METOLIUS WATERSHED ANALYSIS UPDATE

AUGUST 2004

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METOLIUS WATERSHED ANALYSIS UPDATE 2004

EXECUTIVE SUMMARY

Fireweed in bloom, Metolius Basin, July 2004

PURPOSE AND SCOPE OF THIS DOCUMENT

- **Updates the Sisters Ranger District 1996 Metolius Watershed Analysis**
- **Analyzes effects of recent wildfires and changes in the watershed since 1996**
- **Identifies trends of concern**
- **Prioritizes areas to guide future management**
- **Provides recommendations**
- **Identifies data gaps and monitoring needs**
- **Provides basis for cumulative effects analysis**

MAJOR CHANGES IN THE METOLIUS WATERSHED SINCE 1996 INCLUDE:

- **The B&B Wildfire**- The largest wildfire in Deschutes National Forest history.
- **Seven other large wildfires**- Including the Cache Mountain, Link, and Eyerly Wildfires. In total, 54% (80,419 acres) of watershed has been affected by wildfires since 1996.
- **New data** for many resource areas, including new Fire Regime Science.
- **New regulatory information**, i.e. Clean Water Act 303-D listings.
- **Evolving social and management issues**

OVERVIEW

WHAT IS WATERSHED ANALYSIS?

"Watershed Analysis is a systematic procedure to characterize the aquatic, riparian, and terrestrial features within a watershed. Managers use information gathered during watershed analysis to refine riparian reserve boundaries, prescribe land management activities, including watershed restoration, and develop monitoring programs (NWFP, ROD, 1994, pg. 10).

This information helps guide future management and suggest future projects. It serves as a foundation for future project level analysis and decision-making. The analysis helps to ensure that activities are consistent with ecosystem management objectives as described in the *Deschutes National Forest Land and Resource Management Plan* (LRMP) as amended by the *Record of Decision for Standards and Guidelines for Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl*.

Watershed Analysis process is based on the six step analysis process outlined in the *Federal Guide for Ecosystem Analysis at the Watershed Scale* (version 2.2) and associated modules. This analysis is not a decision making process. Project level recommendations for federal lands must be further analyzed according to the National Environmental Policy Act (NEPA) process.

WHY WAS THIS WATERSHED ANALYSIS UPDATE DONE?

The Federal Guide states: "Federal Agencies will conduct multiple analysis iterations of watersheds as new information becomes available, or as ecological conditions, management needs, or social issues change." The need for an update may be triggered by major disturbance events, or if existing analyses do not adequately support informed decision making for particular projects or issues. As analysis updates are conducted, new information is to be added to existing analyses.

The Sisters Ranger District consulted with Forest and Regional Forest Service specialists in September 2003 during the aftermath of the B&B Wildfire. It was recommended that because more than half the watershed had burned since the previous analysis completed in 1996, a focused update should be completed. This update serves to support changed condition analysis for the Metolius Basin Forest Management Project which was partially burned, and identifies recommendations for future management activities. This document provides important new information but **does not** update and rewrite all aspects of the original 1996 Metolius Watershed Analysis. Both documents are useful summaries.

HOW WAS THIS WATERSHED ANALYSIS UPDATE PREPARED?

This update is based on an interdisciplinary analysis done by a team of Forest Service specialists between November 2003 and March 2004. The analysis was used as a basis for the Metolius Basin Forest Management Project EIS Changed Condition Report. This compilation of the analysis was completed in August of 2004. This is a dynamic document that may be updated and modified as needed.

CHRONOLOGY:

1994	The Record of Decision for the Northwest Forest Plan amended local Forest Plans and required Watershed Analysis be completed in Key Watersheds before management actions take place.
1996	The original Metolius Watershed Analysis is completed. The Metolius is one of seven Key Watersheds designated on the Deschutes National Forest.
1996-2003	Projects are planned and completed guided by watershed analysis priorities and recommendations for fuels reduction and restoration, and other management.
July 2003	A major project, the Metolius Basin Forest Management Project EIS, is completed and a record of Decision is issued. Approximately, 12,500 acres of forest tree thinning, mowing, and burning are included in the landscape level project.
August 2003	The B&B Complex Fires are reported on August 19, 2003. The 2 fires eventually join together to encompass about 92,000 acres across multiple ownerships (Willamette NF, Deschutes NF, State of Oregon, Confederated Tribes of Warm Springs, and private lands). The fire is contained in October of 2003. Approximately 1350 acres of the Metolius Basin Forest Management Project area were burned.
September 2003	The Metolius Basin Project is appealed in September of 2003. Part of the appeal claims that a supplemental EIS must be completed for the project as a result of the wildfires. The Decision is affirmed by the Regional Forester in October. In the decision, the Regional Forester informs the plaintiff that the Forest will conduct an assessment of changed conditions resulting from the B&B Fires in accordance with 40 CFR 1502.9 and implementation will not occur until that analysis is completed consistent with regulations.
December 2003-March 2004	An interdisciplinary analysis is conducted to update the 1996 Watershed Analysis to reflect conditions and changes resulting from the B&B Fires and other important changes within the watershed.
March 2004	A lawsuit is filed in US District Court on the Metolius Basin Forest Management Project. Claims include: The FEIS is legally inadequate and violates NEPA, cumulative effects of Eyerly and Cache Mtn Fires, Eyerly Fire Salvage, and McCache Project are inadequately addressed and that a supplemental EIS is required as a result of the Link and B&B fires.
July 2004	The interdisciplinary review of the Metolius Basin Project in relation to the B&B Fires is completed. The Ranger and Forest Supervisor decide to make minor adjustments including: dropping treatments in 170 acres of spotted owl habitat and in 750 acres of forests affected by the fire, and adjusting mitigations to address aquatic and noxious weed concerns. They conclude that a Supplemental EIS is not necessary and implementation on the project should go forward.
August 2004	The Metolius Watershed Analysis is compiled into this document.

PUBLIC INVOLVEMENT

Ranger Bill Anthony leads public tour to Mollie's Rock, near Corbett Snopark

December 2003 – The Metolius Watershed Analysis Update Newsletter is sent to 600 people.

- The newsletter describes watershed analysis process
- It provides preliminary comparison of the watershed in 1996 and 2004
- It describes accomplishments of 1996 recommendations
- It asks for new information
- Six people and/or agencies respond

December 2003 - July 2004- Presentation and Talks

- Summary of analysis is presented to: Region 6, Deschutes and Ochoco National Forest Line Officers and Resource Specialists, Deschutes Provincial Advisory Committee (PAC), Metolius Working Group, and public groups such as Kiwanis, Rotary, and Homeowners associations.

December 2003 - July 2004- Field Trips

- More than a dozen field trips are done in the B&B Fire area to discuss findings, view fire effects, and discuss options for the future. Groups included: Forest Service Chief and Line Officers, Congressional Staff, Forest Industry, State and Private Foresters, Small Woodland Owners, Native Plant Society, College classes, Burned Area Emergency Rehabilitation Coordinators, and public. Several hundred people attend tours.

PUBLIC ISSUES AND QUESTIONS

FIRE

- **Where were fires within the historic range (characteristic) and outside historic range (uncharacteristic)?**
- **Which areas would naturally experience stand replacement fire (i.e. Fire Regime 4 & 5)?**

SALVAGE

- **Need more information on salvage effects**
- **Concern regarding size of trees salvaged- retain large dead and live trees**
- **Prefer investments in proactive thinning versus salvage**
- **Timeliness of salvage affects economics**

SOILS

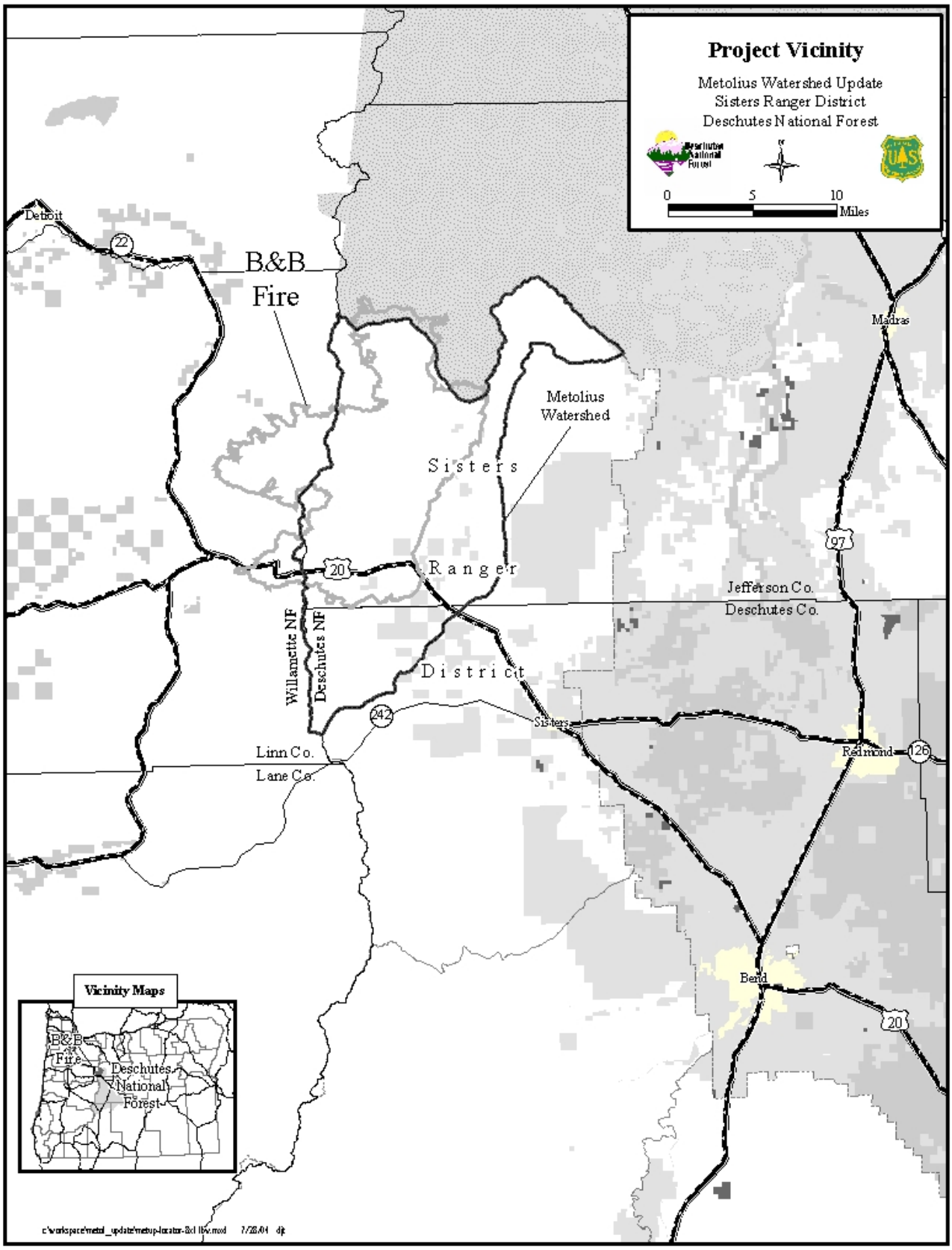
- **Improve soil analysis in watershed analysis document**

WILDLIFE

- **Reevaluate goals for spotted owl habitat.**
- **Consider big game needs/road closures.**

ROADS

- **Use new data on Off Road vehicles and roads.**


Project Vicinity
Metolius Watershed Update
Sisters Ranger District
Deschutes National Forest
0 5 10 Miles
Detroit
22
B&B Fire
Madras
Metolius Watershed
Sisters Ranger District
20
97
Jefferson Co.
Deschutes Co.
Willamette NF
Deschutes NF
242
Sisters
Redmond
126
Linn Co.
Lane Co.
Bend
20
Vicinity Maps
B&B Fire
Deschutes National Forest

METOLIUS WATERSHED ANALYSIS AREA
DISTINGUISHING FEATURES

SETTING

- **The Metolius Watershed Analysis Area is northwest of Sisters, Oregon.** It is located in the northern half of the Sisters Ranger District, Deschutes National Forest, and is within Jefferson and Deschutes Counties. It lies approximately 30 miles west of Bend, Oregon along Highway 20, which bisects the southern third of the analysis area

PHYSICAL

- **Key Watershed- Metolius River**
- **Cascade Mountain backdrop**- Mt Jefferson, Three Finger Jack
- **Unique geology-** Creates springs and highly permeable outwash plains of sand and gravel left by glaciers
- **Subwatersheds:** Covers 14 subwatersheds, including: Headwaters, Upper and Middle Metolius River, Dry Creek, Cache Creek, Upper Lake Creek, Lower Lake Creek, First Creek, Jack Creek, Canyon Creek, Abbot Creek, Candle Creek, and Jefferson Creek.
- **Part of Columbia River Basin-** The Metolius is within the Upper Deschutes River Basin and in a larger context the Columbia River Basin. The Metolius River enters the Deschutes River above Pelton and Round Butte Dams, the Deschutes flows into the Columbia River, which flows into the Pacific Ocean.
- **The Metolius River is spring fed, stable, sensitive to sediment-** One of the most stable rivers in the world for its size, vulnerable to sediment because of the lack of flood events to flush gravels clean.
- **Precipitation:** The area is located on a steep rain gradient on the eastern slope of the Cascade Mountain range.
- **Elevations :** Range from 10,358 feet at the top of South Sister to 2900 feet near the community of Camp Sherman.

