CHAPTER III
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III. Current Conditions

Description of current conditions is the third step in the six-step process for ecosystem analysis at the watershed scale. The purpose of step 3 is to develop information (more detailed than was done for characterization in step 1) relevant to the issues and key questions identified in step 2. The current range, distribution, and condition of key ecosystem elements are documented in this step (Regional Ecosystem Office 1995).

Soils and Geology

Erosion/Mass Wasting

Table 12, Geologic Hazard, lists (by USGS quad) areas that have been identified in the Umatilla National Forest Soil Resource Inventory (SRI) as areas of higher potential for unstable soils or landforms. Unstable sites are either the geologic landslide unit identified as 'Qls', or 'SRI slump' which are identified with spot symbols on the maps. This information is not yet available as a GIS layer. Therefore, the total acres indicated are for the entire quad and may not necessarily be within the Desolation boundary. Individual quads may be viewed in hard copy form in order to locate specific areas. The 'SRI slump' locations may be also found in the SRI on the appropriate map.

Table 12. Geologic Hazard Acreage

QUAD	TOTAL ACRES	LOCATION	TYPE
72	3241	*	Qls SRI slump
73	3332	*	QLS Sri slump
74	407	*	Sri slump
80	214	*	Sri slump
81	1201	*	Qls Sri slump
82	499	*	Qls
84	-	*	
85	32	*	Sri slump

**Geologic hazard maps are not in the GIS system: Acre totals are for entire quad, not just within Desolation. Specific locations can be viewed manually or after input into GIS.*

On a drainage-wide basis, the Desolation watershed is has somewhat lower erosion potential largely due to the preponderance of gentle slopes. Area tallies of Soil Resource Inventory (SRI) interpretation-based erosion potentials were not included in this document. Mapping of the Desolation watershed via the Ecological Unit Inventory for the Blue Mountains is largely complete and is being processed. As this information becomes available, more accurate assessment of erosion potentials will be possible using the new data and mapping. This will be more useful at a project-level analysis. The dominant erosional process within the Desolation drainage is overland surface erosion. Mass wasting activity is evident in some areas due to the young age of the geologic units and unconsolidated materials. The large unit of landslide and debris flow mapped in the lower watershed are most unstable.

Much of the current erosion is a result of the various wildfires in the drainage. Areas of moderate to high fire severity are most susceptible to intense rainstorm events and spring runoff. Isolated summer downpours have initiated some overland flow and surface erosion within the fire areas. Areas which have not received these intense storms have begun vegetative recovery with little erosion. Large-scale fires (like Summit) have the greatest potential to initiate slumping or landslides. There are some smaller areas of slumping mapped as part of the Umatilla SRI. These geologic landslide areas have a higher likelihood of (at least) small-scale mass failures when subjected to large disturbances such as fire or major storms, or management activity.

Field observations have determined that construction of transportation systems (roads and trails) for timber management and recreation activities have caused erosion to occur. Little accelerated erosion has been observed outside of transportation networks. However slight, the erosion resulting from transportation systems within the drainage adds to the erosion caused by mining, grazing, fires, etc., to produce a cumulative effect of increased erosion (levels). This is discussed further in the Watershed hydrology section.

The prominence of volcanic ash surfaces, other medium textured volcanic-source soil surfaces, and unconsolidated materials indicates relatively higher erosion potentials on the steeper slopes in the drainage. The large areas of gentler slopes helps reduce overall erosion risk, although even gentle slopes can erode easily in many of these materials.

Productivity

A way of assessing comparative basic productivity levels by soil type and plant association types is available for project needs but is not included in this document. Generally, some of the more productive sites on the south end of the Umatilla are found in the Desolation drainage.

Most of the management activity within the drainage that has had an effect on soil productivity are related to road building and harvest operations. The private land in the watershed appears to have had more impacts but there is little hard data to quantify observable effects. The sections on harvest activity and roads provide a indicator of relative effects to productive potentials.

Effects from fire also have affected productivity potentials in the watershed, at least for the short term. Nutrient and soil losses due to increased erosion levels, and areas of moderate to high fire intensity (severity), are assumed for the fire areas identified and discussed in the Current Conditions section. Short-term release of otherwise unavailable nutrients has allowed considerable increases in grass and forb growth in the fire areas, and should provide an enhanced nutritional environment for tree seedlings planted or sprouting shortly after the fire.

