow data (EPA 1997 and 2000), Thirtymile Creek is a high priority for flow in the John Day River Watershed Sub-basin Revised Draft Plan. Fine sediments, another form of pollution, is also present at levels affecting fish reproduction (see Chapter 8: Sediment).

What does all this mean? How is water quality affecting salmonid fish in the Thirtymile Creek watershed? High nutrient levels, low flow, exposure to direct sun, and high water temperatures promote algae growth. Algal growth increases the magnitude of daily fluctuations in dissolved oxygen and pH. When dissolved oxygen, temperature, and pH fall outside the range to which salmonids are adapted to, mortality and reduced reproduction occur. Extreme fluctuations place additional stress on the fish. As salmonid fish rearing is the most sensitive beneficial use in the Thirtymile Creek watershed, current water quality conditions are not adequate to support this beneficial use. Algal growth, with its effects on fish habitat requirements, is a large factor in this. By minimizing algal growth and minimizing human caused increases in temperature, fish habitat parameters can be improved and Thirtymile Creek's most sensitive beneficial use protected.

Minimizing algal growth requires limiting exposure to sunlight, lowering water temperatures and reducing nutrient levels in streams. Limited data is showing that nutrient levels are not outside of the parameters set by DEQ so the main emphasis should be placed on restoring a good condition riparian area with adequate brush to shade the stream from solar radiation which will have an effect on both flow and temperature. Storing water in the soil profile to provide cool accretion inputs during the late summer can also be enhanced by creating wetland areas in the floodplain.

Additional monitoring in the future will provide a stronger basis with which to assess and improve water quality in the Thirtymile Creek watershed. By monitoring in the headwaters of the watershed, information on how much pollution is natural and how much is human-induced can be gathered, providing further insight on how to improve water quality in the watershed.

Data Gaps

- Lack of water quality data
- Flow data
- Monitoring that measures daily DO and pH fluctuations
- Amount of natural versus human-caused pollution

Sediment

Too much sediment in spawning gravels can adversely affect salmonid spawning. Fine sediment in riffles ranged from 7 to 68% (estimated by author) in surveyed reaches in the Thirtymile Creek watershed. As the ODFW benchmarks are set for fish needs, the excessive fines in riffles or the surveyed reaches indicates that fish reproduction and development may be impaired in those reaches. This also means sediment deposition amounts are too large for quality fish habitat in those reaches. Most deposition occurs in pools, where there is less flow. It is possible that the sediment loads of Thirtymile Creek are more than the stream can handle and therefore you have deposition in riffles. It is also possible that the lack of large woody debris (LWD) and the low number of pools per mile (See Chapter 10: Fish and Fish Habitat discussion) have changed the

distribution of sediment in the stream. To determine whether sediment loading, stream structure, or both are the causes of excessive fines in riffles, more sediment data needs to be collected.

The Thirtymile Creek watershed was listed as a high priority area for sediment reduction in the John Day River Sub-basin plan. If the sediment loads are too large for the stream to handle, what can be done? Sediment sources need to be identified and minimized. Possible sediment sources in the Thirtymile Creek watershed include: roads, crop and range lands, stream bank erosion, ditch erosion, and landslides.

Roads can be one of the major contributors of sediment to streams, especially when there are high road densities. In the Thirtymile Creek watershed, the entire watershed and each sub-watershed all have relatively low road densities. But a large majority of the roads in the watershed are unpaved, and thus are contributing larger amounts of sediment to streams. Native surface roads contribute more sediment to streams than rocked or paved roads.

The geology and topography of the upland sections of the watershed show landslides as a potential occurrence. While the geology and topography cannot be changed, they can be recognized and land uses adjusted to minimize landslides and debris flows.

Most of the crop and range lands are highly erodible and some of those lands are on moderate slopes. These lands are probably contributing sediment to streams. Conservation practices and riparian buffers can minimize the amount of sediment that reaches streams and also conserve soil on crop and range lands.

The ODFW habitat survey shows the potential for high levels of bank erosion throughout all sections of the watershed. Therefore, stream bank erosion is a source of sediment to streams in the watershed. The erosion can be a result of stream bank instability or from peak flows reshaping the channel form. Flows passing through channelized reaches may have more energy than when in original channels, with the added energy resulting in stream bank and stream bed erosion. Stream bank instability can be the result of lack of riparian vegetation. As the results in Chapter 5 indicate, riparian areas show limited woody and brush vegetation in riparian areas, this is likely a significant factor in bank erosion.

Erosion from ditches is also a source of sediment to streams in the Thirtymile Creek watershed. How and when ditches are cleaned can help control ditch erosion.

Understanding the geology, topography, climate, and soils of the watershed, along with how human activities can contribute sediment to streams and alter how streams manage their sediment loads is a good beginning for improving sediment conditions and fish habitat. Implementing actions to control sediment and improve stream structure will be the next step.

Data Gaps

- Miles of private unpaved roads
- Assessment of all culverts
- Identification and mapping of all landslides in watershed
- Miles of ditches in the watershed

Channel Modifications

Several types of channel modifications were identified while researching this chapter. Ditches and diversions are not that prevalent, due to the agricultural nature of the watershed but roads and road ditches are prevalent in the watershed. As mentioned in the background section of this chapter, these modifications have changed the hydrology of the watershed, causing less infiltration of water into the soil and water to enter the stream system more rapidly.

Stream channelization is not that common in the agricultural areas of the watershed, but agricultural lands on both sides of streams and roads that parallel streams have artificially confined stream channels. This can result in effects similar to those of channelization, namely disconnection with the stream's floodplain, loss of habitat complexity, and unstable stream banks.

Many of the channel modifications in the Thirtymile Creek watershed are the result of infrastructure and agriculture. Irrigation and road ditches are necessary for crop production and road stability. Diversion dams are necessary for irrigation purposes. However, the effects that these necessary modifications have on fish habitat and stream structure can be minimized. Fish passage barriers can be identified and actions taken to provide passage, such as dam designs that allow passage. Roads and ditches can be maintained in order to have minimal sediment enter the stream system. Inadequate culverts can be replaced with 50-year or 100-year flood sized culverts. Opportunities exist for rerouting channelized sections of streams into their old channels. This would increase the length of stream channels and the amount of time that water stays within the watershed, thereby assisting with diminishing the intensity of peak flows and potentially decreasing the amount of time of low flows. Increasing the amount of channel could be combined with riparian buffers (see Chapter 5: Riparian Areas) to improve the adjacent floodplain's ability to store and hold water, thereby increasing the amount of water available for release during low flows.