BIOLOGICAL

- **Important Fishery-** The Metolius River once supported large sockeye and spring chinook runs**.** One of the healthiest Bull Trout populations in the state. Reintroduction of Salmon is planned under the relicensing of Pelton/Round Butte Dams.
- **Trademark Ponderosa Pine Forests-** The Metolius Basin is known for large ponderosa pine trees and scenic forest views.
- **Diversity of Fire Regimes and Vegetation-** All five Fire Regimes are present, although much of the area historically experienced frequent low intensity fire. Higher elevations and moisture gradient areas support diverse subalpine, moist, and dry mixed conifer forests.
- **Diversity of Wildlife-** Typical westside species, such as the Northern Spotted owl, survive here at the edge of their range. Supports a diversity of wildlife including pine forest species such as goshawks and white headed woodpeckers. Bald eagle Management Area and known bald eagle nests
- **Rare endemic wildflower, Peck's penstemon and rare fungi and lichens-** Epicenter of the global population of the endemic wildflower Peck's Penstemon. Habitats support a high

diversity of wildflowers and native plants.

- **Sub-alpine and alpine habitats**
- **Expanding noxious weed populations associated with roads, urban areas, and past management**

SOCIAL

- **Ownership- 95% Public lands, 5% Private lands**
- **State Highway 20- Oregon's busiest route over the Cascade Mountains**
- **Important Recreation and Residential Area-** The community of Camp Sherman, resorts, and campgrounds are within the analysis area. The Metolius is a popular recreation area for camping, fishing, hiking, and other activities.
- **Growing population and new developments**
- **Large areas of forest/ urban interface**
- **Long history of Native American use and early European settlement**
- **Wild and Scenic-** The Metolius is a Wild and Scenic River managed under a plan completed in 1996.
- **Valued scenic vistas-** Head of Metolius, Black Butte, Wilderness Trails,Camp Sherman Area.

LAND ALLOCATIONS

The following tables illustrate the land allocations within the watershed.

The public land in the watershed is managed under the Northwest Forest Plan and the Deschutes National Forest Land and Resource Management Plan. Table 1 describes allocations that have been designated by the Northwest Forest Plan while Table 2 shows the Deschutes National Forest land allocations.

OV Table 1. Land Allocations as described by the Northwest Forest Plan for the Metolius watershed.

NORTHWEST FOREST PLAN (NWFP)			
MANAGEMENT ALLOCATION	**ACRES**	**% OF TOTAL NWFP ACRES**	**% OF WATERSHED**
Late-successional Reserves	74,344	50%	50%
Congressionally Withdrawn	42,340	28%	28%
Matrix	19,419	13%	13%
Other Ownership	7,939	5%	5%
Administratively Withdrawn	3,218	2%	2%
Area Outside NWFP	1,436		1%
TOTAL	148,696	100%	100%

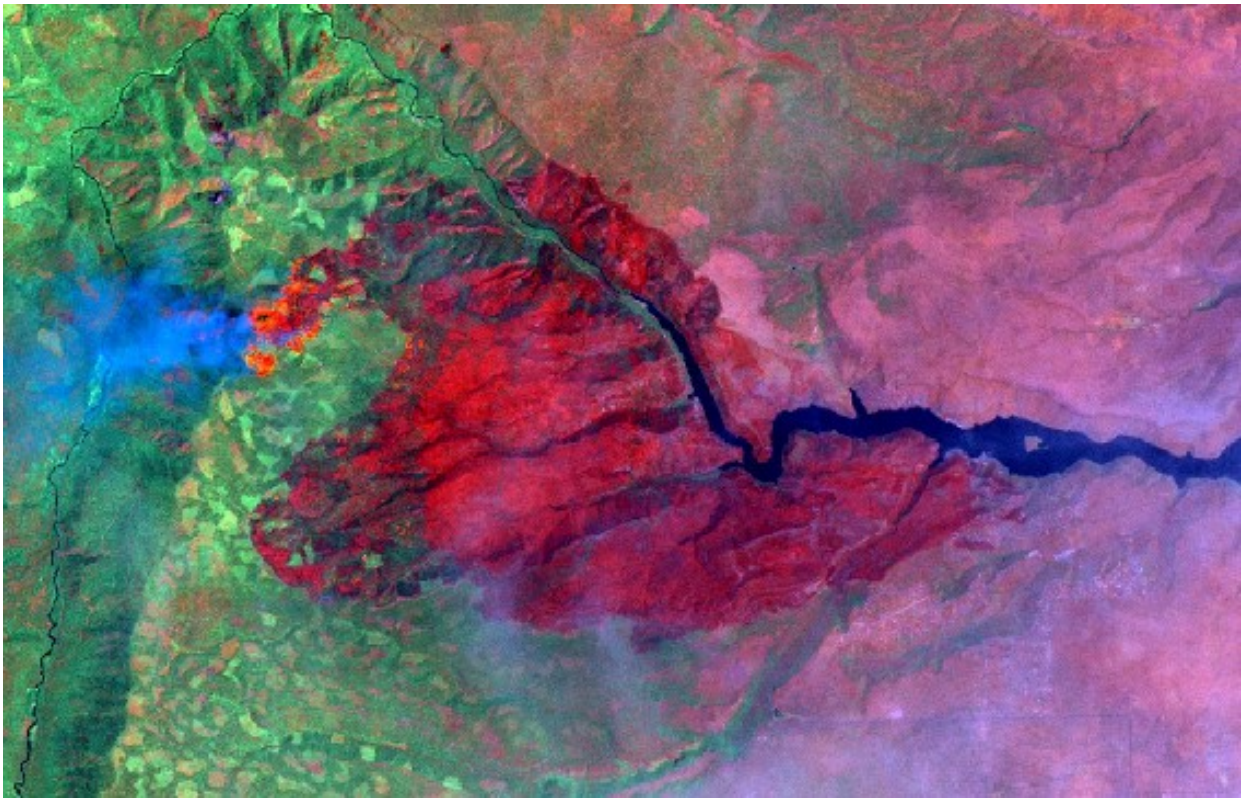
OV Table 2. Land Allocations as described by the Deschutes National Forest Land and Resource Management Plan (LRMP) for the Metolius watershed.

DESCHUTES FOREST PLAN		
LRMP MANAGEMENT ALLOCATION	**ACRES**	**% OF WATERSHED**
Wilderness	42,340	28%
Metolius Special Forest	19,933	13%
Metolius Heritage	17,722	12%
General Forest	14,467	10%
Metolius Wildlife/Primitive	9,807	7%
Other Ownership	8,138	5%
Metolius Scenic - Retention Midground	7,537	5%
Metolius Black Butte Scenic	6,187	4%
Metolius Wild & Scenic River, Recreation Segment	4,920	3%
Metolius Wild & Scenic River, Scenic Segment	3,132	2%
Winter Recreation	2,853	2%
Scenic Views - Retention Foreground	1,717	1%
Cache Mtn Research Natural Area	1,602	1%
Intensive Recreation	1,492	1%
Scenic Views - Retention Midground	1,345	1%
Metolius Research Natural Area	1,335	1%
Metolius Scenic - Retention Foreground	1,157	1%
Eagle	808	1%
Metolius Special msi	749	1%
Metolius Special msj	634	<1%
Metolius Scenic - Partial Retention Midground	285	<1%
Scenic Views - Partial Retention Midground	259	<1%
Scenic Views - Partial Retention Foreground	179	<1%
Metolius Old Growth	98	<1%
TOTAL	148,696	100%

KEY QUESTIONS – FOCUS OF ANALYSIS:

1. HOW HAVE THE WILDFIRES AFFECTED THE WATERSHED AND ITS PROCESSES?

2. WHAT IMPORTANT NEW INFORMATION HAS EMERGED IN THE PAST 8 YEARS?



The lower Metolius Watershed and the Eyerly Fire burning on Green Ridge towards the Metolius River. A rain storm helped stop the fire's westward spread, but also started the Cache Mountain Fire. 2002. IR photo.

KEY FINDINGS- BY RESOURCE AREA

The following is a synopsis of resource reports and team synthesis.
For more detail, see the attached Resource Reports.

FIRE

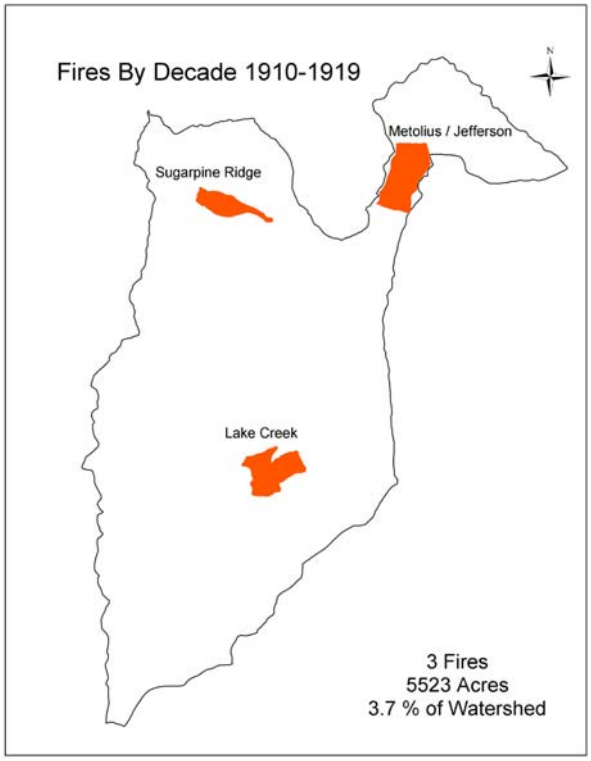
- **The Metolius Basin has been changed by wildfire**

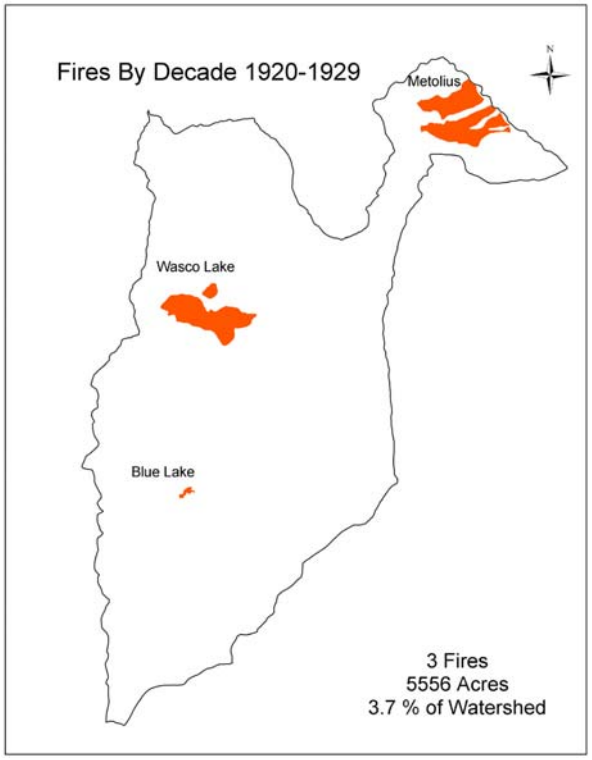
- **Between 1996 and 2003, eight large wildfires have burned in the Metolius Basin**

