

# Appendix A

## Acronyms

The following list of acronyms are used in this document:

<b>ACEC</b>	Area of Critical Environmental Concern
<b>ACS</b>	Aquatic Conservation Strategy
<b>ACSO</b>	Aquatic Conservation Strategy Objectives
<b>BLM</b>	Bureau of Land Management
<b>BMPs</b>	Best Management Practices
<b>BCA</b>	Bird Conservation Area
<b>BCI</b>	Biotic Condition Index
<b>CCC</b>	Civilian Conservation Corps
<b>CFS</b>	Cubic Feet per Second
<b>CONN</b>	Connectivity
<b>CTQ</b>	Community Tolerant Quotient
<b>CWD</b>	Coarse Woody Debris
<b>DBH</b>	Diameter Breast Height
<b>DEQ</b>	Department of Environmental Quality
<b>ECA</b>	Equivalent Clearcut Acres
<b>ERDT</b>	Existing Roads and Designated Trails
<b>ESA</b>	Endangered Species Act
<b>FEIS</b>	Final Environmental Impact Statement

# Appendix B

## Glossary

**Age Class** - One of the intervals into which the age range of trees is divided for classification or use.

**Alluvial** - Deposited by a stream or running water.

**Anadromous Fish** - Fish that are born and reared in freshwater, move to the ocean to grow and mature, and return to freshwater to reproduce. Salmon, steelhead, and shad are examples.

**Aquatic Ecosystem** - A water based ecosystem (see Ecosystem). An interacting system of water with aquatic organisms (plants and animals).

**Aquatic Habitat** - Habitat that occurs in free water.

**Area of Critical Environmental Concern** - An area of BLM-administered lands where special management attention is needed to protect and prevent irreparable damage to important historic, cultural or scenic values, fish and wildlife resources or other natural systems or processes; or to protect life and provide safety from natural hazards.

**Basin Programs** - Sets of state administrative rules that establish types and amounts of water uses allowed in the state's major river basins and form the basis for issuing water rights.

**Best Management Practices** - Methods, measures, or practices designed to prevent or reduce water pollution. Not limited to structural and nonstructural controls, and procedures for operations and maintenance. Usually, best management practices are applied as a system of practices rather than a single practice.

**Biological Diversity** - The variety of life and its processes, including the variety in genes, species, ecosystems, and the ecological processes that connect everything in ecosystems.

**Biological legacies** - Components of the forest stand (e.g., large trees, downed logs, and snags) reserved from harvest to maintain site productivity and to provide structure and ecological functions in subsequent forest stands.

**Bird Conservation Area** - According to the *Conservation Strategy for Land Birds in Lowlands and Valleys of Western Oregon and Washington* (American Bird Conservancy, 2000), areas which were selected based on the presence or potential for priority habitats and/or focal land bird species. These areas are intended to provide a focus for any agencies, non-governmental organizations, companies, or private individuals to prioritize where conservation efforts should

occur, and where actions have the greatest opportunity for regional success.

**Bureau Assessment Species** - Plant and animal species on List 2 of the Oregon Natural Heritage Data Base, or those species on the Oregon List of Sensitive Wildlife Species (Oregon Administrative Rule 635-100-040), which are identified in BLM Instruction Memo No. OR-91-57, and are not included as federal candidate, state-listed or bureau sensitive species.

**Bureau Sensitive Species** - Plant or animal species eligible for federal listed, federal candidate, state-listed, or state candidate (plant) status, or on List 1 in the Oregon Natural Heritage Data Base, or approved for this category by the state director.

**Bureau Tracking Species** - Plant and animal species on List 3 or 4 of the Oregon Natural Heritage Data Base, and/or those species listed as Undetermined Status on the Oregon List of Sensitive Wildlife Species (Oregon Administrative Rule 635-100-040), and are not included as federal candidate, state-listed, bureau sensitive, or bureau assessment species.

**Candidate Species** - Those plants and animals included in Federal Register “Notices of Review” that are being considered by the U.S. Fish and Wildlife Service for listing as threatened or endangered.

**Cavity Nesters** - Wildlife species, most frequently birds, that require cavities (holes) in trees for nesting and reproduction.

**Channel** (watercourse) - An open outlet either naturally or artificially created which periodically or continuously contains moving water, or which forms a connecting link between two bodies of water. River, creek, run, branch, and tributary are some of the terms used to describe natural channels. Natural channels may be single or braided.

**Climax Community** - The final or stable biotic community in a successional series which is self-perpetuating and in dynamic equilibrium with the physical habitat.

**Closed Sapling Seral Stage** - See Seral Stages.

**Coarse Woody Debris (CWD)** - Logs on the forest floor that are at least 20 inches in diameter at the large end and twenty feet in length.

**Commercial Thinning** - The removal of merchantable trees from an even-aged stand to encourage growth of the remaining trees.

**Community** - An aggregation of living organisms having mutual relationships among themselves and to their environment.

**Concern** - A topic of management or public interest that is not well enough defined to become a

planning issue, or does not involve controversy or dispute over resource management activities or land use allocations or lend itself to designating land use alternatives. A concern may be addressed in analysis, background documents, or procedures or in a non-controversial decision.

**Connectivity** - A measure of the extent to which conditions between late-successional/old-growth forest areas provide habitat for breeding, feeding, dispersal, and movement of late-successional/old-growth-associated wildlife species. Connectivity (CONN) is also a Federal Land Use Allocation which is considered to be part of the Matrix. CONN is designed to maintain a minimum of 25 to 30 percent late successional habitat at any given point in time. These lands are managed on a 150 year rotation with greater green tree retention than GFMA.

**Core Area** - That area of habitat essential in the breeding, nesting and rearing of young, up to the point of dispersal of the young. Most often used in conjunction with nesting spotted owls to describe the area which includes the nest tree and a primary area where the young are reared after leaving the nest.

**Critical Habitat** - Under the Endangered Species Act, the specific areas within the geographic area occupied by a federally listed species on which are found physical and biological features essential to the conservation of the species, and that may require special management considerations or protection.

**Culmination of Mean Annual Increment** - The peak of average yearly growth in volume of a forest stand (total volume divided by age of stand).

**Cultural Resource** - Any definite location of past human activity identifiable through field survey, historical documentation, or oral evidence. Includes archaeological or architectural sites, structures, or places, and places of traditional cultural or religious importance to specified groups whether or not represented by physical remains.

**Cultural Site** - Any location that includes prehistoric and/or historic evidence of human use or that has important sociocultural value.

**Cumulative Effect** - The impact which results from identified actions when they are added to other past, present, and reasonably foreseeable future actions regardless of who undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time.

**Debris Slide/Avalanche** - A mass wasting process characterized by a relatively shallow failure plane, which generally corresponds to the soil/bedrock interface. The distinction between an avalanche and a slide is that a slide moves slower, and retains more of a coherent slide mass. An avalanche generally fails rapidly, with the slide mass disaggregating, and sometimes flowing, depending on the water content.

**Debris Torrent** - Rapid movement of a large quantity of materials (wood and sediment) down a

stream channel during storms or floods. This generally occurs in smaller streams and results in scouring of streambed.

**Density Management** - Cutting of trees for the primary purpose of widening their spacing so that growth of remaining trees can be accelerated. Density management harvest can also be used to improve forest health, to open the forest canopy, or to accelerate the attainment of old-growth characteristics if maintenance or restoration of biological diversity is the objective.

**Desired Condition** - Objectives for physical and biological conditions within the watershed. They may be expressed in terms of current conditions, ecosystem potential, or social expectations. They describe the conditions that are to be achieved and are phrased in the present tense.

**Desired Future Condition** - See Desired Condition.

**Developed Recreation Site** - A site developed with permanent facilities designed to accommodate recreation use.

**Diameter at Breast Height (DBH)** - The diameter of a tree 4.5 feet above ground on the uphill side of the tree.

**Dispersed Recreation** - Outdoor recreation in which visitors are diffused over relatively large areas. Where facilities or developments are provided, they are primarily for access and protection of the environment rather than comfort or convenience of the user.

**Domestic Water Supply** - Water used for human consumption.

**Early-Grass/Forb Seral Stage** - See Seral Stages.

**Ecosystem** - The complex of a community of organisms and its environment functioning as an ecological unit in nature.

**Ecosystem Management** - The management of lands and their resources to meet objectives based on their whole ecosystem function rather than on their character in isolation. Management objectives blend long-term needs of people and environmental values in such a way that the lands will support diverse, healthy, productive, and sustainable ecosystems.

**Eligible River** - A river or river segment found, through interdisciplinary team and, in some cases, interagency review, to meet Wild and Scenic Rivers Act criteria of being free flowing and possessing one or more outstandingly remarkable values.

**Endangered Species** - Any species listed through the Endangered Species Act as being in danger of extinction throughout all or significant portion of its range and published in the Federal

Register.

**Endemic** - Restricted to a specified region or locality.

**Environment** - The complex of climatic, soil and biotic factors that act upon an organism or ecological community and ultimately determine its form and survival.

**Ephemeral Streams** - Streams that contain running water only sporadically, such as during and following storm events.

**Erosion** - The group of processes whereby earthy or rock material is worn away, loosened or dissolved, and removed from any part of the earth's surface. It includes the processes of weathering, solution, corrosion, and transportation. Erosion is often classified by: The eroding agent (wind, water, wave, or raindrop erosion); the appearance of the erosion (sheet, rill, or gully erosion); the location of the erosional activity (surface or shoreline); and/or by the material being eroded (soil erosion or beach erosion).

**Eyrie** - A raptor's cliff nest, such as a peregrine falcon.

**Exotic Species** - Non-native species which occur in a given area as the result of deliberate or accidental introduction of the species from a foreign country.

**Fauna** - All animals, including birds, mammals, amphibians, reptiles, fish, and invertebrates (clams, insects, etc.).

**Fifth Field Watershed** - Fifth largest level in watershed classification hierarchy. Generally refers to an area between 20-200 square miles. For the Quartzville Creek Watershed, the 4<sup>th</sup> field is the South Santiam Subbasin and the 5<sup>th</sup> field is the Quartzville Creek Watershed.

**Flora** - All plants, including trees, shrubs, forbs, and grasses, and considered as a whole.

**Forest Canopy Closure** - The cover of branches and foliage formed collectively by the crowns of adjacent trees and other woody growth.

**Forest Land** - Land that is now, or is capable of becoming, at least 10 percent stocked with forest trees and that has not been developed for nontimber use.

**Forest Succession** - The orderly process of change in a forest as one plant community or stand condition is replaced by another, evolving towards the climax type of vegetation.

**Fragmentation** - Breaking up of contiguous areas into progressively smaller patches of increasing degrees of isolation.

**General Forest Management Area (GFMA)** - A Federal Land Use Allocation which is considered to be part of the Matrix. GFMA is managed on a regeneration harvest cycle of 70 to 110 years and a biological legacy of six to eight green trees per acre is retained to provide habitat components over the next management cycle.

**Green Tree Retention** - A stand management practice in which live green trees, as well as snags and large down wood, are left as biological legacies within harvest units to provide habitat components over the next management cycle.

**Habitat Fragmentation** - The breaking up of habitat into discrete islands through modification or conversion of habitat by management activities.

**Hazardous Materials** - Anything that poses a substantive present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed.

**Historic Site** - A cultural resource resulting from activities or events dating to the historic period (generally post AD 1830 in western Oregon).

**Impact** - A spatial or temporal change in the environment caused by human activity.

**Infiltration (soil)** - The movement of water through the soil surface into the soil.

**Interior Habitat Area (IHA)** - According to *Northwest Oregon State Forests Management Plan* (Oregon Department of Forestry, 2001), areas of various shapes and sizes consisting of older forest structure and layered stands designated in specific areas to protect municipal watersheds, sensitive fisheries, recreation and scenic areas, and provide spotted owl habitat.

**Intermittent Stream** - Any nonpermanent flowing drainage feature having a definable channel and evidence of scour or deposition. This includes what are sometimes referred to as ephemeral streams if they meet these two criteria.

**Issue** - A matter of controversy or dispute over resource management activities that is well defined or topically discrete. Addressed in the design of planning alternatives.

**Key Questions** - Questions that watershed analysis attempts to answer. These are the interdisciplinary team's expectations for the analysis. Key questions are designed to: Focus on ecosystem elements that influenced by potential management activities; be measured at the watershed scale; and promote integration among elements.

**Landscape** - A heterogeneous land area with interacting plant communities and non-forest lands across a large area such as a watershed.

**Landscape Diversity** - The size, shape and connectivity of different plant communities and non-forest lands across a large area.

**Landscape Features** - The land and water form, plant communities, structures, elements, and non-forest lands which compose the characteristic landscape.

**Land Use Allocations** - Federal allocations which define allowable uses/activities, restricted uses/activities, and prohibited uses/activities according to the various Forest and Resource Management Plans. Each Land Use Allocation is associated with specific management objectives.

**Large Woody Debris** - See Coarse Woody Debris.

**Late-Successional Forests** - Forest seral stages which include mature and old-growth age classes, generally 80 years and older.

**Late-Successional Reserves (LSR)** - A Federal Land Use Allocation which is reserved and managed to maintain, protect, and promote late successional forest habitat and associated species.

**Long Term** - The period starting 10 years following implementation of the resource management plan. For most analyses, long-term impacts are defined as those existing 100 years after implementation.

**Long-Term Soil Productivity** - The capability of soil to sustain inherent, natural growth potential of plants and plant communities over time.

**Mass Movement** - The downslope movement of earth caused by gravity. Includes but is not limited to landslides, rock falls, debris avalanches, and creep. It does not include surface erosion.

**Matrix Lands** - Federal land outside of reserves and special management areas that will be available for timber harvest at varying levels. Consists of both Connectivity (CONN) and General Forest Management Area (GFMA) lands.

**Mature Seral Stage** - See Seral Stages.

**Mining Claims** - Portions of public lands claimed for possession of locatable mineral deposits, by locating and recording under established rules and pursuant to the 1872 Mining Law.

**Mitigating Measures** - Modifications of actions which:

- . avoid impacts by not taking a certain action or parts of an action;
- . minimize impacts by limiting the degree or magnitude of the action and its implementation;

- . rectify impacts by repairing, rehabilitating or restoring the affected environment;
- . reduce or eliminate impacts over time by preservation and maintenance operations during the life of the action; or
- . compensate for impacts by replacing or providing substitute resources or environments.

**Monitoring** - The process of collecting information to evaluate if objectives and anticipated or assumed results of a management plan or action are being realized or if implementation is proceeding as planned.

**Multilayered Canopy** - Forest stands with two or more distinct tree layers in the canopy (also called multistoried stands).

**Multiple Use** - Management of the public lands and their various resource values so that they are utilized in the combination that will best meet the present and future needs of the American people; making the most judicious use of the land for some or all of these resources or related services over areas large enough to provide sufficient latitude for periodic adjustments in use to conform to changing needs and conditions. Multiple use can include the use of some land for less than all of the resources and a combination of balanced and diverse resource uses that takes into account the long-term needs of future generations for renewable and nonrenewable resources. Multiple use includes, but is not limited to, recreation, range, timber, minerals, watershed, wildlife and fish, and natural scenic, scientific, and historical values; and harmonious and coordinated management of these various resources without permanent impairment of the productivity of the land and the quality of the environment with consideration being given to the relative values of the resources and not necessarily to the combination of uses that will give the greatest economic return.

**Non-forest Land** - Land developed for non-timber (human) uses or non-forest types incapable of being 10 percent stocked with forest trees.

**Nonpoint Source Pollution** - Water pollution that does not result from a discharge at a specific, single location (such as a single pipe) but generally results from land runoff, precipitation, atmospheric deposition or percolation, and normally is associated with agricultural, silvicultural and urban runoff, runoff from construction activities, etc. Such pollution results in the human-made or human-induced alteration of the chemical, physical, biological, radiological integrity of water.

**Noxious Plant or Weed** - A plant specified by law as being especially undesirable, troublesome, and difficult to control.

**Objectives** - Expressions of what are the desired end results of management efforts.

**Off-Highway Vehicle** - Any motorized track or wheeled vehicle designed for cross country travel over natural terrain. The term "Off-Highway Vehicle" will be used in place of the term

“Off-Road Vehicle” to comply with the purposes of Executive Orders 11644 and 11989. The definition of both terms is the same.

**Off-Highway Vehicle Designations:**

- . **Open:** Designated areas and trails where off-highway vehicles may be operated subject to operating regulations and vehicle standards set forth in BLM Manuals 8341 and 8343.
- . **Limited:** Designated areas and trails where off-highway vehicles are subject to restrictions limiting the number or types of vehicles, date, and time of use; limited to existing or designated roads and trails.
- . **Closed:** Areas and trails where the use of off-highway vehicles is permanently or temporarily prohibited. Emergency use is allowed.

**Old-Growth Associated Species** - An animal species so adapted that it is associated primarily with old-growth forests.

**Old-Growth Conifer Stand** - Older forests occurring on western hemlock, mixed conifer, or mixed evergreen sites which differ significantly from younger forests in structure, ecological function, and species composition. Old-growth characteristics begin to appear in unmanaged forests at 175 to 250 years of age. These characteristics include:

- . a patchy, multilayered canopy with trees of several age classes;
- . the presence of large living trees;
- . the presence of large standing dead trees (snags) and down coarse woody debris; and
- . the presence of species and functional processes which are representative of the potential natural community.

For purposes of inventory, old-growth stands on BLM-administered lands are only identified if they are at least 10 percent stocked with trees of 200 years or older and are ten acres or more in size. For purposes of habitat or biological diversity, the BLM uses the appropriate minimum and average definitions provided by Pacific Northwest Experiment Station publications 447 and GTR-285. This definition is summarized from the 1986 interim definitions of the Old-Growth Definitions Task Group.

**Old-Growth Seral Stage** - See Seral Stages.

**Open Sapling/Brush Seral Stage** - See Seral Stages.

**Operations Inventory** - An intensive, site-specific BLM forest inventory of forest stand location, size, silvicultural needs, and recommended treatment based on individual stand conditions and productivity.

**Outstandingly Remarkable Values** - Values among those listed in Section 1(b) of the Wild and Scenic Rivers Act: “scenic, recreational, geological, fish and wildlife, historical, cultural, or other similar values.” Other similar values which may be considered include ecological, biological or botanical, paleontological, hydrological, scientific, or research.

**Peak Flow** - The highest amount of stream or river flow occurring in a year or from a single storm event or period of snow melt.

**Perennial Stream** - A stream that has running water on a year-round basis under normal climatic conditions.

**Physiographic Province** - A continuous geographic area wherein species composition, both plant and animal, is more homogeneous than between adjacent areas.

**Plant Association** - A plant community type based on land management potential, successional patterns, and species composition.

**Plant Community** - An association of plants of various species found growing together in different areas with similar site characteristics.

**Pool/Riffle Ratio** - The ratio of surface area or length of pools to the surface area or length of riffles in a given stream reach; frequently expressed as the relative percentage of each category. Used to describe fish habitat rearing quality.

**Population** - A group of individuals of a species living in a certain area. They have a common ancestry and are much more likely to mate with one another than with individuals from another area.

**Precommercial Thinning** - The practice of removing some of the trees less than merchantable size from a stand so that remaining trees will grow faster.

**Proposed Threatened or Endangered Species** - Plant or animal species proposed by the U.S. Fish and Wildlife Service to be biologically appropriate for listing as threatened or endangered, and published in the Federal Register. It is not a final designation.

**Public Water System** - A system providing piped water for public consumption. Such a system has at least fifteen service connections or regularly serves at least twenty-five individuals.

**Rearing Habitat** - Areas in rivers or streams where juvenile salmon and trout find food and shelter to live and grow.

**Regeneration Harvest** - Timber harvest conducted at the end of the rotation with the objective

of opening a forest stand to the point where favored tree species will be reestablished.

**Relative Density** (Curtis, 1982) - A measure that estimates stand density using stand basal area and tree diameters.

**Resource Management Plan** - A land use plan prepared by the BLM under current regulations in accordance with the Federal Land Policy and Management Act (FLPMA).

**Restoration** - The process of restoring site conditions as they were before a land disturbance.

**Right-of-Way** - A permit or an easement that authorizes the use of public lands for specified purposes, such as pipelines, roads, telephone lines, electric lines, reservoirs, and the lands covered by such an easement or permit.

**Riparian Reserves** - A Land Use Allocation which overlays the entire Federal land base as stream buffers. Riparian Reserves are to be managed to maintain and enhance riparian and late successional conditions to meet Aquatic Conservation Strategy Objectives.

**Riparian Zone** - Those terrestrial areas where the vegetation complex and microclimate conditions are products of the combined presence and influence of perennial and/or intermittent water, associated high water tables and soils which exhibit some wetness characteristics. Normally used to refer to the zone within which plants grow rooted in the water table of these rivers, streams, lakes, ponds, reservoirs, springs, marshes, seeps, bogs, and wet meadows.

**River Basin** - An area, defined by physical boundaries, in which all surface water flows to a common point. River basins are associated with large river systems and are typically 1000s of square miles in size.

**Rotation** - The planned number of years between establishment of a forest stand and its regeneration harvest. The management cycle.

**Rural Interface Areas** - Areas where BLM-administered lands are adjacent to or intermingled with privately owned lands zoned for 1 to 20-acre lots, or that already have residential development.

**Sediment Yield** - The quantity of soil, rock particles, organic matter, or other debris transported through a cross-section of stream in a given period of time. Measured in dry weight or by volume. Consists of suspended sediment and bedload.

**Seral** - A biotic community which is a developmental, transitory stage in an ecological succession.

**Seral Stages** - The series of relatively transitory plant communities which develop during forest

succession from bare ground to the climax stage. There are five stages:

**Early Grass/Forb Seral Stage** - The period in the life of a forest stand from disturbance to stand establishment with forest tree saplings. Grass, forbs and herbs, including annuals and perennials, dominate the site. Tree age class is generally from 0 through 10.

**Open Sapling/Brush Seral Stage** - The period in the life of a forest stand from stand establishment to crown closure. Usually occurs from ages 10 through 40, with tree diameters less than 10 inches DBH. Depending on stand density, brush dominates, with grass and forbs declining as the stand reaches crown closure.

**Closed Sapling Seral Stage** - The period in the life of a forest stand from first merchantability to culmination of mean annual increment. Much of the commercial thinning occurs during this stage, generally 40 to 80 years of age, with tree diameters typically ranging from 11 to 20 inches DBH. During this period, stand diversity is at its minimum, with grasses, forbs and brush often sparse due to high canopy closures.