Stream bank stabilization through the use of riprap and other man made materials is a channel modification that can ultimately do more harm than good. While temporarily preventing bank erosion, peak flow events can whittle stream banks out from behind riprap, causing even further erosion problems. Although sometimes necessary in the short term, manmade stream bank stabilization is best minimized in the long term. A long term alternative is riparian revegetation, which can provide natural bank stabilization that will not alter channel form.

Data Gaps

- Inventory of diversions
- Inventory of all possible fish passage barriers
- Culvert inventory on all culverts in the watershed

Fish and Fish Habitat

Historically, Thirtymile Creek and its tributaries supported large runs of summer steelhead. These runs were historically plentiful, but now have diminished to where they have been listed as threatened under the Endangered Species Act.

Fish passage is one of the greatest concerns for salmonids. Dams and diversions can partially or completely cut off fish access to spawning habitat. On a large scale, dams on the Columbia have impeded fish access to the John Day Basin and thus Thirtymile Creek, thereby playing a role in declining fish populations. Within the Thirtymile Creek watershed, fish passage barriers are assumed but not located with the use of pushup dams for irrigation purposes.

Habitat conditions in the 1971 habitat surveys on Thirtymile Creek highlighted some undesirable conditions that were prevalent in all the tributaries also. Desirable and undesirable benchmarks were derived by Oregon Department of Fish and Wildlife as a method of comparing a stream against standards to determine its general condition. As different channel habitat types and geological location will cause variances in an individual reach's potential habitat, these are general guidelines. Width to depth ratios, percent open sky, fines in riffles, bank erosion, and large woody debris all fell into the undesirable category for many reaches along Thirtymile Creek. However, on all reaches, the percent gravel available in riffles was equal to or greater than the desirable benchmark.

What can be done to improve habitat conditions? Width to depth ratios of streams increase as streams widen. Streams widen from increased flows and/or eroding banks. This is caused by higher peak flows and increased stream velocities. This is often the result of changes in upland vegetation and the inability of the stream to access it's historic floodplain. As eroding banks are prevalent in many reaches of Thirtymile Creek and its tributaries, these streams are likely widening over time. Widening streams are undesirable for their effects on water temperature (see Chapter 7: Water Quality). Also, as streams widen, their ability to transport and handle their sediment loads changes. Stabilization of stream banks through riparian revegetation will help decrease the widening of streams. Stream widening is undesirable for fish because of the resulting increase in water temperature, reduction in available habitat and substrate degradation.

The percent of open sky present out of 180° at a given point, is the opposite of shade. Thus, high percent of open sky numbers mean low shade. As shade limits exposure of the water to solar radiation, it helps reduce the warming of stream temperatures. By increasing the amount of shade in the stream profile, the availability of summer habitat and mobility of salmonids also increases, since too-high water temperatures can be fish barriers.

In Chapter 5: Riparian Areas, in-stream large wood and the recruitment potential of riparian areas for future large woody debris were shown to be limited. As large wood helps in the formation of pool habitat, a critical area for salmonids in the warm summer months, the enhancement of fish habitat in the Thirtymile Creek watershed will ultimately necessitate large woody debris being present in the stream system in greater amounts. This can be accomplished in the short term by large woody debris placement projects and in the long term through increasing the recruitment potential of riparian areas for large wood.

Improving fish habitat through establishing riparian vegetation, increasing shade, improving riffle and pool habitats, and the placement of large woody debris is part of improving conditions for fish in the watershed. It would also be beneficial to increase fish access by identifying and removing fish barriers and to increase surveys to determine population trends and the entire distribution of steelhead in the system.

Data Gaps

- Current stream habitat surveys
- Current redd surveys in the watershed
- Complete inventory of fish passage barriers
- Development of specific Habitat Benchmarks for the John Day Basin

Noxious Weeds

Noxious weeds are present in the Thirtymile Creek watershed, although not in as large numbers as other parts of Oregon. Un-maintained patches of weeds can quickly jump to large acreages taken over by weeds. Thus, it is important to control weeds while they are small problems and before it becomes a large and unmanageable one.

Diffuse knapweed, the most prevalent noxious weed in the watershed and other noxious weeds can cause serious land degradation. Diffuse knapweed has a weak root system and does not hold soil as well as the native grasses it replaces, thereby increasing surface erosion. In addition to land degradation, it reduces land values and limits the amount of forage available to livestock and wildlife.

Coordinated efforts in weed control are important to reducing weed numbers. If only one landowner is maintaining his or her lands free from weeds in a given area, weeds will invade from nearby landowners. This includes coordinating with Gilliam County Public Works, which maintain roadsides, and state and federal agencies that are property owners within the watershed. Coordinated efforts are cost-effective and prevent weeds from re-colonizing an area.

Data Gaps

- Exact location of noxious weed sites on private, state, and federal lands
- Estimates on acreages of noxious weeds on private, state, and federal lands

Forest Health

Although there is a lack of technical information, the author concludes that forest composition and structure in the Thirtymile Creek watershed have changed over time. Average tree size has decreased in size, with most stands currently small or medium in size classes. Crown closures are medium to dense, indicative of thick stands. The majority of forests are in dry mix or wet mix types. A smaller amount of dominate stands than historically are Ponderosa pine dominated stands.

Forest management is, and always has been, a highly debated issue in the West. People have different ideas about how a forest should be managed. Since how a forest is managed plays an integral role in forest health, how management is influenced should be understood. On public lands, forest management is often subject to public opinion. Private land management has some restrictions placed upon it by the Oregon Forest Practices Act. For the most part it is the landowners' decision on how to manage their forests.

