



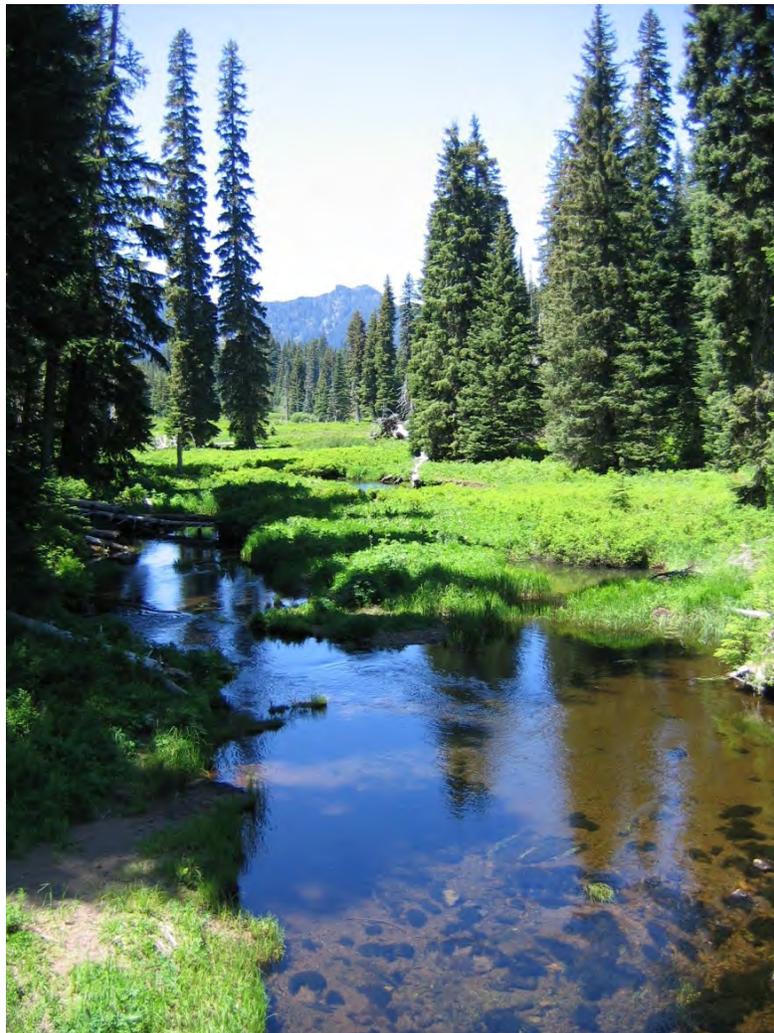
United States  
Department of  
Agriculture

Forest  
Service

September 2011



# Headwaters McKenzie Watershed Analysis Update 2011



**Sweet Home and Detroit Ranger Districts  
Willamette National Forest**

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## Introduction

The Federal Guide for Watershed Analysis identified the need for “Federal agencies [to] conduct multiple analysis iterations of watersheds as new information becomes available or as ecological conditions, management needs, or social issues change. The time between iterations will depend on factors such as major disturbance events, monitoring or research results, new management objectives, and different regulatory requirements. Subsequent analysis iterations may be triggered when existing analyses do not adequately support informed decision making for particular issues or projects. Future iterations also may be necessary to fill critical data gaps identified during earlier analyses” (USDA, 1995).

The original watershed analysis for the Headwaters McKenzie Watershed (formerly identified as the Upper McKenzie Watershed) was completed in 1995 (USDA, 1995). In 2006, the McKenzie River Ranger District updated the analysis to incorporate and expand the Willamette National Forest’s 2005 “Priority Watershed Assessment Process” specifically for the Headwaters McKenzie (USDA, 2006). This update identified goals, objectives, restoration opportunities, past projects, and an implementation strategy.

This 2011 watershed analysis update is not intended to be a full update of the conditions, processes, issues, or opportunities within the Headwaters McKenzie Watershed. Limited funding focused this update on those portions of the watershed within the Sweet Home and Detroit Ranger Districts. The purpose of this update is to document a few key large-scale assessments and processes occurring within the watershed as well as updates to the 2006 assessment focusing on the Sweet Home and Detroit Ranger Districts. This update is intended to assist in the future planning efforts on the two districts.

