CHAPTER II
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II. Issues and Key Questions

Identification of issues and key questions is the second step in the six-step process for ecosystem analysis at the watershed scale. The purpose of step 2 is to focus the analysis on key elements of the ecosystem that are most relevant to the management questions and objectives, human values, or resource conditions within the watershed. Key questions are formulated from indicators commonly used to measure or interpret the key ecosystem elements (Regional Ecosystem Office 1995). Key questions were used to focus the analysis. While answers to key questions are not always stated as such, and are not contained in a single section, all questions are addressed at some point in the analysis.

Water Quality and Fisheries

Water Quality

Recognized beneficial uses in the John Day Basin that occur in the Desolation watershed are: public and private domestic water supply, livestock watering, anadromous fish passage, salmonid fish rearing and spawning, resident fish and aquatic life, wildlife and hunting, water contact recreation, and aesthetic quality.

Past and current land uses and recent extreme events (fire and storms) have altered the physical integrity in the watershed to the extent that some upland areas are experiencing elevated erosion levels. Streams within the watershed are experiencing increased sediment loads and warm temperatures in the late summer; and channel adjustments are occurring. Efforts to improve aquatic habitat by constructing artificial instream structures on main Desolation Creek and Kelsay Creek have, to some extent, improved physical aquatic habitat. However, in some cases, instream structures are accelerating streambank erosion.

The goal of water quality standards is to establish thresholds of beneficial use support. Some standards are numeric, such as water temperature (64° F general, 55° F chinook salmon spawning, and 50° F bull trout), while others, such as sediment are narrative ("deleterious amounts"). Standards that apply to the Desolation watershed include temperature, sediment, habitat, and flow.

Desolation Creek has been identified by the state as not meeting water temperature standards (from mouth to headwaters) and is listed on Oregon's 1998 303(d) list of Water Quality Limited streams for water temperature (bull trout). In addition, Wild and Scenic Rivers eligibility includes a water quality criterion of meeting or exceeding state standards.

Thus, the primary water quality issues in the Desolation drainage are elevated water temperatures, increased sediment loads, and channel instability.

Key Questions

1. What are the principle physical characteristics of the Desolation watershed, and how are they related to erosion processes, stream conditions, and water quality?

2. How are past and current land uses influencing background erosion, sediment, channel morphology, and water quality?

3. What are the combined effects of recent fires and precipitation events, together with land uses, on erosion processes, stream conditions, and water quality?

4. What management actions can be taken to offset adverse cumulative effects and improve watershed conditions?

Fisheries

As mentioned previously, Desolation Creek hosts six species of salmonids. Four are listed as Sensitive Species by the Regional Forester, and five are ICBEMP Key Salmonids. One species (bull trout) has been listed under the Endangered Species Act (ESA) as Threatened, and one (steelhead) is proposed for listing as Threatened. In addition to the native species, Desolation Creek also contains exotic brook trout and westslope cutthroat trout. Westslope cutthroat trout are probably exotic to this watershed, but are also an ICBEMP Key Salmonid. The Umatilla National Forest's Land and Resource Management Plan recognizes the importance of Desolation Creek's fisheries resource by classifying nearly half of the watershed as C-7, Special Fish Management Area (Figure 3).

The presence of ESA Threatened and Proposed listed species, and USFS Sensitive species predetermines that fisheries will be an issue in Desolation Creek watershed. Furthermore, biological, environmental, and Tribal interests in the status of native, wild fish, and the status of chinook salmon throughout the Columbia Basin assure that the status of chinook salmon will be an issue in the North Fork John Day Basin (Huntington et al. 1996, Confederated Tribes of the Umatilla Indian Reservation, 1995).

Other professionals familiar with the area (USFS, ODFW, CTUIR, Warm Springs Tribes) support fisheries as an issue. Responses of fisheries professionals contacted were in the context of Desolation Creek's setting in the John Day River basin. That is to say, the identified issues (particularly the first three) apply to the entire John Day basin, including Desolation Creek.

The fisheries and aquatic habitat issues of greatest concern are:

1. Status of the native wild chinook salmon runs. (All surveyed parties agreed that this was the number one biological issue.)

2. Status of the steelhead run, because of their cultural and nutritional importance to the tribes. (Both tribal biologists rated this as the #2 issue)

3. Status of bull trout. (In discussions by phone, ODFW considered this as #2 issue, because of their reduced range and numbers and potential for hybridization with introduced brook trout. Warm Springs gave this as #3 because of the bull trout's function as an indicator of water quality.)

4. Status of Desolation Creek on the State 303(d) list as issue number four (Warm Springs fisheries biologist).

5. Presence of exotic fish species in some streams of the watershed, particularly brook trout, and their potential to hybridize with bull trout.

6. Aquatic habitat quality, especially as it relates to chinook and bull trout. ODFW personnel expressed particular concern over the quality of the aquatic habitat on private lands in the downstream reaches of Desolation Creek.

7. Gully and channel erosion in Desolation Meadows, which affects water quality and aquatic habitat.

8. Management of Riparian Habitat Conservation Areas (RHCAs). RHCA management can profoundly affect water quality, aquatic habitat, economics, and complexity of forest management.