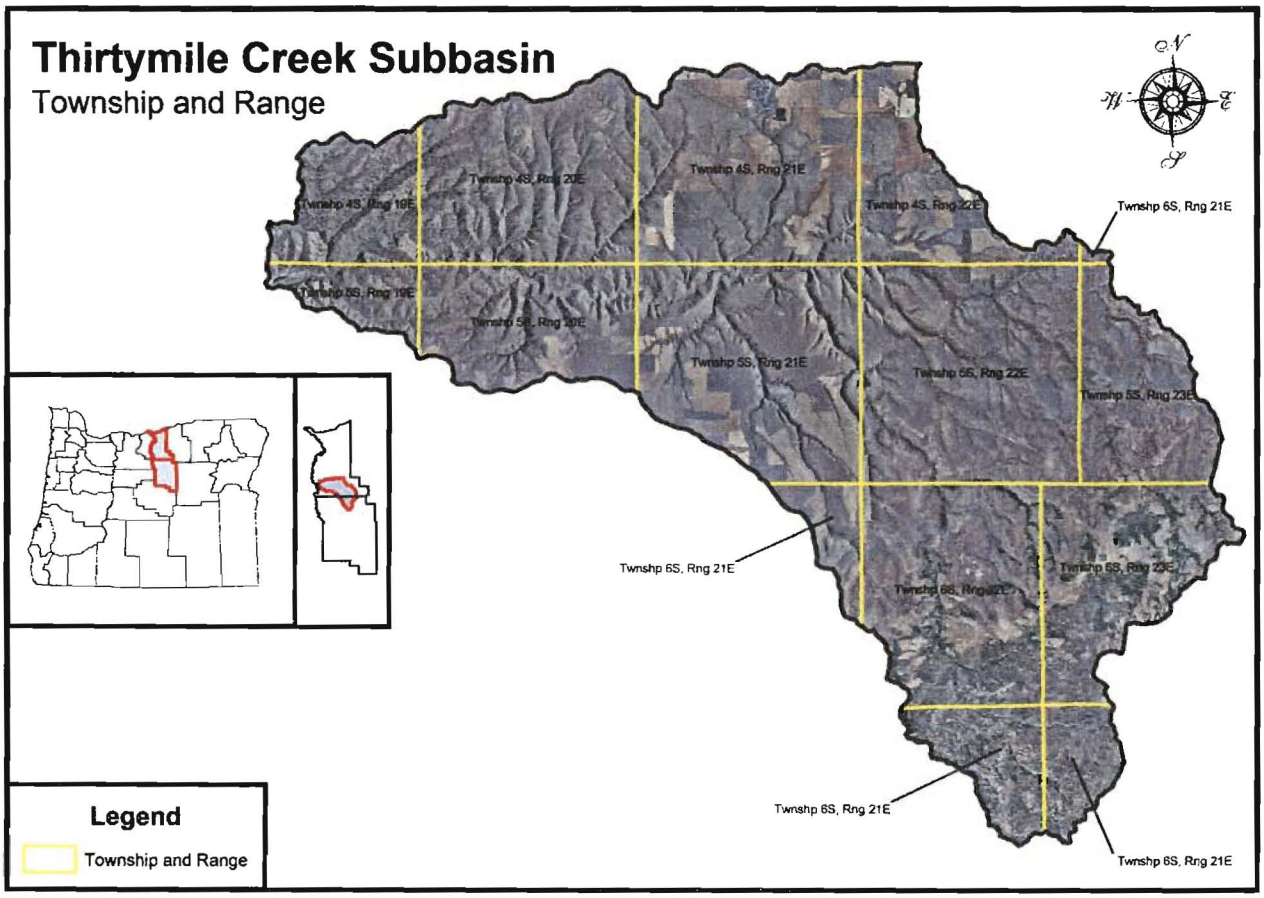
Data Gaps

- Historical conditions of specific forest stand structure and composition

Subwatershed	Riparian Conditions	Wetland Conditions	Stream Conditions	Water Quality	Sediment Sources	Channel Modifications	Hydrology And Water Use	Noxious Weeds
Lower Thirtymile Creek	Mostly grasses with some brush species (hawthorn and willow) present. Low shade coverage and no LWD recruitment potential.	Current Wetlands mostly in riparian areas or around springs.	The 30 Mile Creek substrate is mostly cobbley. The number of pools per mile is less than before the 1964 flood event. Stream bank erosion is higher than desirable. Fine sediments in riffles is higher than desirable.	Information for long term analysis was non-existent. Extensive information was collected in the spring, summer, and fall of 2005. Temperature, dissolved inorganic nitrogen, orthophosphates, and pH were collected at 1 week intervals. Invertebrate were collected at 3 sites spanning the whole of 30 Mile Creek. Data shows that the only concern through the summer of 2005 was temperature and flow.	Bank erosion, roads, agriculture, and range activities are located on highly erodible soils and are influencing sediment in 30 Mile Creek	After the 1964 Christmas floods the main channel was eroded to the point that the original channel was unrecognizable in sections of the lower watershed. Land owners used heavy equipment to relocate the channel in the original location.	During the summer months flows reduce to nothing during the dry part of the year. There is some irrigation but flow reductions are caused more from poor riparian areas and lack of woody vegetation.	Knapweed, Toadflax. Scotch Thistle, and Yellowstar Thistle are the main noxious weeds of concern

Subwatershed	Riparian Conditions	Wetland Conditions	Stream Conditions	Water Quality	Sediment Sources	Channel Modifications	Hydrology And Water Use	Noxious Weeds
Upper Thirtymile Creek	Mostly grasses with some brush species (hawthorn and willow) present. Moderate shade coverage and moderate LWD recruitment potential. There are areas within this section of the watershed that have successful CREP plantings.	Current Wetlands mostly in riparian areas or around springs.	The 30 Mile Creek substrate is mostly cobbley. The number of pools per mile is less than before the 1964 flood event. Stream bank erosion is higher than desirable. Fine sediments in riffles is higher than desirable. CREP is improving these limitations.	Information for long term analysis was non-existent. Extensive information was collected in the spring, summer, and fall of 2005. Temperature, dissolved inorganic nitrogen, orthophosphates, and pH were collected at 1 week intervals. Invertebrate were collected at 3 sites spanning the whole of 30 Mile Creek. Data shows that the only concern through the summer of 2005 was temperature and flow.	Bank erosion, roads, agriculture, and range activities are located on highly erodible soils and are influencing sediment in 30 Mile Creek	After the 1964 Christmas floods the main channel was eroded to the point that the original channel was unrecognizable in sections of the lower watershed. Land owners report that portions of the stream have healed significantly and other sections still are damaged.	During the summer months flows reduce to nothing during the dry part of the year. There is some irrigation but flow reductions are caused more from poor riparian areas and lack of woody vegetation.	Knapweed, Toadflax. Scotch Thistle, and Yellowstar Thistle are the main noxious weeds of concern

Map 1.1: Location of the Thirtymile Creek Watershed



Chapter 1: Watershed Overview

Location:
The Thirtymile Creek watershed is located in the north central part of Oregon, in Gilliam County. Thirtymile Creek joins the John Day River at river mile 218. **Map 1.1** shows the location of the watershed.

Watershed Boundaries
The Thirtymile Creek Watershed is a **5th field HUC** watershed, as designated by the State of Oregon 5th Field Watersheds. As the State of Oregon has not designated sub-watershed boundaries for this part of Oregon, the Gilliam-East John Day Watershed Council had divided the Thirtymile Creek Watershed into 2 sub-watersheds based upon changes in ecological sites that fall very closely to State Highway 19.