## Landscape Assessments and Conditions

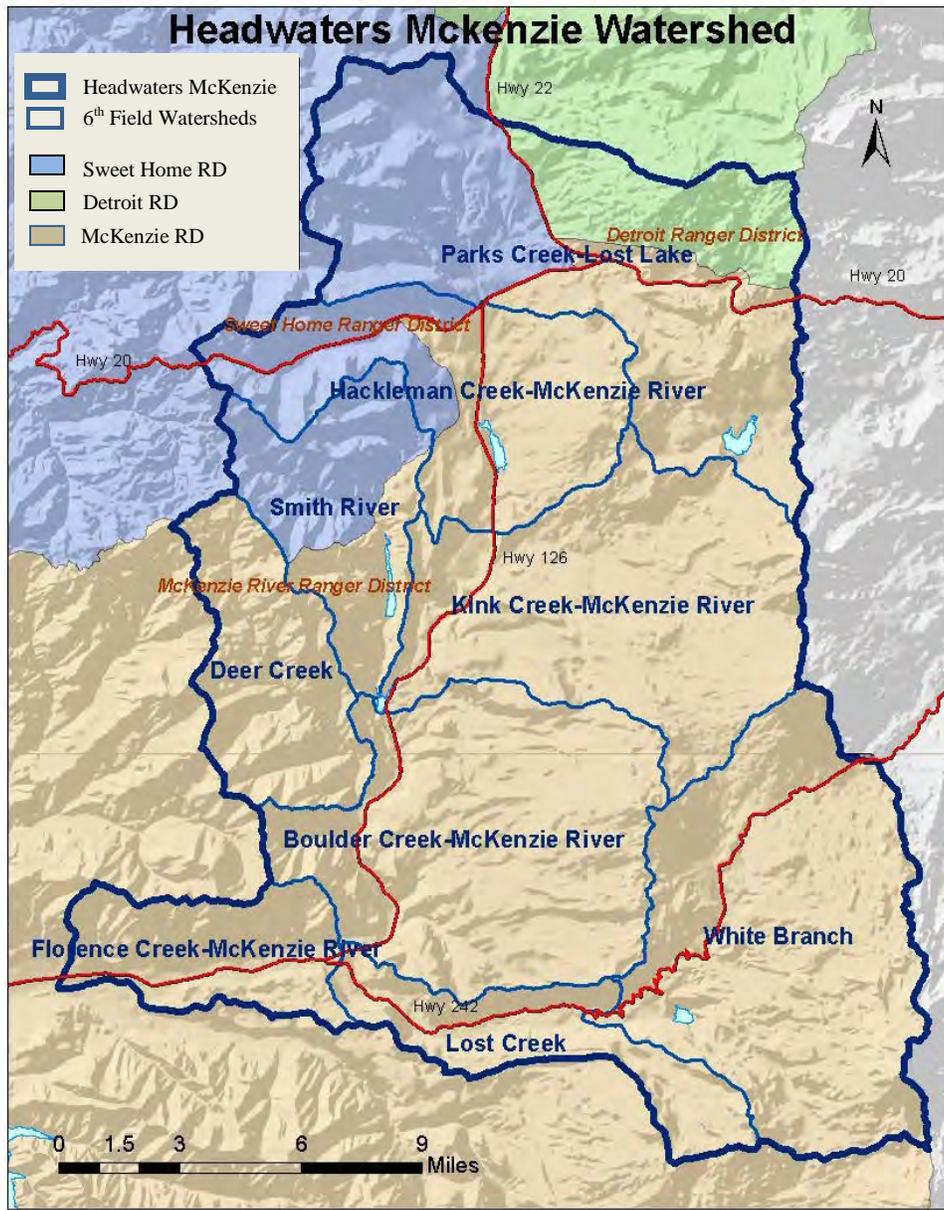
The following section provides a brief overview of the watershed and describes four landscape assessments. The first assessment is the Watershed Condition Framework, a national watershed classification that incorporates twelve biological and physical condition indicators. Two of those condition indicators are described further within the Fire Regime Condition Class Assessment and Forest Health Assessment. Finally a summary of a smaller landscape study within the Parks Creek area is provided.

### *Watershed Overview*

The Headwaters McKenzie Watershed is about 230,700 acres west of the Cascade crest within the McKenzie River, Sweet Home, and Detroit Ranger Districts of the Willamette National Forest. The watershed contains nine subwatersheds and most of the watershed is within the McKenzie River Ranger District. See Table 1 and Figure 1 for more details.

**Table 1: Acres Distribution of Headwaters McKenzie Watershed**

Ranger District	Acres Within Watershed	Percent of Acres Within Watershed
McKenzie River	184,610	80%
Sweet Home	36,178	16%
Detroit	9,912	4%
<b>Totals</b>	<b>230,700</b>	<b>100%</b>



**Figure 1: Sixth-field watersheds within the Headwaters McKenzie**

The 1995 watershed analysis information was presented by Landform Blocks. The Landform Blocks were created to aid in presenting and integrating data within specific areas. This stratification considered geological processes as well as vegetation patterns, fire behavior, valley segment types, and fish and wildlife habitat. A map of the seven Landform Blocks can be found on page 4 of the 1995 watershed analysis and are identified as follows:

**Table 2: Landform Blocks Within Headwaters McKenzie Watershed**

Block No.-Name	McKenzie River	Sweet Home	Detroit
Block 1 – McKenzie Bridge Glacial Valley	✓		
Block 2a – Deer Creek Cirque-Ridge	✓		
Block 2b – Western-High Cascade Transition Zone	✓	✓	
Block 3 – Early High Cascade Platform	✓	✓	
Block 4 – Recent High Cascades Lava	✓	✓	✓
Block 5 – Scott Mtn. Glacial Plateau & Valleys	✓		
Block 6 – Lost Creek Glacial Trough	✓		

### *Watershed Condition Framework*

The USDA *Strategic Plan for FY2010-2015* “targets the restoration of watershed and forest health as a core management objective of the national forests and grasslands. To achieve this goal, the Forest Service is directed to restore degraded watersheds by strategically focusing investments in watershed improvement projects and conservation practices at the landscape and watershed scales” (USDA, 2011).

The Watershed Condition Framework (WCF) is a comprehensive consistent approach for classifying the conditions of all National Forest System watersheds, implementing integrated restoration, and tracking and monitoring outcome-based program accomplishments for performance accountability (USDA, 2011).

The WCF is a six-step process. Step 1 is classifying the condition of all 6th-field watersheds. The condition classification used within the WCF process describes watershed condition in terms of discrete classes that reflect the level of watershed health or integrity. In this context, integrity relates directly to functionality and the definition encompasses both aquatic and terrestrial components, because water quality and aquatic habitat are inseparably related to the integrity and therefore, the functionality of upland and riparian areas within a watershed (USDA, 2011).

The three condition categories are:

- **Class 1 – Functioning Properly:** watersheds exhibit high geomorphic, hydrologic, and biotic integrity relative to their natural potential condition.
- **Class 2 – Functioning at Risk:** watersheds exhibit moderate geomorphic, hydrologic, and biotic integrity relative to their natural potential condition.
- **Class 3 – Functioning Impaired:** watersheds exhibit low geomorphic, hydrologic, and biotic integrity relative to their natural potential condition.

