

Chapter 2 - Issues and Key Questions

Hillslope Processes

Watershed conditions within the Horse Creek analysis area are influenced by various watershed disturbances in combination with steep and mountainous terrain. Landslide and erosion processes play a key role. Some areas have had multiple or repeated disturbances, including extensive timber harvest, high road densities, and high intensity fire. The geomorphology of the analysis area is very complicated.

There are at least six separate geologic terranes with different characteristics that respond to management in different ways. This analysis will discuss the important hydrological and erosional processes of each of these six landscapes, re-evaluate cumulative watershed effects, and make recommendations for future management throughout the analysis area.

STEP 3 - CURRENT CONDITIONS

1- What are the dominant climatic and hydrologic characteristics and processes of this analysis area?

2- What are the dominant erosional and mass wasting characteristics and processes in this analysis area?

3- What effects have recent extreme floods had on watershed conditions and erosional processes in this analysis area?

4-a What parts of the analysis area are considered Areas with Watershed Concerns (AWWCs) in the *Forest Plan*?

-b What parameters are used to make this determination?

STEP 4 - REFERENCE CONDITIONS

1- What were the historical (pre-Euro-American settlement) and reference erosion rates, and what natural processes and post-Euro-American settlement activities affected them?

STEP 5 - INTERPRETATION

1- What changes are there between current and reference/ historical runoff and erosion rates and what is the cause of these changes?

2- What are the hydrologic/ erosional concerns in the analysis area and in each sub watershed?

-a What management strategies should be used to minimize impacts from human activities?

3- Which sub-watersheds have continued watershed concerns, when will they be considered recovered, and how can recovery be promoted?

4-a What watershed processes are of concern with the current road system?

-b What are the criteria used to assess roads for the Roads Analysis Process (RAP) included in **Appendix E Roads Analysis Process** of this document?

5- What are the trends for hillslope processes in the analysis area?

Riparian and Stream Areas

The January 1997 flood event had a considerable affect on the Horse Creek analysis area and contributed large amounts of sediment into analysis area streams. Riparian area disturbances, including roads, wildfire, timber harvest, and mining, may have compounded, and contributed to stream impacts. In addition, significant riparian areas within the Horse Creek analysis area are under private ownership. Altered flows derived primarily from upriver influences, also significantly affect the analysis area.

As a result, water quality and instream habitat conditions are of concern, as well as the condition of streamside vegetation. Minimizing the impacts in riparian areas from past and future disturbances, including additional riparian area damage from future wildfires, is also a concern. Riparian Reserves (RRs) are a Forest land allocation (Management Area) intended to protect riparian areas. This analysis will discuss current and reference conditions of riparian and stream areas, and delineation and management of RRs. It will also make recommendations for future management and stabilization of riparian areas in the watershed.

STEP 3 - CURRENT CONDITIONS

1- What are the current vegetative conditions of riparian and stream areas?

2- What are the current stream channel characteristics and aquatic species habitat conditions?

3-a What are the water quality, quantity, and beneficial use conditions of streams within the analysis area?

-b What are the water quality contributions of analysis area streams to the Horse Creek analysis area?

-c What are the water quality contributions of the analysis area streams to the Klamath River Basin?

4- What is the extent of interim Riparian Reserves and how are they defined?

STEP 4 - REFERENCE CONDITIONS

1- What are the reference riparian and stream conditions in the watershed?

STEP 5 - INTERPRETATION

1- How have Riparian Reserve acreages evolved from the *Forest Plan* through this analysis?

2- What are the natural and human causes of change between historical/ reference and current riparian area conditions, including the impacts of roads and other disturbances?

3- How do the current riparian habitats compare to optimum habitats, and how can riparian areas be protected and/ or restored? What poses problems to stream channel stability and resilience?

4- What are the trends for riparian areas in the watershed?