Streams
There are many intermittent creeks and canyons that drain into Thirtymile Creek. Most of these creeks and canyons have a minimal impact on Thirtymile Creek, so, only creeks will be listed here that are marked as perennial or have the potential for significant impacts on topographic maps:

- Sniption Creek
- Badger Creek
- Searcy Creek
- Little Searcy Creek
- East Fork Thirtymile Creek
- Trail Fork Creek

Population
Thirtymile Creek watershed is a rural watershed with one small population center. The City of Condon has a population of 759 with 413 housing units and is on the far north edge of the watershed. Estimated total population for the watershed is approximately 810. Rural homes and family farms are dispersed throughout the valley and foothills of the watershed.

Land Uses
Gilliam and Wheeler County zoning in the Thirtymile Creek watershed includes areas of Rural Residential/ Exclusive Agriculture, Grazing, Timber Grazing, Agriculture/Timber/Grazing and Farm Residential.

Agriculture: The majority of the farm ground in the watershed is devoted to dryland agriculture. The major crop grown is wheat with a year of summer fallow.

Timber: Most of the timber ground is managed by private land owners where technical assistance is received through the Oregon Department of Forestry there are also small acreages that were recently traded to private land owners by the Umatilla National Forest.

Grazing: There are several grazing allotments managed by the Bureau of Land Management. Cattle, sheep, horses, and other livestock are grazed on private lands. From the 1890's until the 1950's the watershed was grazed by large flocks of sheep. Most of the grazing was converted to cattle in the 1950's.

Rural Residential and Farm Residential: There are a number of residential homes and farms located throughout the 30 Mile Creek watershed.

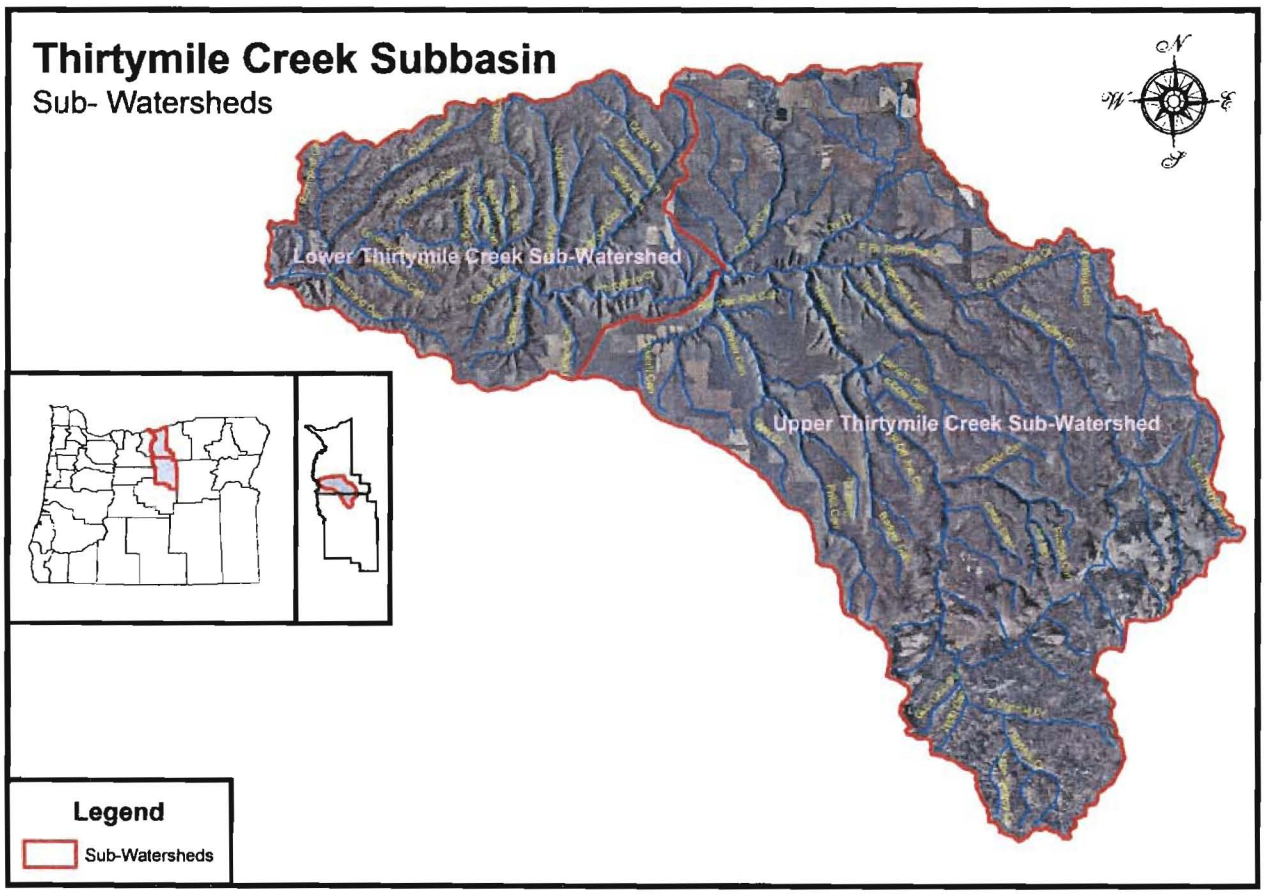
Land Ownership

Map 1.2 shows land ownership in the Thirtymile Creek watershed. **Table 1.1** shows land ownership acreage in the Thirtymile Creek watershed.