Within the WCF a watershed is considered to be functioning properly if the physical attributes are appropriate to maintain or improve biological integrity. By contrast, a watershed has impaired function because some physical, hydrological or biological threshold has been exceeded.

The classification system uses twelve nationally established core indicators as identified in Figure 2 to rate each 6th-field HUC watershed.

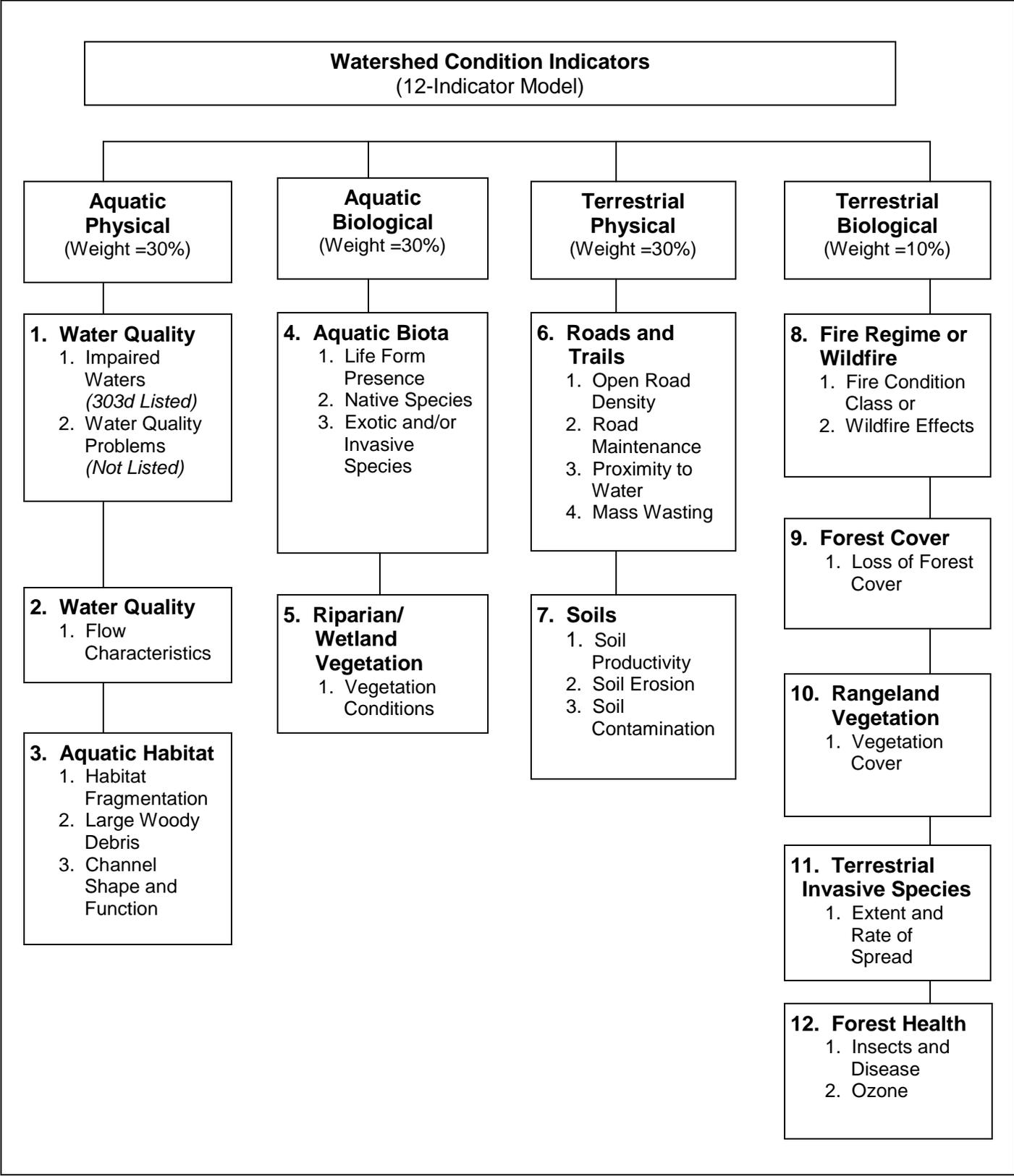


Figure 2: Core national watershed condition indicators and attributes from WCF

Figure 3 shows the results of the first step, the watershed condition classification for all nine 6th-field HUC watersheds within the Headwaters McKenzie. Seven of the nine 6th-field watersheds within the Headwaters McKenzie fall within Class 1 – Functioning Properly. Two of the watersheds, Smith River and Deer Creek, fall within Class 2 – Functioning at Risk.



Figure 3: Watershed condition categories for the Headwaters McKenzie

The second step within the Framework is to prioritize watersheds for restoration. It is important to note that the old paradigm for restoring aquatic and riparian dependent resources tended to focus on the “worst” watersheds to treat first. Within these watersheds the highest priority was to create desired habitat conditions for stream segments/sites in the worst condition. Within the Watershed Condition Framework the focus is to treat the “best” watersheds first. Within these watersheds the highest priority treatments remove risk factors that may threaten the integrity of the watershed. (USDA, 2011).

In 2011, the Willamette National Forest established the first small set of watersheds for targeted improvement over the next five years. None of the nine 6th-field watersheds within the Headwaters McKenzie were selected in this initial round for restoration emphasis. However, several factors may lead to restoration work in the near future within the Headwaters McKenzie including:

- The watershed is identified as a “key watershed” as part of the Northwest Forest Plan,
- The watershed is a municipal watershed providing both water and water generated electricity to communities along and downstream from the McKenzie River and has a high interest from a wide variety of collaborators,
- The watershed has a high percentage of its 6th-fields within condition class 1 and the Framework emphasizes treating the “best” watersheds first.

Appendix A provides a detailed publication on the Watershed Condition Framework process.