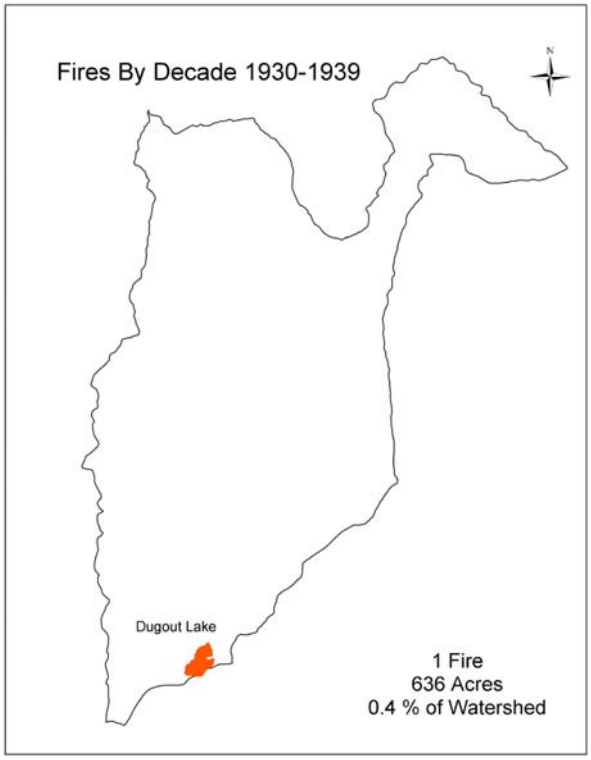
2003- B&B Fire- 91,902 acres
2003- Link Fire- 3,589 acres
2002- Cache Mountain-3,858 acres
2002- Eyerly- 23,135 acres
2002- Metolius RNA- 167 acres
1999- Cache Creek- 382 acres
1998- Square Lake- 113 acres
1996- Jefferson- 3,689 acres

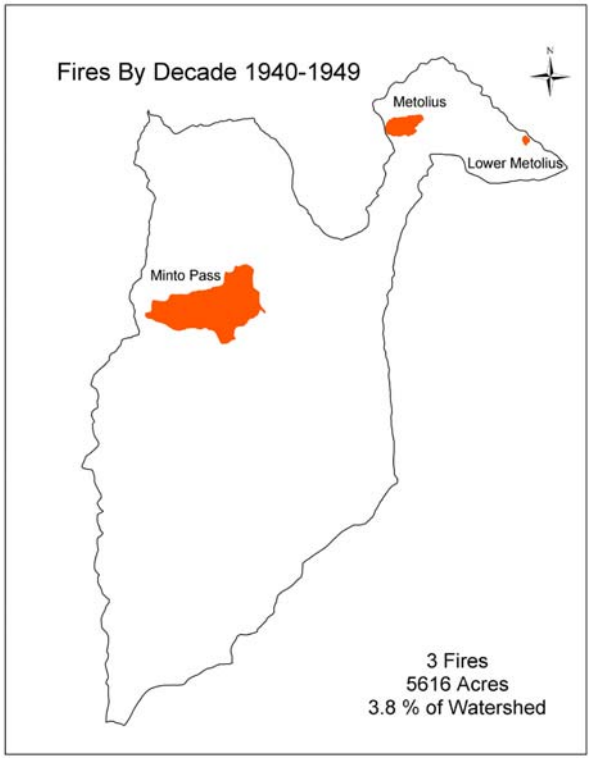
- **The B&B and Eyerly wildfires of 2002 and 2003 are unprecedented in size compared to the fires in the past century.**

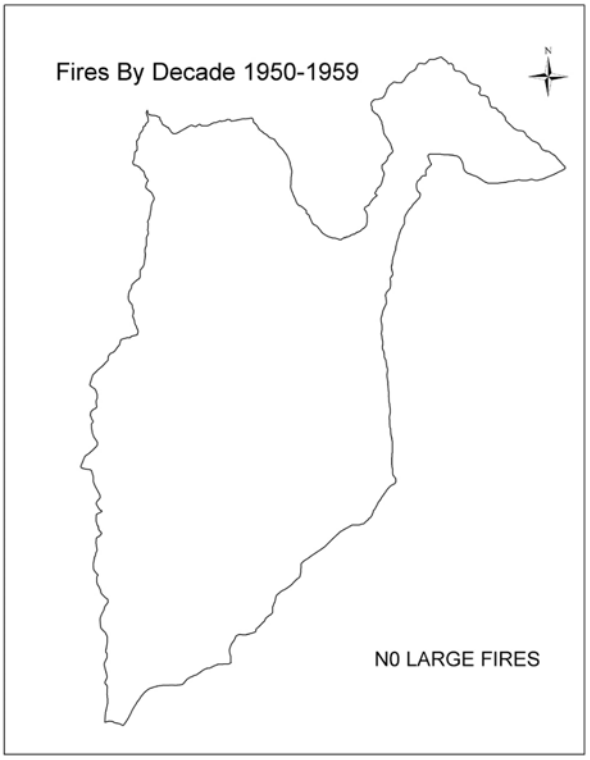
- **This is displayed in the "Fires By Decade" Analysis below, which shows historic fires in the watershed from 1900- 2003.**



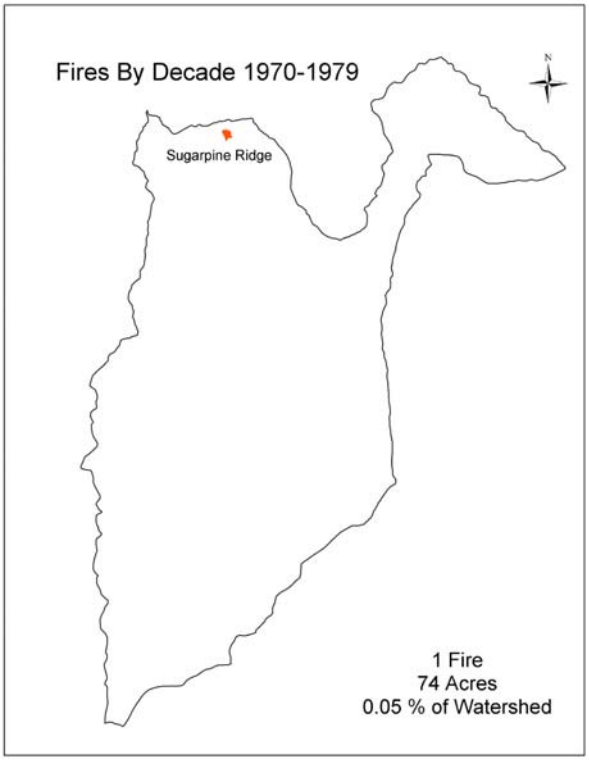

Fires By Decade 1920-1929
Metolius
Wasco Lake
Blue Lake
3 Fires
5556 Acres
3.7 % of Watershed

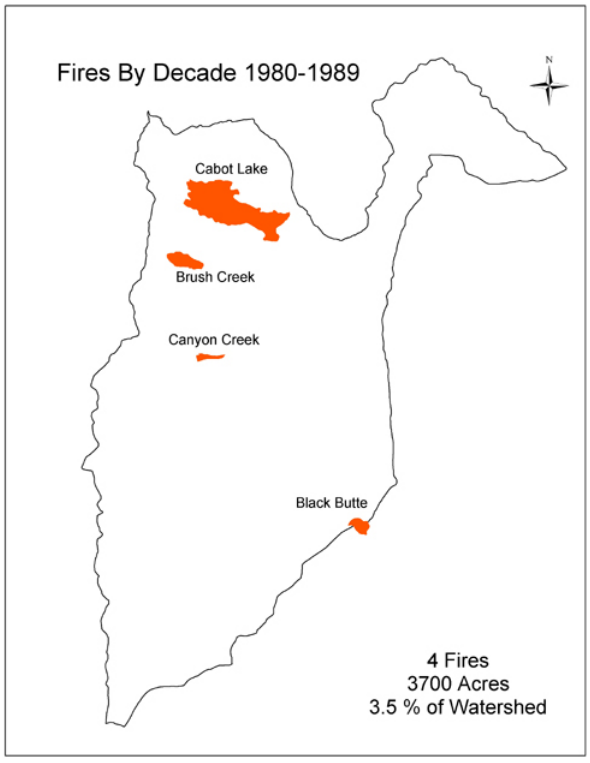

Fires By Decade 1930-1939
Dugout Lake
1 Fire
636 Acres
0.4 % of Watershed

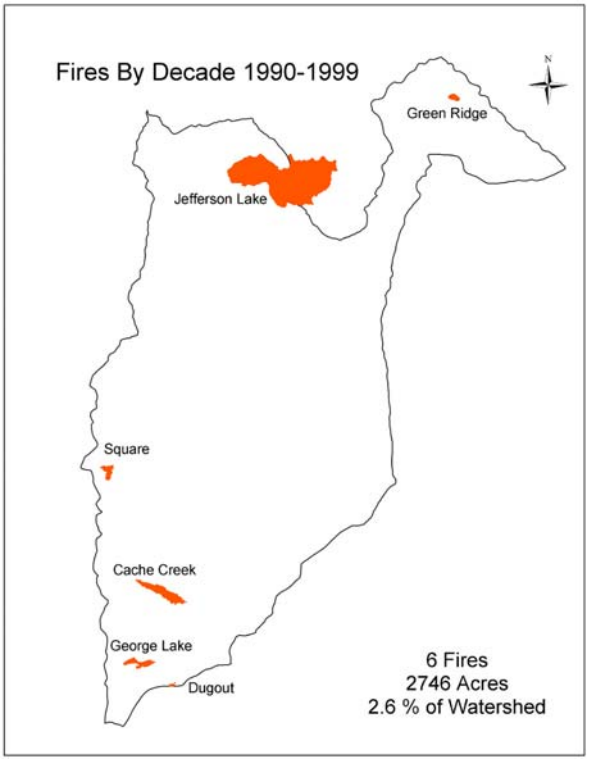

Fires By Decade 1940-1949
Metolius
Lower Metolius
Minto Pass
3 Fires
5616 Acres
3.8 % of Watershed