**Mature Seral Stage** - The period in the life of a forest stand from culmination of mean annual increment to an old-growth stage or stand condition. Usually occurs from stand ages 80 to 200 years. Tree diameters of dominants and co-dominants typically range from 21 to 30 inches DBH. This is a time of gradually increasing stand diversity and differentiation, with increasing understory components, including a multilayered canopy, understory brush layers, grasses, forbs.

**Old-Growth Seral Stage** - This stage constitutes the potential or climax plant community capable of existing on a site, given the frequency of natural disturbance events. For forest communities, this stage exists from approximately age 200 until when stand replacement occurs and secondary succession begins again. Tree diameters of dominants and co-dominants are greater than 30 inches DBH. Depending on fire frequency and intensity, old-growth stands vary in their species composition, stocking levels, age class distributions, and amounts and sizes of snags and down coarse woody debris.

**Short Term** - The period of time during which the Resource Management Plan will be implemented; assumed to be ten years.

**Site** - An area described or defined by its biotic, climatic, and soil conditions as related to its capacity to produce vegetation; an area sufficiently uniform in biotic, climatic, and soil conditions to produce a particular climax vegetation.

**Site Class** - A measure of an area's relative capacity to producing timber or other vegetation.

**Site Index** - A measure of forest productivity expressed as the height of the tallest trees in a

stand at an index age.

**Slope Failure** - See Mass Movement.

**Snag** - Any standing dead, partially-dead, or defective (cull) tree at least 10 inches DBH and, at least, 6 feet tall. A hard snag is composed primarily of sound wood, generally merchantable. A soft snag is composed primarily of wood in advanced stages of decay and deterioration, generally not merchantable.

**Snag Dependent Species** - Birds and animals dependent on snags for nesting, roosting, or foraging habitat.

**Soil Compaction** - An increase in bulk density (weight per unit volume) and a decrease in soil porosity resulting from applied loads, vibration, or pressure.

**Soil Displacement** - The removal and horizontal movement of soil from one place to another by mechanical forces such as a blade.

**Soil Productivity** - Capacity or suitability of a soil for establishment and growth of a specified crop or plant species, primarily through nutrient availability.

**Soil Series** - A group of soils developed from a particular type of parent material; having naturally developed horizons that, except for texture of the surface layer, are similar in differentiating characteristics and in arrangement of the profile.

**Special Forest Products** - Firewood, cedar shake bolts, mushrooms, ferns, floral greens, berries, mosses, bark, grasses, Christmas trees, etc., that could be harvested in accordance with the objectives and guidelines in the proposed resource management plan.

**Special Habitat Features** - Habitats of special importance due to their high ecological values. Examples include meadows, rock talus, cliffs and caves.

**Special Recreation Management Area** - An area where a commitment has been to provide specific recreation activity and experience opportunities. These areas usually require a high level of recreation investment and/or management. They include recreation sites, but recreation sites alone do not usually constitute special recreation management areas.

**Special Status Species** - Plant or animal species falling in any of the following categories (see separate glossary definitions for each):

- . Threatened or Endangered Species
- . Proposed Threatened or Endangered Species
- . Candidate Species
- . State-Listed Species

- . Bureau Sensitive Species
- . Bureau Assessment Species

**Spotted Owl Capable Habitat** - Forest habitat that is not currently classified or functioning as dispersal or suitable habitat for spotted owls, but has the capability to become suitable habitat over time. Capable habitat is in younger age classes, less than 40 years of age.

**Spotted Owl Dispersal Habitat** - Forest habitat that is classified as able to provide for enough of the basic life history requirements of spotted owls to enable movement across the landscape between areas of suitable habitat. Such stands generally lack the structure and characteristics to support nesting or resident spotted owls for long periods of time. Dispersal habitat is in the closed sapling seral stage 40 to 80 years of age, with crown closures over 40 percent and average diameters of 11 inches or more.

**Spotted Owl Foraging, and Roosting Habitat** - Forest habitat that is capable of supporting most of the life history requirements of resident spotted owls, but generally lack the structure required for nesting. These stands are usually in the mature seral stage, 80 to 120 years of age.

**Spotted Owl Known Sites** - Sites monitored by BLM for spotted owl occupancy during some or all of the years from 1985 to the present time, in accordance with U.S. Fish and Wildlife's spotted owl monitoring guidelines. These sites are known to have been occupied by spotted owls at some time during the last ten years.

**Spotted Owl Nesting, Foraging, and Roosting (NFR) Habitat** - Forest habitat that is capable of supporting all life history requirements of resident spotted owls, including nesting activities. These stands are generally in the mature and old-growth seral stages, over 120 years of age.

**Spotted Owl Non-Capable Habitat** - Non-forest habitat that is not classified as dispersal or suitable habitat for spotted owls, and does not have the capability to become suitable habitat over time. Non-capable habitat includes land developed for non-timber (human) uses and non-forest types incapable of being 10 percent stocked with forest trees.

**Spotted Owl Suitable Habitat** - Forest habitat that is capable of supporting resident spotted owls. Suitable habitat is comprised of both nesting, foraging, and roosting habitat, plus foraging and roosting habitat. These stands are generally in the mature and old-growth seral stages, over 80 years of age.

**Stand** (Tree Stand) - An aggregation of trees occupying a specific area and sufficiently uniform in composition, age, arrangement, and condition so that it is distinguishable from the forest in adjacent areas.

**Stand Density** - An expression of the number and size of trees on a forest site. May be expressed in terms of numbers of trees per acre, basal area, stand density index, or relative density index.

**State-Listed Species** - Plant or animal species listed by the state of Oregon as threatened or endangered pursuant to ORS 496.004, ORS 498.026, or ORS 564.040.

**Statewide Comprehensive Outdoor Recreation Plan (SCORP)** - A plan prepared by the state, which describes and analyzes the organization and function of the outdoor recreation system of the state. The plan provides an analysis of the roles and responsibilities of major outdoor recreation suppliers; an analysis of supply, demand, and needs; issue discussions; an action program to address the issues; and a project selection process.

**Stocked/Stocking** - A measure of the number and spacing of trees in a forest stand.

**Stream Class** - A system of stream classification established in the Oregon Forest Practices Act. Class I streams are those which are significant for (1) domestic use; (2) angling; (3) water dependent recreation; and (4) spawning, rearing or migration of anadromous or game fish. All other streams are class II. Class II special protection streams (class II SP) are class II streams which have a significant summertime cooling influence on downstream class I waters which are at or near a temperature at which production of anadromous or game fish is limited.

**Stream Order** - A hydrologic system of stream classification based on stream branching. Each small unbranched tributary is a first order stream. Two first order streams join to make a second order stream. Two second order streams join to form a third order stream and so forth, with the main stream being always of the highest order.

**Stream Reach** - An individual first order stream or a segment of another stream that has beginning and ending points at stream confluence. Reach end points are normally designated where a tributary confluence changes the channel character or order. Although reaches identified by BLM are variable in length, they normally have a range of one-half to one and one-half miles in length unless channel character, confluence distribution, or management considerations require variance.

**Structural Diversity** - Variety in a forest stand that results from layering or tiering of the canopy and the die-back, death and ultimate decay of trees. Structural diversity is measured in terms of the amount, sizes and condition of forest canopy layers, snags, and down coarse woody debris.

**Sub-Watershed** - A sub-division of the watershed into sub-basins in order to allow tracking of various watershed functions on a more localized (site-specific) basis. For the Quartzville Creek watershed analysis, there are seven sub-watersheds (6<sup>th</sup> field watersheds), which are: Canal Creek, Lone Star, Moose Creek, Packers Gulch, South Green Peter, Upper Quartzville, and Whitcomb Creek.

**Succession** - A series of dynamic changes by which one group of organisms succeeds another through stages leading to potential natural community or climax. An example is the development of series of plant communities (called seral stages) following a major disturbance.

**Surface Erosion** - The detachment and transport of soil particles by wind, water, or gravity. Surface erosion can occur as the loss of soil in a uniform layer (sheet erosion), in many rills, or by dry ravel.

**Suspended Sediment** - Sediment suspended in a fluid by the upward components of turbulent currents or by colloidal suspension.

**Terrestrial** - Living primarily on land rather than in water.

**Terrestrial Ecosystem** - An interacting system of soil, geology, topography with plant and animal communities.

**Texture (soil)** - The relative proportion of sand, silt, and clay in a soil; grouped into standard classes and subclasses in the U.S. Department of Agriculture *Soil Survey Manual*.

**Threatened Species** - Any species listed through the Endangered Species Act as likely to become endangered within the foreseeable future throughout all or a significant portion of its range and published in the Federal Register.

**Timber Production Capability Classification (TPCC)** - The BLM process of partitioning forest land into major classes indicating relative suitability to produce timber on a sustained yield basis.

**Transient Snow Zone** - The elevation range within a watershed where snowfall is transitory in nature and rain-on-snow events occur several times during winter months.

**Transportation System** - Network of roads used to manage BLM-administered lands. Includes BLM-controlled roads and some privately controlled roads. Does not include Oregon Department of Transportation, county, and municipal roads.

**Understocked** - The condition when a plantation of trees fails to meet the minimum requirements for number of well-spaced trees per acre.

**Viewshed** - The landscape that can be directly seen from a viewpoint or along a transportation corridor.

**Visual Resources** - The visible physical features of a landscape.

**Visual Resource Management** - The inventory and planning actions taken to identify visual values, establish visual management objectives, and the management actions needed to achieve those objectives.

**Visual Resource Management Classes** - Categories assigned to public lands based on scenic quality, sensitivity level, and distance zones. There are four classes. Each class has an objective that prescribes the amount of modification allowed in the landscape.

**Water Quality** - The chemical, physical, and biological characteristics of water.

**Watershed** - A region or area bounded peripherally by a water parting feature and draining ultimately to a particular watercourse or body of water. There are many watersheds within a river basin. Watershed area range from 20 to 200 square miles in size.

**Watershed Analysis** - Development and documentation of a scientifically based understanding of the processes and interactions occurring within a watershed in order to make more sound management decisions.

**Water Yield** - The quantity of water derived from a unit area of watershed.

**Western Oregon Digital Data Base (WODDB)** - A very high resolution (1 inch = 400 feet) geographic digital (computer) data base derived from aerial photography for BLM-administered lands in Western Oregon.

**Wetlands or Wetland Habitat** - Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for living in saturated soil conditions. Wetlands generally include, but are not limited to, swamps, marshes, bogs, and similar areas.

**Wet Meadows** - Wetland areas where grasses predominate. Normally waterlogged within a few inches of the ground surface.

**Wild and Scenic Rivers System** - A national system of rivers or river segments that have been designated by Congress and the President as part of the National Wild and Scenic Rivers System (Public Law 90-542, 1968). Each designated river is classified as one of the following:

**Wild Classification** - A river or section of a river free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted. Designated wild as part of the National Wild and Scenic Rivers System.

**Scenic Classification** - A river or section of a river free of impoundments, with shorelines or watersheds still largely primitive and undeveloped but accessible in places by roads. Designated scenic as part of the National Wild and Scenic Rivers System.

**Recreational Classification** - A river or section of a river readily accessible by road or

railroad, that may have some development along its shorelines, and that may have undergone some impoundment or diversion in the past. Designated recreational as part of the National Wild and Scenic Rivers System.

<b>FOI</b>	Forest Operations Inventory
<b>FPA</b>	Forest Practices Act (State of Oregon)
<b>GFMA</b>	General Forest Management Area
<b>GIS</b>	Geographic Inventory System
<b>GLO</b>	Government Land Office
<b>HJA</b>	H.J. Andrews Experimental Forest
<b>IDT</b>	Interdisciplinary team
<b>KOS</b>	Known (spotted) Owl Site
<b>LCFPA</b>	Linn County Forest Protection Association
<b>LEA</b>	Law Enforcement Agreement
<b>LHU</b>	Lynx Habitat Unit
<b>LSR</b>	Late Successional Reserve
<b>LSRA</b>	Late Successional Reserve Assessment
<b>LUA</b>	Land Use Allocation
<b>LWD</b>	Large Woody Debris
<b>MFRI</b>	Mean Fire Return Interval
<b>NEPA</b>	National Environmental Protection Act
<b>NFP</b>	Northwest Forest Plan
<b>NMFS</b>	National Marine Fisheries Service
<b>ODEQ</b>	Oregon Department of Environmental Quality
<b>ODF</b>	Oregon Department of Forestry
<b>ODFW</b>	Oregon Department of Fish and Wildlife

<b>OFPA</b>	Oregon Forest Practices Act
<b>OHV</b>	Off Highway Vehicle
<b>ONA</b>	Outstanding Natural Area
<b>ONHP</b>	Oregon Natural History Program
<b>OI</b>	BLM Operations Inventory: Forest Cover Stand Condition and Management History
<b>PCT</b>	Precommercial Thinning
<b>RD</b>	Relative Density
<b>REAP</b>	Regional Ecological Analysis
<b>RIA</b>	Rural Interface Area
<b>RMP</b>	Salem District Resource Management Plan
<b>RM</b>	River Miles
<b>RN</b>	Roaded Natural
<b>RNA</b>	Research Natural Area
<b>RNV</b>	Range of Natural Variation
<b>ROD</b>	Record of Decision
<b>ROS</b>	Recreation Opportunity Spectrum
<b>RR</b>	Riparian Reserve
<b>SCORP</b>	Statewide Comprehensive Outdoor Recreation Plan
<b>SCS</b>	Soil Conservation Service
<b>SEIS</b>	Supplemental Environmental Impact Statement
<b>SFP</b>	Special Forest Products

<b>SNC</b>	Swiss Needle Cast
<b>SRMA</b>	Special Recreation Management Area
<b>SSS</b>	Special Status Species
<b>SSSA</b>	Special Status Special Attention Species
<b>SWB</b>	Sub-Watershed Basin
<b>TMO</b>	Transportation Management Objective
<b>TMP</b>	Transportation Management Plan
<b>TPCC</b>	Timber Production Capability Classification
<b>TSZ</b>	Transient Snow Zone
<b>USDA</b>	U.S. Department of Agriculture
<b>USDC</b>	U.S. Department of Commerce
<b>USDI</b>	U.S. Department of Interior
<b>USGS</b>	U.S. Geological Survey
<b>USFS</b>	U.S. Forest Service
<b>USFWS</b>	U.S. Fish & Wildlife Service
<b>VRM</b>	Visual Resource Management
<b>WA</b>	Watershed Analysis
<b>WAA</b>	Watershed Analysis Area
<b>WAR</b>	Water Available for Runoff
<b>WFPB</b>	Washington Forest Practices Board
<b>WOBS</b>	Wildlife Observations
<b>WODIP</b>	Western Oregon Digital Imagery Project

<b>WQRP</b>	Water Quality Restoration Plan
<b>WRB</b>	Willamette River Basin
<b>WRD</b>	Water Resources Department
<b>WRIS</b>	Water Rights Information System

# Appendix C

## Public Scoping and Comments on Quartzville Watershed Issues and Concerns

The issue identification and scoping process are a two-phased approach. The first step involved scoping through the IDT of scientists and resource professionals. Primary team members were staff from within the Bureau of Land Management (BLM) Cascades Resource Area. During the spring of 2000, an informational scoping letter containing a questionnaire was sent out to watershed landowners, other local, county, and state agencies, and other interested individuals and organizations. These individuals, groups, and organizations were encouraged to complete the questionnaire and return it to our office. In addition, notification regarding ongoing watershed analyses was published in the Salem District Project Update, with contact names, email addresses and phone numbers. Contained within this appendix are a summary of comments, issues and concerns received on the Quartzville Watershed, **Notice of Crabtree and Quartzville Watershed Analysis, Watershed Analysis: Questions and Answers**, and a summary of the questionnaire that was sent out to the public.

### Summary of Public Comments on Quartzville Watershed Analysis Issues and Concerns

#### Most Important Issues

- Need more areas to ride Off-Highway Vehicles
- Keep motorized access open to recreational areas in the watershed
- Lack of rest rooms where overnight camping is allowed
- Clearcutting has resulted in a great increase in water runoff and landslides
- Pollution of creeks and streams
- Increased stream sedimentation
- Loss of private property due to flooding
- Declining fishery resource
- Not replanting trees after harvest
- Support Law Enforcement efforts

## **How Would You Like to See Federal Lands Managed in the Quartzville Watershed?**

Positive management of the motorcycle riding area

Give all interest groups equal preference in how the lands are managed

No harassment of landowners; enforce rules already in place

For timber protection, creating a more natural range of forest conditions

No clearcutting

Manage lands for wildlife benefit

Streambank stabilization

Plant more trees on harvested land

More dams to control flooding

Keep roads and lands open to the public for recreational uses

Remove diseased spike tops and do more thinning

Maintain roads for fire control access using Legacy Road Maintenance Standards under the Oregon Salmon Plan

Maintain the Church Creek closure to control ORV activity and damage and to lessen the threat from fire

## **What Kind of Watershed Restoration Work Would You Like to See Planned in the Watershed?**

Maintain motorcycle trails to eliminate erosion problems

Replant more trees in harvested areas

Keep streams at appropriate safe flow volumes

Spray the maple tree stumps

## **Other Comments, Issues, or Concerns**

Disappointed with the level of funding and support the BLM contributes to the Forest Security Program through Linn Forest Protection Association and the Linn County Sheriff's Office. BLM should pay an equal share like the private landowners do.

Law enforcement is essential in maintaining and protecting a watershed; need more officers out there patrolling the watershed.

Waterways need to be better maintained and kept unplugged

Not enough money for enforcement of laws regarding vandalism, illegal ORV use etc.

Restrict access to the watershed during summer fire season

## **Notice of Crabtree and Quartzville Watershed Analysis**

Dear Citizen:

The Bureau of Land Management(BLM), Cascades Resource Area, is currently analyzing the Crabtree and Quartzville Watersheds (see enclosed map). The Quartzville Watershed analysis is being conducted in cooperation with the U.S. Forest Service, Sweet Home Ranger District. You or your organization was identified as being potentially interested in the watershed analysis process for one or both of these watersheds. We are interested in any issues and comments that pertain to the management of these watersheds. Enclosed is additional information about the watershed analysis process and a questionnaire to help capture your input. Your involvement in this analysis process will be very helpful for future federal land management planning activities in these watersheds. Analysis of both watersheds will occur over the next several months and we hope to have them completed by June of 2000.

The Crabtree Watershed is located approximately 16 miles east of Albany and is just over 100,000 acres in size. The upper portion of the Crabtree Watershed includes private, state and BLM-administered lands in Crabtree Valley and the Snow Peak area. The lower portion of the watershed includes private agricultural/rural lands and the communities of Lcomb and Crabtree. **For more information about the Crabtree Watershed Analysis contact Jim England at (503) 315-5913 or at [Jim\\_England@blm.gov](mailto:Jim_England@blm.gov).**

The Quartzville Watershed is located approximately five miles northeast of Sweet Home and is 95,500 acres in size. The watershed begins at Green Peter Dam and continues up the northern arm of Green Peter Reservoir and ends at the headwaters of Quartzville Creek. The watershed includes land managed by the BLM, the U.S. Forest Service and the U.S. Army Corps of Engineers, as well as state, county, and private lands. **For more information about the Quartzville Watershed Analysis contact Laura Graves at (503) 315-5908 or [Laura\\_Graves@blm.gov](mailto:Laura_Graves@blm.gov).**

**Please return the questionnaire or contact the individuals listed above by April 30<sup>th</sup> if you wish to remain on or add additional contacts to our mailing list. In an effort to reduce unwanted mailings, if you do not notify us of your continued interest in this project, your name will be removed from the mailing list.** Thank you for your interest and assistance in this effort.

Sincerely yours,

Cascades Resource Area Manager

## Watershed Analysis: Questions and Answers

### What is a watershed analysis?

Watershed analysis simply tells the story of a particular watershed. It examines how major ecological processes are working together in the watershed. It is one of the principal assessment tools that will be used to meet the ecosystem management objectives of the BLM Salem District's Resource Management Plan standards and guidelines. It is not a planning or decision document. Watershed analysis will focus on collecting and compiling information about trends and conditions of the watershed that is essential for making sound management decisions. The findings and recommendations resulting from the watershed analysis process will provide guidance for future federal land uses and activities in the watershed. It will serve as a basis for developing project specific proposals and determining monitoring and restoration needs. It will not establish direction or regulations for state, tribal or private lands within the watershed.

### How will a watershed analysis be used?

It will provide important baseline resource information to help federal resource specialists and land managers develop project-specific proposals for forest management, recreation, fisheries and wildlife habitat improvements, restoration and other activities and actions within the watershed. It will also help identify information gaps, monitoring and restoration needs for the watershed.

### Is this a one time process?

Watershed analysis is an ongoing process. The analysis document, maps and files will be updated and expanded as new information is gathered and watershed conditions change.

### Are non-federal lands analyzed and how are they affected?

The analysis will consider resource conditions of the entire watershed, regardless of land ownership or jurisdictional boundaries. **However, the watershed analysis process is not intended to be used to determine or direct management of non-federally owned lands.** The watershed analysis process can help encourage more coordination between landowners and other public land management agencies that have lands or jurisdiction within the watershed. It is our ultimate goal to work collaboratively with those sharing the watershed to ensure the continued health of the forest ecosystem, maintain water quality and meet resource management objectives.

**Why spend money to do a watershed analysis in a drainage where the BLM and FS do not actually manage most of the land?**

Federal lands account for over 18,000 acres in the Crabtree watershed and the majority of the land in the Quartzville Watershed. A watershed consists of many interacting ecosystems. To best manage public lands we need a clear and accurate picture of the condition of the entire watershed, not just specific locations or habitats.

**How will the watershed analysis address water quality?**

Available water quality will be analyzed, problem areas/sources and new data needs will be identified. As a result, opportunities for improving water quality conditions or changing certain management activities will be recommended for federal lands. Opportunities for improving water quality in cooperation with private land owners may also be identified.

**How can I be involved?**

The question is, how do you *wish* to be involved? Since the Watershed Analysis is not a formal decision process but an analytical tool, there are no requirements set forth for public involvement. However, input from the public is desired and encouraged. Many of you are familiar with the resource and know the watershed well. Your information and participation can help us paint a more accurate and detailed picture of the watershed and be more responsive to key issues and concerns. You could help us by filling out the attached questionnaire to ensure that we are addressing issues that are important to you.

