Lower Illinois River Watershed Analysis Update

June
2004

As a result of the Biscuit Fire 2002, conditions have changed since the Illinois River below Silver Creek Watershed Analysis was completed. This document tiers to the Illinois River below Silver Creek Watershed Analysis and updates the sections that have changed as a result of the fire.

Updated Sections include:

Fish
Wildlife
Vegetation
Insect
POC

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R.Miller – Wildlife
N. Vagle - Vegetation
D. Goheen - Insect
F. Betlejewski - POC

Fish

Changes in Current Conditions

Species/Stocks Presence and Distribution: On 5/6/97, the National Marine Fisheries Service listed coho salmon as Threatened under the Endangered Species Act. On 5/5/99, they designated critical habitat to include all stream reaches accessible to coho salmon except areas above specific dams or longstanding, naturally impassible barriers. This definition of critical habitat greatly over estimates the occurrence of coho salmon because it ignores their reliance on abundant side-channel habitat. Streams occupied by coho salmon in the Rogue/South Coast basins typically have more than 10 percent side-channel habitat. Currently the Forest and NOAA Fisheries have agreed to use the StreamNet database (www.streamnet.org) to define critical habitat for coho salmon and Essential Fish Habitat (EFH) for coho and Chinook salmon. This database models coho salmon distribution based on either documented occurrence records or stream gradient and, therefore, may predict occurrence in streams that are not used by coho salmon even at times of population abundance.

Stream shade: The Biscuit Fire of 2002 burned through portions of the Baker Creek, Josephine Creek and the Sixmile Creek subwatersheds and reduced stream shade along many stream reaches.

Large wood: Many riparian trees were killed by the Biscuit Fire and will become future sources of large wood to small tributary stream channels.

Future Trends

Stream shade: Stream shade will increase over time and, barring another fire, recover to pre-fire levels. The rate of recovery depends upon the site potential to grow shade producing plants and the stream width, as wider stream reaches require taller (older) trees for shade recovery.

Large wood and sediment: Large wood and sediment recruitment to stream channels tends to be episodic in nature. The amount, timing, and rate of large wood recruitment to stream channels are determined primarily by the disturbance interval. Streams affected by the Biscuit Fire will be receive relatively high inputs of large wood and sediment as dead and dying tress are recruited to stream channels through natural processes including slump failures and landslides. The rate of large wood recruitment is expected to be high initially and to gradually increase over the first six to seven years. It is at this point that tree root failure of killed trees is highest. Consequently, it coincides with the highest rate of slump failures and landslides. After this period, the rate of large wood and sediment recruitment is expected to slowly decrease over the next ten years to approximately pre-fire levels; followed by several decades, depending upon the disturbance interval, of lower than pre-fire levels.

Management Opportunities

1. Plant conifers along burned perennial stream reaches to improve future stream shade and large wood recruitment and retention. Give priority to areas with the following characteristics: relatively wide stream channels; good conifer site potential; south (shade producing) side of channel; total or nearly total conifer mortality; and at least 0.5 acre in size.

2. Replace undersized culverts in areas of high risk for road fill failure.

3. Improve or eliminate road fords at stream crossings to minimize sediment delivery.

References

USDA Forest Service, Siskiyou National Forest. Fisheries Report for the Biscuit Fire Recovery Project DEIS. 10/15/03
USDA Forest Service, Siskiyou National Forest. Biscuit Fire Assessment
USDA Forest Service, Siskiyou National Forest. Biological Assessment of Fire Suppression and Rehabilitation Activities. 11/12/02
USDA Forest Service, Siskiyou National Forest. Burned Area Emergency Rehabilitation

Wildlife

Introduction

The Biscuit Fire affected 84 % of this watershed. The Biscuit Post-fire Assessment (USDA 2003) and Biscuit Recovery EIS (USDA USDI 2003 and 2004) identified wildlife habitats that need protected and restored in the Biscuit Fire area in order to meet the Forest Service's desired conditions for wildlife; these needs are also relevant outside of the Biscuit Fire area. These habitats of concern are late-successional forest and the grass/forb element of savannas, forest under-stories, and meadows.

Late-successional forest habitats of concern include spotted owl nesting/roosting habitat and pine/deciduous oak woodland or savanna. Late-successional spotted owl nesting/roosting habitat is defined as dominated by trees > 21" dbh with moderate to high canopy cover, > 40 %, (Zabel et al. 2003). This nesting/roosting habitat includes mature (21-32" dbh) and old growth (>32" dbh) forest with canopy cover greater than 40%. Late-successional pine/deciduous oak habitat is defined as dominated by pine and deciduous oak trees > 21" dbh with low to moderate canopy cover with brush and grass/forb ground cover.