Aquatic-Dependent Species

The analysis area contains approximately 18 miles of the Klamath River, a corridor for anadromous fish species to access habitat both upstream and downstream. It also provides important spawning and rearing habitat for coho salmon, (which have been placed on the Federal Endangered Species list), fall Chinook salmon, steelhead trout, and other, less-studied fish species. Aquatic-dependent amphibians and reptiles also access portions of the Horse Creek analysis area. This analysis will describe the current status of aquatic-dependent

species, as compared to historic populations, describe their trends, and describe maintenance, protection, and recovery needs of species at-risk.

STEP 3 - CURRENT CONDITIONS

1- What are the distribution, population size, and life history patterns of anadromous and resident salmonid species? What is the status and role of non-salmonid aquatic-dependent species?

2- What aquatic-dependent species are Threatened, Endangered, Proposed, Petitioned, or Sensitive?

3- What areas are critical for maintenance, protection, and recovery for at-risk species?

4- To what extent does the Horse Creek anadromous fish populations contribute to Klamath River Basin fisheries?

STEP 4 - REFERENCE CONDITIONS

1- What were the distributions and population sizes of aquatic-dependent species?

STEP 5 - INTERPRETATION

1- What are the natural and human causes of change between historical/reference and current species distribution and population sizes?

2- What are the risks/trends to areas critical for maintenance, protection, and recovery of aquatic-dependent species and how can they be mitigated?

3- What are the population trends and desired conditions for aquatic-dependent species in the watershed?

Forest Health and Fire Disturbance Risk and Hazard

Much of the analysis area (40%) is privately owned and a large proportion of these lands have been intensively managed for timber production. Approximately 16% of the National Forest System lands have had timber harvest. Due to past timber harvest, timber stand improvement projects, road construction, impacts from large fires, fire suppression (which has reduced fire disturbances), and natural processes that have continued to generate large amounts of vegetative biomass on

very good site, vegetative conditions have developed that are susceptible to disturbances such as insects and disease outbreaks and stand-replacing fires. Some vegetation communities (i.e., red fir) may be experiencing higher amounts of mortality due to decadence, insects, and disease. In parts of the analysis area, the existing conifer species composition is not sustainable over time. An example is stands that were historically maintained as open and pine-dominated have been encroached by Douglas and white fir in the understories. The competition for moisture and nutrients by the large number of trees in the understory has stressed the vegetation, allowed for increased insects and disease, increased mortality and large accumulations of dead and down material. Current concerns center around dense mid- and late-successional conifer forests with increased fuels (hazard) leading to catastrophic wildfire. A high concern exists over the ability to protect plantations (that were established after large fire events and timber harvest) while they grow and develop into larger trees. Concerns also exist for checkerboard ownership within the analysis area and how to work with private landowners to treat and/ or protect private and National Forest System lands. This analysis will examine the extent of forest health concerns in the analysis area, current vegetation conditions and the current fire regime and recommend possible treatments to maintain long-term forest health, enhance vegetation diversity, and provide an ecological role for fire, which will reduce hazard and fire severity throughout the analysis area.

STEP 3 - CURRENT CONDITIONS

1-Where do high levels of mortality exist that are contributing to high hazard (fuels) in the analysis area?

-a What are the causes of this mortality and what species are most affected?

2-Are there conifer stands at risk of catastrophic loss from mortality and wildfire, and if so, where are they located?

3-What are the current vegetation communities in the analysis area?

4-How does the current fire regime impact vegetation in the analysis area?

5-What are the current fuels and fire behavior potential in the analysis area?

6-What are public concerns related to fuels and fuels treatment activities?

7-What agreements are currently in place and/ or is there interest in developing strategies or methods to allow joint ventures with private landowners to reduce fuels adjacent to and possibly within their properties (in the best interest of both parties)?

8-How does the current road system contribute to fire suppression and fuels treatment activities?

STEP 4 - REFERENCE CONDITIONS

1 -Based on the historic disturbance regimes, what were the vegetation communities, stand densities of the conifer communities, and fuel loadings?