**Quartzville Watershed Questionnaire**

Issue and information response sheet (modified from the original)

1. Yes, I want to be involved in the watershed analysis process and continue to receive mailings and information:

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Address: \_\_\_\_\_  
\_\_\_\_\_

Telephone: \_\_\_\_\_

Organization: \_\_\_\_\_

2. What do you see as the most important issues in this watershed? What do you think needs to be done to resolve these issues?

3. Are there any specific locations within this watershed of particular concern to you? What are those areas and what are your concerns?

4. How would you like to see federal lands managed in the Quartzville Watershed?

5. What kind of watershed restoration work would you like to see planned and specifically where would that work be?

6. How would you like to be involved in the watershed analysis currently underway in the Quartzville Watershed, and to what extent?

7. Other comments, issues or concerns?

# Appendix D

## Botanical Species of Concern Special Status Plants to Search for in the Quartzville Watershed

SPECIES & STATUS	HABI TAT	ELEVATION (FT)	BEST I.D. SEASON
<b>FEDERAL ENDANGERED (FE)</b>			
<i>LOMATIUM BRADSHAWII</i> (Rose) Math. & Const. Bradshaw's lomatium	WV, Linn, Marion WET MEADOWS GRAVELLY STREAMBEDS	<750	APRIL-MAY
<b>FEDERAL THREATENED (FT)</b>			
<i>HOWELLIA AQUATILLIS</i> A. Gray howellia	VW, Clack, Marion, Mult. SHALLOW PONDS & MARSHES	<200	MAY
<i>SIDALCEA NELSONIANA</i> Piper Nelson's sidalcea	WV, Linn, Marion	<2000	JUNE-JULY
<b>FEDERAL PROPOSED THREATENED (PT)</b>			
<i>CASTILLEJA LEVISECTA</i> Greenm. Golden paintbrush	WV, Linn, Marion, Mult. WET OR VERNALLY WET MEADOWS	<1000	JUNE-EARLY JULY
<b>FEDERAL CATEGORY 1 CANDIDATES (FC1)</b>			
<i>DELPHINIUM PAVONACEUM</i> Ewan peacock larkspur	WV, Clack, Marion, Mult.	<1500	MAY-JUNE
<i>ERIGERON DECUMBENS</i> Nutt. VAR. <i>DECUMBENS</i> Willamette daisy	WV, Clack, Linn, Marion GRASSLANDS	<1000	JUNE-EARLY JULY
<b>BUREAU SENSITIVE (BS)</b>			
<i>ASTER CURTUS</i> Cronq. white-topped aster	WV, Clack, Linn, Marion, Mult.		
<i>ASTER GORMANII</i> (Piper) Blake Gorman's Aster	WC, Clack, Linn, Marion OPEN OR SPARSLEY TIMBERED, ROCKY RIDGETOPS & MEADOWS	>3500	LATE JULY- AUGUST
<i>BRIDGEOPORUS NOBILISSIMUS</i> W.B. Cooke giant polypore fungus, fuzzy sandozi	WC, Clack, Linn OLD GROWTH NOBLE FIR		
<i>CIMICIFUGA ELATA</i> Nutt. tall bugbane	WV, WC, Clack, Linn, Marion, Mult. MOIST WOODS	<2000	JUNE-MID JULY

SPECIES & STATUS	HABI TAT	ELEVATION (FT)	BEST I.D. SEASON
<i>CORYDALIS AQUAE-GELIDAE</i> Peck & Wilson cold-water corydalis	WC, Clack, Linn, Marion, Mult. COLD SPRINGS & STREAMS	>1000	MID JUNE-JULY
<i>DELPHINIUM LEUCAPHAENUM</i> Greene white rock larkspur	WV, Clack, Marion, Mult.	<1000	MAY-EARLY JUNE
<i>HORKELIA CONGESTA</i> Douglas ssp. <i>CONGESTA</i> shaggy horkelia	WV, Linn OPEN SANDY OR ROCKY FLATS TO OPEN WOODS	LOW	APRIL-JUNE
<i>LUPINUS SULPHUREUS</i> Douglas ssp. <i>KINKAIDII</i> (Smith) Phillips Kincaid's lupine	WV, Linn, Marion WILLAMETTE VALLEY	<1500	MAY-JULY
<i>MONTIA HOWELLII</i> S. Watson Howell's montia	WV, WC, Clack, Linn, Mult. ROCKY RIVER BANKS ESP. IN DISTURBED SITES	<2500	APRIL-EARLY MAY

**Noxious Weeds to Search for in the Quartzville Watershed**

<b>Plant Scientific Name</b>	<b>Plant Common Name</b>	<b>OR State List<sup>1</sup></b>	<b>Life Span<sup>2</sup></b>	<b>Flowering</b>
<b>Priority I – Potential New Invaders</b>				
<i>Acroptilon repens</i>	Russian knapweed	B		
<i>Aliaria petiolata</i>	Garlic mustard			
<i>Buddleia davidii</i>	Butterfly bush			
<i>Buddleia alternifolia</i>	Butterfly bush			
<i>Brachypodium sylvaticum</i>	False-brome			
<i>Cardaria chalapensis</i>	Lens-podded white top	B		
<i>Cardaria draba</i>	whiteweed	B		
<i>Carthamus lanatus</i>	Woolly distaff thistle	A, T	A	Jul-Aug
<i>Carthamus baeticus</i>	Smooth distaff thistle	A		
<i>Carduus nutans</i>	Musk thistle	B		
<i>Cardaria pubescens</i>	Hairy white top	B		
<i>Carduus pycnocephalus</i>	Italian thistle	B	A, B	May-Jun
<i>Carduus tenuiflorus</i>	Slender flowered thistle	B	P, A	May-Jun
<i>Centaurea calcitrapa</i>	Purple starthistle	A, T		
<i>Centaurea iberica</i>	Iberian starthistle	A, T		
<i>Centaurea macrocephala</i>	Big-headed knapweed	A		
<i>Centaurea solstitialis</i>	Yellow starthistle	B, T	A, B	Jul-Sep
<i>Centaurea triumfetti</i>	Squarrose knapweed	T	P	
<i>Chondrilla juncea</i>	Rush skeletonweed	B, T	P	mid-Jul-frost
<i>Cyperus esculentus</i>	Yellow nutsedge	B		
<i>Cynoglossum officinale</i>	Houndstongue	B		
<i>Cytisus striatus</i>	Portugese broom	B	P	
<i>Euphorbia esula</i>	Leafy spurge	B	P	May-Jul
<i>Genista monspessulana</i>	French broom	B	P	Mar-Apr
<i>Heracleum mantegazzianum</i>	Giant hogweed	A		
<i>Hieracium aurantiacum</i>	Orange hawkweed	A		
<i>Hieracium caespitosum</i>	Meadow hawkweed	A		
<i>Hieracium pilosella</i>	Mouse-eared hawkweed	A		
<i>Hydrilla verticillata</i>	Hydrilla	A	P	
<i>Iris pseudoacorus</i>	Yellow iris			
<i>Lepidium latifolium</i>	Perennial pepperweed	B		
<i>Linaria dalmatica</i>	Dalmation toadflax	B		
<i>Linaria vulgaris</i>	Yellow toadflax	B	P	Jun-Sep
<i>Lythrum salicaria</i>	Purple loosestrife	B	P	Aug-Sep
<i>Onopordum acanthium</i>	Scotch thistle	B	B	Jul
<i>Phalaris aquatica</i>	Harding grass			
<i>Potentilla recta</i>	Sulfur cinquefoil	B	P	May-Jul

<i>Pueraria montana var lobata</i>	Kudzu	A		
<i>Purnus avium</i>	Sweet cherry			
<i>Sorghum halepense</i>	Johnsongrass	B		
<i>Spartinum junceum</i>	Spanish broom	B	P	
<i>Taeniatherum caput-medusa</i>	Medusahead rye	B	A	May-Jun
<i>Tribulus terrestris</i>	puncturevine	B		
<i>Trifolium lappaceum</i>	Burdock			
<i>Xanthium spinosum</i>	Spiny cocklebur	B	A	
	Pampass grass			
<b>Priority II – Eradication of New Invaders</b>				
<i>Centaurea maculosa</i>	Spotted knapweed	B, T	B, P	Jun-Oct
<i>Centaurea debeauxii</i>	Meadow knapweed	B	P	Jul-Oct
<i>Centaurea diffusa</i>	Diffuse knapweed	B	A, B, P	Jul-Sep
<i>Clematis vitalba</i>	Travelers-joy			
<i>Crataegeous monogyna</i>	Hawthorne			
<i>Impatiens glandulifera</i>	Policeman's helmet			
<i>Lathyrus latifolius</i>	Everlasting peavine			
<i>Polygonum cuspidatum</i>	Japanese knotweed	B	P	Jul-Oct
<i>Polygonum polystachyum</i>	Himalayan knotweed	B		
<i>Polygonum sachalinense</i>	Giant knotweed	B	P	
<i>Silybum marianum</i>	Milk thistle	B	A, B	Apr-Jul
<i>Ulex europaeus</i>	Gorse	B, T	P	Apr-May

<b>Priority III – Established Infestations</b>				
<i>Cirsium arvense</i>	Canada thistle	B	P	Jun-Sep
<i>Cirsium vulgare</i>	Bull thistle	B	B, P	Jul-Sep
<i>Convolvulus arvensis</i>	Field bindweed	B	P	Jun-fall frost
<i>Cytisus scoparius</i>	Scotch broom	B	P	May-Jun
<i>Geranium robertianum</i>	Stinky Bob			
<i>Hedera helix</i>	English ivy	B	P	
<i>Hypericum perforatum</i>	St. Johnswort	B	P	Jun-Jul
<i>Ilex aquifolium</i>	English ivy			
<i>Phalaris arundinacea</i>	Reed canary grass			
<i>Rubus discolor</i>	Himalayan blackberry	other	P	
<i>Rubus lasiniatus</i>	Evergreen blackberry			
<i>Senecio jacobaea</i>	Tansy ragwort	B, T	B, P	Jul-Sep
<i>Taraxacum officinale</i>	Dandelion			
<i>Taraxacum laevigatum</i>	Dandelion			

<sup>1</sup> ODA Noxious Weed Rating System

- “A” - a weed of known economic importance which occurs in the state in small enough infestations to make eradication/containment possible; or is not known to occur, but its presence in neighboring states make future occurrence in Oregon seem imminent.
  - “B” - a weed of economic importance which is regionally abundant, but which may have limited distribution in some counties. Where implementation of a fully-integrated statewide management plan is feasible, biological control shall be the main control approach.
  - “T” - a priority noxious weed designated by the Oregon State Weed Board as a target weed species on which the Department will implement a statewide management plan.
- <sup>2</sup> B = biennial, P = perennial, A = annual

# ***Survey & Manage and Protection Buffer Species in the Cascades Resource Area***

*The species listed below are included in the survey and manage and the protection buffer species portion of the Northwest Forest Plan. The species included on this list and their respective survey strategies could change in the future.*

*\* Known sites of these species are the Crabtree and/or Quartzville Watershed Analysis area*

## ***Bryophytes (Category)***

*Racomitrium aquaticum (B)*

## ***Fungi***

*Asterophora lycoperdoides (B)*  
*\*Bridgeoporus nobilissiuus (A)*  
*\*Clavariadelphus pistillaris (occidentalis) (B)*  
*Cudonia monticola (B)*  
*Hypomyces luteovirens (B)*  
*\*Leucogaster citrinus (B)*  
*\*Mycena overholtsii (D)*  
*\*Neournula pouchetii (B)*  
*Otidea leporina (D)*  
*\*Phaeocollybia californica (B)*  
*\*Phaeocollybia kauffmanii (D)*  
*\*Ramaria araiospora (B)*  
*\*Ramaria stuntzii (B)*  
*\*Sparassis crispa (D)*  
*\*Sowerbyella rhenana (B)*

## ***Lichens***

*Calicium viride (F)*  
*Cetrelia cetrariodes (E)*  
*Chaenotheca chrysocephala (B)*  
*Chaenotheca ferruginea (B)*  
*\*Nephroma bellum (E)*  
*\* Pannaria saubinetii (F)*  
*\* Peltigera pacifica (E)*  
*\* Platismatia lacunosa (C)*  
*\* Pseudocyphellaria sp (B)*  
*\*Pseudocyphellaria rainierensis (A)*  
*Ramalina thrausta (A)*  
*\*Usnea longissima (F)*

# Appendix E

## E.1. Vertebrate Wildlife List

The following is a list of vertebrate species for the Quartzville watershed. This list includes species that could occur, or are extirpated, as well as species which are known or suspected to occur. Occurrence codes for are based on Wildlife Observation Databases, Oregon Natural Heritage Program (ONHP) and on extrapolation from literature specific to the Pacific Northwest region. Federal, State Forest Service and Bureau statuses are based on ONHP, Forest Service Sensitive Species and BLM Special Status Species Lists.

---

### **HABITAT & OCCURRENCE KEY:**

V=Willamette Valley & Cascades Foothills  
H=High Elevation Habitats  
I=Introduced, L=local, B=Breeding (Birds), NB=Non-breeding (Birds),  
BU= Breeding Status Uncertain(Birds), OU=Occurrence Uncertain, E=Extirpated

### **FEDERAL/STATE STATUS:**

LE=Federal Endangered, SE=State Endangered,  
LT=Federal Threatened, ST=State Threatened,  
FP= Federal Proposed, FC=Federal Candidates,  
SC=State Critical, SV=State Vulnerable, SU=State Undertermined Status,  
SP=State Peripheral, FS=Forest Service Sensitive, BS=Bureau Sensitive,  
BA=Bureau Assessment, BT=Bureau Tracking,  
SM=ROD Survey and Manage, B=ROD Buffer or Extra Protection Species

**QUARTZVILLE WATERSHED - WILDLIFE LIST - HERPETOFAUNA**

<b>SPECIES</b>	<b>SPCODE</b>	<b>FEDERAL</b>	<b>STATE</b>	<b>BLM/FS</b>	<b>SA-ROD</b>	<b>OCC</b>
Northwestern salamander	AMGR					
Pacific giant salamander	DIEN					
Cascade torrent salamander	RHCA		SV	BT/FS		L
Clouded salamander	ANFE		SU	BT		L
Oregon slender salamander	BAWR		SU	BT/FS		
Ensatina	ENES					
Dunn's salamander	PLDU					
Western redback salamander	PLVE					OU
Roughskin newt	TAGR					
Pacific tree frog	HYRE					
Tailed frog	ASTR		SV	BT		L
Red-legged frog	RAAU		SV	BT		
Foothill yellow-legged frog	RABO		SV	BT/FS		OU
Cascade frog	RACA		SV	BT		H
Bullfrog	RACAT					V- I,OU
Northwestern pond turtle	CLMA		SC	BS/FS		V-OU
Northern alligator lizard	ELCO					
Western fence lizard	SCOC					L
Western skink	EUSK					L
Rubber boa	CHBO					L
Racer	COLCO					L
Ringneck snake	DIPU					L
Northwestern garter snake	THOR					
Common garter snake	THSI					

**QUARTZVILLE WATERSHED - WILDLIFE LIST - BIRDS**

SPECIES	SPCODE	FEDERAL	STATE	BLM/FS	SA-ROD	OCC
Common loon	GAIM			BA		NB
Pied-billed grebe	POPO					BU
Eared grebe	PODNI					NB
Western grebe	AEOC					NB
Great blue heron	ARHE					B
Green-backed heron	BUST					NB
Canada goose	BRCA					B
Wood duck	AISP					B
Green-winged teal	ANCR					NB
Mallard	ANPL					B
Northern pintail	ANAC					NB
Cinnamon teal	ANCY					OU
Blue-wingedTeal	ANDI					OU
Northern shoveler	ANCL					NB
Gadwall	ANST					NB
American wigeon	ANAAM					NB
Ring-necked duck	AYCO					NB
Lesser scaup	AYAF					NB
Harlequin duck	HIHI		SU	BS/FS		B
Common goldeneye	BUCL					NB
Barrow's goldeneye	BUIS		SU	BT		NB
Bufflehead	BUAL		SU	BA/FS		NB
Hooded merganser	LOCUC					B
Common merganser	MERME					B
Ruddy duck	OXJA					NB
Turkey vulture	CAAU					B
Osprey	PAHA					B
Bald eagle	HALE	LT	ST	LT		B
Northern harrier	CICY					NB
Sharp-shinned hawk	ACST					B
Cooper's hawk	ACCO					B
Northern goshawk	ACGE		SC	BS		B
Red-tailed hawk	BUJA					B

SPECIES	SPCODE	FEDERAL	STATE	BLM/FS	SA-ROD	OCC
Rough-legged hawk	BULA					NB
Golden eagle	AQCH					BU
American kestrel	FASP					B
Merlin	FACO			BA		NB
Peregrine falcon	FAPE		SE	BS/FS		B
Blue grouse	DEOB					H-B
Ruffed grouse	BOUM					B
Mountain quail	ORPI					B
Virginia rail	RALI					B
American coot	FUAM					NB
Sandhill Crane	GRCATA		SV	BT		NB
Killdeer	CHVO					NB
Spotted sandpiper	ACMA					B
Western sandpiper	CAMAU					NB
Least sandpiper	CAMI					NB
Dunlin	CAALP					NB
Common snipe	GAGA					NB
Ring-billed gull	LADE					NB
California gull	LACAL					NB
Herring gull	LAAR					NB
Rock dove	COLI					NB
Band-tailed pigeon	COFA					B
Mourning dove	ZEMA					NB
Western screech-owl	OTKE					B
Great horned owl	BUVI					B
Northern pygmy-owl	GLGN					B
Northern spotted owl	STOC	LT	ST	LT		B
Great gray owl	STNE		SV	BT	B	OU
Barred owl	STVA					B
Short-eared owl	ASFL					NB
Northern saw-whet owl	AEAC					B
Common poorwill	PHNU					NB
Common nighthawk	CHMI		SC	BS		B
Vaux's swift	CHVA					B

SPECIES	SPCODE	FEDERAL	STATE	BLM/FS	SA-ROD	OCC
Rufous hummingbird	SERUF					B
Belted kingfisher	CEAL					B
Red-breasted sapsucker	SPRU					B
Downy woodpecker	PIPU					B
Hairy woodpecker	PIVI					B
Black-backed woodpecker	PIAR		SC	BS	B	H-OU
Northern flicker	COAU					B
Pileated woodpecker	DRPI		SV	BT		B
Olive-sided flycatcher	COBO		SV	BT		B
Western wood-pewee	COSO					B
Willow flycatcher	EMTR		SV	BT		B
Hammond's flycatcher	EMHA					B
Dusky flycatcher	EMDU					H-BU
Pacific-slope flycatcher	EMDI					B
Tree swallow	TABI					B
Violet-green swallow	TATH					B
N.rough-winged swallow	STSE					BU
Cliff swallow	HIPY					BU
Barn swallow	HIRU					BU
Gray jay	PECA					B
Steller's jay	CYST					B
Clarke's nutcracker	NUCO					H-NB
American crow	COBR					NB
Common raven	CORCO					B
Black-capped chickadee	PAAT					BU
Chestnut-backed chickadee	PARU					B
Red-breasted nuthatch	SITCA					B
Brown creeper	CEAM					B
Bewick's wren	THBE					OU
House wren	TRAE					B
Rock wren	SAOB					H-B
Winter wren	TRTR					B
American dipper	CIME					B
Golden-crowned kinglet	RESA					B

SPECIES	SPCODE	FEDERAL	STATE	BLM/FS	SA-ROD	OCC
Ruby-crowned kinglet	RECA					NB
Western bluebird	SIME		SV	BT		B
Mountain bluebird	SICU					H-BU
Townsend's solitaire	MYTO					B
Swainson's thrush	CAUS					B
Hermit thrush	CAGU					B
American robin	TUMI					B
Varied thrush	IXNA					B
Cedar waxwing	BOCE					B
American pipit	ANSP					NB
European starling	STVU					I-BU
Solitary vireo	VISO					BU
Hutton's vireo	VIHU					B
Warbling vireo	VIGI					B
Orange-crowned warbler	VECE					B
Nashville warbler	VERU					NB
Yellow warbler	DEPE					BU
Yellow-rumped warbler	DENCO					H-BU NB
Black-throated gray warbler	DENI					B
Townsend's warbler	DETO					NB
Hermit warbler	DEOC					B
MacGillivray's warbler	OPTO					B
Common yellowthroat	GETR					B
Wilson's warbler	WIPU					B
Western tanager	PILU					B
Black-headed grosbeak	PHME					B
Lazuli bunting	PAAMO					NB
Rufous-sided towhee	PIER					B
Chipping sparrow	SPPA					B
Fox sparrow	PAIL					BU
Song sparrow	MELME					B
Lincoln's sparrow	MELI					H-B
Golden-crowned sparrow	ZOAT					NB

SPECIES	SPCODE	FEDERAL	STATE	BLM/FS	SA-ROD	OCC
White-crowned sparrow	ZOLE					B
Dark-eyed junco	JUHY					B
Red-winged blackbird	AGPH					BU
Western meadowlark	STUNE		SC	BS		NB
Brewer's blackbird	EUCY					BU
Brown-headed cowbird	MOAT					NB
Northern oriole	ICGA					NB
Purple finch	CARPU					B
Cassin's finch	CARCA					H-OU
Red Crossbill	LOCU					H-B
Pine siskin	CAPI					B
American goldfinch	CATR					NB
Evening grosbeak	COVE					B

**QUARTZVILLE WATERSHED- WILDLIFE LIST - MAMMALS**

SPECIES	SPCODE	FEDERAL	STATE	BLM/FS	SA-ROD	OCC
Baird's shrew	SOBA			FS		
Pacific water shrew	SOBE					
Pacific shrew	SOPAC			FS		
Water shrew	SOPAL					OU
Trowbridge's shrew	SOTRO					
Vagrant shrew	SOVA					
Shrew-mole	NEGI					
Big brown bat	EPFU					
Silver-haired bat	LANO				B	
Hoary bat	LACI					
California myotis	MYOCA					
Long-eared myotis	MYEV		SU	BT	B	
Little brown myotis	MYLU					
Long-legged myotis	MYVO		SU	BT	B	
Yuma myotis	MYYU			BT		
Townsend's big-eared bat	COTO		SC	BS	B	L
Coyote	CALAT					
Gray Wolf	CALU	LE	SE	LE		E
Gray fox	URCI					
Black bear	URAM					
Raccoon	PRLO					
California Wolverine	GUGU		ST	BS/FS		H-OU
River otter	LUCA					
Pine Marten	MAAM		SV	BT		H
Fisher	MAPE		SC	BS/FS		H
Ermine	MUER					
Long-tailed weasel	MUFR					
Mink	MUVI					
Spotted skunk	SPPU					
Mountain lion	FECO					
Lynx	LYCA	FT		FT	SM	OU
Bobcat	LYRU					
Elk	CEEL					
Black-tailed deer	ODHE					

SPECIES	SPCODE	FEDERAL	STATE	BLM/FS	SA-ROD	OCC
Mountain beaver	APRU					
Northern flying squirrel	GLSA					
Golden-manteled ground squirrel	SPLA					H
Townsend's chipmunk	TATO					
Douglas squirrel	TADO					
Western pocket gopher	THMA					H
Beaver	CASCAN					
Bushy-tailed woodrat	NECI					
Deer mouse	PEMA					
Red tree vole	ARLO			BS	SM	
Western red-backed vole	CLCA					
Gray-tailed vole	MICAN					
Long-tailed vole	MILO					
Creeping vole	MIOR					
Water vole	MIRI					H
Pacific jumping mouse	ZATR					
Porcupine	ERDO					
Pika	OCPR					H
Snowshoe hare	LEAM					H

## E.2. Special Status/Special Attention Invertebrate Species that are documented or suspected to occur in the Quartzville Watershed.