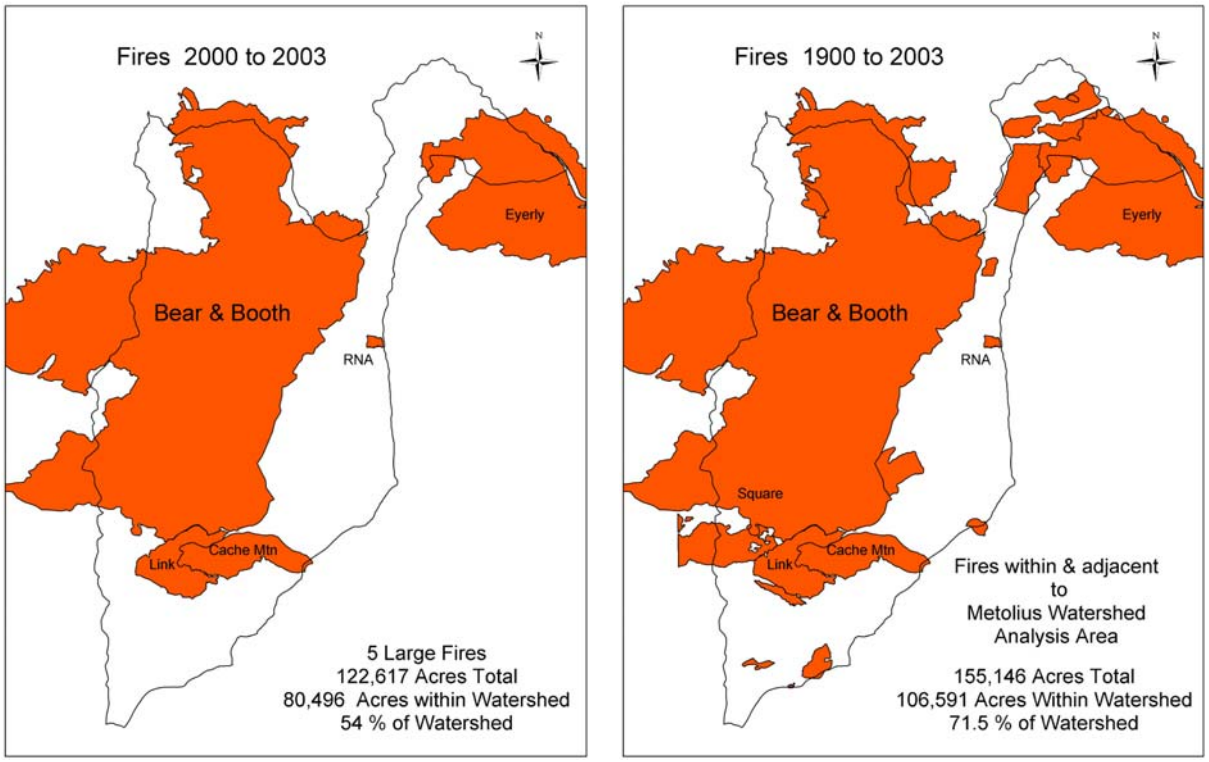

Fires By Decade 1950-1959
N0 LARGE FIRES


Fires By Decade 1960-1969
Round Lake
Big Lake Airstrip
2 Fires
2002 Acres
2.3 % of Watershed

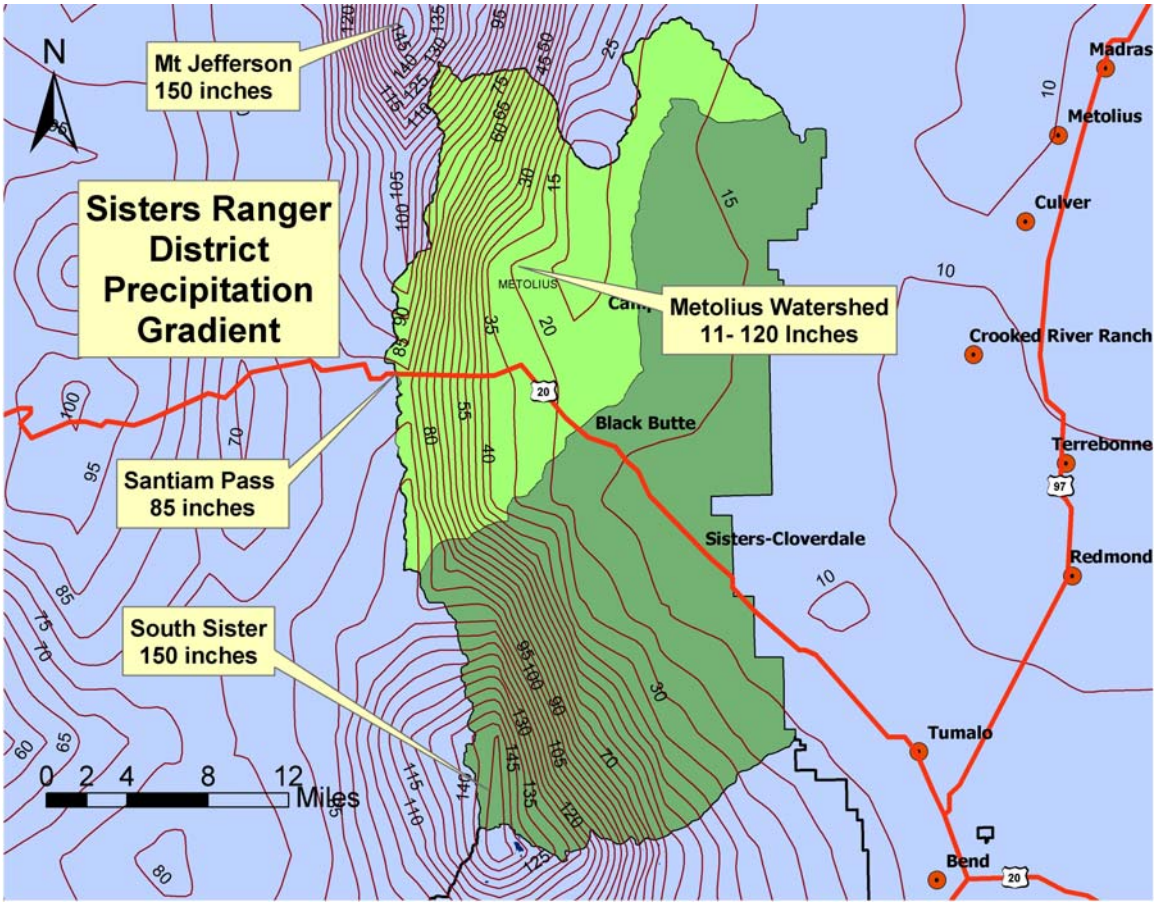

Fires By Decade 1970-1979
Sugarpine Ridge
1 Fire
74 Acres
0.05 % of Watershed


Fires By Decade 1980-1989
Cabot Lake
Brush Creek
Canyon Creek
Black Butte
4 Fires
3700 Acres
3.5 % of Watershed


Fires By Decade 1990-1999
Green Ridge
Jefferson Lake
Square
Cache Creek
George Lake
Dugout
6 Fires
2746 Acres
2.6 % of Watershed



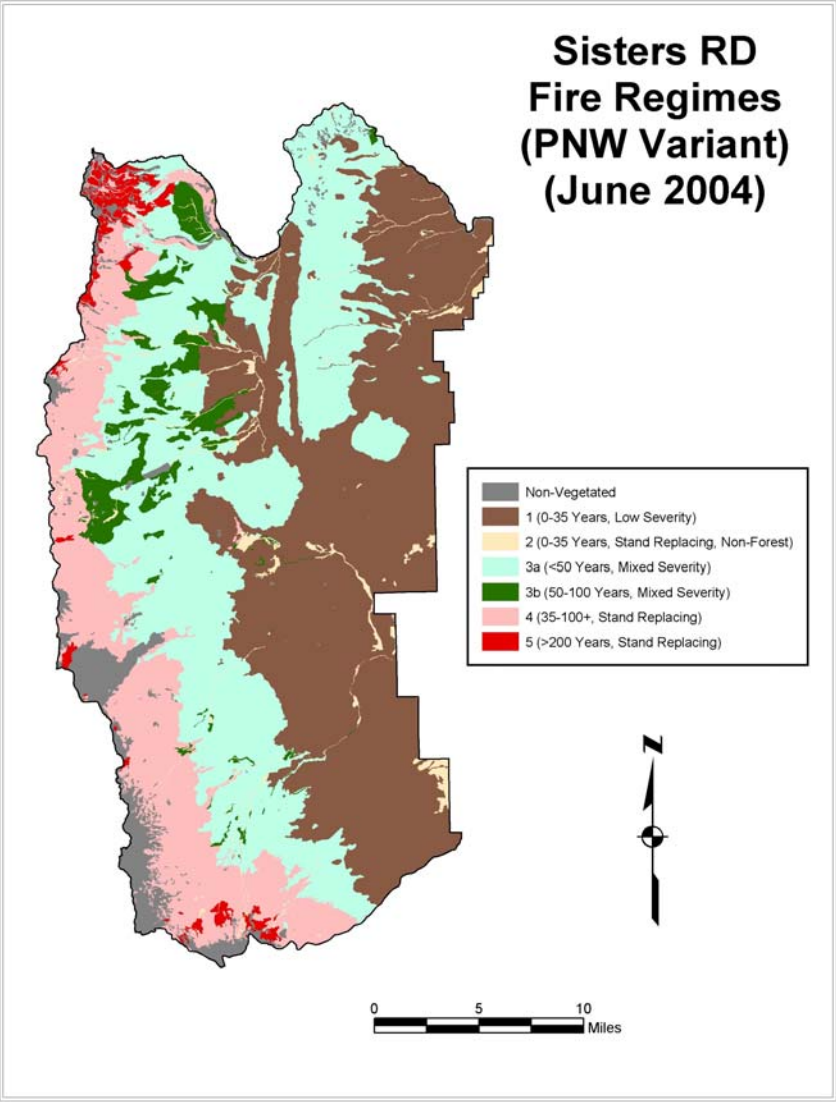
- **In 2 years, four times as many acres have burned than burned in the previous 100 years.**
  - From 1900-1999, 29,449 acres burned.
  - In 2002 and 2003, 122,450 acres burned.



- **A steep rain gradient influences Metolius Basin vegetation and fire regimes**

- **This rain gradient creates a diversity of forest types, fire regimes, and influences fire behavior**

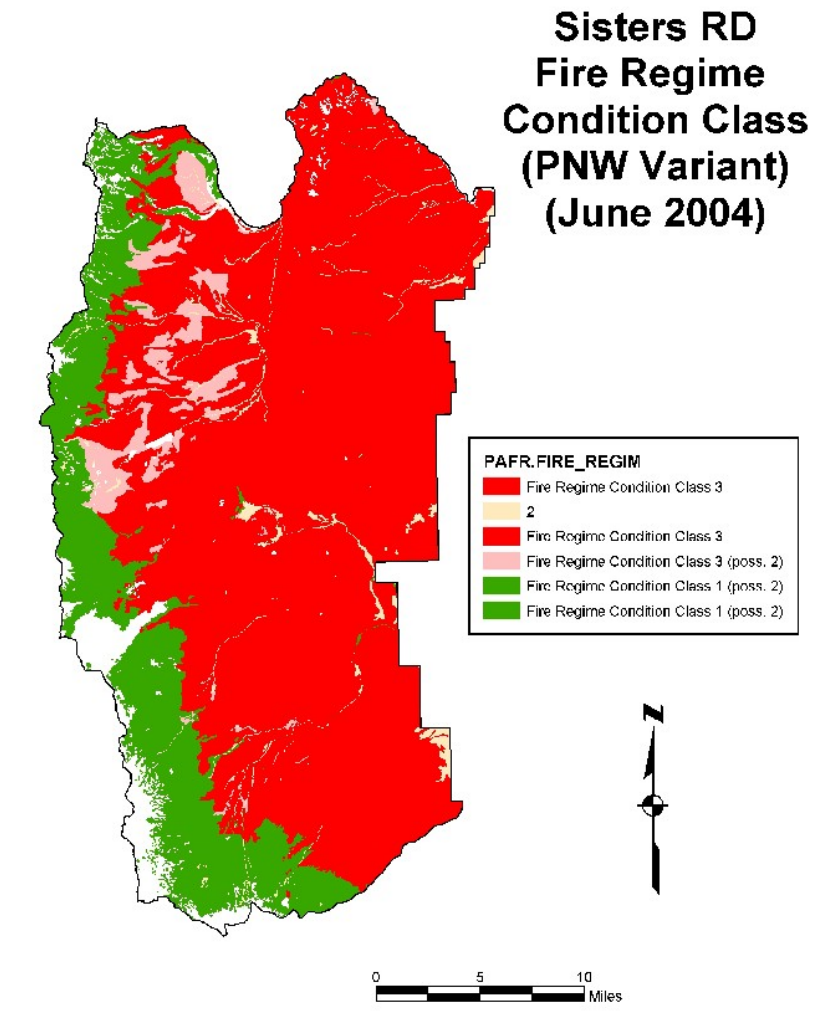
  - ***Fire Regime (FR)*** = A general classification of the role fire would play across a natural landscape in the absence of modern human mechanical intervention, but including the influence of aboriginal burning (Agee 1993, Brown 1995).