### *Fire Regime Condition Class*

Fires have a profound influence on the composition, structure, and function of fire-adapted ecosystems. Understanding fire regimes, ecological departure from historical reference conditions and landscape pattern is an important part of land management. The 2001 National Fire Plan’s Goal #3 emphasizes the restoration of fire-adapted ecosystems and maintenance of land health. In 2003, the Fire Regime Condition Class (FRCC) assessment system was developed to be the standard assessment tool used by federal agencies in implementing the National Fire Plan’s Goal #3. This tool provides a connection between managers’ understanding of fire regimes, ecological departure, and effects to maintain sustainable landscapes (NIFTT, 2010).

FRCC assessments describe general landscape fire regime and vegetation characteristics. Estimates of current characteristics are compared with estimates of historical or reference condition characteristics. From these estimates, current landscape departure from reference conditions can be determined and the landscape is assigned into one of three fire regime condition classes:

- FRCC 1 represents ecosystems with low (<33%) departure and that are still within an estimated historical range of variation as determined by modeling for the pre-EuroAmerican era;
- FRCC2 indicates ecosystems with moderate (33-66%) departure; and
- FRCC3 indicates ecosystems with high (>66%) departure from reference conditions (NIFTT, 2010)

Is it important to note that FRCC is not a fire hazard metric – it is tool for measuring ecological trends (NIFTT, 2010).

Landscape-scale departure and FRCC are determined by evaluating the composition of seven reference condition variables:

- Fire frequency
- Fire severity
- Up to five successional stages
  1. Early seral canopy
  2. Mid seral open canopy
  3. Mid seral closed canopy
  4. Late seral open canopy
  5. Late seral closed canopy

Figure 4 shows that the fire regime condition class within the Headwaters McKenzie Watershed is FRCC2 (moderate departure) across all 6th-field watersheds. The mapping shows that 11% of the watershed is not classified because it is non-forested (primarily lava fields). The analysis did show approximately four acres within the McKenzie River Ranger District as FRCC3 (high departure) in small scattered areas but it is assumed to be a mapping error.

For more information regarding FRCC please go to the website <http://www.frcc.gov>.



Figure 4: McKenzie Headwaters FRCC classification

## Forest Health

Insects and tree pathogens are an important biological process in forest ecosystems affecting forest structure, species composition and succession both at the stand and landscape levels. They can influence the development and quality of wildlife habitat, watershed values, visual character, nutrient cycling, commodity production, and fire risk. Each year, all forested federal, state and private land in Oregon and Washington is aerially surveyed for insect and disease damage. This survey is flown cooperatively by the Region 6 USFS, The Oregon Dept. of Forestry, and the Washington Dept. of Natural Resources. Data is collected to determine regional insect and disease trends and to serve as an indicator to land owners/managers of insect and disease activity in their area (USDA, 2006); (USDA, 2011a).

A variety of insect and disease activity has historically occurred within the Headwaters McKenzie. Most of this activity has been bark beetles and root rot, causing small pockets of mortality, scattered throughout the watershed. In the last decade, however, there has been an increase in activity with three specific species: mountain pine beetle (*Dendroctonus ponderosae*), balsam woolly adelgid (*Adelges piceae*) and cytospora canker (*Cytospora abietis*).

### Mountain pine beetle

Mountain pine beetle causes tree mortality throughout Oregon and Washington. When population levels are low, the beetle tends to attack injured, diseased, and low vigor trees. During outbreaks, the beetle attacks apparently healthy trees and can cause extensive tree mortality over large areas (USDA, 2006). Hosts of the mountain pine beetle within the watershed include lodgepole, western white and sugar pine. None of these pines are the dominant tree species within the Headwaters McKenzie, however, lodgepole does exist intermixed and in pure stands within the upper eastern portion of the watershed. Western white and sugar pine are scattered and considered a minor species in this area and often only occur in plantations because of mortality from white pine blister rust.

Within the last decade, the aerial survey began to detect a large increase in mountain pine beetle activity within the watershed beginning around 2004/2005. In 2004, about 1,000 acres were mapped with low-level mortality in lodgepole pine (1 to 5 dead/trees per acre) and by 2005 that acreage had increased to approximately 7,700 acres. By 2006, the affected acres jumped to about 17,000 acres and by 2007 had expanded to roughly 22,000 acres (see figure 5). Since 2007, the expansion of the acreage affected by mountain pine beetle has started to decrease with 2010 showing only around 400 new acres. As figure 5 indicates most of this affected area progressed from the east and out from the edges of the two large fires. In 2003, the B&B complex fire burned along the eastern edge and crossed into the northeast portion of the watershed burning ~5,000 acres within the Parks Creek/Lost Lake 6th-field watershed. In 2010, the Scott Mtn. fire burned ~1,400 acres within the Kink Creek, Boulder Creek/Frissel Creek, and White Branch 6th-field watersheds.

It is important to note that the amount of mortality each year identified from the aerial surveys has been low. Most affected areas range from less than 1 to 5 dead tree/acre with an occasional small pocket of up to 10 dead trees/acre. However, cumulative mortality from the expansion of the mountain pine beetle from 2004 to 2007 has likely resulted in some areas within the watershed with a fair amount of standing dead lodgepole pine.