SPECIES	SPCODE	BLM/FS STATUS	ONHP LIST	GEOGRAPHIC RANGE or HABITAT NEEDS
MOLLUSKS Oregon megomphix	MEHE	SM/BS	4	CR,WV,WC: Conifer/hardwood forest with bigleaf maple, duff/litter at low/mid elevations. Common along Willamette Valley floor/Cascades foothills.
INSECTS American boreostolus bug	BOAM	BT	3	KM,WC: Under rocks and in sandy substrates of streams
Mulsant's small water strider	MEMU	BT	3	CR,WV,WC,BR: Floating vegetation and water surface of ponds. Wide ranging.
Cascades apatanian caddisfly	APTA	BT	4	WC,EC,BM: Found in small streams on coarse gravel and cobble in areas of low current at mid/high elevations
Mt. Hood brachycentrid caddisfly	EOGE	BT	4	WC: Cold spring fed streams at mid/high elevations, generally subalpine
Tombstone Prairie farulan caddisfly	FARE	BT	4	WC: Small spring fed streams with moderate to fast currents on cobble and wood at high elevations
Tombstone Prairie oligophlebodes caddisfly	OLMO	BT	3	WC: Small to large streams at high elevations
One-spot rhyacophilan caddisfly	RHUN	BT	3	WC,EC: Clear streams at high elevations

**KEY:**

WV=Western Valleys WC=Western Cascades EC=Eastern Cascades CR=Coast Range KM=Klamath Mtns BR=Harney Basin BM=Blue Mtns.

BS = Bureau Sensitive

BT=Bureau Tracking

SM=ROD Survey and Manage

### E.3. Special Status/Special Attention Wildlife Species Known & Suspected - Quartzville

	SPECIES & STATUS	HABITAT DESCRIPTION
<b>INVERTEBRATES</b>		
D	MEGOMPHIX HEMPHILLI SM/BS Oregon megomphix (snail)	Conifer/hardwood forest floor, in association with bigleaf maple, duff /litter at low/mid elevations. Common along Willamette Valley floor/Cascades foothills.
<b>HERPETOFAUNA</b>		
D	RHYACOTRITON CASCADAE BT/FS/SV Cascade torrent salamander	Prefers small cold streams and springs with water seeping through moss-covered gravel. Most common in mature and old-growth conifer forests below 4000 feet.
D	ANEIDES FERREUS BT/SU clouded salamander	Prefers the spaces between loose bark on down logs in forests, forest edges, and clearings created by fire.
D	BATRACHOSEPS WRIGHTI BT/FS/SU Oregon slender salamander	West slope of Cascades. Prefers down logs and woody material in more advanced stages of decay. Most common in mature and old-growth conifer forests.
D	ASCAPHUS TRUEI BT/SV tailed frog	Cold, fast-flowing permanent springs and streams in forested areas. Has a very narrow temperature tolerance.
D	RANA AURORA BT/SU/SV red-legged frog (Willamette Valley)	Common in marshes, ponds, and streams with little or no flow, from the valley floor to about 3000 feet in the Cascades. Populations in the Willamette Valley are of greater concern (SV) than Cascades populations (SU).
S	RANA CASCADAE BT/SV Cascades frog	Highly likely to occur in Quartzville to the east at higher elevations. Found in higher elevation bogs, ponds and stream edges associated with moist meadows.
<b>BIRDS</b>		
D	GAVIA IMMER BA common loon	Breeding populations are of concern. Occurs only as a non breeder on Green Peter Reservoir at the lower end of the Quartzville Watershed.
D	HISTRIONICUS HISTRIONICUS BS/FS/SU harlequin duck	Breeds on Quartzville creek and its tributaries where its a common summer resident. Found in whitewater mountain rivers and streams during nesting season. Winters on rocky coasts.
D	BUCEPHALA ISLANDICA BT/SU Barrow's goldeneye	Breeding populations are of concern. Occurs in Quartzville only as a migrant and winter visitor. Has been observed on Green Peter Reservoir.

D	BUCEPHALA ALBEOLA <b>BA/FS/SU</b> bufflehead	Breeding populations are of concern. Occurs in Quartzville only as a rare migrant and winter visitor. Has been observed on Green Peter Reservoir.
D	HALIAEETUS LEUCOCEPHALUS <b>LT/ST</b> bald eagle	Documented to occur in Quartzville year round. There are two nesting sites in the Green Peter area. The pairs tend to be resident, but some movement to the Willamette Valley occurs during winter. For nesting and perching, prefers large old-growth trees near major bodies of water and rivers.
D	ACCIPITER GENTILIS <b>BS/SC</b> northern goshawk	Has been observed and is known to breed in Quartzville Watershed. Rare Summer resident in Cascades. Prefers mature or old-growth forests with dense canopy cover at higher elevations. Winters at lower elevations.
S	FALCO COLUMBARIUS <b>BA</b> merlin	Breeding populations are of concern. Likely to occur in Quartzville only during migration and winter. Fields, open areas and edges.
D	FALCO PEREGRINUS <b>BS/FS/SE</b> peregrine falcon	Known to breed in the Green Peter area. Suitable cliff habitat for nesting is present in Quartzville. Likely to occur as a transient/migrant and winter visitor. Found in a variety of open habitats near cliffs or mountains. Prefers areas near larger bodies of water and rivers.
S	GRUS CANADENSIS <b>BT/SV</b> sandhill crane	Breeding populations are of concern. Suspected as a rare spring/fall overhead migrant.
S	TRINGA MELANOLEUCA <b>BA</b> greater yellowlegs	Breeding populations are of concern. Likely to occur as a rare transient and winter visitor in Quartzville. Wetlands, flooded fields, and mud flats.
S	TRINGA SOLITARIA <b>BT</b> solitary sandpiper	Breeding populations are of concern. Likely to occur only as a rare spring/fall migrant and transient. Wetlands, flooded fields, and small water bodies.
D	STRIX OCCIDENTALIS CAURINA <b>LT/ST</b> northern spotted owl	Permanent resident in Quartzville, where 35 sites were known from the early 1990s. Prefers mature and old-growth conifer forests with large down logs, standing snags in various stages of decay, high canopy closure and a high degree of vertical stand structure.
D	CHORDEILES MINOR <b>BS/SC</b> common nighthawk (Willamette Valley)	Open habitats from the valley floor to high elevation clearcuts. Breeding populations are of concern, especially in the Willamette Valley.
D	DRYOCOPUS PILEATUS <b>BT/SV</b> pileated woodpecker	Common permanent resident in Quartzville Watershed. Prefers to nest in old-growth and mature forests. Also forages in younger forests containing mature or old-growth remnants. Requires larger snags and down wood.
D	CONTOPUS COOPERI <b>BT/SV</b> olive-sided flycatcher	Uncommon summer resident in more open coniferous forest and edge with prominent tall snags or trees that serve as foraging and singing perches.
D	EMPIDONAX TRAILLII BRESTERI little willow flycatcher <b>BT/SV</b>	Summer resident in Quartzville Watershed. Riparian forests, valley brushlands, clearcuts and early seral forests.
D	SIALIA MEXICANA <b>BT/SV</b> western bluebird	Uncommon permanent resident in Willamette Valley and adjacent foothills. Open areas with standing snags, or small farms with diversified agriculture. Nests in natural woodpecker cavities or artificial nest boxes.

D	STRUNELLA NEGLECTA <b>BS/SC</b> western meadowlark (Willamette Valley)	Occurs as an uncommon transient and winter visitor in lower end of Quartzville Watershed. Found in grassy open habitat.
<b>MAMMALS</b>		
S	SOREX BAIRDII PERMILIENSIS <b>FS</b> Baird's shrew	Moist forests with coarse woody debris. Endemic to Oregon.
S	SOREX PACIFICUS CASCADENSIS <b>FS</b> Pacific shrew	Moist wooded areas with fallen decaying logs and brushy vegetation. Endemic to Oregon.
S	LASIONYCTERIS NOCTIVAGANS <b>BT/B/SU</b> silver-haired bat	Highly likely to occur in the Quartzville Watershed. Associated with cliff/cave and snag habitat. Forages in a variety of forest habitats and riparian areas.
S	MYOTIS EVOTIS <b>BT/B/SU</b> long-eared myotis	Highly likely to occur in the Quartzville Watershed. Associated with snags and cave habitat. Prefers older forests. Forages over water and riparian areas.
S	MYOTIS VOLANS <b>BT/B/SU</b> long-legged myotis	Highly likely to occur in the Quartzville Watershed. Associated with cliff/cave and snag habitat. Prefers older forests. Forages over water and riparian areas.
S	MYOTIS YUMANENSIS <b>BT</b> yuma myotis	Highly likely to occur in the Quartzville Watershed. Associated with cliff/cave and snag habitat. More closely associated with riparian areas than the other myotis. Prefers older forests. Forages over water and riparian areas.
S	CORYNORHINUS TOWNSENDII <b>BS/B/SC</b> Townsend's big-eared bat	Highly likely to occur in the Quartzville Watershed. Feeds on flying insects in a variety of habitats in forested areas. Primary habitat is caves, rock outcrops, buildings and abandoned mines.
S	MARTES AMERICANA <b>BT/SV</b> pine marten	Highly likely to occur in the Quartzville Watershed. Mature and old-growth forests containing large quantities of standing snags and downed logs, in the upper end of LNS. Prefers wetter forests, often near streams.
D	MARTES PENNANTI <b>BS/FS/SC</b> fisher	There are two sightings in the Quartzville Watershed. Prefers mature and old-growth forests and riparian areas containing large quantities of dead and down wood.
S	ARBORIMUS LONGICAUDUS <b>SM</b> red tree vole	Suspected to occur in the Quartzville Watershed. This arboreal vole prefers mid to late seral forests with closed canopies.

## KEY

### Occurrence:

S = Suspected

D = Documented

### Status:

LE = Federal endangered

LT = Federal Threatened

ST = State Threatened

SE = State Endangered

BS = Bureau Sensitive  
BA = Bureau Assessment  
BT = Bureau Tracking  
FS = Forest Service Sensitive  
SM=ROD Survey and Manage  
B=ROD Buffer or extra protection species

SC = State Critical  
SV = State Vulnerable  
SU = State Uncertain  
SP = State Peripheral

## E.4. Special Status/Special Attention Wildlife Species Data Gaps - Quartzville

	SPECIES & STATUS	DATA NEEDS/HABITAT DESCRIPTION
<b>INVERTEBRATES</b>		
D	MEGOMPHIX HEMPHILLI <b>SM/BS</b> Oregon megomphix (snail)	Based on surveys performed to date, known to be common along Willamette Valley floor/Cascades foothills at low/mid elevations. Good distributional data is Lacking, especially in LSR where no surveys have been conducted.
<b>HERPETOFAUNA</b>		
OU	RANA BOYLEI <b>BT/FS/SV</b> foothill yellow-legged frog	Permanent streams and vicinity, with rocky, gravelly and sandy substrates. Quartzville Creek is a good candidate stream.
OU	CLEMMYS MARMORATA <b>BS/FS/SC</b> western pond turtle	Marshes, ponds, lakes, slow rivers and streams, usually with an abundance of aquatic vegetation and emergent logs or boulders for basking. Associated with Willamette Valley. Not likely to occur in Quartzville Watershed.
<b>BIRDS</b>		
D	AQUILA CHRYSAETOS golden eagle	Has been observed in the Boulder Creek and Packer's areas of the Quartzville Watershed. Nesting status is unknown. Known to nest in an adjacent watershed.
D	ACCIPITER GENTILIS <b>BS/SC</b> northern goshawk	Has been observed in Quartzville Watershed, but breeding status is unknown. Rare Summer resident in Cascades. Surveys should target Whitcomb, Green Peter and Elk Creek areas.
D	FALCO PEREGRINUS <b>BS/FS/SE</b> peregrine falcon	Known to nest in the Green Peter area. There could be additional sites in Quartzville. Surveys should target suitable cliff habitat.
D	STRIX OCCIDENTALIS CAURINA <b>LT/ST</b> northern spotted owl	Permanent resident in Quartzville, where 35 sites were known from the early 1990s. Many of these sites have not been surveyed to protocol since then.
OU	STRIX NEBULOSA <b>BT/B/SV</b> great gray owl	Primarily an east side species. On the west side, associated with natural and manmade openings, mostly at higher elevations.
OU	PICOIDES ARCTICUS <b>BS/B/SC</b> black-backed woodpecker	Suspected to occur in the upper end of Quartzville Watershed. Primarily an eastside species. On the westside, it's found in mature/older forests with abundant snags at higher elevations.

<b>MAMMALS</b>		
S	<b>SOREX BAIRDII PERMILIENSIS FS</b> Baird's shrew	Nothing is know about occurrence of this species in the Quartzville Watershed.
S	<b>SOREX PACIFICUS CASCADENSIS FS</b> Pacific shrew	Nothing is know about occurrence of this species in the Quartzville Watershed.
S	<b>LASIONYCTERIS NOCTIVAGANS BT/B/SU</b> silver-haired bat	Highly likely to occur in the Quartzville Watershed. Associated with cliff/cave and snag habitat. Forages in a variety of forest habitats and riparian areas. Little information exists on bat species occurrence in the Quartzville Watershed.
S	<b>MYOTIS EVOTIS BT/B/SU</b> long-eared myotis	Highly likely to occur in the Quartzville Watershed. Associated with snags and cave habitat. Prefers older forests. Forages over water and riparian areas. Little information exists on bat species occurrence in the Watershed.
S	<b>MYOTIS VOLANS BT/B/SU</b> long-legged myotis	Highly likely to occur in the Quartzville Watershed. Associated with cliff/cave and snag habitat. Prefers older forests. Forages over water and riparian areas. Little information exists on bat species occurrence in the Watershed.
S	<b>MYOTIS YUMANENSIS BT</b> yuma myotis	Highly likely to occur in the Quartzville Watershed. Associated with cliff/cave and snag habitat. More closely associated with riparian areas than the other myotis. Prefers older forests. Forages over water and riparian areas. Little information exists on bat species occurrence in the Watershed.
S	<b>CORYNORHINUS TOWNSENDII BS/B/SC</b> Townsend's big-eared bat	Highly likely to occur in the Quartzville Watershed. Feeds on flying insects in a variety of habitats in forested areas. Primary habitat is caves, rock outcrops, buildings and abandoned mines. Little information exists on bat species occurrence in the Watershed.
OU	<b>GULO GULO BS/FS/ST</b> wolverine	Found in higher elevation mountainous and isolated coniferous forests.
D	<b>MARTES PENNANTI BS/FS/SC</b> fisher	There are two sightings in the Quartzville Watershed. Prefers mature and old-growth forests and riparian areas containing large quantities of dead and down wood.
OU	<b>LYNX CANADENSIS FT</b> lynx	Higher elevations in true fir types with snowpacks. Based on analysis of existing and potential habitat, unlikely to occur in the Quartzville watershed.
S	<b>ARBORIMUS LONGICAUDUS SM</b> red tree vole	Likely to occur in the Quartzville Watershed. This arboreal vole prefers mid to late seral forests with closed canopies. Good distributional data is Lacking, especially in I SR where no surveys have been conducted.

## KEY

### Occurrence:

OU=Occurrence Uncertain

S = Suspected

D = Documented

E=Extirpated

**Status:**

LE = Federal endangered

LT = Federal Threatened

BS = Bureau Sensitive

BA = Bureau Assessment

BT = Bureau Tracking

SM=ROD Survey and Manage

B=ROD Buffer or extra protection species

SE = State Endangered

ST = State Threatened

SC = State Critical

SV = State Vulnerable

SU = State Uncertain

SP = State Peripheral

# Appendix F

## Riparian Management Areas and Riparian Reserves

### Oregon Forest Practices Act: Riparian Management Areas for Private Lands (1)

Size (flow)	Type F (fish bearing)	Type D (domestic use)	Type N (all others)
Large(>10 cfs)	100 feet - Basal area target, minimum 40 conifers	70 feet - Basal area target, minimum 30 conifers	70 feet - Basal area target, minimum 30 conifers
Medium(2-10 cfs)	70 feet - Basal area target, minimum 30 conifers	50 feet - Basal area target, minimum 10 conifers	50 feet - Basal area target, minimum 10 conifers
Small (<2 cfs)	50 feet - Basal area target	20 feet - Basal area target	0 to 10 feet - non-merch conifers, understory vegetation

(1) Within specified riparian widths, there are basal area retention requirements that are based on harvest type and geographic region.

**Northwest Oregon State Management Plan: Riparian Management Areas for State of Oregon Lands**

<b>Size (flow)</b>	<b>Type F (fish bearing)</b>	<b>Type N (all others)</b>
<b>Large(&gt;10 cfs)</b>	0 to 25 feet - No harvest	0 to 25 feet - No harvest
<b>Medium(2-10 cfs)</b>	25 to 100 feet - Manage for mature forest condition	25 to 100 feet - Manage for mature forest condition
<b>Small (&lt;2 cfs)</b>	100 to170 feet - Retain 10 to 45 conifers/acre	100 to170 feet - Retain at least 10 conifers per acre
		(75% of reach): 0 to 25 feet - No harvest/maintain channel integrity 25 to 100 feet - retain 10 to 25 conifers/acre 100 to170 feet - Retain 0 to10 conifers/acre

**Northwest Forest Plan: Riparian Reserves for Federal Lands**

<b>Size (flow)</b>	<b>Type F (fish bearing)</b>	<b>Type N (all others)</b>
<b>Large(&gt;10 cfs)</b>	Two site potential tree widths (320 to 360 feet slope distance was modeled) Manage for Late Seral Conditions and Aquatic Conservation Strategy Objectives	One site potential tree width (160 to 180 feet slope distance was modeled)
<b>Medium(2-10 cfs)</b>		Manage for Late Seral Conditions and Aquatic Conservation Strategy Objectives
<b>Small (&lt;2 cfs)</b>		Manage for Late Seral Conditions and Aquatic Conservation Strategy Objectives

# Appendix G

## Riparian Reserve Function and Role of Vegetation

Riparian Vegetation Function	Requirements for Proper Function
Shade <ul style="list-style-type: none"> <li>• regulates instream temperatures for fish/amphibians/invertebrates</li> <li>• regulates terrestrial microclimate</li> </ul>	<ul style="list-style-type: none"> <li>• large trees and other vegetation with high % canopy closure</li> </ul>
Allochthonous input <ul style="list-style-type: none"> <li>• food resource for invertebrates/microbes (99% in 1st order streams)</li> </ul>	<ul style="list-style-type: none"> <li>• diverse species of trees and other vegetation</li> </ul>
LWD source <ul style="list-style-type: none"> <li>• provides habitat for fish, amphibians, invertebrates, and beaver</li> <li>• Helps frame stream geomorphology</li> </ul>	<ul style="list-style-type: none"> <li>• mature conifers in abundant supply</li> </ul>
Nutrient/sediment filter <ul style="list-style-type: none"> <li>• maintains high water quality</li> </ul>	<ul style="list-style-type: none"> <li>• connectivity of flood plain and stream(promotes denitrification)</li> <li>• trees and other vegetation to trap sediment</li> </ul>
Bank stability <ul style="list-style-type: none"> <li>• lowers erosion potential</li> <li>• maintains high water quality</li> </ul>	<ul style="list-style-type: none"> <li>• trees and other vegetation with good root strength</li> </ul>
Habitat/Dispersal corridors <ul style="list-style-type: none"> <li>• provides cover, forage, water</li> <li>• provides connectivity to dispersal areas</li> </ul>	<ul style="list-style-type: none"> <li>• mature to late-successional forest characteristics</li> </ul>
Energy dissipation <ul style="list-style-type: none"> <li>• lowers erosion potential</li> <li>• builds flood plains</li> <li>• maintains high water quality</li> </ul>	<ul style="list-style-type: none"> <li>• trees and other vegetation</li> <li>• connectivity of stream and flood plain</li> </ul>
Regulate stream base flows <ul style="list-style-type: none"> <li>• higher summer low flows/lower winter peak flows</li> </ul>	<ul style="list-style-type: none"> <li>• proper species composition</li> </ul>

# Appendix H

## Transportation Management

### 1. U. S. Forest Service

Roads in the watershed were built using construction methods common at the time of construction. As a result, the majority were constructed using side cast fill placement, and minimal or substandard drainage facilities by today's standards, and are located near or in riparian reserves. Design and construction standards in the past provided little consideration of existing fisheries. These roads are continually in need of maintenance and reconstruction in order to minimize sedimentation from the cut slopes, fill slopes, surface erosion, and roadway failures. These maintenance and reconstruction activities are becoming increasingly difficult to fund, making it impossible to continue maintaining the large network of roads to a standard that will minimize resource problems and provide for public safety. As a result, maintenance work has been prioritized and maintenance of the roads that serve the most users are highest priority. Other roads that have very little use or that cause resource problems are being decommissioned or closed. Many roads are revegetating and will close naturally over time. A variety of uses and demands makes management of the federal transportation system a complex task. On Forest Service lands, a forest wide road closure policy has been developed.