- **Fire regimes in the Metolius Watershed vary with elevation and moisture**

- **Five different Fire Regimes are present**

- **Historically, Fire intensity was different at different elevations**
  - High elevation fires (FR 4 & 5) burn at high intensities and reset forest stands (i.e. similar to lodgepole pine stands in Yellowstone)
  - Middle elevation fires (FR 3) burn at mixed intensities creating diversity (i.e. Mixed Conifer forests)
  - Low elevation fires (FR 1) burn at low intensities and forests survive and thrive (ie. Ponderosa pine forests near Metolius River)



- **Condition Class** = Is the degree of departure from the natural (historic) range of variability within a fire regime.

- **The exclusion of fire has altered most of the mid-low elevation Metolius Basin Forests from their historic structure, composition, and diversity.** Fire regimes in ponderosa pine and mixed conifer forests have been significantly altered from their historic fire return interval, and the risk of losing key ecosystem components is high. These areas were most affected by the B&B Fire.

- **High elevation forests are for the most part, within their historical ranges for fire return and fire regimes.** The risk of losing key ecosystem components is low. These areas will recover naturally from the B&B Fire.

SUMMARY OF FIRE FINDINGS:

- **Some portions of lower elevation mixed conifer and ponderosa pine forest areas experienced fires in the past eight years that were uncharacteristic in size and intensity and unprecedented in the fire history of the past 100 years.**

- **High elevation fires in the past eight years were within historic range of intensity but size was likely outside the historic range. They will recover through normal successional patterns.**

- **The departure from historic patterns of fire, past management, and weather patterns have changed fire regimes and increased risk of larger fires at higher intensities. This is a reason for the recent uncharacteristic wildfires.**

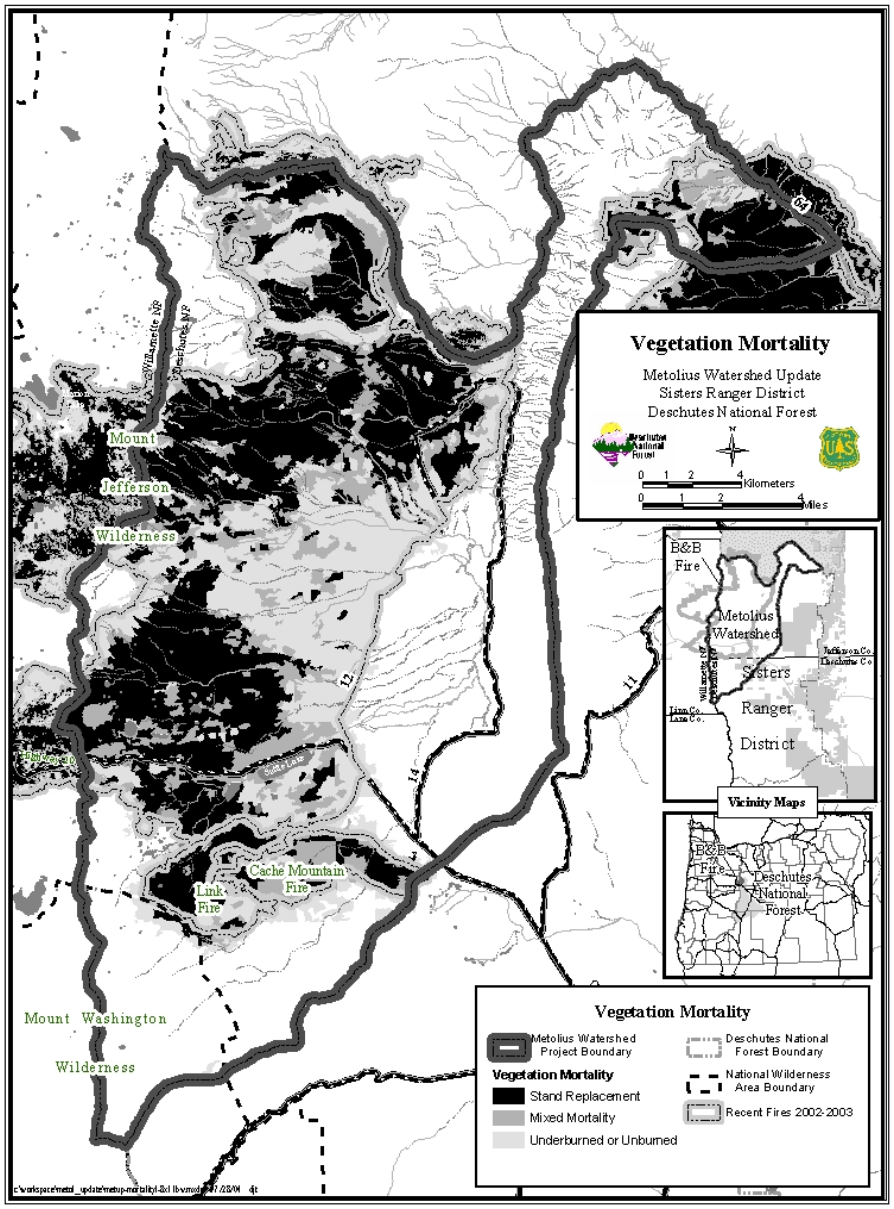
KEY FIRE AND FUELS TRENDS

- **New**- Expect decreased fire risk for 5 years due to reduction of fine fuels and brush.

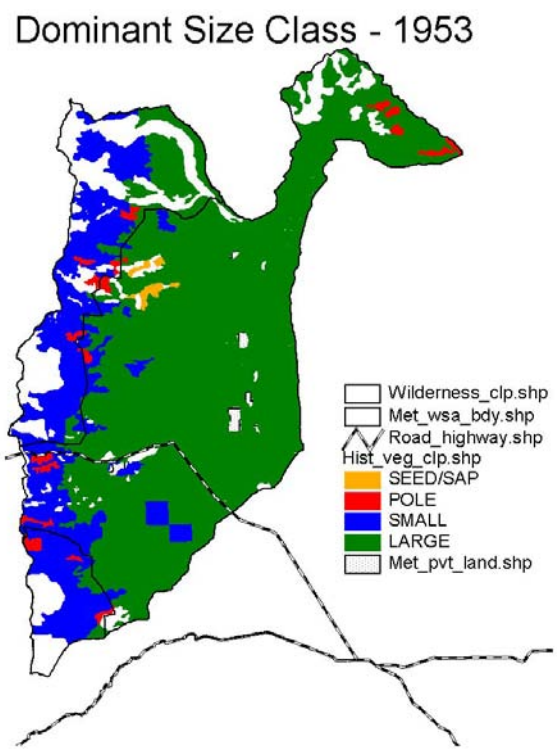
- **New**- Expect increased fuel loading over the next 5-60 years from falling snags. Large amounts of wood on the ground creates resistance to fire suppression, difficulties with fire reintroduction, safety issues, and risks of reburn to developing forest.

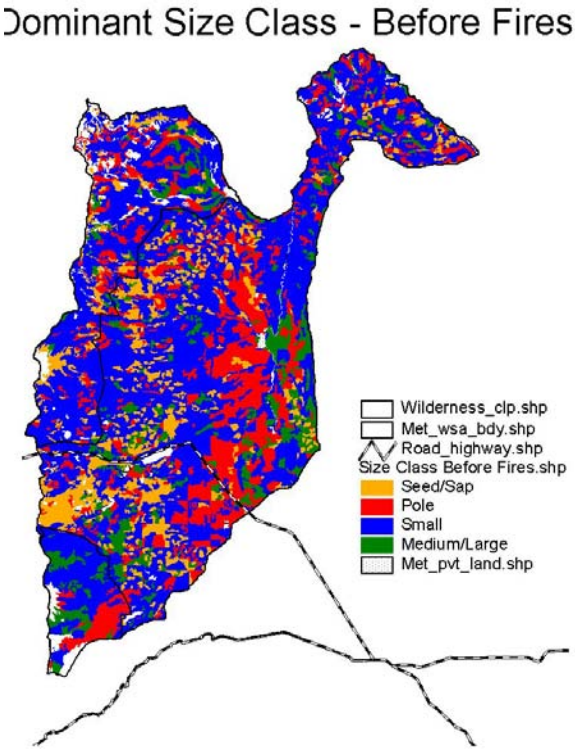
- **New**- Wildfires have created new landscape patterns which in some ways resemble historic landscape patterns with complex edges, some gradual edges, and live stand remnants and legacies. Conversely, more trees in lower elevation forests are dead than would have likely occurred historically and patch sizes of dead trees are larger than historic patch sizes.

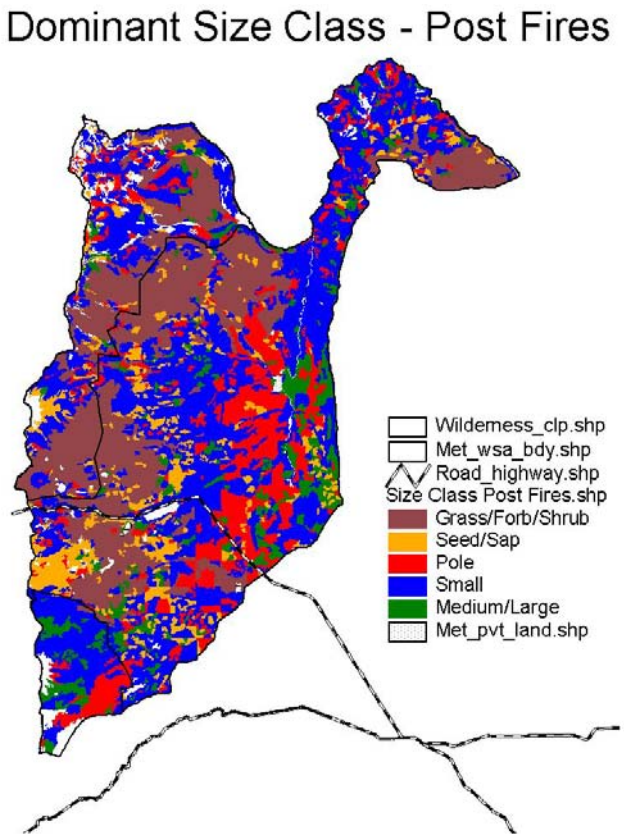
FOREST VEGETATION



- **About 54% of watershed has been affected by wildfires since 1996**
  - Approximately 26% of watershed has experienced stand replacement fire (more than 75% of the trees are dead)
  - Approximately 11% has experienced mixed severity fire (25-75% of the trees are dead)
  - There are now 5 times more early stage forests than in 1996 (grass/forb /shrub class has increased from 6% to 31%)







- **There has been a continual loss of large trees since 1953.**
- **In 1953 large trees dominated the landscape.**
- **Large trees were less prevalent in 1996, before the fires, because of logging which removed large trees and fire exclusion which allowed many small trees to grow and dominate the landscape.**
- **There are even less large trees in 2004 due to fire caused mortality.**
- **About 113,000 or 17% of the large trees over 21” in diameter in the watershed were lost in fires since 1996.**

SUMMARY OF FOREST VEGETATION FINDINGS:

- **Forest vegetation structure and tree size have been pushed even farther outside the historic range due to fire. This continues a trend of more early seral vegetation and fewer older, large trees over 21" in diameter.**
  - 1953 - 64% of the watershed dominated by large trees
  - 1996 - 9% of the watershed dominated by large trees
  - 2004 – 7% of the watershed dominated by large trees

- **The greatest percentage of moderate to high severity fire (where more than 25% of the overstory trees are dead) is found is found in 3 plant association groups:**
  - Lodgepole pine- 56% of fire was moderate to high severity
  - Mixed conifer wet- 50% of fire was moderate to high severity
  - Mixed conifer dry- 43% of fire was moderate to high severity

- **31% of Riparian forest areas burned at moderate to high severity**

- **Landscape patch structure has changed. There are four large, early seral patches in the areas of:**
  1. Cache Mountain and Round Lake
  2. Abbot Butte
  3. Sugar Pine Ridge
  4. North end of Green Ridge

KEY FOREST VEGETATION TRENDS

- **1996 Trend** (still valid outside wildfire areas)– Greatly increased stand densities are putting all trees sizes at risk. Large tree mortality, insect and disease, and catastrophic fire risk are increasing. Species composition shift from early to late seral species. Outside wilderness, stand structure has been shifting from larger to smaller trees and from single or two canopy layers to multiple canopies. Large tree development is slowed.