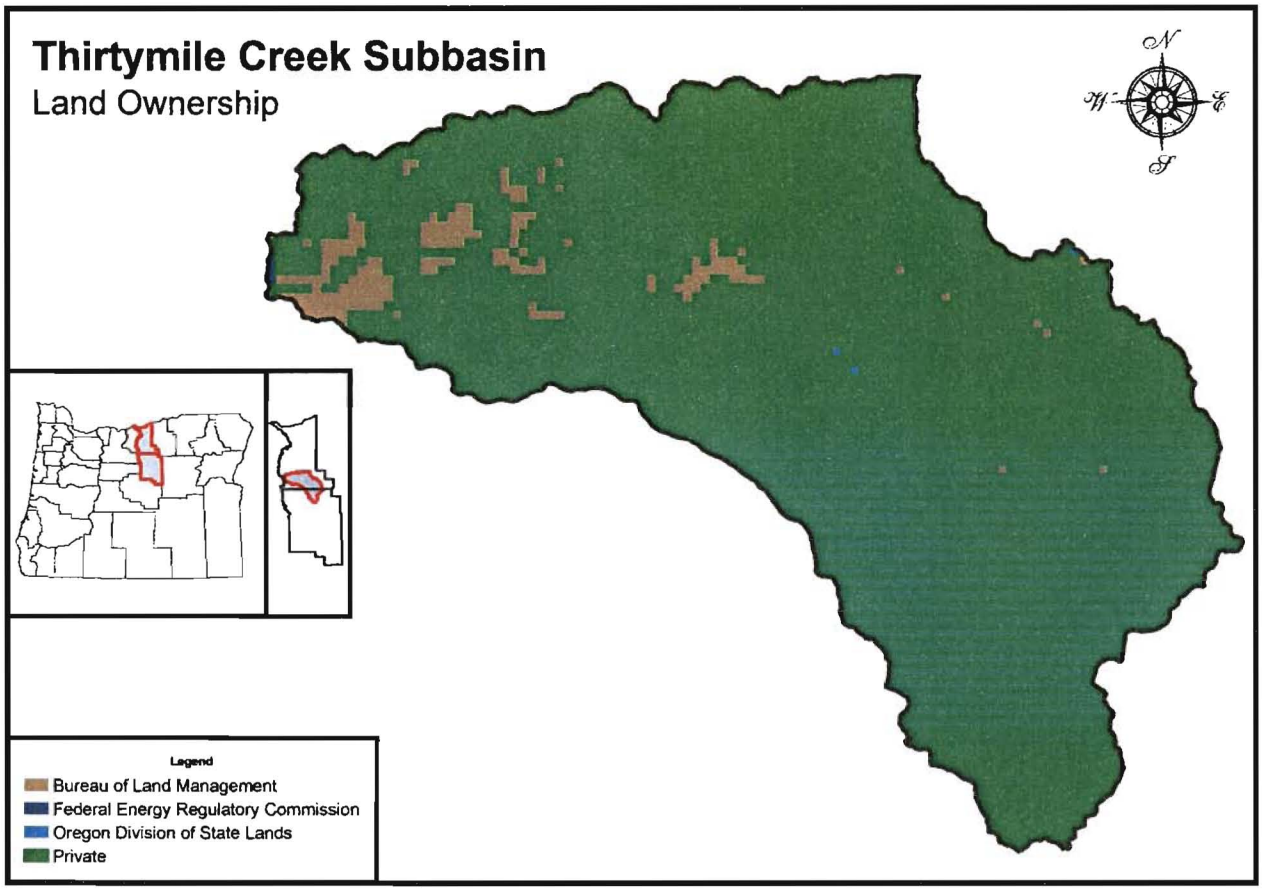
Table 1.1: Land ownership in 30 Mile Creek watershed

OWNER	ACRES	% OF WATERSHED
Private	**166,899**	**96%**
Bureau of Land Management	**6,883**	**4%**
State of Oregon	**116.2**	**<1%**
F.E.R.C.	**106.2**	**<1%**
All Lands	**174,004**	**100%**

Map 1.2: Subwatersheds of the Thirtymile Creek Watershed

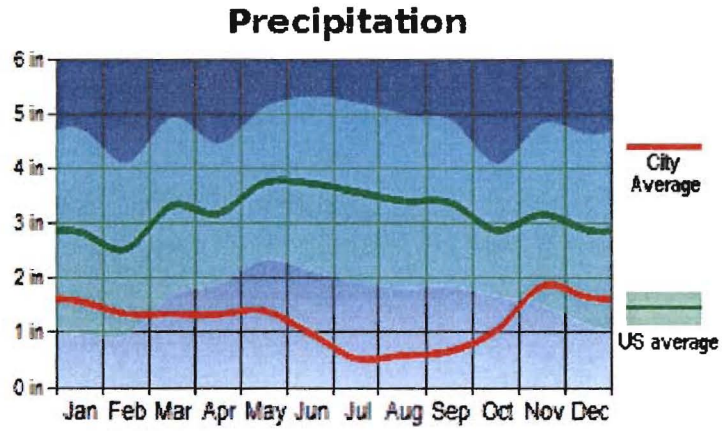


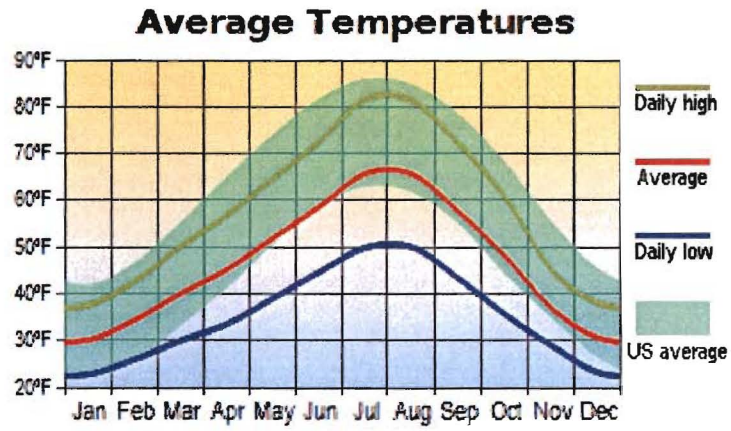
Map 1.3: Land Ownership in the Thirtymile Creek Watershed