### 2. Bureau of Land Management

#### **Overview of the Western Oregon Transportation Management Plan**

Both the *Northwest Forest Plan* (NFP) and each Western Oregon District's Resource Management Plan (RMP) direct each district to develop a road management plan. The NFP and the Salem RMP offer general guidance on road management and items to consider in the development of a transportation plan. This guidance was incorporated into the *Western Oregon Transportation Management Plan* (TMP) to provide consistency throughout the Western Oregon Districts and to communicate a common road management philosophy to other federal, state, or interested entities. The Western Oregon TMP, encompassing all the western Oregon districts, was completed in June 1996 and updated April 2000. The plan was not intended to be specific on a road by road basis. This level of detail was intended to be developed by each district, and would consider specifics unique to each district.

Road management in Western Oregon is complicated by BLM's checkerboard land ownership pattern and legal access agreements. The BLM has acquired access easements across adjacent lands, and has entered into numerous reciprocal right-of-way agreements. These agreements enable the BLM to use private roads and lands to access BLM lands, and in turn, allow private land owners to access their lands through BLM roads and ownership. As a result, the

transportation system utilized to manage forested lands is formed by a combination of BLM, county, private, state and other federal roads. The rights of adjacent land owners to access their lands is often a prime consideration in transportation management.

### **Objectives of the Strategy for Implementing the Transportation Management Plan**

The objectives of the strategy for implementing the TMP on the Salem District are to:

1. Detail how the Western Oregon TMP is to be implemented on the Salem District.
2. Meet Endangered Species Act (ESA) requirements for all federally listed or proposed aquatic and terrestrial species.
3. Meet Aquatic Conservation Strategy objectives (ACSO) in conducting road related activities and addresses specific items identified in the standards and guides of the NFP.
4. Explain the implementation strategy to the District's employees and external interested parties.
5. Ensure that roads are maintained efficiently and effectively.

The TMP outlines goals and objectives for transportation management with respect to various resource values, common definitions for maintenance levels and road closures, and key components for its implementation. Implementation of the TMP consists of three main components: transportation management objectives, an annual road maintenance operation plan, and monitoring of road related activities. The TMP and the process of how the various components relate to each other can best be illustrated by Figure 1.

### **Transportation Management Objectives (TMOs)**

#### **Criteria:**

All resource areas have developed Transportation Management Objectives (TMOs) by assigning each road in the resource area a TMO classification. TMOs are specific management objectives considering multiple resources for both the short and long term access needs for each road under BLM management. The TMO itself is a recommendation which does not initiate an action, but is carried forth into a decision making process as part of project implementation. TMOs are developed and reviewed in conjunction with the watershed analysis process. TMOs may be updated/refined as additional information becomes available, such as collaboration with adjacent land owners and road managers. Figure 2 best illustrates the TMO process.

Compliance with the Aquatic Conservation Strategy (ACS) warrants a reduction of roads in some watersheds. In addition, each Districts' RMP recommends a reduction in the miles of road open

to vehicles. The primary objectives are to reduce sedimentation, to restore hydrological processes, and to reduce impacts to wildlife, botanical resources, or special areas from a large, open road system. Roads controlled by BLM will be managed in varying states of accessibility. Many local or resource roads may be in a continual state of flux from open to closed to regulate motorized access.

Key items which the interdisciplinary team considers in making recommendations to upgrade, close or decommission roads include:

1. Closing or upgrading roads which pose substantial risk to riparian conditions in terms of landslide susceptibility and flood effects.
2. Closing or upgrading roads in order to minimize sediment delivery to streams from roads and reduce the need for routine maintenance. This can include seasonal restriction of use to reduce sedimentation from winter haul traffic.
3. Removing (road closure) or upgrading culverts to provide or maintain fish passage.
4. Closing or upgrading roads in order to minimize disruption of hydrologic flow paths. Examples include increasing the number of relief culverts and avoiding diversion of streamflow down road ditches.
5. The needs to upgrade or stabilize roads in sensitive soils or unstable areas.
6. Access for resource management in the short-term (<5yrs) and long-term (5-25 yrs). This may have an effect on the type and duration of a road closure.
7. The current/future use and constraints of each road, including the rights of adjacent land owners to access their lands. Access to adjacent private ownership and/or roads under reciprocal right-of-ways have constraints subject to review by the affected parties.
8. Road density criteria established by the RMP and the Biological Opinions between the BLM, USFS, and/or NMFS concerning anadromous fish species (NMFS, March 1997).
9. Reducing road densities according to the Salem District RMP and/or to reduce disturbance to big game and other wildlife species.
10. Closing roads to reduce disturbance sensitive areas and special habitats, including botanical resources.
11. Reasonable and prudent measures, terms and conditions, and conservation measures as addressed in the current Biological Opinions received from USFWS and NMFS to protect

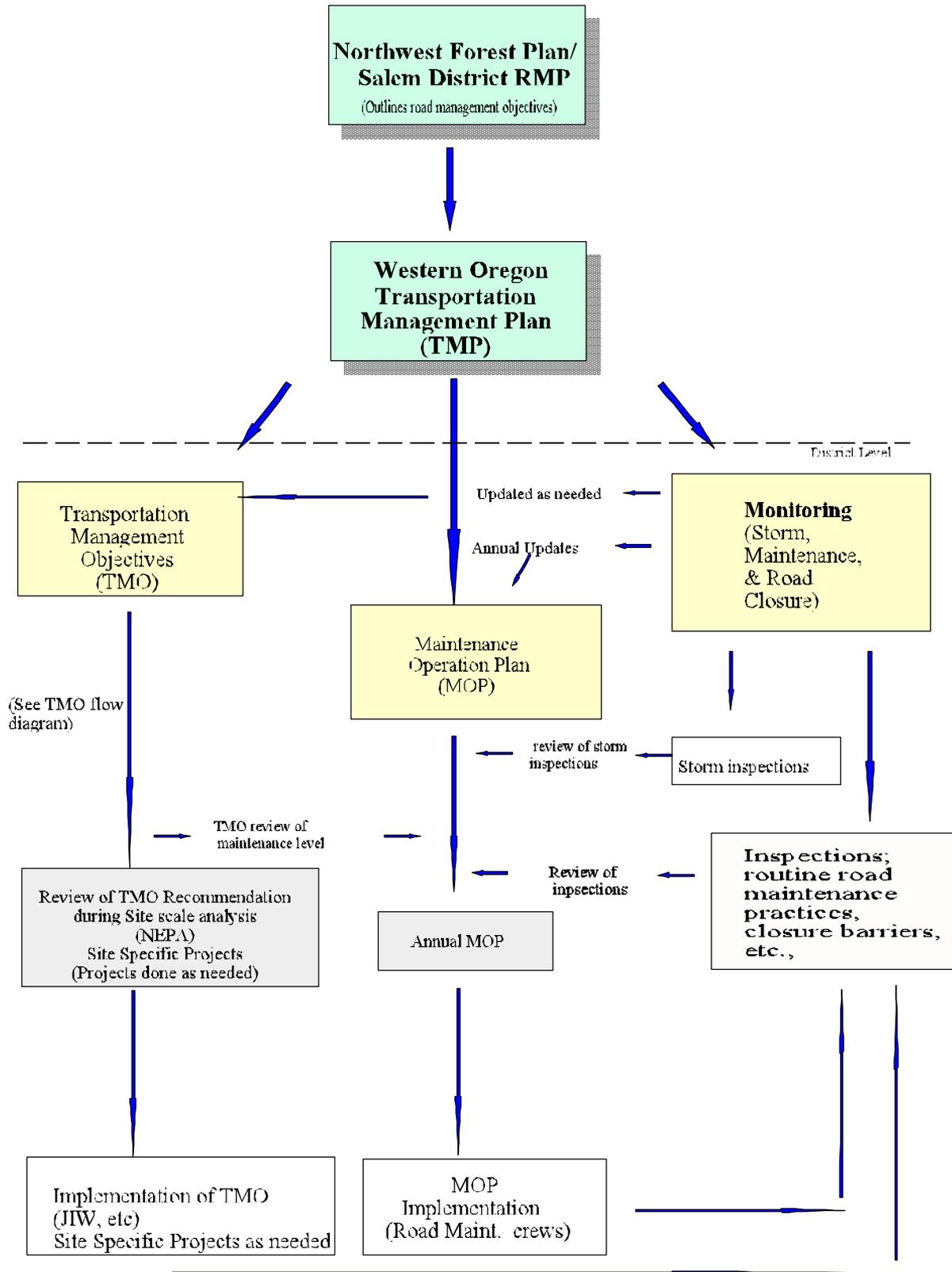
proposed, threatened or endangered species.

On a project by project basis, budget and funding limitations have to be weighed against the risk of resource damage, long term and short term effects and viability of projects. More inexpensive methods may be employed to mitigate risks, address the greatest risk situations and maximize the efficient use of funding across project areas.

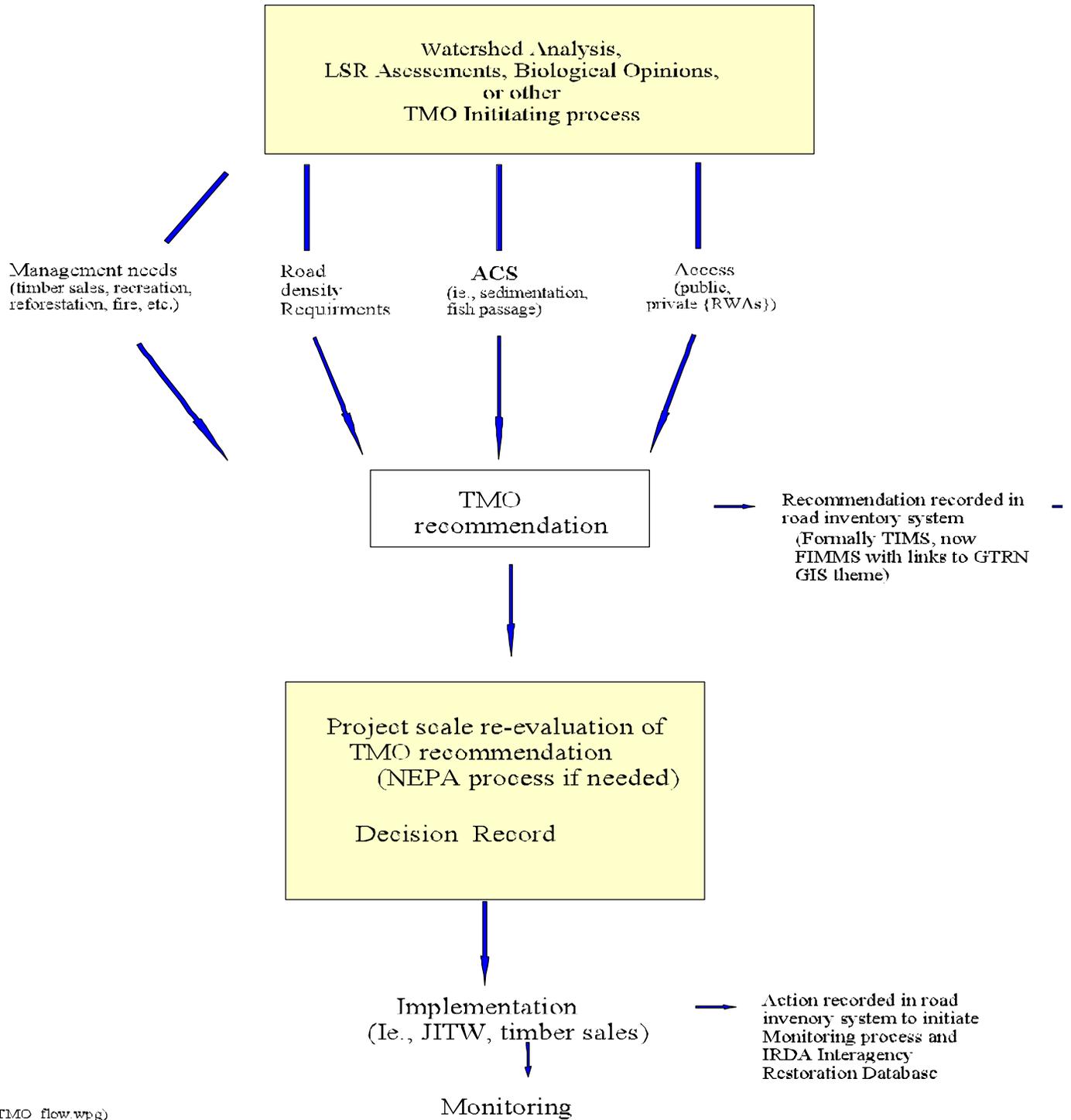
**Figure 1. Flow Chart Describing Implementation of the Western Oregon Transportation Plan.**

**Figure 2. Flow Chart Describing the TMO Development Process.**

(Following pages)



## Transportation Management Objectives



(TMO\_flow.wpp)

## Potential Road Restoration Areas

The following list of roads and road segments in the Quartzville Watershed are planned for decommissioning or closure based on the Western Oregon TMP, the strategy for implementation of the TMP on the Salem District and the Quartzville Watershed Analysis. Most of these roads have been assigned a TMO of 8, which are roads that are no longer needed for the overall transportation system.

Road #	Route Name	Miles	Sub basin
11-2E-14.1	K Line	1.49	Packers Gulch
11-3E-1.1	Packers Gulch to 6000 Line	0.55	Packers Gulch
11-3E-1.5	Toms Try II P-Line	0.24	Packers Gulch
11-3E-2.4	Harry South Side Ext	0.58	Packers Gulch
11-3E-10	Livingston Fire Road	0.44	Packers Gulch
11-3E-10.1	Cougar Camp Spur	0.12	Packers Gulch
11-3E-11	Harry South Side East	0.25	Packers Gulch
11-3E-11.1	Harry South Side West	0.37	Packers Gulch
11-3E-11.2	Dr Livingston Road	0.36	Packers Gulch
11-3E-11.3	Dr Livingston I	0.15	Packers Gulch
11-3E-11.4	Dr Livingston II	0.13	Packers Gulch
11-3E-12	Packers Road System	0.48	Packers Gulch
11-3E-12.1	11-3E-12.1	0.34	Packers Gulch
11-3E-12.2	Ham and Cheese	0.22	Packers Gulch
11-3E-12.3	Packers Gulch Skyline	0.13	Packers Gulch
11-3E-12.4	Red Rock	0.07	Packers Gulch
11-3E-13.3	West Fork Packers Spur	2.25	Packers Gulch
11-3E-14	11-3E-14	0.33	Packers Gulch
11-3E-14.1	11-3E-14.1	0.79	Packers Gulch
11-3E-14.2	Packers Divide	2.08	Packers Gulch
11-3E-14.3	11-3E-14.3	0.54	Packers Gulch
11-3E-14.4	11-3E-14.4	0.17	Packers Gulch
11-3E-15.1	11-3E-15.1	0.23	Packers Gulch
11-3E-16	11-3E-16B	0.34	Packers Gulch
11-3E-22	Yellowstone Loop SPU	0.24	Packers Gulch
11-3E-22.2	Yellowstone Loop Spur 2	0.11	Packers Gulch
11-3E-22.3	Yellowstone Loop Spur 3	0.46	Packers Gulch
11-3E-22.4	Upper Virgin Flats	0.07	Packers Gulch
11-3E-22.5	Virgin Spur 1	0.14	Packers Gulch
11-3E-22.7	Stadeli's Revenge	0.43	Packers Gulch
11-3E-22.8	Crabtree Cherry Road	0.54	Packers Gulch
11-3E-22.9	Crabtree Cherry Spur	0.12	Packers Gulch
11-3E-23	Size 34 Disposal	0.42	Packers Gulch
11-3E-23.1	Virgin Flats Mainline	1.15	Packers Gulch
11-3E-24	Simpsons High Road	0.08	Packers Gulch

<b>Road #</b>	<b>Route Name</b>	<b>Miles</b>	<b>Sub basin</b>
11-3E-24.4	Simpson Road Spur 1	0.19	Packers Gulch
11-3E-26.2	Yellowstone Road C2	0.33	Packers Gulch
11-3E-26.4	Yellowstone Loop Road	0.49	Packers Gulch
11-3E-26.5	Size 34	0.22	Packers Gulch
11-3E-26.7	Purring Kitten	0.14	Packers Gulch
11-3E-28	Longbench	1.64	Packers Gulch
11-3E-28.1	Longbench Spur 1	0.15	Packers Gulch
11-3E-28.2	Longbench Spur 2	0.08	Packers Gulch
11-3E-29.1	Yellowstone Mountain System	0.33	Packers Gulch
11-3E-29.3	The Bank	0.60	Packers Gulch
11-3E-29.4	The Bank Spur	0.15	Packers Gulch
11-3E-32	Yellowstone Mountain System	0.95	Packers Gulch
11-3E-32.2	Repeater Spur	0.32	Packers Gulch
11-3E-32.4	Yellowstone Mountain Sale	0.06	Packers Gulch
11-3E-32.5	Yellowstone Mountain P/1	0.06	Packers Gulch
11-3E-32.6	Yellowstone Mountain P/2	0.03	Packers Gulch
11-3E-33.1	Lonely Buck East	0.16	Moose Creek
11-3E-33.2	Lonely Buck West	0.11	Packers Gulch
11-3E-33.3	Good Old Boy	0.17	Packers Gulch
11-3E-34	50 Cent Spur	0.73	Moose/Packers
11-3E-34.1	4 Bit Adverse Spur	1.09	Packers Gulch
11-3E-34.1	Yellow Eye Spur 11	0.24	Packers Gulch
11-3E-34.2	E. Pluribus Unum	1.01	Moose Creek
11-3E-34.3	Yellow Eye	0.04	Packers Gulch
11-3E-35	Simpson Spur Boulder	0.65	Moose/Packers
11-3E-35.4	11-3E-35.4	0.83	Packers Gulch
11-3E-36	Lower Boulder	2.40	Packers/Moose
11-3E-36.1	Lower Boulder Spur	0.56	Packers Gulch
11-4E-4	Lower Pat Creek Road	0.47	Canal Creek
11-4E-4.1	Pat Creek Spur	0.07	Canal Creek
11-4E-4.2	Upper Pat Creek Spur	0.25	Canal Creek
11-4E-5.4	Flat Top East	0.33	Canal Creek
11-4E-6	Thomas Ridge Spur	0.16	Packers Gulch
11-4E-6.1	Toms Try II P/1 Spur	0.18	Packers Gulch
11-4E-8.1	Backside Road (Packers)	1.19	Packers Gulch
11-4E-16.5	South Pat Creek Ridge	0.21	Canal Creek
11-4E-16.6	Pat Creek Spur 1 Road	0.10	Canal Creek
11-4E-17.3	11-4E-17.3	0.29	Packers Gulch
11-4E-17	Old E F Longline Road	1.64	Packers Gulch
11-4E-17.2	Johnsons Road	0.65	Canal Creek
11-4E-19.1	Yellowbottom Spur 1	0.66	Packers Gulch
11-4E-19.2	Yellowbottom Spur 2	0.44	Packers Gulch
11-4E-19.3	Yellowbottom A	1.21	Canal Creek
11-4E-20	Ceanothus Heaven	0.84	Packers Gulch

<b>Road #</b>	<b>Route Name</b>	<b>Miles</b>	<b>Sub basin</b>
11-4E-20.1	Prone Tree Road	0.35	Packers Gulch
11-4E-21	Yellowbottom A Spur	0.21	Canal Creek
11-4E-31.1	Tyler Spur	0.50	Packers Gulch
11-4E-31.2	Boulder Creek System	0.47	Packers Gulch
11-4E-31.3	Screaming Cat Spur	0.17	Packers Gulch
12-2E-11	12-2E-11 Spur	0.35	Whitcomb Creek
12-2E-11.2	H G Sale Road	0.16	Whitcomb Creek
12-2E-11.3	White Wall Spur	0.08	Whitcomb Creek
12-2E-12.1	12-2E-12.1 Spur	0.41	Whitcomb Creek
12-2E-12.2	12-2E-12.2	0.16	Whitcomb Creek
12-2E-13	O & C 1 (End Section)	1.25	Whitcomb Creek
12-2E-14	Whitcomb Creek System	0.67	Whitcomb Creek
12-2E-14.1	Whitcomb 14.1	0.10	Whitcomb Creek
12-2E-14.2	Whitcomb 14.2	0.91	Whitcomb Creek
12-2E-14.3	E. F. Whitcomb 14.3	0.66	Whitcomb Creek
12-2E-14.4	E. F. Whitcomb P 1	0.06	Whitcomb Creek
12-2E-14.5	White Wall Road	0.26	Whitcomb Creek
12-2E-15	Whitcomb Creek 2 One	0.05	Whitcomb Creek
12-2E-15.1	Whitcomb Creek 2 Two	0.49	Whitcomb Creek
12-2E-15.2	Whitcomb Creek 2 Three	0.06	Whitcomb Creek
12-2E-21.1	Bald Peter Spur 5	0.26	Whitcomb Creek
12-2E-21.3	Bald Peter Spur 6	0.21	Whitcomb Creek
12-2E-23.1	Lower Thistle Spur	0.33	Whitcomb Creek
12-2E-26	Genesis Salvage Road E	0.66	Whitcomb Creek
12-2E-35	Thistle Creek	1.40	Whitcomb Creek
12-3E-1	Upper Boulder	0.89	Moose Creek
12-3E-1.1	Upper Boulder 1.1	1.26	Moose Creek
12-3E-1.2	Upper Boulder 1.2	0.36	Moose Creek
12-3E-2	Upper Boulder 2	0.04	Moose Creek
12-3E-3.1	Lower Dogwood	0.75	Moose Creek
12-3E-3.2	One Eyed Fish	0.06	Moose Creek
12-3E-4	Upper Dogwood	1.30	Moose Creek
12-3E-9.1	One Eyed Fish	0.25	Moose Creek
12-3E-9.2	One Eyed Fish	0.06	Moose Creek
12-3E-9.3	One Eyed Fish	0.15	Moose Creek
12-3E-9.4	One Eyed Fish	0.06	Moose Creek
12-3E-10	Rocky Top 10	0.30	Moose Creek
12-3E-10.1	Rocky III	0.44	Moose Creek
12-3E-11	Rocky Top 11	0.40	Moose Creek
12-3E-11.1	Rocky Top 11.1	0.34	Moose Creek
12-3E-11.2	Sturgeon Falls	0.09	Moose Creek
12-3E-12	Galena Ridge Fire Spur	0.09	Moose Creek
12-3E-15	Rocky Top Spur 1	0.63	Moose Creek

<b>Road #</b>	<b>Route Name</b>	<b>Miles</b>	<b>Sub basin</b>
12-3E-15.1	Rocky Top Spur 2	0.11	Moose Creek
12-3E-15.3	Lower Rocky Top Extension	1.17	Moose Creek
12-3E-15.4	Infantile Rivalry	0.27	Moose Creek
12-3E-16	Rocky Top	0.70	Moose Creek
12-3E-16.1	Simpsons Yellowstone	1.59	Moose/Packers
12-3E-17	Moose Creek Spur 1	0.25	Moose Creek
12-3E-17.2	Moose Creek Spur 2	0.19	Moose Creek
12-3E-17.4	Moose 17.4	0.04	Moose Creek
12-3E-18	Bull Moose Spur	0.04	Moose Creek
12-3E-19.1	Section 19 Spur 1	0.37	Moose Creek
12-3E-19.2	Pre-Coot Spur	0.38	Moose Creek
12-3E-19.3	Coot Spur	0.13	Moose Creek
12-3E-19.4	Section 19 Spur 4	0.12	Moose Creek
12-3E-19.5	Bull Moose P1 Extension	0.19	Moose Creek
12-3E-19.6	Bull Moose 19.6 D	0.19	Whitcomb Creek
12-3E-19.7	Moose 19.7 Road	0.20	Moose/Whitcomb
12-3E-19.8	Bull Moose Main	0.47	Moose Creek
12-3E-20	Thomas Creek Coot Extension	0.09	Moose Creek
12-3E-30.1	Lower M & M Thinning Spur	0.16	Moose Creek
12-3E-30.2	Lower M & M Thinning Spur	0.11	Moose Creek
	<b>TOTAL</b>	<b>63.30</b>	

# Appendix I

## Recreation Opportunity Spectrum (ROS)

The Recreation Opportunity Spectrum (ROS) is the planning framework that was used to inventory both private and public lands in the Quartzville Watershed. Three major components that affect visitor use and preference are setting, activity, and desired experience. Visitors participating in the same activity may be seeking different settings and experiences. For example, one camper may desire a wilderness setting to experience solitude and challenge. Another camper may want highly developed facilities that offer more comfort and social opportunities. To meet these different needs, ROS is a system that is divided into seven major classes that provide a spectrum of opportunities, ranging from more primitive to more developed.