2 -What were the endemic levels of mortality in conifer stands?

3-What is the history of fire suppression and fuels treatment in the analysis area?

STEP 5 - INTERPRETATION

1-How have the vegetation communities changed over time and what have been the agents of change?

2-Where are large areas at risk from catastrophic disturbances and what areas are important to treat and/or protect?

3-What is the desired role of fire in the analysis area and how can fire be incorporated as an ecological process and meet standards for smoke management?

4-What type(s) of fuels treatments have been done in the analysis area and how successful have these projects been in meeting objectives?

5-What is the desired relationship with private landowners in regards to fuels treatment?

6-What is the desired road system for forest management, including fire suppression and fuels treatment activities?

7-What are forest health trends for the analysis area?

Late-Successional Habitat –

The amount, distribution, and condition of late-successional forest habitat has been identified as an issue in this analysis area as it relates to the management of late-successional forest-related species and the recovery of Federally listed species. Of particular concern is the development of late-successional habitat in Late-Successional Reserves (LSRs) in areas that were impacted by wildfire. Roughly, 28% of the analysis area has been allocated as LSR in the *Forest Plan* to provide habitat for late-successional forest-associated wildlife species. Human activities, including past forest management and road building, have fragmented habitat in the LSRs and across the analysis area. In addition, checkerboard land ownership patterns, where private commercial timber land is intermixed with National Forest System lands, presents a challenge to effectively managing habitats for late-successional forest related species across the landscape. Past management activities, combined with fire suppression, have left some areas of late-successional habitat at risk to loss from large-scale disturbance. This analysis will evaluate the current condition and make recommendations for providing and sustaining late-successional habitat within LSRs. The analysis will also assess the existing condition of late-successional forest connectivity and recommend ways to provide connectivity across the watershed, both within and between LSRs.

STEP 3 - CURRENT CONDITION

1- What is the current distribution and condition of late-successional forest habitat within LSRs and within the analysis area?

-a Which vegetative communities provide late-successional forest habitat?

-b Which vegetative communities are capable of providing late-successional habitat in the future?

2- Where does connectivity of late-successional forest habitats occur within and between LSRs? Where are the barriers to dispersal?

3- What is the current density of roads in the analysis area and within LSRs?

4- What is the current management emphasis on private lands adjacent to LSRs?

STEP 4 - REFERENCE CONDITIONS

1- What was the historic distribution of late-successional forest habitat and what was its condition?

STEP 5 - INTERPRETATION

1- How has the amount, distribution, and condition of late-successional habitat within LSRs changed across the analysis area?

-a What have been the agents of change (e.g. timber harvest, roads, wildfire, fire suppression)?

2 - What is the desired condition of late-successional habitat within LSRs and across the analysis area?

3- How will connectivity of late-successional habitat be maintained within and between LSRs?

4- How will the effects of high road density on late-successional habitats be minimized?

-a What are the criteria used to assess roads for the road analysis included in **Appendix E Road Analysis Process** of this document?

5- What are the implications of private land management adjacent to LSRs as it relates to managing for late-successional forest-related species across the landscape?

Terrestrial Wildlife and Plants

The Horse Creek analysis area is biologically diverse as measured by the number of different vegetative communities, or habitats, identified in the landscape. The variation in elevation, precipitation, parent material, geomorphology, disturbance, and land-use history contribute to the significant diversity. The area contains unique habitats, such as high elevation sub alpine and true fir forest surrounding open meadows, montane riparian habitats, and montane hardwood stands dominated by white oak. These habitats represent occupied and potential habitat for rare or uncommon species of wildlife and plants (special emphasis species). The diversity of unique habitats and associated special emphasis species have been identified as an issue due to the effects of fire suppression, timber harvest, roading, and other human activities on the distribution and condition of unique habitats within the analysis area. This analysis will evaluate

habitats in the watershed and recommend strategies to manage for them over time.