### Mountain Pine Beetle Activity Within and Around Watershed

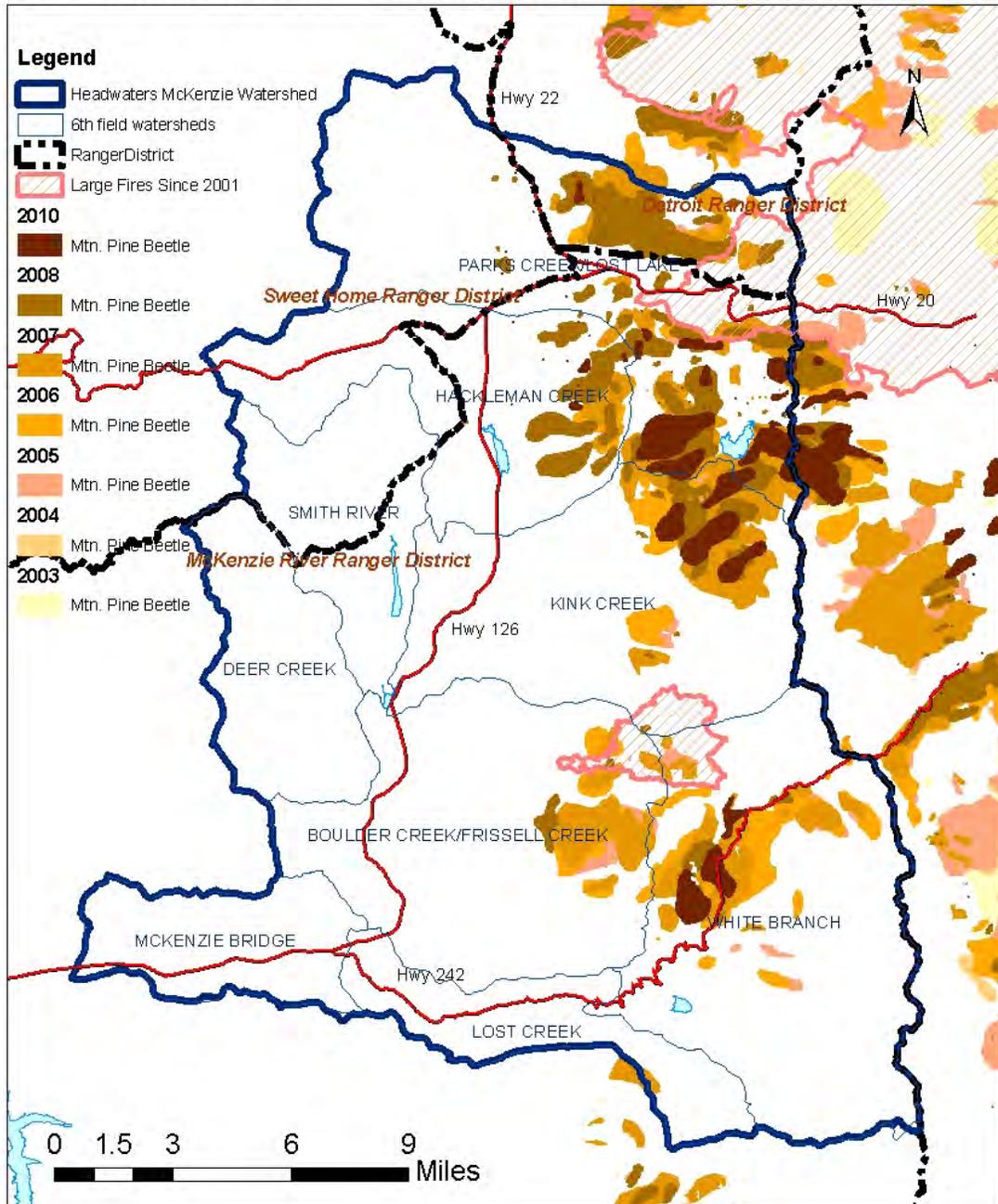


Figure 5: Large fires and mountain pine beetle activity progression within the watershed

### **Balsam woolly adelgid**

This adelgid is a non-native insect commonly found in the Cascade Mountains that can cause subtle but long-term ecological effects. The insect causes swelling of tree branches and branch tips resulting in stunted growth, scattered dead branches and occasional mortality in trees. All true firs are hosts with subalpine and Pacific silver firs, growing at the lower extremes of the elevational range, particularly susceptible. Chronic feeding progressively weakens trees, reduces cone production and causes deformity (*USDA, 2006*). Within the last decade the adelgid activity began to increase within the watershed. In 2005 ~4,000 affected acres were identified and classified as medium to high damage severity. In 2008/09, the survey detected another 3,400 acres mostly along the eastern edge of the watershed. In 2009, ~7,500 affected acres were identified as medium damage severity. This insect activity has been across the watershed, however, it should be noted that most of the watershed acres within the Detroit Ranger District have been affected by this insect since 2005.

### **Cystospora canker**

This canker affects all true firs causing branch dieback and occasional mortality in trees. The pathogen is a weak parasite: attacking those trees stressed by other agents including drought and fire (*USDA, 2006*). Aerial surveys began to detect this disease in 2007 with most of the affected area concentrated within the Sweet Home Ranger District portion of the watershed. In 2007, ~1,500 affected acres were identified with low to medium damage severity. The 2008 survey identified ~1,300 acres affected while the 2009 survey identified ~700 acres. In 2010 the disease expanded south into the Deer Creek 6<sup>th</sup>-field watershed and a total of ~4,000 affected acres were identified with low to medium damage severity.

### ***Parks Creek Landscape Study***

In 2007 and 2008, a study was conducted by Oregon State University within the Parks Creek/Lost Lake and Hackleman Creek 6<sup>th</sup>-field watersheds on the Sweet Home Ranger District. This study was established to explore the age structure and past fire regime of the Parks and Hackleman Creek areas using stump surfaces within harvested units. The study objectives included : 1) reconstructing the historical fire regimes of the study area, and 2) describing the historical range of stand conditions (composition and structure) associated with the fire regimes (*Bailey & Dunn, 2008*).

Twenty-one sites were selected that had been previously harvested within the Big Springs Sno Park area, Parks Creek, Lava Lake, Hackleman Creek, and Gate Creek areas. The study area consists of forests dominated by Douglas-fir and true fir species. Sample data was used to develop size and age-class distributions. Harvested sites were utilized because age determinations and fire scars are best available on tree stumps, since living trees require coring and often grow over fire scars concealing evidence of fire disturbance events (*Bailey & Dunn, 2008*).