Fire and vegetation management affect these habitats of concern. The greatest potential for impacts to habitats of concern from fire is within fire regimes I and IIIA, and the greatest potential for impacts from vegetation management are from regeneration harvest or thinning.

The exclusion of low intensity fire and timber management practices has adversely affected habitats of concern in this watershed. Exclusion of low intensity fire reduced the amount of grass/forb habitats, because this allowed encroachment to increase forest canopy cover, which eliminates most grass/forb ground cover. In addition, exclusion of low intensity fire contributed to the massive mortality of forest habitats during the high-intensity burning of the Biscuit Fire; more late-successional forest was killed in fire regimes I and IIIA than in other, more mesic, fire regimes. Suppression of low intensity fire has increased the risk of losing late successional habitat to high intensity fire, and restoration of low intensity fire could reduce this potential, especially within fire regimes I and IIIA.

The effects from vegetation management to these habitats of concern are dependant upon treatment prescriptions. Treatments that help protect and restore habitats of concern are recommended, such as low intensity fire, while treatments that degrade or remove these habitats, such as harvest of large trees, are discouraged from a wildlife perspective.

Site Productivity

Late successional spotted owl habitat does not generally develop on serpentine sites with low or moderate productivity. This watershed contains about 5,400 acres of low or moderate productivity serpentine sites, which is 13 % of 41,200 acres in the watershed.

Fire Regime

33 % of this watershed is in fire regimes I or IIIA, 66 % in Fire Regime IIIB, and 1 % in other fire regimes.

Changes in Current Conditions

Late-successional spotted owl habitat

The Biscuit Fire destroyed 30 % of mature and 26 % of the old growth spotted owl nesting/roosting habitat that existed before the fire in this watershed.

Currently, this watershed has 20 % mature and 15 % old growth on sites capable of developing late-successional spotted owl habitat. This amount of old growth is well below desired/historic levels.

Grass/forb habitats

The Biscuit Fire should have benefited grass/forb habitats where seed sources were present before the fire and where suppression rehab efforts included seeding.

Future Trends

Forests will continue to be at risk from stand replacement fires, with areas in fire regime's I and IIIA having the highest risk. Suppression of low intensity fires will continue, which will result in continued encroachment of woody plants into deciduous oak savannas, meadows, and late-successional forest under-stories.

Management Opportunities

Restoration of low intensity fires where they were historically common could help protect and restore habitats of concern within this watershed. Shaded fuel breaks or Fuels Management Zones (FMZs) could facilitate the restoration of low intensity fires, because they would provide relatively safe and defensible locations for managing fires at the landscape scale.

Previous ecosystem analyses at the watershed scale identified other relevant management opportunities; however, within fire regimes I and IIIA, there is probably no treatment more important than development and maintenance of FMZs, because these are needed in order to restore low intensity fire that helps protect and restore habitats of concern.

References

1. Zabel, Cynthia J.; Jeffery R. Dunk, Howard B. Stauffer, Lynn M. Roberts, Barry S. Mulder, and Adrienne Wright. 2003. Northern spotted owl habitat models for research and management application in California (USA). Ecological

Applications. 13(4), 2003, pp. 1027-1040. Agee, J.K. 1993. Fire ecology of Pacific Northwest forests. Washington, D.C.: Island Press; 493 p.
2. USDA 2003. Biscuit Post Fire Assessment. Rogue River/Siskiyou National Forests.
3. USDA USDI 2003 and 2004. Rogue River/Siskiyou National Forest and Medford District BLM. Biscuit Recovery EIS: Draft and Final.

Vegetation - Silviculture

Changes in Current Conditions

Changes in Current Conditions

In the summer of 2002, the Biscuit Fire burned 67,061 acres or 100% of the Watershed. The fire burned in a wide range of intensities and exhibited varying behavior. The effect on the forest vegetation is just as varied, ranging from nearly complete consumption of vegetation and woody material to light underburning with little effect on the dominant trees, creating a mosaic of dead and live vegetation. As noted in the Biscuit Fire Recovery Project DEIS, satellite imagery was used to create 4 classes of fire effects.