**Primitive:** Characterized by an unmodified natural environment of fairly large size where evidence of humans and human-induced restrictions and controls is essentially absent and motorized access is not permitted. Very low social interaction.

**Semi-Primitive / Non-Motorized:** Characterized by a predominantly natural environment of moderate to large size where evidence of humans and human controls is present but low. Motorized use is not permitted. Social interaction is low.

**Semi-Primitive / Motorized:** This class is similar to the previous one, however, motorized use is allowed.

**Roaded Natural:** Characterized with a predominantly natural environment with moderate evidence of human modification and control, that are in harmony with a natural setting. Moderate social interaction

**Roaded Modified:** Forest or other natural environment, with obvious modifications such as logging or mining, etc., road access and limited facility development, within an open space context. Moderate social interaction.

**Rural:** Characterized by an environment that is culturally modified to the point that it is dominant feature. Cultural modifications are usually associated with agricultural activities, residential activities, and utility corridors. Moderate social interaction.

**Urban:** This class is similar to rural however facility development is intensified and the environment though natural appearing is often landscaped. Modifications are designed to enhance specific recreational activities.

# Appendix J

## Quartzville Creek Wild and Scenic River Management Actions

This appendix outlines the key Management Actions from the Quartzville Creek Wild and Scenic River Management Plan (November, 1992).

### Resource Management Guidance and Actions

The planning cycle for most plans of this nature are 10 to 15 years; however, its effects could be evident for the next 50 years or longer. In developing the plan, management objectives and a desired future condition were developed for each resource to help provide short-term and long-term guidance in the management of Quartzville Creek.

### Recreation

#### Management Objectives

- \* To provide a wide range of recreation opportunities managed in a fashion that prevents the degradation of the outstandingly remarkable values.
- \* To provide facilities, river access and administrative control that support resource protection, visitor safety, health, and enjoyment.
- \* To provide recreation users with education, information, and interpretation designed to encourage stewardship and minimize user impacts and conflicts.

#### Desired Future Condition

The outstanding recreation opportunities that Quartzville Creek offers for activities, such as swimming, camping, fishing, recreational mining, whitewater boating, and nature study, will continue to attract visitors to the corridor. Additional facilities would be developed to meet growing recreational demands and provide short-term and long-term protection of the river's resources and outstandingly remarkable values. However retaining the natural and undeveloped character of the river corridor would be emphasized.

**Facilities:** New overnight facilities would vary in size and level of development depending on

their location in the corridor. Providing resource protection and barrier-free access would be emphasized. The area around the upper portion of the designated segment would be the priority for resource development. Facility design would attempt to minimize impacts to scenic values and other resources within the corridor.

**River Access and Trail Development:** Some improvements in river access would occur in the river corridor in places where needed and where parking is adequate. Efforts would be made to provide barrier-free access where possible. Trail development opportunities, within and extending outside of the river corridor would be pursued. Connectivity to potential trails on Green Peter Peninsula, Crabtree Lake, and the Willamette National Forest, would be emphasized.

**Land Acquisition:** The lands in the corridor which have the greatest concentration of overnight use and the highest potential for recreation development are currently under private ownership. These lands would be acquired on a willing-seller-basis to provide potential sites for facility development and support more consistent recreation management in the corridor.

**Administration:** The level of administrative presence would increase through patrolling, education and interpretation. Visitor safety and resource protection would be emphasized. Recreation use patterns and preferences would continue to be monitored, helping managers to track recreation use levels, trends, and to anticipate potential use conflicts. Standards for recreational use impacts would be developed along with management actions designed to reduce unacceptable impacts. The least restrictive actions would be selected, as long as standards for unacceptable impacts are not exceeded.

Currently boating activity on Quartzville Creek is minimal, consisting primarily of kayaking, when flows are high enough. The need for a use-allocation system for recreational boating is not expected in the near future.

Increases in recreation use along the Green Peter Reservoir may affect the level and type of use within the corridor. These connections make coordination between neighboring management agencies a key component of managing recreational use both within and outside the boundary limits. Any increase in agency presence would be coordinated, when possible, with neighboring agencies in an effort to provide greater coverage and consistent management.

**Undeveloped Camping:** This plan would attempt to maintain undeveloped camping opportunities, however, management of undeveloped use would increase and long-term resource protection would be emphasized. Visitor education would be increased to encourage low impact use habits and minimize undesirable conditions such as multiple fire rings, litter, loss of vegetation, tree damage and improper disposal of human waste. Undeveloped sites continuing to exhibit these undesirable impacts would be temporarily or permanently closed.

**Recreational Mining:** Recreational mining, an outstandingly remarkable value, would continue as an important recreation opportunity within the river corridor. Regulations governing the

management of recreational mining will be consistent with requirements of the Division of State Lands (DSL) and the Oregon Department of Environmental Quality (ODEQ) (see Appendix C). This plan would seek to enhance the recreational mining experience through interpretation information about the mining history of the Quartzville drainage. Education about minimizing the impacts of recreational mining and reducing conflicts with other river users would also be provided.

**Interpretation:** Interpretation of prehistoric and historic values, along with the importance of river resources and resource protection would be key themes. Another important component would provide adequate orientation information to visitors about recreation facilities and opportunities available within the corridor.

## Management Actions

### Facility Development

#### 1. Prepare a facility development plan which would include:

\* Constructing up to four overnight recreation facilities of varying size and levels of development. (The estimated costs below do not show maintenance costs for any new facilities being developed.)

**Schedule:** Planning will begin in 1993 and construction will occur as funding allows.

**Estimated Cost:** \$350,000 for the larger facility (similar to Yellowbottom Recreation Site) and \$100,000 for each smaller facility.

\* Identifying and providing for interim facility needs such as portable restrooms.

**Schedule:** Attempt to provide in 1993, or as soon as funding allows.

**Estimated Cost:** \$6,000 for six units over five months.

\* Evaluating the feasibility of expanding Dogwood Recreation Site to include overnight walk-in tent camping.

**Schedule:** Begin planning in 1993 with construction occurring as funding allows.

**Estimated Cost:** \$15,000-20,000 for planning and to provide a water source and overnight tent sites.

\* Converting a 3.2-acre parcel of BLM land acquired from the General Services Administration into a group-use recreation site.

**Schedule:** Begin planning in 1993 with construction occurring as funding allows.  
**Estimated Costs:** \$75,000 for planning and construction.

\* Identifying key areas for developing permanent restroom facilities outside of developed recreation sites.

**Schedule:** Identify sites in 1993 with construction occurring as funding allows.  
**Estimated Costs:** \$2,000 for planning and \$10,000 per one-person unit.

\* Providing an RV dump station within or in close proximity to the river corridor.

**Schedule:** Identify site in 1993 with construction occurring as funding allows.  
**Estimated Cost:** \$10,000-15,000 for planning and construction.

## **River Access and Trail Development**

### **1. Improve river access in four to six locations and provide barrier-free access where possible.**

**Schedule:** Begin in 1994 with construction occurring as funding allows.  
**Estimated Cost:** \$4,000 to \$6,000 for planning and construction, with varying maintenance costs.

### **2. Construct up to two barrier-free fishing platforms along Quartzville Creek.**

**Schedule:** Begin planning in 1994, with construction occurring as funding allows.  
**Estimated Cost:** \$10,000 to \$15,000 for the planning and construction of each platform.

### **3. Prepare a trail development plan including trails within and extending out of the river corridor and connecting with trails on the Willamette National Forest when possible. Connections to Crabtree Lake and Green Peter Peninsula would also be considered.**

**Schedule:** Attempt to complete plan by 1994, construction would be begin as funding allows.  
**Estimated Cost:** \$7,000 for planning. Construction costs will vary depending on the types and lengths of trails.

## **Land Acquisition**

### **1. Pursue the acquisition (on a willing seller basis) of approximately 1,200 acres of private land through purchase or exchange. In the case of an exchange, the use of public domain**

lands rather than O and C lands would be emphasized in an effort to minimize impacts on county timber receipts.

**Schedule:** Ongoing.

**Estimated Cost:** \$6,000 to \$8,000 to complete the administrative portion of the exchange. \$20,000 to \$30,000 will be needed to staff botanical, wildlife, and cultural resource clearances on both the private and BLM parcels.

**2. Pursue an MOU with private landowners in the corridor for the management of recreation on private lands, on an interim basis, until acquisition is completed.**

**Schedule:** Attempt to establish in 1993.

**Estimated Cost:** \$1,000 for staffing.

## **Administration**

**1. Work cooperatively and develop a Memorandum of Understanding (MOU) with the USFS, Sweet Home Ranger District, U.S. Army Corps of Engineers, Linn County and the State Marine Board to manage recreation along the entire Quartzville drainage and Green Peter Reservoir.**

**Schedule:** Attempt to complete during 1993.

**Estimated Cost:** \$1,000 per year for staffing.

**2. Develop standards for user impacts, conflicts and crowding.**

\* Informally monitor through visitor contact on a yearly basis.

\* An intensive study would be completed every five years or as needed. Information on use levels, patterns, conflicts, and user preferences would be gathered.

**Schedule:** First five year study completed in 1991, next one to occur in 1996.

**Estimated Cost:** \$1,000 a year for staffing and approximately \$7,000 to \$10,000 dollars every five years, depending on the extent of the study.

**3. Develop interim recreational use guidelines for the corridor. (see Appendix C)**

**Schedule:** Finalize guidelines by 1993 and revise as necessary.

**Estimated Cost:** \$1,000 for staffing.

**4. Provide a seasonal recreation staff during peak-use period. Attempt to coordinate with**

neighboring agencies for providing additional coverage.

**Schedule:** Attempt to begin in 1994 as funding allows.

**Estimated Cost:** \$14,000 per year.

**5. Install and maintain limited signing as well as publications informing visitors of use regulations encouraging low-impact use practices and directing them to public river access, recreation sites.**

**Schedule:** Begin installation in 1994 and maintain as needed.

**Estimated Cost:** \$3,000 to \$5,000 initially with maintenance costs as needed.

## **Undeveloped Camping**

**1. Inventory undeveloped campsites within the corridor.**

**Schedule:** Attempt to complete in 1993 and update every five years.

**Estimated Cost:** \$3,500 every five years for staffing.

**2. Develop criteria for identifying sites unsuitable for undeveloped camping and close those sites permanently. Also develop criteria for those sites which are suitable but have unacceptable use impacts and need to be temporarily closed and rehabilitated.**

**Schedule:** Develop criteria in 1993, finalize in 1994 and update every five years or as needed.

**Estimated Cost:** \$3,500 for staffing.

**3. Develop signing and interpretive materials that encourage low impact camping practices.**

**Schedule:** As funding allows.

**Estimated Cost:** See Administration actions.

## **Recreational Mining**

**1. Develop interim guidelines for managing recreational mining using ODEQ and DSL requirements. (See Appendix D)**

**Schedule:** Attempt to finalize in 1993 and update as necessary.

**Estimated Cost:** \$1,800 for staffing, with minor costs for updating.

**2. Develop recreation mining brochure which has historical mining information, mining guidelines and encourages low-impact mining practices.**

**Schedule:** Attempt to complete by 1994.

**Estimated Cost:** \$5,000 for design, layout and one year of printing.

## **Interpretation**

**1. Develop an interpretative master plan for the entire river corridor that would provide guidance in enhancing visitor experiences and supporting resource protection.**

**Schedule:** Begin planning in 1994, with implementation occurring as funding allows.

**Estimated Cost:** \$7,000 for planning with construction costs varying with interpretive projects selected.

**2. Develop an MOU with neighboring private, state and federal entities to coordinate efforts, promote linkage, and prevent duplication of interpretive messages and materials.**

**Schedule:** Would be incorporated into 1993 recreation MOU.

**Estimated Cost:** See Administration actions.

## **Road Management**

### **Management Objectives**

\* To provide scenic driving opportunities and promote road safety along Quartzville Access Road.

### **Desired Future Condition**

The Quartzville Access Road would be managed for recreational and commercial traffic. The BLM-administered segment of the Quartzville Access Road would be dedicated as a part of the BLM's Back Country Byway program. An Oregon State Scenic Byway dedication would also be pursued. A road design and feasibility study would be sought to evaluate the Quartzville Access Road's ability to safely accommodate current and future levels and types of traffic. Coordination and cooperation on the management and maintenance of the entire length of the Quartzville Access Road would be sought.

### **Management Actions**

**1. Pursue a road design and feasibility study for the BLM-administered segment of the Quartzville Access Road. Where possible attempt to implement the recommendations of the study.**

**Schedule:** Attempt to fund in 1994, will be completed as funding allows.

**Estimated Costs:** \$200,000 for study and varying implementation costs depending upon recommendations made.

**2. Until a feasibility study is completed, continue to meet safety requirements for a single-lane road with turnouts.**

**Schedule:** Ongoing.

**Estimated Cost:** \$34,000 annually.

**3. Dedicate the Quartzville Access Road as a BLM Back Country Byway.**

**Schedule:** Begin dedication submission process in 1993.

**Estimated Cost:** \$5,000 for planning and Back Country Byway Kiosk.

**4. Pursue having the Quartzville Access Road nominated and dedicated an Oregon State Scenic Byway.**

**Schedule:** Begin nomination process in 1993.

**Estimated Cost:** Unable to estimate at this time.

**5. Coordinate with the USFS Sweet Home Ranger District in road management and maintenance.**

**Schedule:** Ongoing.

**Estimated Cost:** \$500 per year for staffing.

**6. Install signing encouraging traffic safety and warning drivers of oncoming commercial log truck traffic.**

**Schedule:** As funding allows.

**Estimated Costs:** \$3,000 initially, with additional funding required for replacement as needed.

## **Water Quality**

### **Management Objectives**

\* To protect and enhance water quality. Strive to maintain acceptable water temperatures and levels of turbidity, oxygen, suspended sediment, chemicals, and bacteria.

\* Seek to restore natural ecological and hydrological functioning along Quartzville Creek.

## **Desired Future Condition**

Water quality is specifically addressed in the National Wild and Scenic Rivers Act. The intent of the Act is to maintain the character of the river and protect or enhance specific resource values. Maintaining water quality on Quartzville Creek is important because it directly relates to the health and condition of the river's outstandingly remarkable values, such as scenery (including cascading white water and water clarity) and recreation (recreational mining and white water boating). Water quality is also important to other significant values such as fisheries. Maintaining and improving water quality while enhancing the rivers outstanding scenic and recreational values will require a monitoring program to collect baseline data, develop water quality standards, assess trends, and identify pollution sources and potential mitigating measures.

The BLM is obligated by a number of federal laws to concern itself with water quality. Chief among these laws are the National Environmental Policy Act of 1969, the Federal Land Policy and Management Act of 1976, and the Clean Water Act of 1977 amended 1987. The Clean Water Act lists the State of Oregon as ultimately responsible for the protection of the quality of all waters contained in the state. However, the Oregon Department of Environmental Quality (ODEQ) has identified the BLM as a designated water management agency responsible for protecting water quality as part of its land management planning and implementation. Taken together, these laws require BLM to comply with all federal, state, and local water quality protection measures.

Guidelines for water quality have been defined by ODEQ for the Willamette River Basin, which contains Quartzville Creek. These guidelines include maximum allowable changes in the physical, chemical, and microbiological quality of the creek depending on natural or background levels. The 1988 ODEQ publication entitled "Oregon Statewide Assessment of Non-point Sources of Water Pollution" lists Quartzville Creek as moderately impacted for nutrients, sediment, and stream structure caused by landslides, erosion, changes in flow patterns, road runoff, riparian disturbance, elimination of thermal cover, and removal of vegetation from the watershed.

Once baseline data is collected and the natural variation in the river's water quality is established, standards will be developed to characterize existing water quality. These standards will enable hydrologists to detect changes in water quality and identify potential sources. If negative impacts are identified, point or non-point sources will be isolated and appropriate state and federal authorities notified to take enforcement actions as prescribed by existing laws. All human activities that can affect water quality will be reviewed. Specific projects such as recreation trails and facilities will be reviewed for adverse impacts to water quality.

## **Management Actions**

**1. Recommend to the United States Geological Survey (USGS) to maintain operation of the**

**stream gage on Quartzville Creek at Panther Creek.**

- \* Recommend the USGS maintain the gage on Quartzville Creek. If the agency considers closure, then consider cooperative funding if possible.

**Schedule:** As needed.

**Estimated Costs:** Up to \$5,000 a year for cooperative funding.

**2. Develop water quality standards for Quartzville Creek using state guidelines and baseline data currently being collected.**

- \* After three years of baseline data have been collected, interim guidelines will be established using the Limits of Acceptable Change (LAC) process (see Appendix E).

- \* Interim guidelines will be tested for applicability and effectiveness for two years, then finalized.

- \* Notify ODEQ of the parameters.

**Schedule:** Establish interim parameters (natural variation) by 1995 and final parameters by 1997.

**Estimated Costs:** One time costs are \$5,000 for planning and staffing.

**3. Develop a long-term monitoring program for water quantity and quality.**

- \* BLM will conduct monitoring and testing at three locations on the river, one site near the upper end of the designated segment, one between, and one near the lower end of the segment.

- \* The locations will be tested for a range of chemical, biological, and physical indicators, and stream discharge on a monthly basis for three years, and bi-monthly or quarterly thereafter.

**Schedule:** Begin monitoring immediately.

**Estimated Costs:** Annual costs are \$5,000 per year for staffing, equipment and water testing.

**4. Establish an action plan outlining notification procedures and specific actions if pollution levels are exceeded.**

- \* BLM will develop an action plan to isolate pollution sources if a problem develops.

- \* BLM will develop notification procedures to follow if pollution is detected.

**Schedule:** Attempt to have completed by 1995.

**Estimated Costs:** One time costs are \$4,000 for planning and staffing.

**5. Notify ODEQ of any water quality problems originating outside BLM jurisdiction.**

\* ODEQ will be notified and a request made to locate and mitigate problems which develop outside BLM jurisdiction.

**Schedule:** As needed.

**Estimated Costs:** \$500 a year for staffing.

**6. Dispersed campsites in and adjacent to riparian areas would be evaluated for adverse impacts to water quality. Areas found to have unacceptable impacts would be permanently closed or temporarily close and rehabilitated.**

**Schedule:** Attempt to complete by 1994.

**Estimated Costs:** One time costs are \$2,000 for planning and staffing. Rehabilitation costs will depend on the number of sites selected and the type of rehabilitation needed.

**7. If the need develops, coordinate water quality monitoring with the USFS.**

\* Coordinate water quality monitoring with the USFS to identify non-point pollution sources if problems arise on forest service lands.

**Schedule:** Ongoing.

**Estimated Costs:** \$500 a year for staffing.

**8. Identify watershed enhancement opportunities on BLM lands which would meaningfully reduce non-point source pollution on Quartzville Creek.**

\* Identify and implement projects such as, riparian area rehabilitation, landslide rehabilitation, erosion reduction projects on roads, campgrounds, and trails.

**Schedule:** Ongoing.

**Estimated Costs:** \$2,000 per year for staffing and materials.

**9. Initiate cooperative watershed enhancement opportunities on neighboring private and public lands, if necessary, to reduce non-point pollution.**

\* Identify and work with neighboring landowners if necessary to reduce non-point pollution sources.

**Schedule:** Ongoing.

**Estimated Costs:** \$1,000 a year for staff and planning.

# **Botanical/Ecological**

## **Management Objectives**

- \* To provide plant and animal community diversity and maintain and/or enhance healthy functioning ecosystems as the foundation to sustain long-term productivity.
- \* To protect any special status species identified in the corridor.