Only three fire scars were found among 1400+ study observations so the ability to correlate age-class distributions directly to fire events proved impossible. The study did, however, state that “The age-class recruitment pattern that we see today alternatively reflects repeated moderately-frequent, low-severity disturbances that have stimulated episodes of Douglas-fir regeneration since 1500” (*Bailey & Dunn, 2008*). That dynamic was interrupted 150 years ago, with resultant changes to composition and structure favoring shade-tolerant species.

See Appendix B for the complete 2008 Parks Creek Study Report along with the age-class distributions for all twenty-one sites.

## Supplement to 2006 Update

In 2006, the McKenzie River Ranger District updated the 1995 watershed analysis for the Headwaters McKenzie using a four-step process:

- Step 1 – Describe the desired future condition for the watershed
- Step 2 – Identify geographic “hotspots” for restoration/enhancement opportunities
- Step 3 – Develop a completed projects list, update 1995 recommendations, and develop a project opportunity list
- Step 4 – Develop an implementation strategy

As stated previously this 2011 document is not intended to be a full watershed analysis update. Limited funding focused this update primarily to those portions of the watershed within the Sweet Home and Detroit Ranger Districts. The following section focuses on supplementing Step 3 of the process above with the most current available information for the two districts.

The 2006 update utilized the same Landform Block classification system used in the 1995 analysis to categorize projects, recommendations, and opportunities (see [Watershed Overview](#)). Currently, the portion of the watershed within the Sweet Home and Detroit Ranger Districts is being considered for one future project area known as the “Frost Lava Stewardship Project”. This project will incorporate a landscape level strategy to identify processes and restoration opportunities. Since the landscape classification may be different than the original classification it was decided to address projects, recommendations, and opportunities on a project scale rather than at a landform block scale.

## Completed Projects

**Table 3: Projects with completed decisions from 1995-2011 and the status of implementation (Sweet Home and Detroit Ranger Districts)**

Type of Project	Description	Status
<b>Large Landscape NEPA Projects</b>		
Parks Smith EA	Commercial thin and introduce gaps in second growth managed stands in order to increase stand health and vigor; promote structural and natural vegetation species diversity; accelerate the development of late-successional stands; and provide wood products to the local community	Decision Notice signed 2008; project implementation ongoing
Lodgepole Flats Plan Amendment #54	This amendment will change the north section of Park Creek Semi primitive Non-motorized Dispersed Recreation (10E) to Special Habitat-Wildlife (9D) to promote more opportunity for wildlife enhancement projects.	NEPA will be signed Dec 2011
<b>Vegetation/Botany/Wildlife Management Projects</b>		
Browder Ridge and Crescent Mtn. Meadow Restoration	Treat small conifers and tree islands on up to 565 acres with fire and manual removal	NEPA done; implementation ongoing
Echo Mountain Meadow Enhancement	Treat small conifers and tree islands on up to 300 acres with fire and manual removal	NEPA done; implementation ongoing
Iron Mountain Sensitive Species Augmentation	Collect seed of <i>Hell's Canyon Rockcress</i> ; contract grow out and establishment with Portland State University (PSU)	Implementation ongoing
Wildcat Mountain RNA Addition	Establishment Record for Addition signed adding 525 acres to the Research Natural Area (RNA)	Completed 1998
Crescent Mountain Aspen Enhancement	Release aspen grove from surrounding conifers	Completed 2009

**Table 3: Projects with completed decisions from 1995-2011 and the status of implementation (Sweet Home and Detroit Ranger Districts)**

Type of Project	Description	Status
<b>Vegetation/Botany/Wildlife Management Projects</b>		
Lodgepole Flats	<ul style="list-style-type: none"> <li>• 1997-2003: Conifers, primarily lodgepole pine, had encroached into the meadow during the past 50 years. Most trees varied in size from 1-12" diameter. Mechanical treatment was used to restore the meadow with funds that were available. Approximately 5 acres were treated and no logs were removed from the site.</li> <li>• 2008: Lodgepole Flats Meadow Restoration Project involved cutting and girdling lodgepole pine trees less than 12 inches in diameter and removing them from Meadow #1. Approximately 16 acres were treated for conifer encroachment and the logs were decked in the southern portion of the meadow. Most decked logs were removed.</li> <li>• 2009-2010: Approximately 28 acres were treated for conifer encroachment and most of the logs were removed for firewood. Prescribed burning was also applied to the meadow in 2009.</li> <li>• 2011: The remaining logs will be removed for firewood and the area will be seeded with native seed collected from the site.</li> <li>• 2012: The meadow will be broadcast burned.</li> </ul>	NEPA DONE; implementation ongoing
Smith Prairie	<ul style="list-style-type: none"> <li>• 1997-2006: Conifers species had encroached into the meadow during the past 50 years. Most trees varied in size from 1-12" diameter. Rocky Mountain Elk Foundation volunteers removed some small trees with chainsaws and weed eaters. Future Plans: Future activities involve enhancing the meadows by removing saplings under 4 inches, seed collection, girdling 1-2 trees per acre under 12 inches DBH in or on the perimeter of the meadow complex and potentially falling 1 tree per acre along the perimeter for down woody debris dependent species. The project involves the use of hand tools, chainsaws or other mechanical equipment to</li> </ul>	NEPA DONE; implementation ongoing

**Table 3: Projects with completed decisions from 1995-2011 and the status of implementation (Sweet Home and Detroit Ranger Districts)**