The codes in the Vegetation Change classification system are as follows:
1 = little or no change (majority of vegetation is alive, primarily low intensity under-burn);
2 = low change (majority of the vegetation is dead but some live trees remain; dead trees retain needles and leaves; primarily moderate to high intensity underburn);
3 = moderate change (all vegetation is dead but needles and leaves remain in the overstory; primarily from high intensity underburn);
4 = high change (trees are dead with few or no needles or leaves; primarily from crown fires).

The acreage results are displayed below:

Table 1, Vegetation Change for the Watershed

	Canopy Mortality Categories				
	1 (Little or no change)	2 (Low)	3 (Moderate)	4 (High)	Fire Totals
Total Acres 67,061	22,007	19,260	14,750	11,043	67,061
Percent of Area for Each Category	33	29	22	16	100

The current condition of trees in the Biscuit Recovery Area contrasts starkly with the desired future condition projected in the Siskiyou National Forest Plan. The Forest Plan envisioned stands of late successional forest and plantations stocked with valuable conifers. The current reality in the Biscuit area is expanses of dead trees and sprouting brush, interspersed with under burned stands. Stands of varying age classes in commercial timber producing areas were set back to the earliest of age classes. Trees that shaded streams where salmonids thrive in the cool water are dead.
Areas of high severity burn are often far from conifer seed sources and within areas where significant hardwood and brush competition is expected. Natural regeneration of conifers is expected to require decades. Resprouting hardwood and brush are expected to dominate these sites for at least that period of time.

Some of the drier sites that were severely burned clearly manifest the consequences of over 50 years of effective fire exclusion. These south and west aspects were generally open stands of large pine with some deciduous oak and little understory except grasses and forbs and occasional brush and small trees. In the past, these sites were maintained by a frequent, low intensity fire regime. By the time of the Biscuit Fire they had become choked with dense small trees and brush as a result of fire exclusion.

Future Trends

Following the Fire, hardwood vegetation will sprout very rapidly in the tanoak PAGs. The growing space for conifers, that will seed in naturally or be planted, will be taken over by the aggressive sprouts. Many of the conifer trees that do become established, will grow very slowly or die due to lack of sunlight, moisture, or both. In the other PAGs, sprouting of hardwood vegetation is not expected to be as aggressive, and the natural and planted seedlings will have less competition.

Management Opportunities

Many areas that burned with high severity supported stands of Port Orford-cedar, sugar pine, and western white pine, which were reduced by introduced diseases prior to the fire. Natural regeneration of these species is expected to be extremely low and without the planting of resistant stock their abundance may be significantly reduced over time.

Opportunities exist for salvage of dead trees for the next two to three years. After that, the wood will deteriorate and loose its value. Wood that is retained on site, will benefit the habitat of many species, if it does not burn in subsequent fires. In order to have large conifer trees in the future, planting and subsequent tending of the salvage sale plantations, existing plantations, riparian areas, oak-pine sites, and other planting will be necessary in many areas. Planting of disease resistant Port-Orford-cedar and sugar pine will be necessary in order to keep these two valuable species in the watershed.

References

USDA Forest Service, Siskiyou National Forest. Biscuit Fire Assessment, 2003.
USDA Forest Service, Siskiyou National Forest. The Biscuit Fire Recovery Project, Draft Environmental Impact Statement, 2004.
Silvics of North America, Western white pine, p 385, Vol. 1-Conifers, Sugar Pine, p 375, and Port-Orford-cedar, p 94.

Insect Considerations

Changes in Current Conditions

Prior to occurrence of the Biscuit Fire, forest insects were not considered to constitute a significant concern in this watershed. The fire has changed this by killing or injuring substantial numbers of trees and predisposing them to possible insect attack.

Future Trends

It is likely that insects will colonize fire-killed trees and infest and kill fire-injured trees within the burned areas in this watershed in the next few years. It is well documented that both bark beetles (family Scolytidae) and woodborers (families Cerambicidae, Buprestidae, Scolytidae, and Siricidae) readily infest trees injured but not killed outright by fire and that many species of woodborers infest fire-killed trees (Miller and Keen 1960, Furniss 1965, Furniss and Carolin 1977, Thomas and Agee 1986, Ryan 1990, Swezy and Agee 1990, Ryan and Frandsen 1991, Harrington and Sackett 1992, Flanagan 1996, Scott et al. 1996). In fact: a) most of the fire-injured trees that die in a burned area within the 5 years following a forest fire are infested by bark beetles, woodborers, or representatives of both groups concurrently, and b) insects along with decay fungi that they vector play significant roles in the deterioration of most fire killed trees.