Even though Desolation Creek is not now, and may never have been, an important chinook spawning stream, most of the fisheries professionals contacted considered the status of chinook to be the most important issue in an analysis of Desolation Creek. This probably is a result of its location within the North Fork John Day River drainage and the special value many biologists, fishermen, and tribal members place on the John Day River chinook salmon population.

However, because of its relatively small size, Desolation Creek may be more important as a bull trout refuge and for steelhead production than for chinook salmon spawning. The primary effect of Desolation Creek on the status of chinook in the John Day Basin would be as rearing habitat for juveniles spawned elsewhere, and to a lesser extent through the quality of the water it contributes to the system.

Key Questions

The following key questions were derived from the above issues.

1. What is the present status of bull trout and the salmon and steelhead runs in the John Day River Basin, and in Desolation Creek?

2. What is the quality of the aquatic habitat in the Desolation Creek watershed and how does it affect the status of the native salmonids in the watershed?

3. How have National Forest Management and other human activities affected fish populations and the quality of aquatic habitat in the Desolation Creek watershed?

4. What adjustments to management protocols could best protect and improve the quality of the aquatic habitat in the Desolation Creek watershed?

5. What additional information is needed in order to most effectively manage fish habitat in the Desolation watershed?

Vegetation Sustainability

A recent survey conducted by Oregon State University found that residents of the Blue Mountains perceive their forests to be unhealthy (Shindler and Reed 1996). In response to high levels of concern about forest health, both from the scientific community and the general public, the primary issue used in this analysis was **forest sustainability**.

The term *Sustainable Forest* as used in this document implies forest *ecosystems* (as opposed to simply the coniferous tree overstory) that maintain their complexity while providing for human needs (O'Laughlin and others 1994). This means that sustainable forests contain insects, pathogens, parasites, and other tree-killing agents, but dead and dying trees are not so abundant as to jeopardize the long-term survival of the forest or its dependent flora and fauna.

Key Questions

The upland forest vegetation (i.e. trees) analysis was designed to respond to these key questions:

1. How do current forest conditions compare to those that existed historically?

2. Are current forest conditions considered to be ecologically sustainable over the long term?

3. If current forest conditions are considered to be unsustainable, how could they be changed in order to create a more sustainable situation?

4. How have disturbance processes shaped existing forest conditions, and what role might we expect them to play in the future?

Understory and Non-Forest Botanical Resources

The issue of vegetation sustainability pertains to non-forest plants as well as to forest overstory vegetation (trees). For example, not much is known about the biology of *Botrychium spp.* The plants are very small and difficult to find. Some species are rare, or may even be unique to the Desolation watershed.

The invasion of noxious weeds, as well as introduced grasses, threatens the sustainability of native, non-forest species.

The increasing awareness of and demand for native plants for medicinal purposes has the potential of greatly impacting plants with medicinal properties, and could threaten their sustainability.

Key Questions

The following questions were addressed in analysis of the botanical resources (excluding forest tree species) in the Desolation Watershed:

Floristic Biodiversity

1. What vascular plant species presently occur in the Desolation Creek Analysis Area?

2. What is the floristic richness of the Desolation Creek Analysis Area in comparison with the rest of the North Fork John Day Ranger District, and within the Umatilla National Forest?

3. What is the ratio of native to introduced species in the Analysis Area? Is this ratio an accurate indicator of historic variability in Floristic Biodiversity?

Sensitive Species

1. What are the occurrences of historically-listed or presently-listed sensitive plant species within the Desolation Creek Analysis Area?

2. How might management activities occurring in the Analysis Area adversely impact plant species with an historic track of sensitivity?

3. What other plant species might be "at risk" in the Analysis Area?

Noxious Weeds

1. What noxious weeds occur in the Analysis Area, and what are their affinities for ecological settings?

Culturally and Economically Significant Plants

1. What are the culturally significant plant species in the Analysis Area? Are any of them "at risk" because of management activities? Are any of these species so limited in abundance and/or geographical amplitude that they may become major issues in the future?

2. What plant species may come under harvesting pressure as "Special Forest Products"?

3. What native plant species could be important for revegetation projects within the watershed?

Terrestrial Vertebrate Biodiversity

Wildlife issues in the Desolation Watershed center on the availability, distribution and condition of important habitat types, the effects of management and recent fires on those habitats, and the resultant status of wildlife populations.

Key Questions

Habitat Quantity and Quality

1. How have important habitat types, including late/old coniferous forest, riparian hardwood forest (aspen and cottonwood) and wet meadows, changed since historical times in terms of patch size, distribution, and connectivity?

2. How has human manipulation of the Desolation landscape affected wildlife habitat quality?

3. How might habitat conditions and patterns be restored to be more "ecologically sustainable", keeping in mind the community of terrestrial vertebrates that currently occupies the watershed?

4. What was the net effect of the Bull and Summit fires on habitats of terrestrial vertebrates within the watershed? Are there habitats in need of restoration and/or protection-particularly in light of the 1996 fires?

Terrestrial Vertebrate Populations

1. What terrestrial vertebrate species occur in the watershed?

2. How has human manipulation of the Desolation landscape affected wildlife populations?

3. How does wildlife community composition relate to habitat composition and availability?

4. Are there species at risk of "local extirpation? If so, can risks be lessened through management?

5. What is the status of Management Indicator Species/Sensitive/Listed Species within the watershed?

6. What is the level of risk to terrestrial vertebrates (and their habitats) of additional large, stand-replacement fires?