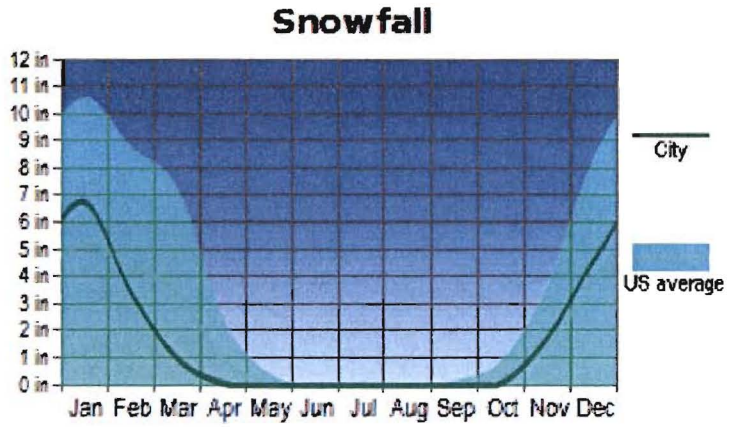


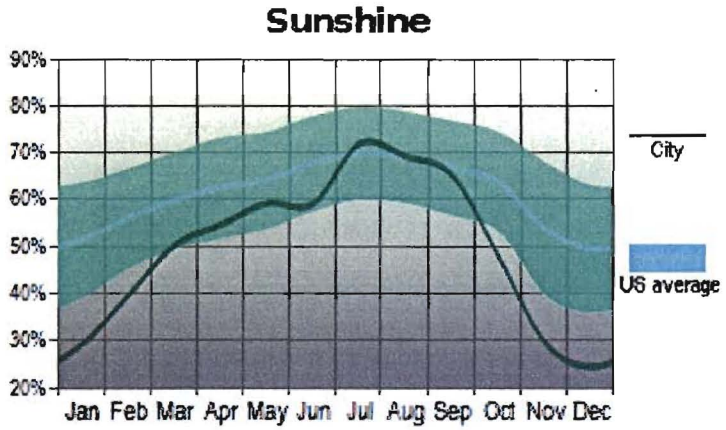
Climate

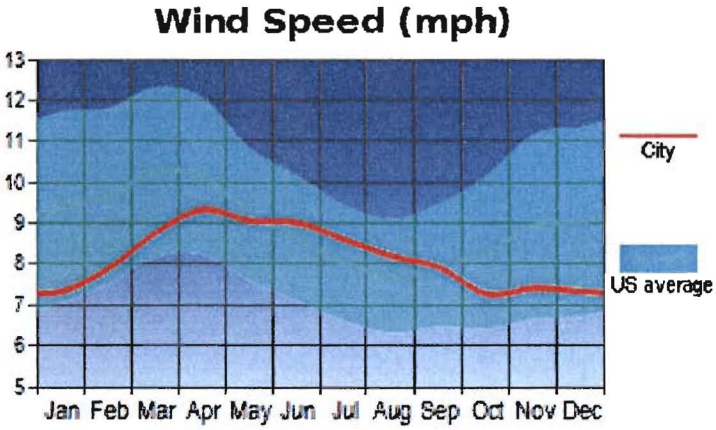
The only weather station in the watershed is located in the City of Condon. The information presented in this chapter is from that weather station.











Sources: http://www.city-date.com

Mean monthly temperature changes with the seasons and elevation in the watershed. The coolest month is January, with a mean temperature of 31.6°F at Condon. The warmest month is July, with a mean temperature of 66.4°F. (Oregon Climatic Service)

Average annual precipitation varies within the watershed. Where Thirtymile Creek enters the John Day River is less than 10 inches. In the uplands, it varies between 20 and 40 inches per year. The majority of precipitation occurs during the winter and early spring. The driest month is July and the wettest month is November. The average precipitation in Condon is 12.94 inches. (Averaged since 1928, Oregon Climatic Service)

Geology

The geology of the Thirtymile Creek Watershed is dramatically diverse. The lower and middle sections of Thirtymile Creek are in the Columbia Plateau physiographic province and the upper part of the watershed are in the Blue Mountain section of this province. Generally, most of the watershed is a plain that was covered by molten basalt and then uplifted. The basalt in the floor of the plain is overlain by wind-deposited silt. Elevation of the plain ranges from 984 feet at the mouth of Thirtymile Creek to approximately 5,100 feet on the highest ridge. Relief is dominantly nearly level to rolling on the plain above the dissected streams.

The Blue Mountain section is a tilted, folded, and faulted uplift of the Columbia River basalt and older underlying rocks. This section is characterized by flat topped, ridges, broad flats, and steep walled canyons. Topography is mainly the result of erosion and stream cutting in the basalt. Ash deposited during the past volcanic activity in the Cascade Mountains has influenced the soils in the Blue Mountain section, especially north facing exposures. The drainage pattern of the watershed is mainly effected by the underlying basalt. The mantle of loess has had little effect on modifying this pattern. Stream gradient is determined by the tilt of the basalt.

Forests

Forest lands in the Thirtymile Creek watershed can be divided into 2 types: lowland dry forest and montane forest.

Lowland Dry Forest

The high temperature and low moisture levels characteristic of this forest limit the number of species that can grow in this zone. Historically, these forests have been composed of the fire-resistant and fire dependant tree species Ponderosa pine and Western larch, which can survive in this climate. Historically, wildfires that occurred every five to 30 years prevented fuel buildup, so fires were usually low in intensity. Ponderosa pine and Western larch were selected for by fires, as other tree species were more easily killed by these fires. In unmanaged forests, Ponderosa pine tends to replace itself as it matures. Because of fire suppression , dense multi-layered stands of other conifer species, such as Grand fir, have sprung up underneath the canopy. Now these species ultimately tend to replace the Ponderosa pine and Western larch when mature trees die. Shade from the dense understory does not favor seedling and sapling Ponderosa pine survival and growth. Poor, dry sites with shallow soils, remain dominated by Ponderosa pine, even when fire is suppressed, since only Ponderosa pine is adapted to the poor growing conditions.

Montane Forest

Mixed-conifer forests are typical between the foothills and the sub-alpine zones of the Blue Mountains. Here, forests contain a larger number of species than the lower, drier pine-dominated forests. Grand fir, Ponderosa pine, Douglas fir, Western larch, Engleman spruce, Lodgepole pine, and other conifer species can all be represented in montane forests. These forests are more productive than lowland forests and there is a larger natural fuel build-up. Fires occur every 20-40 years, with some of these fires stand-replacing. These forests are favored by long intervals between fires and disturbances. Insects and diseases are common occurrences in mixed-conifer forests and can kill off entire stands. Trees and insects have co-evolved together, and regeneration can be dependant upon insects to kill entire stands, when not altered for timber production or fire.

Grassland and Wetland Communities

The Thirtymile Creek watershed includes forest, grasslands, and wetland plant communities. Agriculture has replaced many acres of grassland and wetlands in the watershed. Perennial grasses with large root masses and soil holding capacity have been replaced by the production of annual crops and tillage practices that periodically leave the soil with no cover. Soil types indicate what the potential plant communities are.

In the Soil Survey of the Gilliam County Area, each soil type description describes the potential plant communities found in uncultivated areas of that soil type. In addition to the coniferous forest in the uplands, the soils in the Thirtymile Creek watershed support a number of grassland communities. These include: Bluebunch Wheatgrass/Idaho Fescue/Stiff Sagebrush; Bluebunch Wheatgrass/Idaho Fescue/Sandberg Bluegrass; Bluebunch Wheatgrass/Idaho Fescue/Big Sagebrush; Bluebunch Wheatgrass/Idaho Fescue. One other potential plant community is: water tolerant grasses/sedges/rushes.