A number of systems have been devised for risk rating the still-living trees in a burned area immediately after a fire and predicting which are most likely to succumb to subsequent bark beetle and woodborer infestation (Wagner 1961, Reinhart and Ryan 1988, Flanagan 1996, Southwest Oregon Forest Insect and Disease Service Center 2001, Scott et al 2002,). Use of the rating system devised by the Southwest Oregon Forest Insect and Disease Service Center on a sample of plots within the perimeter of the Biscuit Fire suggests that 40 percent of the fire-injured but still-living trees there are at high risk of bark beetle or woodborer infestation. This is also probably a reasonable estimate of the proportion of fire-injured trees in this watershed that are at high risk of infestation. In addition, there is a possibility that insect populations will build up sufficiently when fire-injured trees are infested to attack nearby uninjured trees.

Management Opportunities

1) Trees killed outright by the fire could be removed before insects and decay fungi cause substantial deterioration. The sooner such trees are removed the less the likelihood of substantial amounts of deterioration. Rate of likely deterioration can be used in prioritizing treatments. Deterioration due to insects and associated fungi develops most quickly in smaller trees and thin-barked species though, given enough time, all fire-killed trees are eventually affected. Decisions on whether or not to salvage fire-killed trees should be made in the context of overall management objectives.
2) Fire injured but still living trees could be evaluated using a risk rating system, and high risk trees in strategic locations could be considered for treatment. Alternatively, fire injured trees could be monitored, and if significant numbers are infested, those in strategic locations could be considered for treatment. Treatment of high risk or insect

infested trees would involve cutting and removal. If trees are removed quickly enough, this will reduce likelihood of insect spread to other trees. Decisions on whether or not to treat high-risk or recently-insect-infested trees should also be made in the context of overall management objectives.

References

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Guidelines for selecting fire-injured trees that are likely to be infested by insects in Southwest Oregon forests. USDA Forest Service, Rogue River National Forest. 5 p.

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Guidelines for estimating the survival of fire-damaged trees in California. USDA Forest Service, Pacific Southwest Forest and Range Experiment Station. Miscellaneous Paper 60. 11p.

Changes in Current Conditions

Data gap. POC locations within the Biscuit fire perimeter are unknown. Until a new POC inventory is completed, all project sites will require an on site visit to determine presence or absence of POC and/or *Phytophthora lateralis* (PL), the pathogen that causes POC root disease.

Future Trends

Data gap. An Inter-agency Supplemental Environmental Impact Statement (SEIS) for managing POC is being developed. The alternative selected in the Record of Decision for SEIS will determine future trends.

Management Opportunities

General

The main stem of the Lower Illinois is infested with PL. There are two infested sites in the Fox creek area.

Populations of POC are not faced with extirpation. POC is prolific and reproduces readily even on infested sites. The effect of the decline in POC populations is likely to be in loss of ecosystem function provided by larger POC and an overall reduction in biodiversity. This effect will be most severe on ultramafic soils. POC can provide a higher level of shade on ultramafic soils than other tree species such as Jeffrey or western white pine.

Environmental analysis for any projects in areas with POC (includes access and egress routes) will include a PL control strategy.

Project design criteria for work in POC areas must include a determination of whether or not the area has root disease. Uninfested areas will be treated prior to infested areas. Most work should be limited to the dry season. Exceptions can be made for prescribed fire or in emergency situations which will have to be decided on a site specific basis. This does not mean that no precautions should be taken. Only that working in the wet season may be necessary to meet prescribed fire or other management objectives. For wet season operations, unit scheduling (treat uninfested areas first, then infested areas), vehicle washing (before entering uninfested areas and before leaving infested areas), designation of access and egress routes or other measures should still implemented.

Add POC treatments to records for treated unit.

Bough Collection

Bough harvest should only be permitted when bough collection is accomplished via permit (negotiated contracts or by bid), requiring dry season operations (June through September), designation of access and egress routes, designation of parking areas, unit scheduling (collect all uninfested areas prior to infested areas), washing of boots and equipment, daily inspections, and

easily identifiable areas where boughs are to be collected. No other special forest products permits will be issued where Port-Orford-cedar is present unless administration described above can be implemented.