STEP 3 - CURRENT CONDITIONS

1- What are the general habitat types found in the analysis area and what species are associated with them?

-a Where are the different habitats located and how much is in the analysis area?

-b What is our current knowledge of special emphasis species populations in this analysis area (e.g. Federally listed Threatened and Endangered, Forest Service Region 5 Sensitive, Survey and Manage)?

2- What unique plant species or communities are found in the analysis area (either natural or human introduced)?

3- What exotic plants or animals occur within the analysis area (distribution/habitat)?

STEP 4 - REFERENCE CONDITIONS

1- What was the historic distribution of habitats and associated species populations?

2- How were exotic species introduced and spread in the analysis area?

STEP 5 - INTERPRETATION

1- For the identified habitats, what has changed from historic to present and what have been the agents of change (fire suppression, timber harvest, cattle grazing, private land)?

2- What are the desired conditions for habitat types in the analysis area?

3- What are the effects of exotic species on the ecosystems within the analysis area?

4- What are the effects of road density on wildlife and plant species and their habitats?

Roads

The original road system was developed to provide access to private property, area gold mines, and later extended for timber sales. An extensive road system of 330 miles (including State, County, Forest

Service, and private roads) now provides access to many parts of the analysis area. The road system is used for a variety of human uses, such as timber and fire management, recreation, access to trailheads, hunting, woodcutting, sight-seeing, etc., while causing some resource impacts to streams, riparian areas, and wildlife. Recent changes in agency policy, budget, focus, and direction have caused all National Forests to critically examine their road systems. Pursuant to Agency policy, the new Roads Analysis Process (RAP) will be utilized (see **Appendix E**). This analysis will identify current road system uses, impacts, and resource concerns. The Road Analysis will also make recommendations for future transportation system management, including restoration, maintenance, and decommissioning of the existing road system. The recommendations in the Roads Analysis will require further site-specific environmental analysis before implementation, as do all opportunities identified through watershed analysis.

STEP 3 - CURRENT CONDITIONS

1- What are the current conditions and uses of roads within the watershed?

2- How does the current road system provide access outside the watershed?

Step 4 - Reference Conditions

1- Why and how was the road system developed?

Step 5 – Interpretation

1- How have road uses changed from the past and why?

2- What resource and social concerns exist with the current road system?

3- What are future trends in road uses, needs, and management?

4- What is the recommended travel and access network?

Human Uses

A variety of human uses occur in the analysis area, including dispersed recreation, commodities (timber, mining, etc.), and heritage resources. The community of Klamath River is the analysis area. This analysis will discuss recreational activities, community values and interests, commodity uses, and heritage resources. This analysis will also

discuss special uses (for example, water lines, etc.) of National Forest System lands as well as pending and proposed land adjustments by private landowners. It will also recommend opportunities to maintain or enhance these uses and/ or community values.

STEP 3 - CURRENT CONDITIONS

- 1- What are the recreational uses in the watershed?
- 2- What are the private land uses (include domestic water use)?
- 3- What are the public and local community concerns and interests about this watershed?
- 4- What commodities are produced in the watershed?
- 5- What are the heritage resources (prehistoric, historic, and contemporary uses) of the watershed?
- 6- What is the current status of land adjustments within the watershed?
- 7- What are the special uses on National Forest System lands?

STEP 4 - REFERENCE CONDITIONS

- 1- What were the prehistoric and/ or historic human uses in watershed?

STEP 5 - INTERPRETATION

- 1- How have recreation uses changed from the past and what are their trends?

-a What are the desired conditions for the recreation program?

- 2- How does private land affect National Forest management?

- 3- How has community interest/involvement changed from the past and what is likely to change in the future?

- 4- How have commodity uses changed from the past and what are their trends?

-a What is the capacity of the watershed for commodity outputs?

- 5- What are the contemporary American Indian uses and trends and how have they changed?

-a What are the desired conditions for the heritage resources program?

- 6- What the expected special uses in the watershed?