## **Desired Future Condition**

The desired future condition is to perpetuate and conserve naturally functioning ecosystems within the river corridor. Some aspects of ecosystem conservation will include: nutrient cycles, plant and animal habitat, number of species, abundance and density of species, spatial arrangement and geological and successional processes. Conservation practices would seek to maintain native plant communities and their habitats and protect rare, sensitive, threatened and endangered species administered by federal and state agencies and the Oregon Natural Heritage Program. Facility development and any other management activities would take into consideration and mitigate the impacts to these resources. Revegetation, where necessary, would be done with native species when possible.

## **Management Actions**

- 1. Comply with existing BLM policy, federal and state laws and regulations governing the management of special status species should any be identified in the corridor.**

**Schedule:** Ongoing.

**Estimated Cost:** Will vary depending on situation and species identified.

- 2. Complete botanical surveys on specific locations where planned management actions such as access routes to streams, access road modifications, sanitation and dump station sites, waste disposal sites, interpretive trails and timber harvest would occur.**

**Schedule:** As needed.

**Estimated Cost:** \$500 per clearance (may vary with size of project area).

- 3. Cooperate with the Department of Agriculture on the removal of any noxious weeds identified within the corridor or in close proximity to the corridor boundary.**

**Schedule:** As needed.

**Estimated Cost:** Will vary with type and extent of invasion, and method of eradication.

## **Riparian Areas**

### **Management Objectives**

\* Seek to restore proper functioning condition of riparian areas. Proper functioning condition exists when adequate vegetation and large woody debris are present to dissipate stream energy associated with high water flows, stabilize streambanks, develop diverse channel characteristics, and support greater biodiversity.

\* Maintain a spectrum of seral stages throughout the riparian corridor driven primarily by natural disturbances.

\* Manage for native species.

### **Desired Future Condition**

Healthy riparian areas provide values and benefits far in excess of the small percentage of area they occupy. When a riparian area is healthy and functioning properly, its lush vegetation contributes to improved water quality, rebuilds flood plains, reduces erosion, helps store floodgates, and regulates flows. A healthy riparian also encourages vegetative growth for a more productive animal community and are of critical importance to fish, birds, and other wildlife. It supports a large diversity of insects, mollusks, and crustacean species that are key resources in the food chain. Riparian areas provide shelter, nesting, and traveling corridors for a diversity of wildlife species.

The BLM national policy goal guiding future riparian management is to maintain, restore, or enhance riparian-wetland values to achieve a healthy and properly functioning condition for maximum long-term benefit. Four major goals and strategies for achieving the riparian management policy are outlined in the BLM publication "The Riparian-Wetland Initiative for the 1990s". These general goals are: (1) maintain and restore riparian areas, (2) protect riparian areas and associated uplands, (3) provide information and education, and (4) improve coordination between land owners.

### **Management Actions**

**1. Comply with BLM policy, federal, and state laws and regulations governing the management of riparian areas.**

**Schedule:** Ongoing.

**Estimated Costs:** Will vary with situation.

**2. Allow no timber harvesting within 200 feet of Quartzville Creek on BLM- administered lands.**

\* Exceptions to this action would be harvesting for recreational development or improvements, scenic enhancement, and hazard tree removal. Such activities would require an interdisciplinary review for approval.

**Schedule:** As needed.

**Estimated Costs:** No cost expenditures necessary.

**3. Seek watershed and riparian enhancement opportunities and provide technical assistance and funding for enhancement projects. Pursue cooperative and voluntary opportunities for rehabilitation projects.**

**Schedule:** As needed beginning in 1993.

**Estimated Cost:** \$1,000 annually for supplies and \$1,800 annually for staffing.

**4. Close sensitive or excessive river access routes and trail networks within riparian zone.**

**Schedule:** Initiate after plan implementation.

**Estimated Costs:** \$300 annually for supplies and \$900 annually for staffing.

## **Wildlife**

### **Management Objectives**

- \* To comply with existing BLM policy, federal and state laws and regulations, governing the management of special status species and other wildlife.
- \* To protect, restore and/or enhance wildlife habitat in and adjacent to the corridor.
- \* To coordinate with other agencies and organizations to better manage wildlife habitat.

### **Desired Future Condition**

Management of wildlife habitat would stress protection of critical habitats such as wetlands, riparian areas, deer and elk winter range, and old-growth forests. Management would attempt to minimize or mitigate impacts from human activities to the extent that natural processes are allowed to continue.

Selected wildlife species and habitats within the corridor would be inventoried to establish baseline data for the development of a future habitat monitoring program and to better evaluate impacts of future actions. Wildlife species inventories would stress those species listed by the U.S. Fish and Wildlife Service and the State of Oregon as threatened, endangered, sensitive, or of special concern.

Coordination and cooperation with other agencies and interested parties would be important for the consistent management of the wildlife resource. This includes opening negotiations for the acquisition of private land within and adjacent to the corridor to better facilitate management of the wildlife resource.

Habitat restoration and/or enhancement would be pursued in order to restore previously impacted areas or improve existing habitats.

## **Management Actions**

### **1. Inventory and monitor selected wildlife species and habitat to establish baseline data on species presence, habitat condition and trends.**

\* Species inventory would place emphasis on determining occurrence and relative abundance of species listed as threatened, endangered, sensitive, or of special concern. A site specific wildlife observation file would be compiled and maintained. Baseline data would be used to better evaluate impacts of future actions and develop a wildlife habitat monitoring program. Monitoring efforts would be directed toward wildlife habitat. Wildlife habitat inventory and monitoring would focus on critical habitats such as wetlands, riparian areas, deer and elk winter range, and old-growth forests.

**Schedule:** Attempt to begin inventory in 1994.

**Estimated Costs:** \$9,000 annually for two years until the inventory is completed. The cost of the monitoring program will vary depending on the level of monitoring necessary.

### **2. Dispersed campsites in and adjacent to riparian areas would be evaluated for adverse impacts to wildlife. Close and rehabilitate areas found to have unacceptable impacts. Other habitat protection, restoration and enhancement opportunities would be identified based on habitat inventories and monitoring.**

**Schedule:** Same as wildlife inventory.

**Estimated Costs:** Costs included in species inventory estimate.

### **3. Pursue negotiations for the acquisition of private land within and adjacent to the corridor to better facilitate management of the wildlife resource.**

\* Critical habitat areas on private lands in and adjacent to the corridor would be identified. Land values would be investigated and parcels identified and ranked in importance from a wildlife perspective. Continue negotiations with private landowners

for the acquisition of parcels.

**Schedule:** Begin in 1993 and continue until completed.

**Estimated Costs:** See Land Acquisition section.

#### **4. Recommend the Quartzville Creek Corridor be designated a Watchable Wildlife Area.**

\* Quartzville Creek provides the opportunity for observing several osprey and osprey nests along the corridor. Bald eagle activity is also common around Green Peter Reservoir, directly below the designated river segment.

**Schedule:** Begin in 1993.

**Estimated Costs:** \$900 for staffing and up to \$2,500-3,500 for an interpretive signing.

## **Fisheries**

### **Management Objectives**

- \* Maintain/improve the current condition of fish habitat, to preserve the quality of the recreational rainbow trout fishery and the wild cutthroat trout fishery.
- \* Minimize impacts on fish habitat from facility development, unregulated recreation use and road construction.
- \* Maintain/improve the current habitat conditions, such that reintroduction of anadromous fish to Quartzville Creek is feasible, in the event that Oregon Department of Fish and Wildlife makes a decision to do so.

### **Desired Future Condition**

Existing fish resting, rearing and spawning habitat will not be further degraded as a result of human activities. Habitat quality will gradually improve in Quartzville Creek and its tributaries as previously disturbed riparian areas revegetate, and as new land management practices afford better protection for these areas in the future. Fish habitat restoration measures will help speed this process.

### **Management Actions**

#### **1. Conduct a habitat and species inventory for Quartzville Creek and one of its main tributaries.**

**Schedule:** Will be completed by September, 1993.

**Estimated costs:** One-time costs of \$4,650 for habitat inventory and \$1,500 for staffing for species inventory work.

## **2. Develop a habitat monitoring program for Quartzville Creek and that same tributary.**

\* Habitat inventories are generally conducted at ten-year intervals. If habitat improvement structures are constructed, intervals of five years are recommended.

**Schedule:** Program will be developed after the initial inventory is completed.

**Estimated Costs:** Unless habitat improvement structures are implemented, annual monitoring costs will be \$465 for staffing.

## **3. Leave fallen trees along and in Quartzville Creek to provide large woody debris in the stream channel.**

**Schedule:** Ongoing.

**Estimated costs:** None.

## **4. Enhance riparian conditions where possible.**

\* Planting of cedar, willow and alder in impacted riparian zones.

\* Possible installation of structures to divert water away from areas of human-caused bank erosion.

\* Closure of riparian areas impacted by heavy recreational use.

**Schedule:** Ongoing.

**Estimated costs:** Annual costs of \$1,000 for materials and \$1,000 for staffing.

# **Visual Resources**

## **Management Objectives**

\* To comply with Visual Resource Management (VRM) guidelines (see Appendix E) for public lands within the river corridor.

\* To protect and maintain the visual resources within the river corridor.

## **Desired Future Condition**

Scenic driving was identified as one of the outstandingly remarkable values for which Quartzville Creek was designated. This plan would seek to maintain the undeveloped character of the river as well as protecting the key visual components within the river corridor.

Some of the key visual components within the river corridor are old-growth stands, views of Quartzville Creek (waterfalls and white water riffles), wildlife (osprey nests), color and texture contrasts provided by younger stands and hardwoods and rocky outcroppings.

Directed by VRM guidelines (see Appendix E), those lands with a Class 2 rating would be managed such that, "changes in any basic element caused by a management activity should not be evident in the characteristic landscape." Those lands with a Class 3 rating require that, "while contrasts to the basic elements caused by management activity may be evident and may attract attention in the characteristic landscape, changes should remain subordinate to the existing landscape.

Some vegetation manipulation may be allowed for enhancement of scenic qualities. (i.e. removing vegetation to open up view of water falls, revegetation where needed, etc. Any management activities such as facility development or timber harvest would be subject to modification, and screening of any development would be used whenever possible to preserve scenic values within the corridor.

Scenic values on private lands within the corridor will improve as disturbances become less observable as vegetation regrowth continues. Should any of these lands be acquired through purchase or exchange, they would be inventoried, classified and managed under the same guidance as other public lands in the corridor.

## **Management Actions**

### **1. Inventory and map viewshed along Quartzville Creek from Quartzville Road, and identify key viewpoints to be protected or enhanced.**

\* After initial inventory and map has been completed, monitor visual resources every five years, and update as necessary.

**Schedule:** Complete by 1995.

**Estimated Cost:** \$2,000 for initial inventory and mapping.

### **2. Monitor compliance with VRM guidelines for any proposed management action and make necessary modifications on proposed actions for the protection of visual resources.**

**Schedule:** As needed.

**Estimated Cost:** Will vary depending on extent and type of proposed action.

### **3. Work with private landowners in minimizing the visual impacts of timber harvest and other activities on private lands.**

**Schedule:** As needed.

**Estimated Cost:** Will vary, depending on level and type of involvement.

#### **4. Open negotiations on a willing-seller basis for the acquisition of private land within the river boundary.**

**Schedule:** See land acquisition.

**Estimated Cost:** See land acquisition.

## **Cultural Resources**

### **Management Objectives**

\* Identify historic and prehistoric cultural resource sites and protect and stabilize significant sites.

\* Emphasize providing users with education, information, and interpretation designed to minimize user impacts and to encourage appreciation of cultural resources.

### **Desired Future Condition**

This plan will seek to protect prehistoric and historic cultural resources within the river corridor. Significant cultural sites will remain stable and where necessary, stabilization measures will be taken to prevent deterioration resulting from natural or human-induced processes. Sites will be available for scientific research purposes if the site can contribute significant information to broad research questions. Conservation of sites for future use will be emphasized for all significant sites. Interpretation of cultural resource themes relevant to the Quartzville Corridor will be undertaken to enhance recreational visitors experience and to promote site protection and positive stewardship values in the public. Interpretation efforts may take a variety of forms, including publications, but would not typically occur on the cultural resource site locations themselves. Interpretive materials may take a variety of forms, including publications, and would be made available typically at developed recreation sites or interpretive facilities.

The presence of specific prehistoric sites is not known at this time. Historic activities and sites have been identified. The National Historic Preservation Act and other laws mandate certain requirements for identification, evaluation and protection of cultural resource values. The intent of this plan is to identify and protect significant cultural resources and to enhance recreational experiences of visitors through a variety of means including interpreting the local history and prehistory of the Quartzville Creek Corridor. This will be done by conducting inventories of lands and recorded sources and may also include collecting oral histories, when possible. Evaluations of identified sites will occur in accordance with federal law and Bureau policy.

### **Management Actions**

**1. Conduct a cultural resource inventory within the Quartzville Wild and Scenic corridor boundary.**

**Schedule:** Complete by 1995.

**Estimated costs:** \$35,000 for a one-time cost.

**2. Evaluate and determine eligibility of all sites for the National Register of Historic Places.**

**Schedule:** Following inventory, or as needed.

**Estimated costs:** \$5,000 to \$20,000 per site.

**3. Manage suitable cultural resources for scientific use, socio-cultural use, public use or conserve for future use according to the use categories in BLM Manual 8111.21.**

**Schedule:** Ongoing.

**Estimated costs:** \$5,000 annually.

**4. Interpret cultural resource information, emphasizing prehistoric and historic themes pertinent to the corridor and the importance of resource protection. Interpretation efforts would focus on minimal on-site construction in developed recreation sites.**

**Schedule:** Following inventory, with the majority of work in the two years immediately thereafter. Ongoing and updating interpretation would continue to occur in the years following the initial work.

**Estimated costs:** \$10,000 annually for the first two years after initiation of interpretation efforts, \$3,000 annually in succeeding years.

**5. Monitor cultural resources in the corridor.**

**Schedule:** Following inventory, ongoing.

**Estimated costs:** \$3,000 annually.

## **Timber and Special Forest Products**

### **Management Objectives**

\* To provide timber and special forest products management that is consistent with National Wild and Scenic Rivers Act and other BLM land use plan allocations and guidelines.

### **Desired Future Condition**

Timber management and special forest products collecting would be allowed to occur within the corridor as long as they are consistent with other resource management objectives and broader land use plans for the Salem District. Management actions associated with these resources would be analyzed for potential adverse impacts to the outstandingly remarkable values or other

significant river-related values. Actions resulting in impacts will require modification or mitigation to eliminate or reduce such adverse impacts.

## **Management Actions**

**1. Timber management activities and the collection of special forest products will be allowed as long as they are consistent with other resource management objectives and guidelines for the corridor.**

**Schedule:** As needed.

**Estimated Cost:** Will vary, depending on extent and type of activity.

## **Implementation Priority**

The full implementation of this plan will require a significant investment. Some of the costs associated with staffing for monitoring purposes may be partially covered with existing personnel. However, additional funding will be necessary for facility planning and construction and program development. Where possible, partnerships will be sought to help provide additional funding.

The priority in implementing this plan will emphasize public health, safety and resource protection. Of immediate concern is the lack of sanitation facilities and agency presence within the corridor. Another important concern is the high level of undeveloped recreation use and user impacts occurring on private land in the corridor.

The feasibility study for the Quartzville Access Road is also a priority, because the capacity of the road should be established before any major facility development occurs which might increase traffic in the area.

As impacts associated with high concentrations of undeveloped camping continue to increase, the need for more developed sites will intensify. This makes implementing the facility development portion of this plan a key activity.

To aid in tracking the implementation process, a brief summary report will be prepared on an annual basis discussing accomplishments, monitoring activities, and unmet needs.

# Appendix K

## Quartzville Cultural Resource Sites

The following sites are affiliated with historic mining and settlement within the Quartzville Mining District. All of the sites are located in the BLM's (U.S.D.I., n.d.; Stumpf, 1979) Quartzville Creek Wild and Scenic River corridor:

Note: ownership of the site is shown in parentheses following the site description.

SHS 638 - A cabin site designated "Miners Cabin" on the 1897 GLO survey map in an area that was heavily mined. (Private Land)

SHS 640 - The George Ross cabin, shown on the 1897 GLO survey map. Prior to 1897, Ross built a water ditch from Boulder Creek to Quartzville Creek, apparently for mining purposes. The land on which the cabin stood was purchased in 1906 and now belongs to BLM. (BLM)

SHS 642 - A cabin and small power plant built in the 1940's by four men from Albany, this site was destroyed by construction of the Yellowstone Road. (BLM)

SHS 657 - The W.B. Stevens cabin, shown on the 1907 GLO survey map. (BLM)

SHS 658 - The H.H. Stevens cabin, shown on the 1907 GLO survey map. (BLM)

SHS 659 - A cabin designated "Old Cabin" on the GLO survey map of 1907, this cabin site may date to the gold rush of the 1860's. (BLM)

SHS 662 - The Crutch field cabin, shown on the 1907 GLO survey map. (BLM)

SHS 663 - The Nat Needham cabin, shown on the 1907 GLO survey map. (BLM)

SHS 667 - A cabin designated "Hunter's Cabin" on the 1907 GLO survey map. (BLM)

SHS 670 - The Elizabeth Cox cabin, shown on the 1907 GLO survey map. (Private Land)

SHS 671 - The C.B. Chandler cabin, shown on the 1907 GLO survey map. (Private Land)

SHS 820 - Quartzville Access Road. An 1879 GLO survey map shows a trail running from Foster to the Quartzville Mining District along the west and north sides of Quartzville Creek. Portions of the trail were improved into road at various times. In the 1930's, the CCC improved the entire road from Foster to Quartzville. Originally, the trail

was used by early miners and settlers to carry supplies from Sweet Home to Quartzville. After 1911, the Linn County Fire Patrol Association used the trail grade for a string of telephone lines connecting fire lookouts at High Deck, Green Peter and Yellowstone Mountain to their Lebanon main station. Today, the road is incorporated into the major Quartzville county access route. (Private and BLM)

SHS 821 - A short trail branching from the Quartzville Wagon Road at Bryant City and extending south along Canal Creek to join the Quartzville Access road. This trail was in use prior to the 1900's. (BLM)

SHS 828 - Dogwood Park was the location of intensive placer mining from the 1890's through the 1930's. (BLM)

SHS 876 - The A.J. and Robert Babb's cabin on the Maple Leaf placer claim, dates to 1955. The claim was declared void in 1965. (BLM)

SHS 877 - August Kroop cabin on the Big Bend Placer Mining claim dates to 1934. The claim may actually have been made to get the timber. (BLM)

The sites of the town of Quartzville and the town of Bryant City, the Mining District's entertainment center, are outside the Wild and Scenic River corridor on private land. No structures remain on either site.

With the exception of SHS 642 and SHS 820, the condition of these mining-related cultural resources along Quartzville Creek is unknown.

Nearly all the BLM managed lands along Quartzville Creek are originally those unhomesteaded lands granted by Congress to the Oregon and California Railroad Company (O&C company) between 1866 and 1869 for the purpose of raising money to pay for the construction of a railroad which would start in Portland and go through the Willamette Valley, south to California. the O&C Company was required to sell these lands to settlers, but in many cases, as with this area, the land was heavily timbered, steeply dissected, slopes with forest-type soils, and so unsuitable for farming. In 1916, unsold O&C lands were revested to the Federal Government due to numerous violations in the terms of the original grant, and these Quartzville Creek lands returned to be managed as timber lands by the GLO and ultimately, its successor, the Bureau of Land Management. The first timber sales on these lands occurred in the early 1950's.

**Other historic sites in the corridor include:**

Yellowstone Guard Station, which was built in 1936 by the Linn County Fire Patrol Association (Linn County Fire Patrol Association, 1962) for fire patrol and suppression purposes.

Quartzville Guard Station/Work Center (11-4-29-1h), built in the 1930's at Rabbit Camp on the Willamette National Forest as part of a CCC camp, and moved before 1956 to its present location on BLM land. The two buildings at the site have never been used in their current location and have been found ineligible for the National Register of Historic Places. (U.S.D.I., n.d.)

At this time, the Quartzville Guard Station/Work Center is the only site in the corridor to have been evaluated for National Register eligibility.

Findings: The identified existing historic sites within the Quartzville Creek Wild and Scenic River corridor are not associated with rare, unusual or one-of-a-kind events or cultural activities in the region. Scattered gold mining districts of small production in the western Cascades dating to the same era include the North Santiam District in Clackamas and Marion Counties (1872 to 1947), the Blue River District in Linn and Lane Counties (1887 to 1913), Fall Creek District in Lane County (1901 to 1931) and the bohemia district in Lane County (1858 to recent) (Brooks and Ramp, 1968). None of the Quartzville historic sites are currently listed on or determined eligible for the National Register of Historic Places, although this may be due to the fact that these sites have not been systematically inventoried and evaluated. The current information on historic resources in the Quartzville Creek corridor is incomplete and does not support a finding of outstandingly remarkable value. However, additional inventory and evaluation should be conducted in the future to accurately assess these historic resources' values.

# Appendix L

## Bibliography

Agee, J.K. 1993. *Fire Ecology of Pacific Northwest Forests*. Island Press.

Applegarth, J. 1999. *Draft Management Recommendations for Terrestrial Mollusk Species, Megomphix hemphilli*, the Oregon Megomphix, Version 2.0, November, 1999.

Bailey, J.D, Tappeiner, J.C. 1996. *Effects of Thinning on Structural Development in 40-100 Year Old Douglas-fir Stands in Western Oregon*. Reprinted from *Forest Ecology and Management* 108 (1998) 99-113. Conclusions from BLM Retrospective Thinning Study, USDI, BLM.

Barbour, R.J., Johnston, S., Hayes, J., Tucker, G. 1997. *Simulated Stand Characteristics and Wood Product Yields from Douglas-fir Plantations Managed for Ecosystem Objectives*. In *Forest Ecology and Management* 91 (1997) 205-219.

Baxter, P. W. 1986. *Archaic Upland Adaptations in the Central Oregon Cascades*. Ph.D. Dissertation, Department of Anthropology, University of Oregon.

Berg, D.R., Brown, T., Blessing, B. 1996. *Silvicultural Systems Design with Emphasis on the Forest Canopy*. Northwest Science, Vol. 70, Special Issue, 1996.

Biswell, B., Blow M., Finley L., Madsen S., Schmidt K. 2000. *Survey Protocol for the Red Tree Vole (Arborimus longicaudus)*. Version 2.0.