Engineering

Washing areas should be at entry/exit points of the road system with Federal control. Washing areas should be situated so that runoff does not enter stream channels, ditchlines, or areas with POC. Washing areas should be mapped and recorded in a GIS layer so that they can be used in the future. Each road system that accesses areas with POC should have at least one washing area designated. Vehicle washing should take place as close as possible to infested sites. Ideally, vehicles should not travel for any substantial distance prior to being washed. Vehicles moving into uninfested areas may be washed miles away as long as they do not travel through infested areas to reach their destination. An evaluation to test the effectiveness of a vehicle washing treatment was conducted by the Southwest Oregon Forest Insect and Disease Service Center (SWOFIDSC) in June, 1999 (Goheen et al. 2000). Results indicated that there were large reductions in inoculum on the vehicles following washing.

Map water sources to show presence or absence of PL. Utilize uninfested water sources for planned activities such as road watering and other water distribution needs, or treat water with Clorox (Ultra, Institutional, as per label) to prevent the spread of PL.

As part of roads analysis, determine if areas with POC still require road access.

Road locations should be made, when possible, below POC areas or on opposite sides of ridges.

Where POC is concentrated within stream courses, road drainage should be designed to disperse water away from streams.

Locate and design waste areas so they do not spread PL spores. Use only approved waste areas if material must be transported.

Limit road construction and maintenance to the dry season (June through September). Minimize operations during periods of heavy rain regardless of time of season. However, this will not prevent the opening of plugged culverts or ditches or other maintenance when the need arises during periods of heavy rain.

Access to the project area should be along routes with least occurrence of infection sites.

Eradication

Use eradication and prescribed fire as management tools in areas with PL. Eradication is the killing of live POC in areas that have PL. Eradication distances will be a function of the crown radius of the infected tree. All healthy looking POC within three crown radii from the last infested tree will be killed. Removal of the tree is not required but may be necessary to allow for prescribed fire application. POC treatment areas should be treated as soon as possible after regenerating POC reach a height of 6 inches above ground level. This treatment should be incorporated into routine management such as roadside brushing, young stand management treatments, and pre-commercial thinning.

Eradication treatments may include the commercial harvest of POC products.

Eradication treatments can serve as a source for large wood used in aquatic habitat restoration. However it can also serve as a source for PL spores into the stream channel.

Inventory

Map POC and PL locations in the watershed by plant association.

Monitoring

Monitor for effectiveness of treatments. Monitoring can be at varying levels of intensity. Monitoring can include photo points of treated areas (pre and post treatment), formal plots (number of trees before and after sanitation or eradication treatments), or walk through inventory.

Recreation

Route new trails (OHV, motorcycle, mountain bike, horse, and foot) away from areas with POC or PL. Established trails should be re-routed in the same manner where trails present risk to POC.

Sanitation

Sanitation is the removal of live POC in areas without PL. Use sanitation to protect POC populations along roads that remain open during the wet season. Sanitation treatments may include the commercial harvest of POC products. Sanitation area width is recommended to be a minimum of 25 feet above the road or to the top of the cutbank. Below the road, recommended minimum width of 25 to 50 feet.

Sanitation treatments can serve as a source for large wood used in aquatic habitat restoration.

Silviculture

Utilize resistant stock for reforestation. During calendar year 2002, 1.75 million resistant seed was produced and is available for reforestation in parts of the native range of POC; primarily the northwest portion of the range. Additional resistant seed will become available in the future for other portions of the range.

Thinning treatments should break up POC continuity across thinning units. Spacing should be a minimum of four crown radii between leave POC.

Emphasize management of POC on sites where conditions make it likely that they will escape infection by PL, even if the pathogen has already been established nearby or may be introduced in the future. POC is favored above roads, uphill from creeks, on ridgetops, and on well-drained sites. Emphasis may include priority retention during thinning or other silvicultural treatments, and planting to increase the presence of POC in areas unfavorable to the pathogen.

Ultramafic Soils

These soils are dry environments distinguished with a soil imbalance of the magnesium to calcium ratio. POC is among the few tree species that can grow in these soils and may provide a majority of or the only source of stream shading. Preventing the spread of PL into these areas should be a consideration in any project design.

Wildfire Suppression

POC issues are secondary priority during wildfire suppression. While management objectives for POC are a concern, safety of firefighters and the public, as well as protection of property or protecting the fireline is always a higher priority. When practicable, management strategies to prevent spread of PL shall be incorporated into firefighting activities.

References

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