Riparian Vegetation

Riparian vegetation is dependant upon the elevation and topography of the stream. In the Thirtymile Creek watershed, riparian vegetation will generally be willow, other brush species, and cottonwoods along streams in the valley floor. However, it is thought that only brush species, not hardwoods, grew historically along lower Thirtymile Creek, because of seasonal inundations. In higher forested regions, riparian vegetation will generally be composed of conifers, such as Grand Fir, hardwoods, such as Cottonwood and Alder, and some brush species such as Willow. (OWEB, Ecosystem Appendix, 1999).

Fish and Wildlife

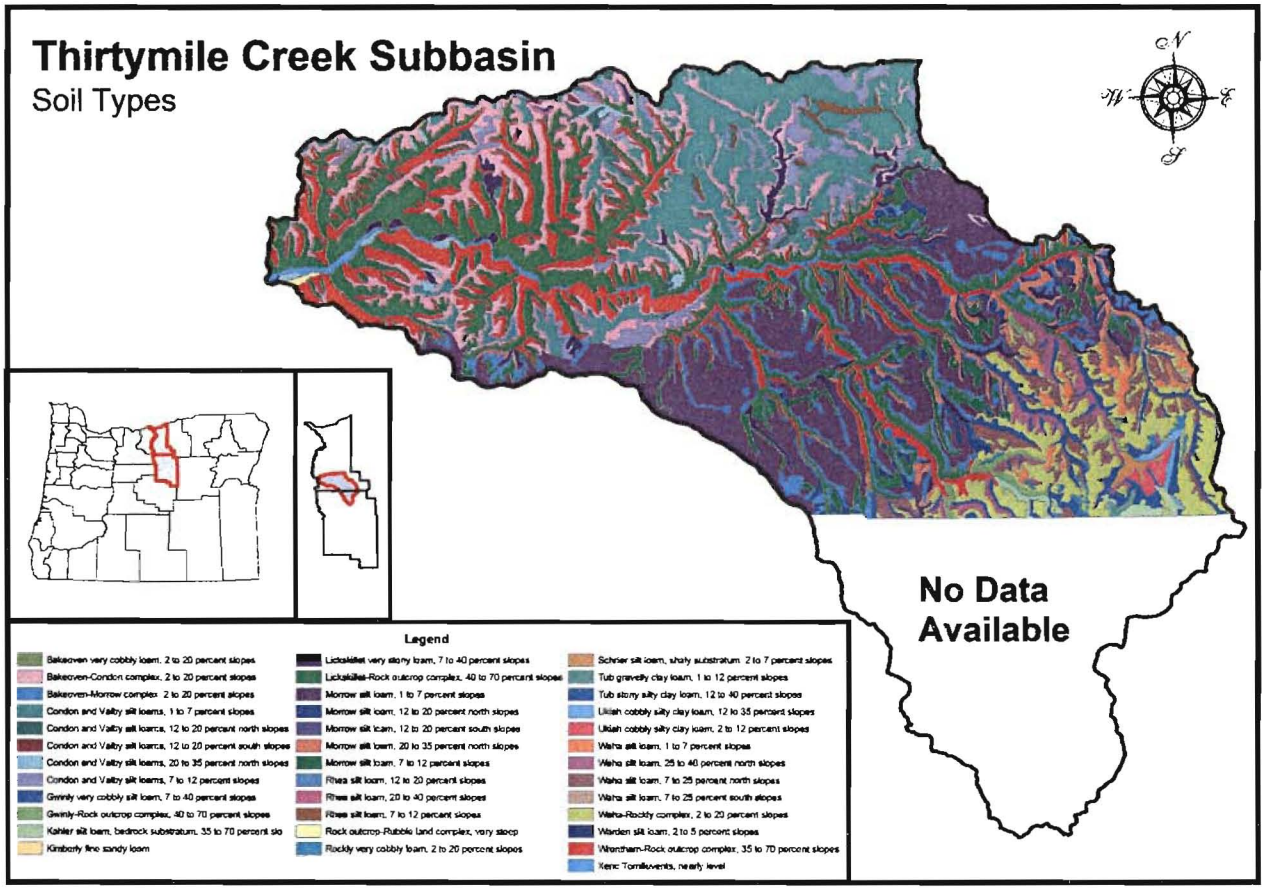
Summer steelhead and rainbow trout are among the cold water fish species currently found in the Thirtymile Creek watershed. There are also a number of non-salmonoid fish, including dace, sculpins, shiners, suckers, squawfish, and small mouth bass.

Wildlife residing in the watershed include deer, elk, cougar, bear, big horn sheep and numerous migratory and resident bird species, beaver, and many other species. Most species known or suspected to occur historically in the watershed still do, with the exception of grizzly bears and the gray wolf. While species that thrive in early serial stages have increased in numbers, other species' numbers have declined. (Personal communication with Tim Unterwegner)