Boyd, R. 1986. *Strategies of Indian Burning in the Willamette Valley*. *Canadian Journal of Anthropology*. 5:65-86.

Brooks, H. and Ramp L. 1968. *Gold and Silver in Oregon*. Bulletin 61. Oregon Department of Geology and Mineral Industries.

Brown, E.R., et al. 1985. *Management of Wildlife and Fish Habitat in Forests of Western Oregon and Washington*. USDA Forest Service. Publ. No. R6-F&WL-192-1985. PNW Region, Portland, OR.

Burke, C.J. 1979. *Historic Fires in the Central Cascades, Oregon*. M.S. thesis, Oregon State University, Corvallis.

Burke, T. 1999. *Draft Management Recommendations for Terrestrial Mollusk Species, Prophyaon coeruleum*, the Blue-Gray Taildropper and *Prophyaon dubium*, the Papillose

Taildropper, Version 2.0, November, 1999.

Burroughs, J., Edward R., Chalfant G., Townsend M. 1976. *Slope Stability in Road Construction*. Bureau of Land Management, USDA. Oregon State Office. Portland, OR.

Bury, R.B., Corn, P.S., Aubry, K.B., et al. 1991. *Aquatic Amphibian Communities in Oregon and Washington*. In: Wildlife and Vegetation of Unmanaged Douglas-Fir Forests. USDA Forest Service. General Technical Report PNW-GTR 285. Portland, OR.

Callaghan, Eugene, and Buddington, A. F., 1938, *Metalliferous Mineral deposits of the Cascade Range in Oregon*. In United States Department of the Interior, Bulletin 893. United States Government Printing Office, Washington, D. C., 141 pages.

Carey, A.B., Johnson, M.L. 1995. *Small Mammals in Managed, Naturally Young, and Old-Growth Forests*. Ecological Applications 5(2):336-352.

Carey, A.B. 1998. *Ecological Foundations of Biodiversity: Lessons from Natural and Managed Forests of the Pacific Northwest*. Northwest Science 72:127-133.

Carey, et.al. 1999. *Ecological Scale and Forest Development: Squirrels, Dietary Fungi, and Vascular Plants in Managed and Unmanaged Forests*. Wildlife Monographs 142:1-71.

Carey, A.B., Lippke, B.R., Sessions, J. 1999. *Intentional Ecosystem Management: Managing Forests for Biodiversity*. Journal of Sustainable Forestry 9(3/4): 83-125.

Corkran, Char C., Thoms, Chris. 1996. *Amphibians of Oregon, Washington and British Columbia*. Lone Pine Publishing, Edmonton, Alberta, Canada.

Curtis, R. 1982. *A Simple Index of Stand Density for Douglas-fir Stands*, Forest Science, Vol.28, No. 1, pp.92-94.

DeBell, D., Curtis, R., Harrington C., Tappeiner, J. 1997. *Shaping Stand Development Through Silvicultural Practices*. In Forest Ecology and Management, 1997.

Diaz, N., and Apostol, D. *Forest Landscape Analysis and Design*. USDA, Forest Service. Pacific Northwest Region. Portland, OR.

Dyrness, C. 1967. *Mass Soil Movement in the H.J. Andrews Experimental Forest*. USDA Forest Service. PNW Forest and Range Experimental Station. Research Paper PNW-42.

*Ecosystem Analysis at the Watershed Scale: A Federal Guide for Watershed Analysis*. 1995. Regional Ecosystem Office (updated March, 2000).

England, J., Brown, L., McCaull, A., Turner, S., LeComte, J., DeFord, S. 1991-2001. *Northern*

*Spotted Owl Monitoring Reports*, Cascades Resource Area, Salem District, Bureau of Land Management.

Evers, L. Hubbs, H. Crump, R., Colby, J. and Dobson, R. *Fire Ecology of the Mid-Columbia*. USDA Forest Service, Mt. Hood National Forest. Sandy, Oregon.

Farnell, J.E. 1979. *Santiam River Navigability Study*. Army Corps of Engineers.

Fahnestock, G.R. 1977. *Interactions of Forest Fire, Flora, and Fuels in Two Cascade Range Wilderness Areas*. PhD. Dissertation, University of Washington, Seattle.

Forest Ecosystem Management Team, [FEMAT]. 1993. *Forest Ecosystem Management: An Ecological, Economic, and Social Assessment*. Portland, OR.

Forsman, E., DeStefano S., Raphael, M., Gutierrez, R. 1993. *Demography of the Northern Spotted Owl*. Studies in Avian Biology No. 17. Cooper Ornithological Society.

Franklin, J., Kohm, K. 1997. *Creating a Forestry for the Twenty-First Century: The Science of Ecosystem Management*. Island Press, Washington, D.C.

Franklin, J.F., and Spies, T.A. 1991. *Ecological Definitions of Old-Growth Douglas-Fir forests*. In: *Wildlife and Vegetation of Unmanaged Douglas-Fir Forests*. USDA Forest Service. General Technical Report PNW-GTR 285. Portland, OR.

Furnish, Joseph, et. al. 1997. *Survey Protocol for Terrestrial C-3 Mollusk Species from the Northwest Forest Plan*. USDI, Bureau of Land Management and USDA, Forest Service, Portland, OR.

Garza, E.S. 1995. *Fire History and Fire regimes of East Humbug and Scorpion Creeks and Their Relation to the Range of Pinus lambertiana*. DouL. M.F. Project, Oregon State University, Corvallis, OR.

Gilbert, F.F., and Allwine, R. 1991. *Small Mammal Communities in the Oregon Cascade Range*. In: *Wildlife and Vegetation of Unmanaged Douglas-Fir Forests*. USDA Forest Service. General Technical Report PNW-GTR 285. Portland, OR.

Gilbert, F.F., and Allwine, R. 1991. *Spring Bird Communities in the Oregon Cascade Range*. In: *Wildlife and Vegetation of Unmanaged Douglas-Fir Forests*. USDA Forest Service. General Technical Report PNW-GTR 285. Portland, OR.

Gilbert, F.F., and Allwine, R. 1991. *Terrestrial Amphibian Communities in the Oregon Cascade Range*. In: *Wildlife and Vegetation of Unmanaged Douglas-Fir Forests*. USDA Forest Service. General Technical Report PNW-GTR 285. Portland, OR.

Gilligan, J., Smith, M., Rogers, D., Contreras, A. et. al. 1994. *Birds of Oregon: Status and Distribution*. Cinclus Publications, McMinnville, OR.

Gilsen, Leland. Archeologist, Oregon State Historic Preservation Office. *Personal communication*, April 24, 1990.

Hayes, J., Chan, S., Emmingham, W., Tappeiner, J., Kellogg, L.D., Bailey, J. 1998. *Wildlife Response to Thinning Young Forests in the Pacific Northwest*. Journal of Forestry, August, 1997.

Heinselman, M.L. 1981. *Fire Intensity and Frequency as Factors in the Distribution and Structure of Northern Ecosystems*. In Mooney, H.A. et al. (eds.): Fire regimes and ecosystems properties. pp. 7-57. USDA Forest Service General Technical Report WO-26.

Hitchcock, C.L., Cronquist, A., Ownbey, M., Thompson, J. 1994. *Vascular Plants of the Pacific Northwest*. University of Washington Press.

Hostetler, B., Ross, D. 1996. *Generation of Coarse Woody Debris and Guidelines for Reducing the Risk of Adverse Impacts by Douglas-fir Bark Beetle*. USDA, Forest Service.

Iaasacs, Frank. *Distribution and Productivity of Nesting Bald Eagles in Oregon 1979-2001*. 2001. Oregon Cooperative Wildlife Research Unit, Corvallis, OR.

Impara, P.C. 1997. *Spatial and Temporal Patterns of Fire in the Forests of the Central Oregon Coast Range*. PhD. Dissertation. Oregon State University.

Johannessen, Carl L., W.A. Davenport, A. Millet, and S. McWilliams. 1970. *The Vegetation of the Willamette Valley*. Annals of the Association of American Geographers, 61, 286-302.

Jones, J.A., Grant, G. 1996. *Peakflow Responses to Clearcutting and Roads, in Small and Large Basins, Western Cascades, Oregon*. Water Resources Research, Vol. 32 (4): 959-974.

Krusemark, F., Agee, J.K., and Berry, D. 1996. *The History of Fire in the Bull Run Watershed, Oregon*. USDA Forest Service Research Paper Final Report on Supplemental Agreement PNWE-92-0225.

Langridge, Russell W. 1987. *Soil Survey of Linn County Area, Oregon*. USDA, Soil Conservation Service in cooperation with USDA, Bureau of Land Management & Oregon Agricultural Experiment Station. 344 pages, 97 maps.

Legard, H.A., Meyer, L.C. 1973. *Willamette National Forest Soil Resource Inventory*. Pacific Northwest Region. 167 pages.

Lehmkuhl, J.F., Ruggiero, L.F. 1991. *Forest Fragmentation in the Pacific Northwest and its*

*Potential Effects on Wildlife*. In: *Wildlife and Vegetation of Unmanaged Douglas-Fir Forests*. USDA Forest Service. General Technical Report PNW-GTR 285. Portland, OR.

Leonard, W.P., Brown, H. A., et al. 1993. *Amphibians of Washington and Oregon*. Seattle Audubon Society, Seattle, WA.

Leonard, W.P., Storm, R.M., et al. 1995. *Reptiles of Washington and Oregon*. Seattle Audubon Society, Seattle, WA.

Leopold, J.B., Wolman, M., Miller, J. 1964. *Fluvial Processes in Geomorphology*. W.H. Freeman, San Francisco, 522pp.

Linn County Fire Patrol Association. 1962. *50<sup>th</sup> Annual Report*. Sweet Home.

Long, C.J. 1996. *Fire History of the Central Coast Range, Oregon: a ca 9000 Year Record From Little Lake*. M.S. thesis. University of Oregon, Eugene.

Marshall, D.B., Chilcote, M.W., Weeks, H. 1996. *Species at Risk: Sensitive, Threatened, and endangered Vertebrates of Oregon*. 2nd edition. Oregon Dept. Fish and Wildlife, Portland, OR.

McArthur, L. 1965. *Oregon Geographic Names*. Third Edition, Revised and Enlarged. Oregon Historical Society, Portland.

McIntosh, B., Clarke, S., Sedell, J. 1994. *Summary Report for the Bureau of Fisheries Stream Habitat Surveys, Willamette River Basin, 1934-1942*. Bonneville Power Administration.

McNutt, J., McGreer, D. 1985. *Pitfalls in the Strict Reliance on Expert Opinion in Assessing Slope Stability Hazard*. USDA Forest Service GTR - PNW - 180.

Means, J.E. 1980. *Dry Coniferous Forests in the Western Oregon Cascades*. PhD. thesis. Oregon State University. Corvallis, 268 pages.

Minor, Rick, Beckham, S.D., Lancefield-Steeves, P.E., and Toepel, K.A. 1980. *Cultural Resource Overview of the BLM Salem District. Northwestern Oregon: Archaeology, Ethnography, History*. University of Oregon Anthropological Papers No. 20.

Morris, William G. 1934. *Forest Fires in Western Oregon and Western Washington*. The Oregon Historical Quarterly 35:313-339.

Morrison, P., Swanson, F.J. 1990. *Fire History and Pattern in a Cascade Range Landscape*. USDA Forest Service General Technical Report PNW-GTR-254.

Nussbaum, R.A., Brodie, E.D. Jr., and Storm, R.M. 1983. *Amphibians and Reptiles of the Pacific Northwest*. University of Idaho Press, Moscow, ID.

Oregon Department of Environmental Quality. 1988. *1988 Oregon Statewide Assessment of Non-Point Sources of Water Pollution*.

Oregon Department of Fish and Wildlife. 1995-1999. *Aquatic Inventory Project Stream Reports: Quartzville Creek, Whitcomb Creek, East Fork Whitcomb Creek, Moose Creek, Trout Creek, Trout Creek (post flood resurvey), Yellowstone Creek, Boulder Creek, Packers Gulch Creek, Thomas Fork Packers Gulch, East Fork Packers Gulch, South Fork Packers Gulch, West Fork Packers Gulch*.

Oregon Department of Forestry. *Clackamas-Marion District Interim Implementation Plan. Working Draft*.

Oregon Department of Forestry. 2000. *Northwest Oregon State Forests Management Plan. Final Draft, Sept. 2000*.

Oregon Department of Forestry. 2000. *Oregon Forest Practices Rules and Statutes*. Chapter 629, Forest Practices Administration.

Oregon Natural Heritage Program, Feb. 2001. *Rare, Threatened, and Endangered Plants and Animals of Oregon*. Portland, OR.

Pagel, J.E. (Ed.) 1992. *Protocol for Observing Known and Potential Peregrine Falcon Eyries in the Pacific Northwest*. In: Proceedings - Symposium on Peregrine Falcons in the Pacific Northwest, Jan. 1991. Rogue River National Forest, OR.

Parsons, G., et. al. Invertebrates of the H.J. Andrews Experimental Forest, Western Cascade Range, Oregon. *An Annotated List of Insects and Other Arthropods*. USDA Forest Service, PNW Research Station, Portland, OR.

Power, W. E., Tausch, W. 1987. *TPCC Technical Guide*. USDI. Bureau of Land Management, Salem District - Oregon. 43 pages.

Rasmussen M. 1996. *Landscape Patterns of Pre-logging Forest Conditions in Western Oregon*. MS Thesis. Oregon State University, Corvallis, OR.

Rigsby, B. n.d. *The Molala* (draft). In Handbook of North American Indians, Volume 12. Smithsonian Institution.

Ripple W. 1994. *Historic Spatial Patterns of Old Forests in Western Oregon*. Journal of Forestry, 92;11. November 1994, 45-48.

Rosgen, Dave. 1996. *Applied River Morphology*. Wildland Hydrology. Pagosa Springs, CO.

Ruediger, B. et.al. 2000. Canada Lynx Conservation Assessment and Strategy. USDA Forest Service, USDI Fish and Wildlife Service, USDI Bureau of Land Management, and USDI National Park Service. Forest Service Publication #R1-00-53, Missoula, MT. 142 pp.

Schlottmann, D. et. al. 2000. *Salem District Forestry/Terrestrial Strategy* (FOTEST) Issue Paper. Salem District BLM.

Schowalter, T.D. 1989. *Canopy Arthropod Community Structure and Herbivory in Old-Growth and Regenerating Forests in Western Oregon*. Canadian Journal of Forest Research 19:318-22.

Schowalter, T.D. 1995. *Canopy Arthropod Community Responses to Forest Age and Alternative Harvest Practices in Western Oregon*. In Forest Ecology and Management 78:115-25.

Scott, S.L. 1987. *Field Guide to the Birds of North America*. National Geographic Society, Washington, D.C.

Soil Conservation Service. USDA. 1987. *Soil Survey of Linn County Area, Oregon*.

South Santiam Watershed Council, and Bischoff, J. (ed). 2000. *South Santiam Watershed Assessment*.

Stumpf, G. 1979. *Cultural Resources of Eastside Salem BLM District: Unit Resource Analysis - Management Framework Plan*. U.S.D.I., Bureau of Land Management, Salem District.

Surdam, E. and Anderson, R.E. 1939. *Historical Sketch of Santiam Water Shed*. Draft report of personal recollections and interviews, on file at Salem District BLM.

Swanton, J. R. 1952. *The Indian Tribes of North America*. Bureau of American Ethnology, Bulletin 145.

Spies, T. 1998. *Forest Structure: A Key to the Ecosystem*. Northwest Science, Vol. 72, Special Issue No. 2.

Tappeiner, J.C., Huffman, D., Marshall, D., Spies, T., Bailey, J. 1996. *Density, Ages, and Growth Rates in Old-Growth and Young Douglas-fir in Coastal Oregon*. Canadian Journal of Forest Resources 27: 638-646 (1997).

Taylor, G. 1992. Oregon Climate Service. Oregon State University, Corvallis, OR.

Teensma, P.D.A. 1987. *Fire History and Fire Regimes of the Central Western Cascades of Oregon*. PhD. Dissertation. University of Oregon, Eugene, OR.

Tetra Tech. 1993. *Willamette River Basin Water Quality Study*. Summary Report. TC8983-10. Tetra Tech, Inc., Redmond, WA

Thomas, J.W., Raphael, M.G., Anthony, R.G., et al. 1993. *Viability Assessments and Management Considerations for Species Associated with Late-Successional and Old-Growth Forests of the Pacific Northwest*. The Report of the Scientific Analysis Team. USDA Forest Service, National Forest System, and Forest Service Research, Portland, OR.

USDA. 1986. *Interim Definitions for Old-Growth Douglas-Fir and Mixed Conifer Forest in the Pacific Northwest and California*. Pacific Northwest Research Station, Research Note PNW-447. Portland, OR.

USDA, Forest Service. 2000. *Draft Guide to the Forested Plant Associations of Oregon's Central Cascades*. Technical Paper. USFS Pacific Northwest Region.

USDA, Forest Service. Willamette National Forest. 2000. Regional Forester's Sensitive Animal list for the Willamette National Forest.

USDA, Forest Service. USDI. Bureau of Land Management. 1994. *Final Supplemental Environmental Impact Statement (FSEIS) and Record of Decision (ROD) For Amendments to Forest Service and Bureau of Land Management Planning Documents within the Range of the Northern Spotted Owl*. Portland, OR.

USDA, Forest Service. USDI, Bureau of Land Management. 1999. *Draft Supplemental Environmental Impact Statement for the Amendment to the Survey and Manage, Protection Buffer, and Other Mitigating Measures Standards and Guidelines*.

USDA, Forest Service. USDI, Bureau of Land Management. 2000. *Management Recommendations for the Oregon Red Tree Vole (*Arborimus longicaudus*)*. Version 2.0

USDA, Forest Service. USDI. Bureau of Land Management and U.S. Fish and Wildlife Service. 1998. *Mid-Willamette Late Successional Reserve Assessment*. Portland, OR.

USDC, National Oceanic & Atmospheric Administration. National Weather Service. 1973. *Precipitation-Frequency Atlas of the United States*. NOAA Atlas No. 2. 40 pp.

USDC, NMFS. USDI, BLM. USDA, Forest Service. 1997. *Biological opinion and Conferencing Opinion, Implementation of Land Use Plans and Resource Management Plans, ESA Section 7 Consultations*.

USDI, Bureau of Land Management. n.d. *Cultural Resources Site Files*. Salem, OR.

USDI, Bureau of Land Management. 1990. *Oregon-Washington Special Species Policy*, BLM

Instruction Memo No. OR-91-57. November 5, 1990 (updated Sept. 1999). Oregon State Office, Portland, OR.

USDI, Bureau of Land Management. 1995. *Salem District Record of Decision and Resource Management Plan and EIS*. Salem, OR.

USDI, Bureau of Land Management. 1995. *Special Status Invertebrate Species and Invertebrate Abstracts*. Oregon State Office, Portland, OR.

USDI, Bureau of Land Management. 1996. *Conclusions from BLM Retrospective Thinning Study*.

USDI, Bureau of Land Management. 1997. *(Interagency) Interim Guidance for Survey and Manage Component 2 Species: Red Tree Vole*. IM-OR-97-009, Nov. 4, 1997. Oregon State Office, Portland, OR.

USDI, Bureau of Land management. 1999. *Field Guide to Survey and Manage Terrestrial Mollusk Species from the Northwest Forest Plan*. Oregon State Office, Portland, OR.

USDI, Bureau of Land Management. 2000. *Crabtree Creek Watershed Analysis*. Salem District, Cascades Resource Area, Salem, OR.

USDI, Bureau of Land Management. 1994. *Hamilton Creek Watershed Analysis*. Salem District, Cascades Resource Area, Salem, OR.

USDI, Bureau of Land Management. 1997. *Little North Santiam Watershed Analysis*. Salem District, Cascades Resource Area, Salem, OR.

USDI, Bureau of Land Management, 1999. *Molalla River Watershed Analysis*. Salem District, Cascades Resource Area, Salem, OR.

USDI, Bureau of Land Management. 2000. *Special Status/Special Attention Species Database. Bureau of Land Management*, Salem District, Cascades Resource Area, Salem, OR.

USDI, Bureau of Land Management, 1996. *Thomas Creek Watershed Analysis*. Salem District, Cascades Resource Area, Salem, OR.

USDI, U.S. Fish and Wildlife Service. 1986. *Recovery Plan for the Pacific Bald Eagle*. Portland, OR.

USDI, U.S. Fish and Wildlife Service. 1992. *Critical Habitat for the Northern Spotted Owl*. Portland, OR.

USDI, U.S. Geological Survey. 1990. *Statistical Summaries of Streamflow Data in Oregon: Volume 1—Monthly and Annual Streamflow, and Flow-Duration Values*. Open-File Report 90-118. Portland, OR

Verts, B. J., Carraway, L. N. 1998. *Land Mammals of Oregon*. University of California Press, Berkeley, Calif.

Walker, G.W., Duncan, R.A. 1989. *Geologic Map of the Salem 1 (Degree) By 2 (Degree) Quadrangle, Western Oregon: Miscellaneous Investigations Series*. U.S. Geological Survey, 1989G.

Walstad, J., Radosevich, S., Sandberg, D. 1990. *Natural and Prescribed Fire in Pacific Northwest Forests*. Oregon State University Press, Corvallis, OR.

Washington Forest Practices Board. 1993. *Standard Methodology for Conducting Watershed Analysis. Version 2.0*

Weisburg, P.J.. 1997. *Fire History in the Foothills of the Central Western Cascades, U.S.A.* Submitted to the Canadian Journal of Forest Research.

Wevers, M.J., Wetherbee, J, Hunt, W. 1992. *Santiam and Calapooia Subbasin Fish Management Plan*. Oregon Department of Fish and Wildlife.

Willis, R., Collins, M., Sams, R. 1960. *Environmental Survey Report Pertaining to Salmon and Steelhead in Certain Rivers of Eastern Oregon and the Willamette River and its Tributaries*. Part II. Survey Reports of the Willamette River and its Tributaries. Fish Commission of Oregon, Research Division, Clackamas, OR.

Winkler, C. Willamette National Forest Archeologist, Rigdon RD. *Personal communication*. April 24, 1990.

Zenk, H. B. 1976. *Contributions to Tualatin Ethnography: Subsistence and Ethnobiology*. Master's Thesis, Department of Anthropology, Portland State University.