Type of Project	Description	Status
	cut and/or girdle trees less than 12 inches in diameter that are encroaching on the historic meadow boundaries. In addition, the meadows may be burned by utilizing broadcast burning techniques to restore and reinvigorate the native meadow plant communities. These activities may be completed with possible assistance from Rocky Mountain Elk Foundation and Oregon Hunter's Association. Seed may be collected with assistance from the North American Butterfly Association and used to reseed the meadows if a prescribed burn is applied.	
<b>Watershed/Fisheries/Roads Management Projects</b>		
Aquatic Risk Road Treatments	Aquatic risk road stormproofing, storage and decommissioning identified in the Park Smith Thin EA including 11 road segments	NEPA completed 2007; implementation ongoing
<b>Recreation Management Projects</b>		
Hackleman Old Growth Grove Parking Area	Improved parking area to asphalt; installed restroom; improved trail to ADA grade and width	Completed 2010
<b>Management Plans within the Upper McKenzie Watershed</b>		
Iron Mtn./Echo Mtn Botanical Special Interest Area Implementation Plan	Management Plan for Special Interest Area (SIA)	Completed 1997
Historic and Current Age Structures of Douglas-fir and True Fir/Hemlock Stands in the Parks Creek Area of the Willamette National Forest	John Bailey and Christopher Dunn OSU Cost-Reimbursable Agreement	Completed 2008

## Status of Recommended Actions

**Table 4: Status of Recommended Action from 1995 WA and 2006 Update for Upper McKenzie (Sweet Home and Detroit Ranger Districts)**

Significant Findings	Recommendation	Action Required	Accomplishment
<b>Fish/Soil/Water Resources</b>			
Non-native invasive Brook trout are present in Park creek and Lava Lake	Work with ODFW to eradicate brook trout	Cooperation	Ongoing
Non-native invasive Brook trout are present in Hackleman creek and Lava Lake	Work with ODFW to eradicate brook trout	Cooperation	Ongoing
A genetically isolated population of Cutthroat trout is present in Parks Creek/Lava Lake. They have been isolated for about 4000 years and are likely to be genetically divergent from other cutthroat trout.	Protect and support this important population through habitat enhancement projects such as riparian stand management activities that will result in improved riparian conditions that will benefit fish and other aquatic species	Information for planning	Ongoing
A genetically isolated population of Cutthroat trout is present in Hackleman Creek. They have been isolated for about 4000 years and are likely to be genetically divergent from other cutthroat trout.	Protect and support this important population through habitat enhancement projects such as riparian stand management activities that will result in improved riparian conditions that will benefit fish and other aquatic species	Information for planning	
Genetically isolated populations of Cutthroat trout exist in the parks and Hackleman watersheds	Send genetic samples taken to get tested for genetic divergence.	Find funding or genetic analysis, and send them to the current genetic lab for analysis	Ongoing

**Table 4: Status of Recommended Action from 1995 WA and 2006 Update for Upper McKenzie (Sweet Home and Detroit Ranger Districts)**

Significant Findings	Recommendation	Action Required	Accomplishment
<b>Vegetation/Botany Resources</b>			
From 2006 Opportunity List:	Restore Crescent Mountain meadows	Prescribed fire	NWYC 2009 girdled trees
From 2006 Opportunity List:	Restore landscape in Parks Creek area	Planning EA	Area within the planned Frost Lava Stewardship project area scheduled to begin in FY 2014
All white pines in watershed have been significantly reduced by white pine blister rust	Emphasize planting disease resistant white pines in areas within historic range	Information for future planning	24 acres of gap planting that include white pines scheduled as part of the 2007 completed Parks Smith EA
Many of the stands in this block have high density conditions contributing to high levels of stress	Emphasize stocking control through precommercial thinning and commercial thinning.	Information for future planning	
There has been a loss of old growth system function from edge effect in leave blocks	Opportunity for large block minimum fragmentation strategies in these areas	Information for future planning	Minimizing fragmentation a project purpose in the 2007 completed Parks Smith EA
<b>Wildlife Resources</b>			
W. Footed Vole: Unknown population levels in watershed.	Riparian reserve buffers in low elevation streams that are wide enough to capture riparian veg and a portion of the transition zone will be needed to adequately protect this species.	Information for future planning	None to date. This is NOT a listed species anymore and Sweet Home did not contribute to any survey effort.

**Table 4: Status of Recommended Action from 1995 WA and 2006 Update for Upper McKenzie (Sweet Home and Detroit Ranger Districts)**

Significant Findings	Recommendation	Action Required	Accomplishment
Red Tree Voles: The statement in the 1995 watershed analysis that stated there were "two records of occurrence in the watershed" is not accurate for the Sweet Home & Detroit Ranger Districts. Current number of occurrences is unknown.	Conduct surveys in all series where Doug fir occurs.	Survey, Information for future planning.	Done as needed.
Snag Inventory	High priority to conduct snag inventories	Information for future planning	Ongoing modeling with ecology group.
Early Seral Habitat (Currently there is 38% early seral habitat by a wildlife definition on Sweet Home's portion of the watershed).	It's in high quantity, but is of LOW quality. Need to provide structure, complexity and appropriate early seral forage species to increase wildlife use.	Information for future planning	Lodgepole Flats, Smith Prairie in 2011-2012 and other sites in the new 9D Special Habitat Wildlife Area.
Mid-Seral Habitat – <b>[NOTE:</b> The statement in the 1995 watershed analysis that "no wildlife species rely on this habitat" is not accurate for the Sweet Home & Detroit Ranger Districts]. This habitat provides breeding, foraging and other use for many wildlife species.  (Currently there is 15% mid-seral habitat by wildlife definition on Sweet Home's portion of the watershed).	Additional structural diversity would be needed to improve this type of habitat.	Information for future planning	Parks Smith EA Thin 1,272 acres of commercial thinning scheduled as part of the 2007 completed Parks Smith EA