- **1996 Trend**-(modified, but still valid outside fire areas)- Some Wilderness areas are in late stages of successional development and despite fire exclusion, vegetative disturbance patterns and successional trends will continue within the range of historic variability.

- **1996 Trend**-(Still valid outside wildfire area) – In mixed conifer, the horizontal landscape structure is fragmented with higher edge contrast and landscape patches are smaller and more numerous than occurred historically.

- **1996 Trend and New**- Continued loss of large trees, interior habitats, and connectivity for some wildlife species.

- **New**- Large areas of early seral vegetation due to wildfire created mortality in forest vegetation, increasing amounts of grass, shrubs, and seedlings.

- **New** - Continued mortality of fire damaged trees is expected from secondary agents such as insects and disease, especially bark beetles and root disease.

SOILS

SUMMARY OF SOIL FINDINGS:

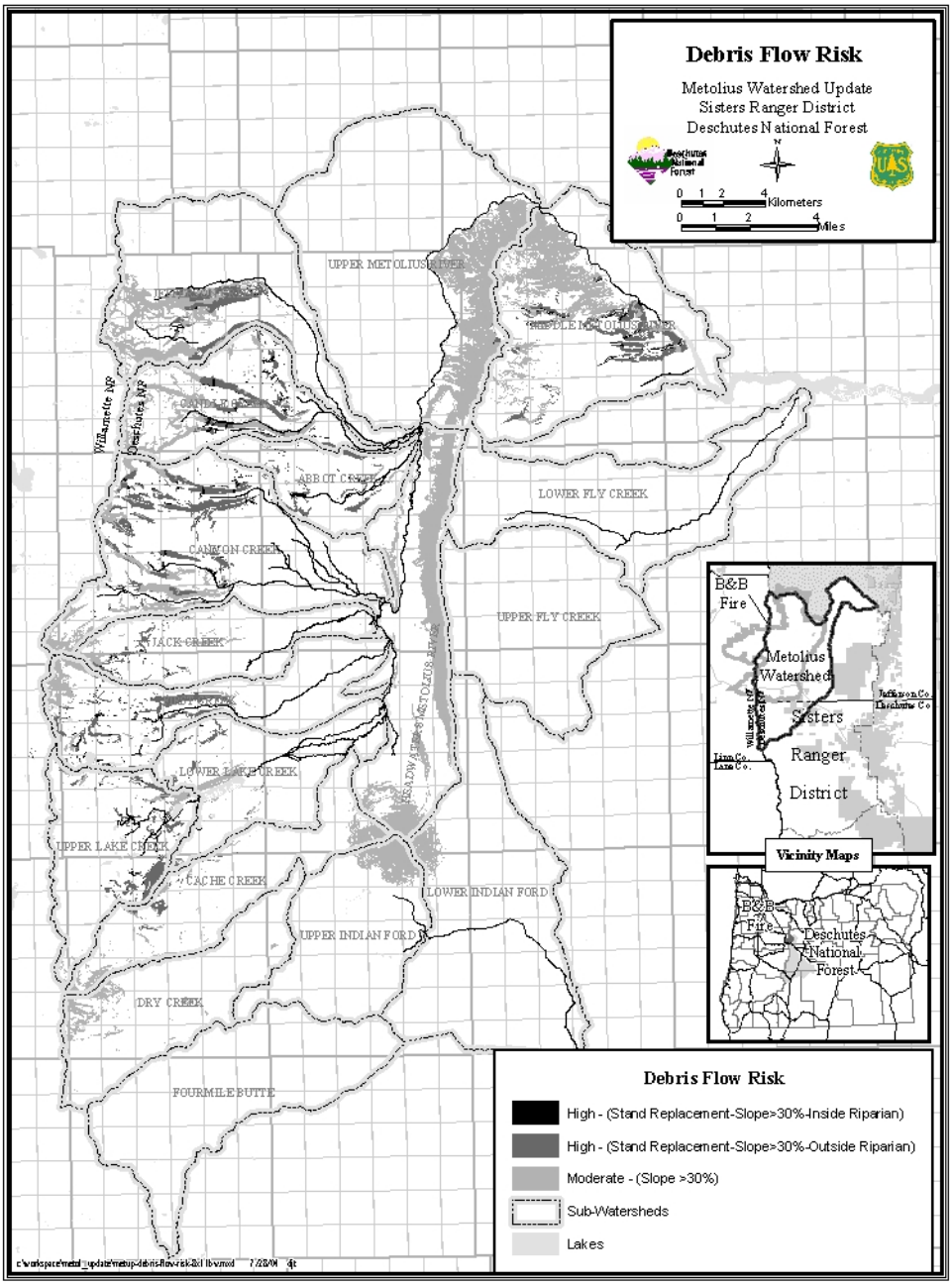
- **Despite extreme fire behavior and stand replacement tree mortality, the wildfires within the watershed had minimal effects to soil productivity.**
  - Negative changes were isolated and localized to areas where stumps or down wood burned for extended periods of time.
  - Less than 4% of the area showed negative changes in terms of altered mineral composition or nutrient volatization.

- **There are elevated erosion risks associated with severely burned areas**. Risk is tempered and lowered by high infiltration rates of soils in the area and relatively gentle slopes. Highest risk areas are headwater areas of:
  1. First Creek
  2. Jack Creek
  3. Canyon Creek
  4. Brush Creek

- **Ten debris flows (landslides) occurred in the Metolius Basin during an intense winter storm in 1996**
  - Nine of the ten debris flows in 1996 were associated with managed areas where vegetation had been manipulated in varying degrees.
  - Five older debris flows were discovered in the Highway 20 corridor and appear to be associated with a similar intense winter storm in 1964.

- **Slopes exceeding 25% in areas of stand replacement fire have an elevated risk of debris flows within 3 years of the fire as tree roots decay and lose soil holding strength**.

  - Slope stability in these areas is not likely to return to pre-fire levels within the next 20 years, although returning shrubs and trees will help stabilize soil.



KEY SOIL TRENDS

- **New-** Increased risk of debris flows (landslides) after 5 years up to 20 years due to loss of stabilizing tree roots in wildfire areas.
- **New-** Increased risk of erosion due to wildfire effects, channeling fine sediment into aquatic habitats, threats to road structures, and lowered soil productivity.
- **1996 Trend** (less concern/ improvements/new information) - Lowered soil quality due to altered nutrient cycling, compaction related to ground based harvest systems, roads, trails, and recreation activities.

AQUATIC SYSTEMS

SUMMARY OF AQUATIC FINDINGS:

- **There are more 303D Listed Streams (**Brush, Canyon, First, & Lake Creek and Lake Billy Chinook), largely due to changes in standards, rather than to changes in water quality since 1996.

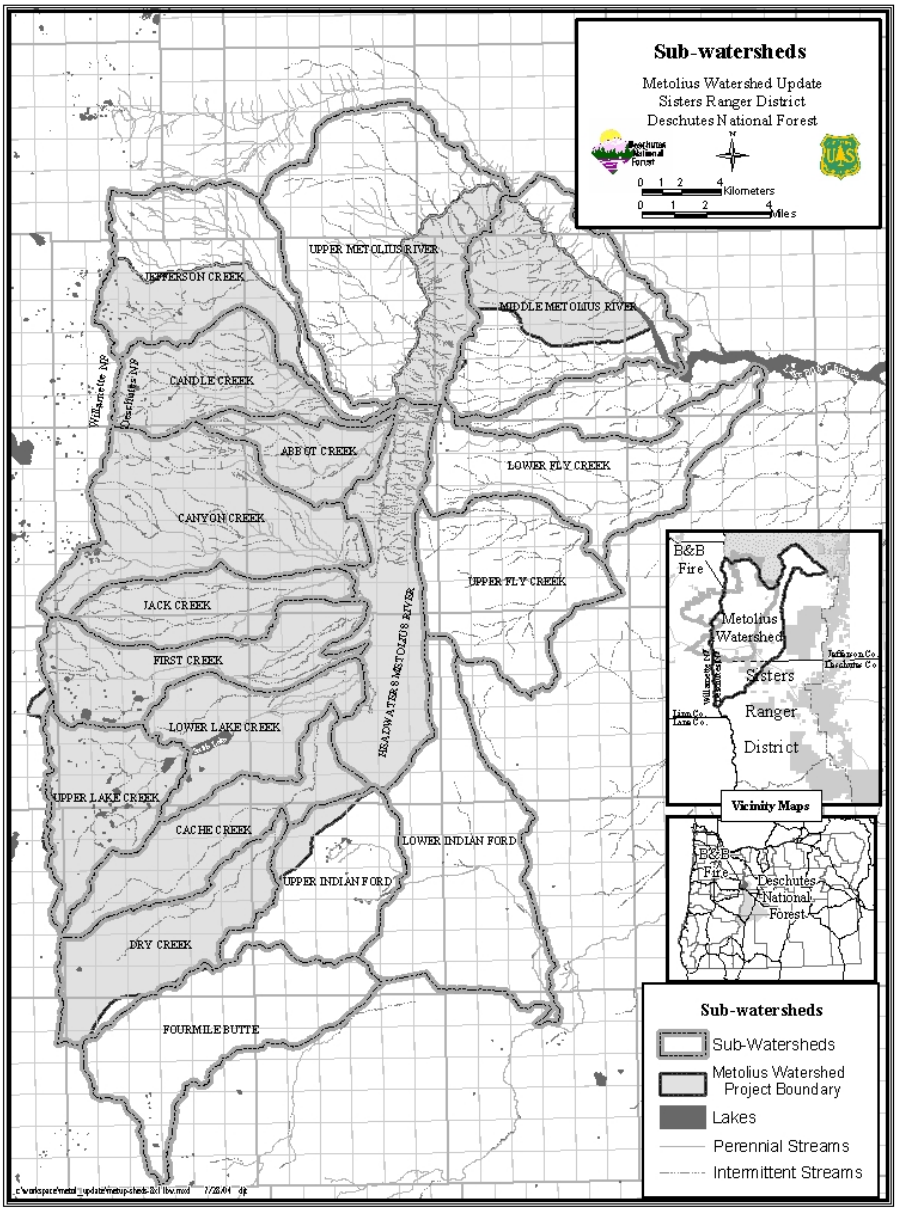
- **There are threats to water quality associated with wildfire**:
  - Sediment from upland erosion
  - Channel instability and erosion
  - Debris slides in the upper watersheds
  - Storm runoff can stress the road drainage network and wash out roads, including roads at stream crossings

- **About 43% of the watershed falls within the rain-on snow elevation zone** (3500-5000 feet), where openings from harvest or fire could increase peak flows in streams downstream. Approximately 4,400 acres of harvest in this zone since 1994 could elevate the risk of increased peak flows.

- **Risks to Aquatic habitat are tempered by**: topography, infiltration rates, and stream characteristics.

- **Six Subwatersheds are at higher risk after the wildfires**. Factors include: sediment deposition into important fish spawning areas, morphological changes to stream channels, or temperatures increases.