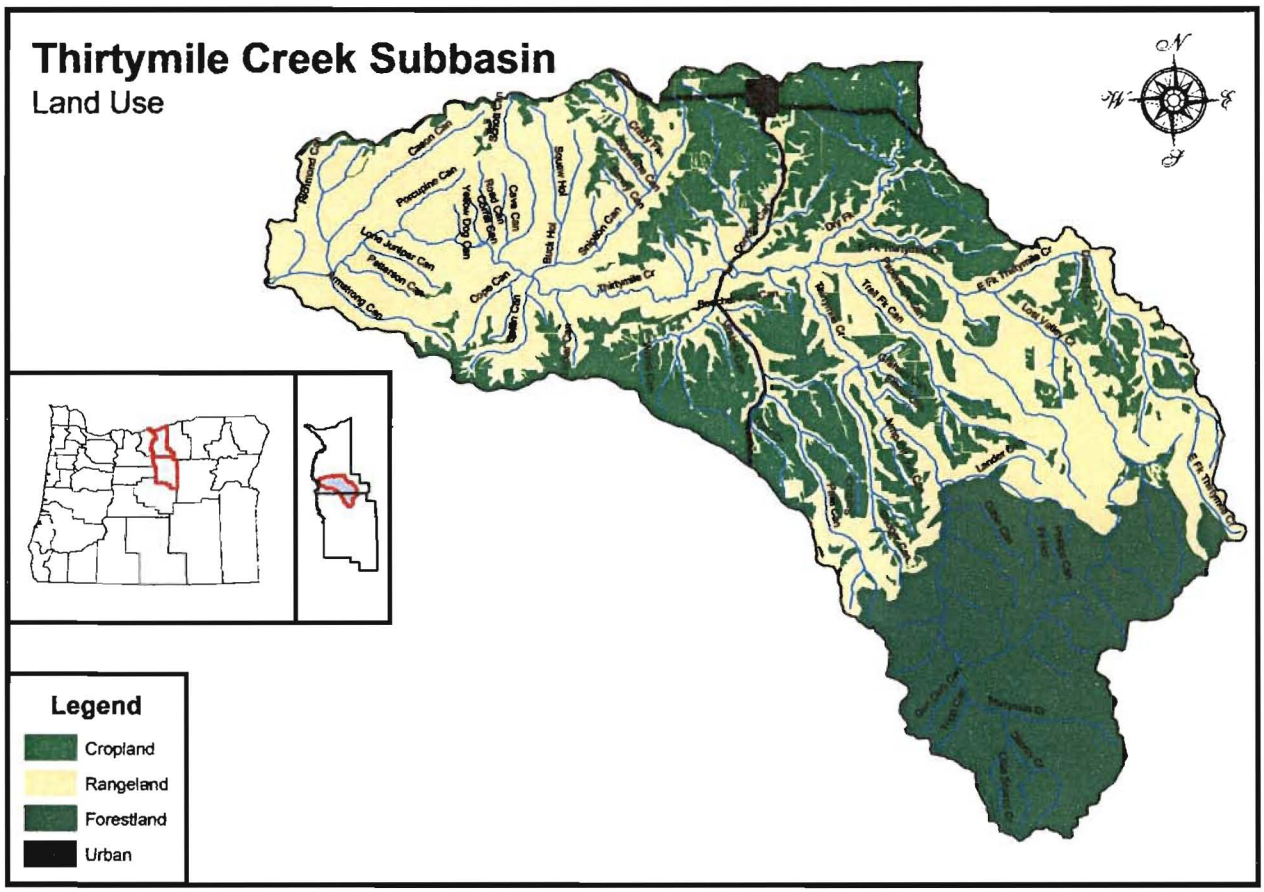
Noxious Weeds

There are a number of noxious weeds found in the Thirtymile Creek watershed. Knapweed is considered by the Gilliam County Weed Control Board to be the most severe noxious weed problem in the watershed area. (Personal communication with Don Farrar) It is mostly found in areas where there is heavy grazing or some sort of human activity, it is also located along roads high up in the watershed. Knapweed is known to spread by water, putting riparian habitat at risk of invasion (Sheley & Petrof, 1999).

Map 1.4: Gilliam County Soil Survey General Map



Map 1.5: Thirtymile Creek Land Types



Soils

Soils in the Thirtymile Creek Watershed vary based upon geology and topography. **Map 1.4** shows the soil complexes in Thirtymile Creek watershed. The numbers on the map correspond to the description below the map. There are five basic soils in the watershed area:

Lickskillet-Wrentham – Shallow and moderately deep well drained very gravelly silt loams and very stony loams.

Condon-Valby – Moderately deep, well drained silt loams.

Morrow-Bakeoven – Very shallow and moderately deep, well drained silt loams and very cobbly loams.

Waha-Gwinly-Rockly – Very shallow to moderately deep, well drained stony silt loams, very cobbly loams and very cobbly silt loams.

Tub-Simas-Ukiah – Moderately deep and very deep, well drained stoney silt loams, cobbly silty clay loams and stoney silty clay loams.

Ecoregions

Oregon is divided into ecoregions based upon climate, geology, physiography, vegetation, soils, land use, wildlife, and hydrology (OWEB manual, Ecoregion Appendix, 1999). Each ecoregion has characteristic disturbance regimes that shape the form and function of watersheds in the region. Generalized ecoregion information characterizes patterns within a watershed that can aid in understanding watershed processes.

Thirtymile Creek watershed lies within the John Day Basin: Lower John Day Sub-Basin with three level IV ecoregions: Umatilla Plateau (10C), Deschutes/John Day Canyons (10k), and the John Day/Clarno Highlands (11b).

References

Draft Ecosystem Appendix, Oregon Watershed Assessment Manual, Salem, Oregon: prepared for the Oregon Watershed Enhancement Board. 2001

Sheley, Roger L. and Janet K. Petroff, eds. Biology and Management of Noxious Rangeland Weeds. Corvallis, Oregon, Oregon State University press, 1999.

Watersheds Professionals Network, Oregon Watersheds Assessment Manual. Salem, Oregon, prepared for the Governor's Watershed Enhancement Board. June 1999.

Chapter 2: Historical Conditions

Introduction

Explorers and settlers in the 1800s often documented the area around the Columbia and John Day Rivers in journals, dramatically different from today's agricultural lands. "We had no sooner gained the foot of this mountain than another more steep and dreadful was before us. After dinner and rest we descended it. Mount Pleasant, in Prattsburg, would not compare with these Mount Terribles. Our ride this afternoon exceeded anything we have had yet, and what rendered it the more aggravating was the fact that the path all the way was very stony, resembling a newly macadamized road. Our horses' feet were very tender, all unshod, so that we could not make the progress we wished. The mountain in many places was covered with this black broken basalt. We were very late in making camp to-night. After ascending the mountain we kept upon the main divide until sunset, looking in vain for water and a camping place. While upon this elevation we had a view of the Valley of the Columbia River. It was beautiful. Just as we gained the highest elevation and began to descend the sun was dipping his disk behind the western horizon. Beyond the valley we could see two distinct mountains - Mount Hood and Mount St. Helens. These lofty peaks were of a conical form, separated from each other by a considerable distance. Behind the former the sun was hiding part of his rays, which gave us a more distinct view of this gigantic cone. The beauty of this extensive valley contrasted well with the rolling mountains behind us, and at this hour of twilight was enchanting and quite diverted my mind from the fatigue under which I was laboring. We had yet to descend a hill as long, but not as steep or as stony as the other. By this time our horses were in haste to be in camp, as well as ourselves, and mine made such lengthy strides in descending that it shook my sides surprisingly. It was dark when we got into camp, but the tent was ready for me, and tea also, for Mr. McLeod invited us to sup with him. (Narcissa Whitman, 1842)"

Other documentation talks about huge grasslands with well timbered mountains, abundant water, with fields of camas and riparian forests with cottonwood, willow, and other woody species. Today, virtually all historic wetlands, camas fields, and cottonwood forests have been drained, cleared, and converted to farm land (Gildemiester 1999).

Methods

Various oral histories, historical reports, and compilations of historical information were gathered for this chapter. Pertinent information has been included in the text of this chapter, with references at the end of the chapter. Some of the quotes and references are for Oregon in general and not specific to the Columbia Basin