**Table 4: Status of Recommended Action from 1995 WA and 2006 Update for Upper McKenzie (Sweet Home and Detroit Ranger Districts)**

Significant Findings	Recommendation	Action Required	Accomplishment
<p>Late Seral Habitat – [NOTE: The statement in the 1995 watershed analysis that “...none of these species require large contiguous blocks of LS habitat” is not accurate for the Sweet Home &amp; Detroit Ranger Districts]. The species that do breed primarily in LS habitat do need larger blocks of land that are connected to persist.</p> <p>(Currently there is 47% mature to late seral habitat by wildlife definition, on Sweet Home’s portion of the watershed).</p>	<p>Provide connectivity between late-seral habitats</p>	<p>Information for future planning</p>	<p>Park Smith EA</p> <p>Minimizing fragmentation a project purpose in the 2007 completed Parks Smith EA</p>
<p>Riparian Habitat</p>	<p>Maintain protective buffers on class III streams, etc.</p>	<p>Information for future planning</p>	<p>Parks Smith EA Thin</p>
<b>Recreation/Visual Resources</b>			
<p>From 2006 Opportunity List:</p>	<p>Interpret B&amp;B fire recovery</p>		<p>Included in 2011 project opportunity list under scenic byway enhancement</p>
<b>Historic/Archaeological Resources</b>			
<p>From 2006 Opportunity List:</p>	<p>Complete Santiam Wagon Road Plan</p>		<p>Management plan completed in 2009</p>
<p>From 2006 Opportunity List:</p>	<p>Restore huckleberry fields with Tribes</p>		<p>Will be a purpose and need in the planned Frost Lava Stewardship project area scheduled to begin in FY 2014</p>

## Restoration Opportunities

**Table 5: Potential project opportunities within the Sweet Home and Detroit Ranger Districts**

<b>Fish/Soil/Water Resources</b>
Removal of fish passage barriers
Eradicate brook trout (non-native invasive spp.) within Parks Creek and Lava Lake
Eradicate brook trout (non-native invasive spp.) within Hackleman Creek
Fish habitat improvement including wood placement into Hackleman Creek
Fish habitat improvement including wood placement into Parks Creek and Lava Lake
Fish habitat improvement including wood placement into Park Creek and monitoring of willow planting around Lava Lake. More willows probably need to be planted.
Removal of riparian roads.
Acquisition of private land.
<b>Vegetation/Botany Resources</b>
Fuel Reduction along highways and within high risk areas
Develop biomass utilization opportunities
Expand special forest products opportunities
<b>Wildlife Resources</b>
The Smith Prairie Wildlife Special Habitat Area - 9D. Large landscape project that will span the next 10 years. Over 500 acres will be improved for wildlife species. Projects will include seral stage habitat enhancement, meadow enhancement, seed collection, native forage plantings, snag and down wood creation, to name a few.
The Parks Creek Wildlife Special Habitat Area - 9D. Large landscape project that will span the next 15 years. Over 5,500 acres will be improved for wildlife species. Projects will include seral stage habitat enhancement, meadow enhancement, seed collection, native forage plantings, snag and down wood creation, to name a few.

<b>Recreation/Visual Resources</b>
Cone Peak Meadow restoration - enhancement of winter skiing opportunities
Continue Scenic Byway enhancement along Highway 20 & 22 (ex. Interpretive signs)
Heart Lake user analysis and dispersed camping management
Hackleman Old Growth Grove management plan development
Lost Prairie Campground enhancement (ex. Construct cabins for rent)
Improve security at Lava Lake Sno Park
ATV trail analysis and development utilizing existing roads
<b>Cultural Resources</b>
Huckleberry inventory and restoration for traditional uses – See preliminary inventory map in Appendix C
Pacific Yew wood availability study - for traditional uses
Land exchange to gain T13S, R6E, Section 3 for traditional uses
<b>Road Management</b>
Conduct Minimum Road Analysis

## Literature Cited

Agree, J. (1993). Fire Ecology of Pacific Northwest Forests.

Bailey, J., & Dunn, C. (2008). Historic and current age structures of Douglas-fir and true fir/hemlock stands in the Park Creek of the Willamette National Forest. Corvallis, OR: Unpublished.

Brown, J. (1995). Fire regimes and their relevance to ecosystem management. *Proceedings of Society of American Foresters National Convention, Sept. 18-22, 1994* (pp. 171-178). Anchorage: Society of American Foresters.

Ecosystem Analysis at the Watershed Scale (Version 2.2) . (1995, August). Portland, Oregon, USA: USDA Forest Service.

Hann, W. B. (2001). Fire and land management planning and implementation across multiple scales. *Wildland Fire* , 10:389-403.

NIFTT. (2010). *Interagency fire regime condition class (FRCC) guidebook, version 3.0*. Retrieved from Fire Regime Condition Class (FRCC): <http://www.frcc.gov>

USDA. (1995, August). Federal Guide for Watershed Analysis. *Ecosystem Analysis at the Watershed Scale* . Portland, OR: USDA Forest Service.

USDA. (2006). *Field Guide to Common Diseases and Insect Pests of Oregon and Washington Conifers. R6-NR-FID-PR-01-06*. Pacific Northwest Region, US Forest Service: US Government Printing Office.

USDA. (2011a). *Forest and Grassland Health*. Retrieved from Aerial Detection Surveys (ADS): <http://www.fs.fed.us/r6/nr/fid/>.

USDA. (2010). Strategic Plan for FY 2010-2015. USDA.

USDA. (1995). Upper McKenzie Watershed Analysis. McKenzie Bridge, OR: USDA.

USDA. (2006, June). Upper McKenzie Watershed Analysis Update. McKenzie Bridge, OR: USDA.

USDA. (2011). Watershed Condition Framework (FS-977). *A Framework for Assessing and Tracking Changes to Watershed Condition* . USDA.