    1. Abbot Creek
    2. Candle Creek
    3. Canyon Creek
    4. First Creek
    5. Lower Lake Creek
    6. Middle Metolius Subwatershed- Street Creek
    7. Headwaters of the Metolius



KEY AQUATIC TRENDS

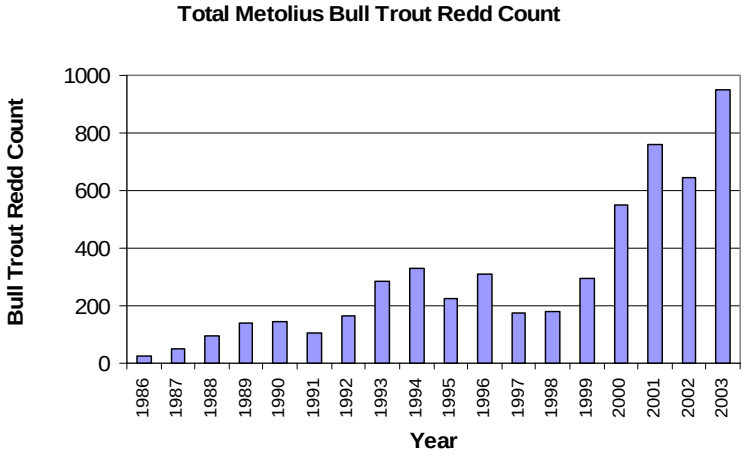
- **New** -Potential for increased peak flows that threaten stream bank stability and loss of soil cover which increases erosion.
- **New**- Increased risk of higher stream temperatures due to loss of stream shade, especially in small streams (Brush, First, and Abbot Creek).
- **New-** Increased risk of short term nutrient increases in water for 4-6 years due to nutrients released by the wildfire.
- **New** and **1996 Trend (has improved but still valid)** – Decrease in water quality and clarity due to algae and possible nutrients from development around Suttle and Blue Lakes.
- **1996 Trend** (some improvements) - Increased sediment delivery and changes in flow regimes from road density, soil compaction, and road/stream interactions.

FISHERIES

SUMMARY OF FISHERIES FINDINGS:

- **There will be a return of anadromous fish (chinook and sockeye salmon) to the Metolius watershed within 6-10 years. The Pelton Round Butte Dam settlement agreement for relicensing specifies restoration of fish passage over the dams.**

- **Bull Trout and Redband Trout populations are currently doing well but sediment is a concern**.
    - Fine sediment in fish spawning habitats can reduce spawning and rearing success of trout and salmon by reducing waterflows through spawning gravel, filling hiding places for young fish and the aquatic invertebrates on which they feed.



KEY FISHERIES TRENDS

- **New and 1996 Trend**-(improving)– Reduced density of instream wood and subsequent loss of habitat complexity in the Metolius River. Trend has improved due to active management and will improve from falling trees in wildfire areas. After a spike in recruitment as fire killed trees fall there will be a gap in new recruitment of wood.

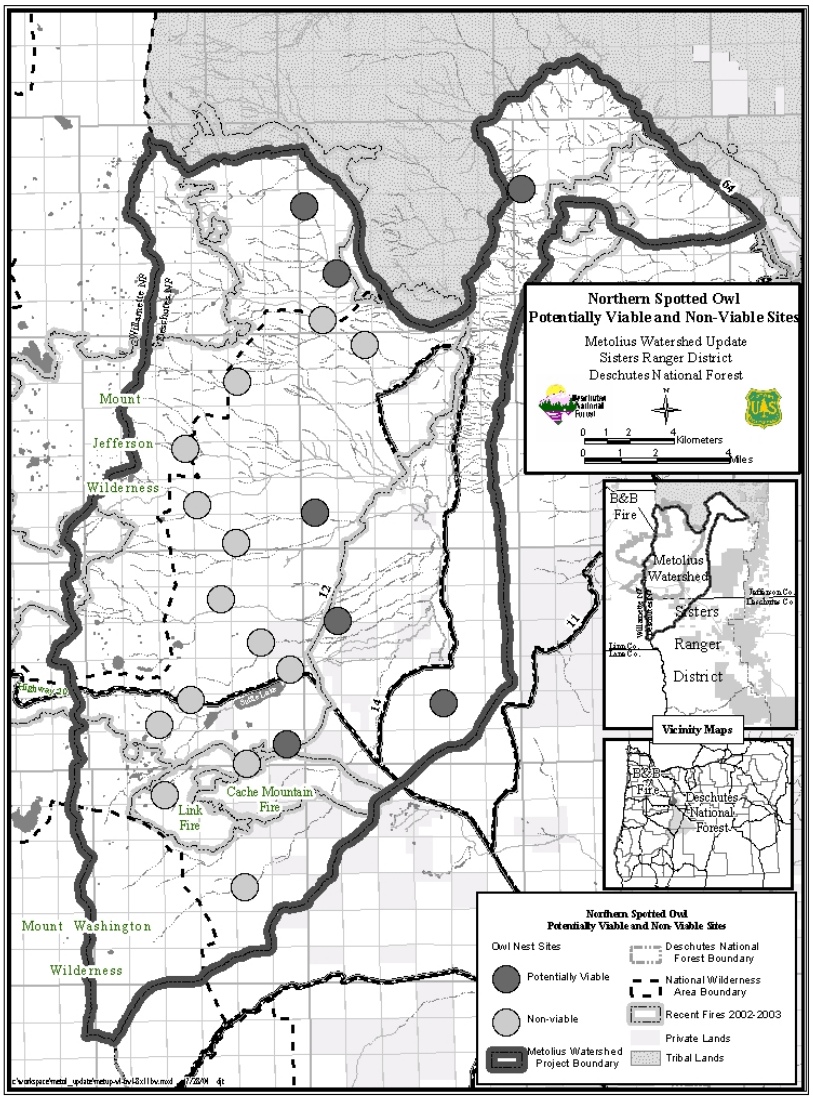
- **New and 1996 Trend**-(modified, less concern, but still valid)- Interaction of native and non-native fish species because of non-native fish introduction. Less of a concern in high lakes because stocking has been reduced.

WILDLIFE

SUMMARY OF WILDLIFE FINDINGS:

- **There has been a loss of large tree habitats and snags.** This especially affects: owls, white-headed woodpecker, pileated woodpecker, marten, bald eagle, osprey, and bats.

- **Wildfires have accelerated the loss of spotted owl habitat in the watershed, which was already in decline before the fires due to drought, insects and disease.**
    - Over 11,000 acres of NRF (Nesting, Roosting, Foraging Owl Habitat) was lost
    - Of 21 known owl sites only 7 are still potentially viable due to loss of habitat
    - 66% of the Metolius watershed owl sites were lost
    - 59% of the district owl sites lost



KEY WILDLIFE TRENDS

- **1996 Trend and New**- Continued loss of large trees, interior habitats, and connectivity for some wildlife species.

- **New-** The need to remove hazard trees and firewood cutting in high use areas and recreation sites will reduce snag habitats. Of special concern are areas around lakes (Meadow Lakes) and streams for wildlife perches (i.e. eagles).

- **New**- Risk of increase of non-native wildlife species (Starlings, Barred owls) and natives (Great Grey owls and cowbirds). Expanssion of their range due to wildfire changes to habitats.

BOTANY

SUMMARY OF BOTANY FINDINGS:

- **Rare plants such as Peck's penstemon and Tall Agoseris will benefit from the wildfires due to fire stimulated flowering and increase in habitat with bare mineral soil.**

- **Noxious weeds will also expand into burned areas and can degrade native habitats.**

It's pretty but… The noxious weed St Johns Wort near Corbett Snopark is displacing native plants. Knapweed is also rapidly expanding in burned areas.

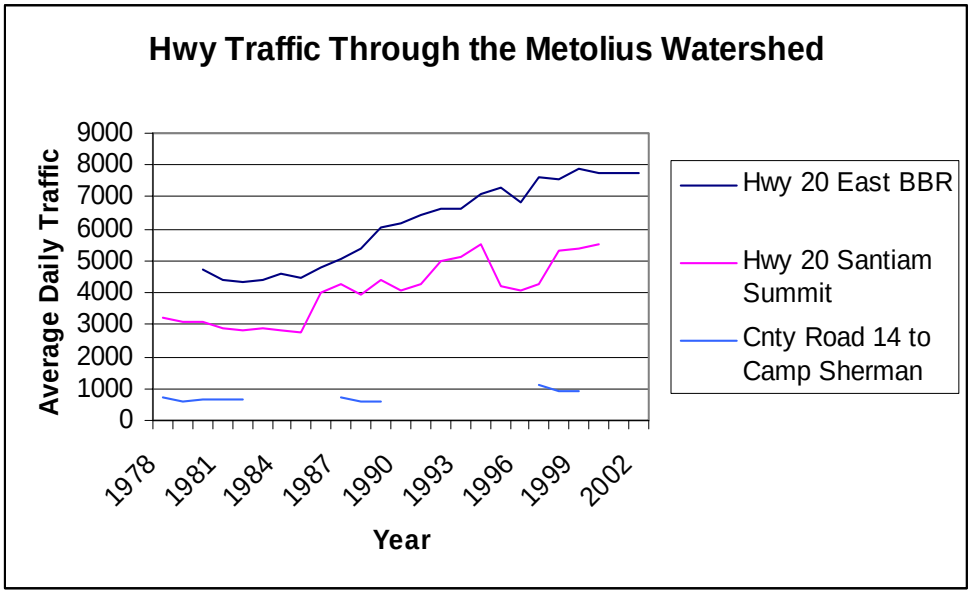
KEY BOTANY TRENDS

- **New**- Risk of expansion and spread of noxious weeds due to wildfire changes to habitats and vectors for spread (roads, OHV's, wildlife, streams).

ROADS

SUMMARY OF ROADS FINDINGS:

- **Traffic on Highway 20 and Road 14 (the road to Camp Sherman) has continued to increase.**
    - There has been an 80 % increase in traffic on Highway 20 in 20 years (1982 to 2002), from 4300 to 7800 vehicles per day east of the Black Butte Ranch entrance.
    - There has been a 54 % increase in traffic on Road 14 into Camp Sherman in 20 years (1979 to 1999), from 600 to 950 vehicles per day



- **Road densities still exceed Forest Plan standards although there has been a slight drop due to road closures.**
    - 1996 open and closed road densities for the watershed were 3.9 miles/sq.mile
    - 2004 open and closed road densities are 3.7 miles /sq.mile
    - Open roads only density is 2.8 miles/sq.mile
    - If wilderness acres are excluded, this density is considerably increased

- **Only 12% of the watershed roads receive routine maintenance each year, the remaining roads receive little or no maintenance.**

- **In many areas low use roads are closing themselves without being assessed to see if they are hydrologically stable, due to blow down, and shrub growth.** This will increase in fire areas due to dead trees falling in roadways.

KEY ROAD TRENDS

- **New**- Shift in road users from Forest management use to forest visitors. About 95% of forest road traffic is now associated with recreation and forest users rather than timber production. Road maintenance funding, traditionally supplied by forest management activities is decreasing.

- **New**- Increased controversy over road closures.

- **New**- Increasing use and economic importance of Highway 20.

- **New and 1996 Trend** (Modified but still valid)- Human use of the watershed is increasing, especially diversity and intensity of activities, traffic, access on roads, and demand for day use recreation. Wildfire effects are likely to result in an increase in OHV use and increase traffic temporarily.

SOCIAL, INCLUDING RECREATION & SCENERY

SUMMARY OF SOCIAL FINDINGS:

- **There will be a shift in sense of place expectations. There are changes to scenery. Burned areas have a distinctive character and will have short term low scenic integrity for many people for up to 5 years.** Wildflower displays will be prevalent for several years

- **There will be long term scenic quality recovery after about 5 years as understory plants recover and new trees grow.**

- **The fires and subsequent highway closures and evacuations had a tremendous impact on Central Oregon economy**. There is an increasing economic importance of Highway 20 and adjacent public lands to local business.

- **Salvage and other forest management (including road closures) remains controversial.**

KEY SOCIAL TRENDS

Paul Engstrom surveys Round Lake Christian Camp after the B&B Fire, several structures and vehicles were destroyed

- **New and 1996 Trend** (Modified but still valid) - Human use of the watershed is increasing, especially diversity and intensity of activities, traffic, access on roads, and demand for day use recreation. Wildfire effects are likely to result in an increase in OHV use, mushroom picking (especially commercial), hunting, and increase traffic temporarily.

- **New**- Shifts in type and location of recreation. Some unburned areas may receive a great increase in use.

- **New**- Increased risks to visitor and employee safety from falling snags, down trees, and falling rock.

- **New**- Increasing sense of risk for forest/urban interface residents and increasing tolerance/desire for urban interface fuels reduction.

- **New**- Off road travel is increasing and affecting resources.

- **New**- Shift in sense of place expectations for some users, especially those off the beaten path (hunters, mushroom pickers, fisherman, hikers).

- **New**- Perceptions of what is natural can be in conflict with restoration of ecosystem process and function. Tradeoff and costs are not clearly understood by all members of the public.

- **New**- Continued interest in economic uses, including timber and recreation as well as research use of the watershed.

HERITAGE RESOURCES

SUMMARY OF HERITAGE RESOURCES FINDINGS

- **Wildfires have exposed and damaged historic and prehistoric sites.**

- **There are opportunities to continue to improve coordination with the Confederated Tribes of Warm Springs concerning ceded lands and tribal resources.** The entire Metolius watershed and the entire Sisters Ranger District are ceded lands with protected treaty rights, managed in trust for the Tribes by the Forest Service**.**

KEY HERITAGE RESOURCES TRENDS

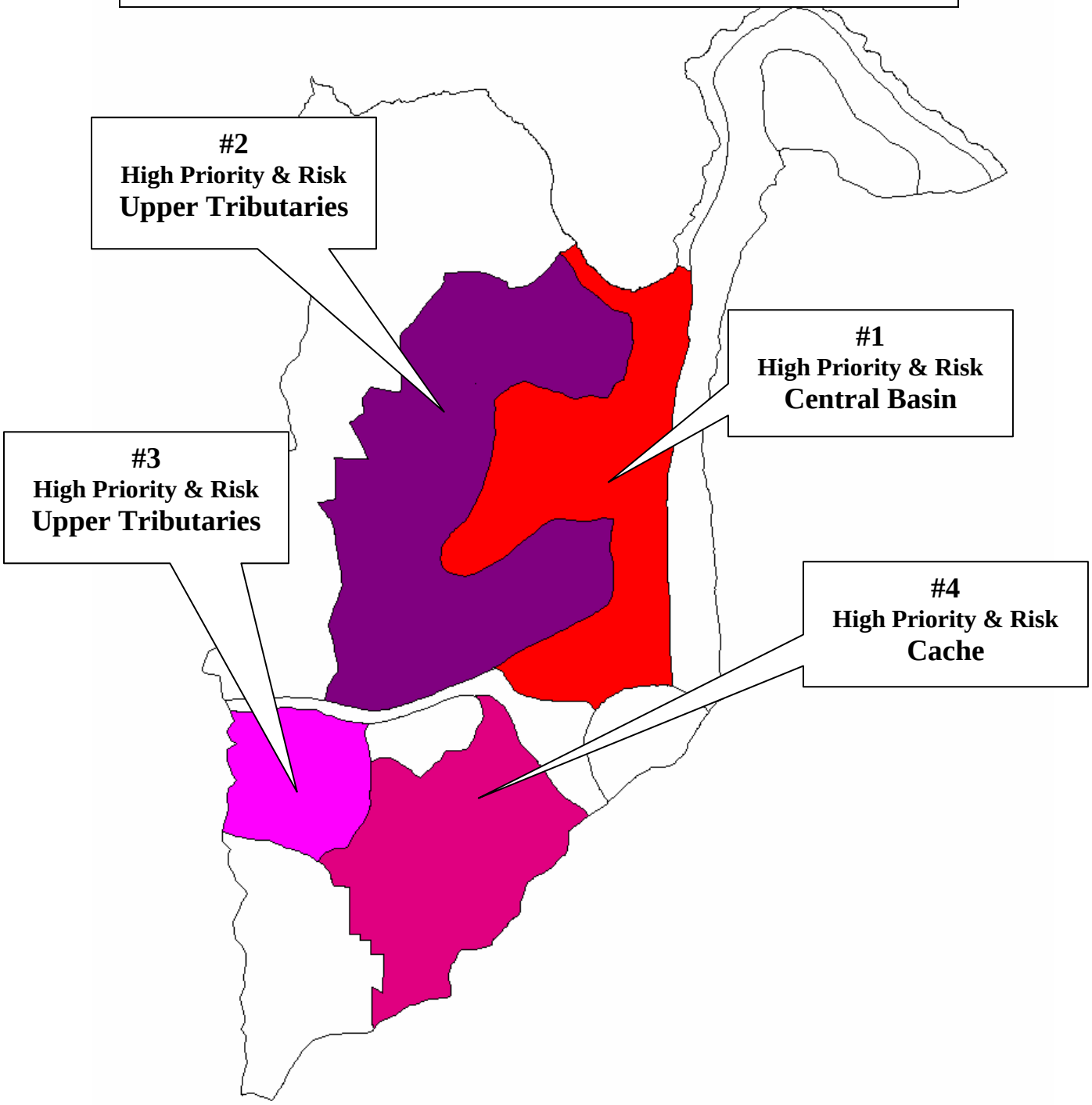
- **New- Increased vulnerability of heritage resources due to exposure and loss of some historic structures in wildfire**.

- **New- Communication and information sharing between the Forest Service and the Tribes has improved in the last decade**. Continuing efforts to understand and address Tribal concerns is needed. Several projects have brought Tribal elders and resource specialists together with Forest Service specialists. Information sharing and cooperation is at unprecedented levels, but still need improvement. Information about resources of Tribal interest remains fragmentary and incidental. There are no systematic methods in place to locate, identify, and communicate to Warm Springs about such resources.

- **New- Increased human use and disturbance have increased the probability that undiscovered and known sites of cultural importance are being impacted**. Inventory and protection of culturally significant sites needs to continue at a more rapid pace to match growth pressures.

PRIORITY AREAS

FOR FUTURE MANAGEMENT ACTIVITIES



PRIORITY AREAS FOR MANAGEMENT ACTIVITIES

Landscape Areas Priorities						
High Priority RED	**8-Upper Tributaries**	**2-Central Basin**	**4- Meadow Lakes**	**6-Cache**		
Medium Priority YELLOW	9-Green Ridge	7-Suttle	3-Hwy 20	1-Wilderness	10-Scarp	
Low Priority GREEN	11-Lower River	5- Black Butte				

COMPARISON BETWEEN 1996 & 2004-

- **Upper Tributaries and Central Basin** were the top high priorities in 1996 and 2004.
- **Meadow Lakes and Cache** have become high priorities, largely due to fire effects and increasing uncontrolled Off Road Vehicle use.
- **Suttle** has decreased in priority due to management intervention.
- **Green Ridge, the Wilderness, and Scarp** have risen to medium priority largely due to fire effects

Landscape Area	Red Flag Trends	Yelllow Flag Trends
Upper Tributaries	**16**	**9**
Central Basin	**13**	**11**
Meadow Lakes	**11**	**11**
Cache	**10**	**11**
Highway 20	10	5
Wilderness	9	7
Suttle	8	12
Green Ridge	9	11
Scarp	7	7
Lower River	4	11
Black Butte	3	5

TRENDS WITH MOST RED FLAGS:

- Social conflicts affecting management
- Increase in noxious weeds
- Loss of large trees & connectivity
- Increase in insects & disease
- Increase in human use
- Increase in off road travel

GENERAL RECOMMENDATIONS

Specific detailed recommendations follow in Recommendations Report

PROTECT AQUATIC SYSTEMS AND FISH HABITATS

1) Reduce road densities, especially riparian road densities and stream crossings. Focus on high and moderate risk sub-watersheds.

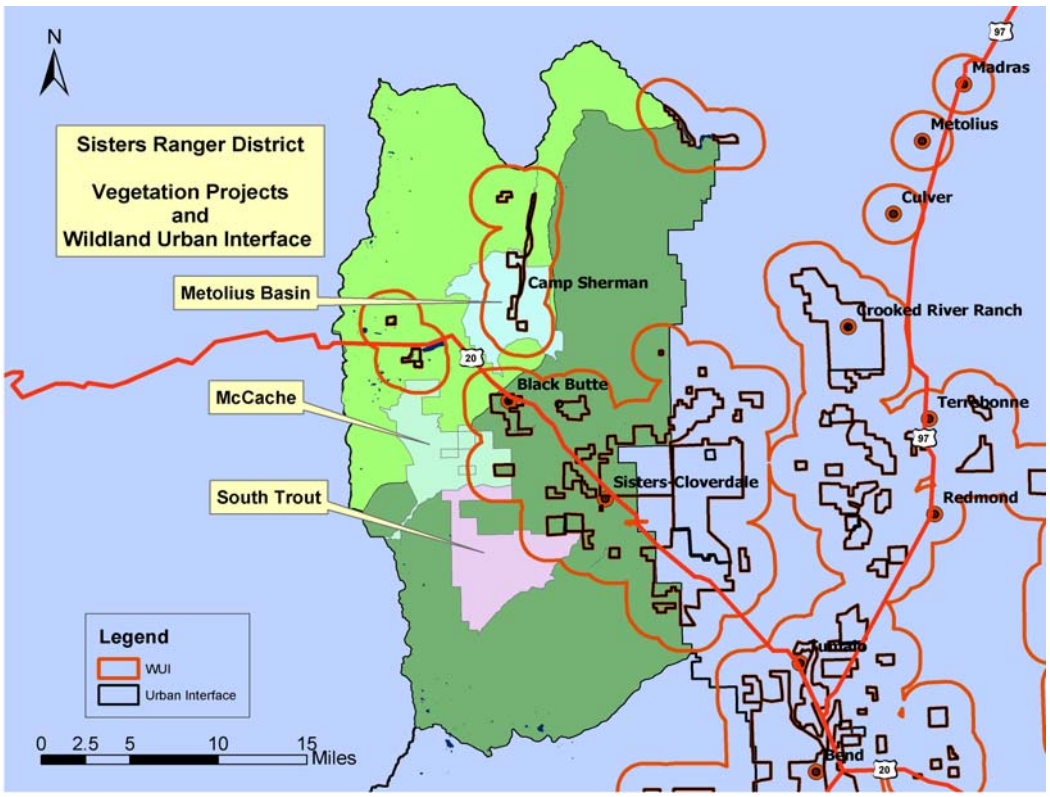
2) Consider expanded buffers for activities in burned and unburned riparian reserves.

3) Increase capacity of culverts to accommodate increased flows and debris.

4) Increase recovery of riparian shade and large wood by planting in high risk sub-watersheds.

5) Prepare for the return of salmon to the Metolius River and Suttle Lake.

RESTORE FOREST HABITATS AND CONTINUE TO REDUCE RISKS



6) Continue thinning around Wildland Urban Interface- Camp Sherman and other areas where stand densities are high to protect large trees, the Metolius River, and people. Proceed with Metolius Basin Forest Management Project EIS

7) Consider salvage of burned trees for ecological benefit in Fire Regimes 1 and 3 to reduce fuels toward historic levels to improve the ability to re-introduce fire and to make fires easier to control in the future.

8) Manage strategically to maintain and restore dense forest areas, such as northern spotted owl habitat in forest types which are likely to sustain habitat over time.

9) Continue forest management which promotes large trees and restores fire process to this fire dependent ecosystem.

10) Allow some areas to recover naturally. When replanting trees, increase variability and reduce edges in plantations.

11) Prevent spread and introduction of noxious weeds to protect forest habitats and biological diversity.

12) Ensure consideration of big game needs including: cover, forage, security, mobility across landscape. Increase road closures.

ADDRESS SOCIAL CONCERNS

13) Reduce risks to public health and safety in burned areas. Education and awareness are an important part of this because the post fire environment will have more risks and not all can be controlled.

14) Consider salvage of burned trees for economic benefit to produce wood products and provide jobs.

15) Continue planning to reduce conflicts and resource damage form uncontrolled off road vehicle use.

16) Expand heritage inventories, evaluate and manage historic sites.

17) Continue to work with the Confederated Tribes of Warm Springs on resources of interest.

18) Continue outreach and learning opportunities, especially regarding Fire Ecology.

19) Continue monitoring and research. Some topics of concern:

- Long term salvage studies
- Modeling reburn potential
- Tree mortality in mixed severity
- Fall rates of snags
- Historic research on fire, forests, and people of the Metolius Basin
- Monitor natural regeneration
- Monitor use- Off Road vehicles and mushroom harvest