Watershed Hydrology

Past and present management activities and recent watershed-scale disturbances (fire and storms) are influencing runoff and erosion, channel conditions, and water quality to the extent that many miles of Desolation Creek and its tributaries are not in optimum condition. Observed impacts include accelerated upland erosion in some of the burned areas and on roads, and channel erosion especially in grazed meadows. Measured impacts include elevated water temperatures from the North Fork-South confluence to the mouth, including most tributaries. Some effects may be occurring because of past activities, for example, beaver trapping in the early 19th century and livestock grazing, beginning in the late 19th century and continuing to the present. Some effects are the result of ongoing activities, specifically the road system. Recent wildfire and storms are also contributing to watershed impairment.

Management Activities and Fire Effects

Current levels of timber harvest and roads, when interpreted with field inventories and water quality monitoring, are reasonable indicators of watershed and stream conditions. High levels of harvest and roads or moderate levels in sensitive areas increase the likelihood of accelerated erosion, change in peak flows, channel adjustments, and adverse impacts to water quality and aquatic habitat. Recent wildfires also have the potential to impact watershed conditions; several subwatersheds were burned in August of 1996 (Table 13, Figure 18).

Road density is a measure of the extent of roads in an area; all roads on the Forest transportation management system were included in the analysis. Roads have several impacts on watershed function; including reduced infiltration, increased runoff and erosion, extension of the channel network (increasing the "efficiency" of watershed runoff), reduced vegetative cover in streamside areas, and increased sediment delivered to stream channels. Road densities in Desolation subwatersheds range from 0.1 mi/mi^2 in South Fork Desolation to 2.9 mi/mi^2 in Battle Creek. All Desolation subwatersheds have "high" densities (1.7 to 4.7 mi/mi^2, as defined in the ICBEMP Status of Scientific Findings) except for Howard and South Fork Desolation (Table 13).

Percent Equivalent Clearcut Acres (ECA) is a measure of the extent of harvested openings in a watershed, at some level above which increases in water yields and peak flows would be expected (Table 13). The procedure accounts for harvest method and vegetative recovery typical in the Blue Mountains (Ager and Clifton, 1995). The level of percent ECA above which measurable increases in flows will occur has not been established in the Desolation watershed; however, based on an administrative study in a nearby watershed (upper Umatilla), current harvest levels would not be expected to cause increased peak flows (Helvey and Fowler, 1996).

Wildfires that occurred in 1996 have increased the potential for peak flow increases and area susceptible to accelerated erosion in the Howard, North Fork Desolation, and South Fork Desolation watersheds. Wildfire impacts on streamflows, erosion, water temperature, and sediment have been previously documented (Helvey, 1979, Helvey, 1980, Beschta, 1987). The majority (70%) of the South Fork Desolation subwatershed burned in a low-moderate intensity fire. Most of the burn was of a low intensity which is a "cooler" ground fire that leaves most of the organic matter in place. Peak flow increases would be more likely where areas burned at moderate or high intensity. Fifteen percent of the South Fork Desolation watershed experienced moderate burn intensity; these acres are most likely to exhibit increased streamflows as a result of 1996 wild fire.

Intense spring and summer storms struck over previously burned areas in the Desolation watershed in 1998. Field observations indicate accelerated upland erosion (sheetwash and rill) in areas of high precipitation intensity and low ground cover. For example, fine sediment from hillslopes was delivered to the upper South Fork Desolation Creek meadows, and transported downstream. Channel changes from recent high flows were observed through the South Fork Desolation to the mouth. Other fire-related effects reflect past fire suppression activities, actions taken to put out the fire, and post-fire salvage operations. The greatest impacts usually result from mechanical fireline construction and ground-based logging.

No data were available for the four analysis subwatersheds in private ownership; results are valid only for National Forest lands (Table 13).

Table 13. National Forest Roads, Harvest, and Recent Fires by Subwatershed**.**

Subwatershed	SWS Area (Mi^2)	Road Miles[2]	Road Density (Mi/Mi^2)	NF Forested Acres[2]	ECA Acres	ECA %	Percent SWS Burned
Lower Desolation [1](36A)	11	18.5	1.7	5125	8	0.2	0
Wassen [1](36B)	14	30.4	2.2	7978	136	1.7	0
Kelsay [1](36C)	10	27.4	2.7	6142	395	6.4	0
Bruin (36D)	17	40.4	2.4	9567	485	5.1	0
Junkens/Beeman (36E)	7	13.2	1.9	3571	191	5.4	0
Battle (36F)	16	47.1	2.9	9685	813	8.4	1
Howard [3](36G)	10	13.7	1.4	6119	116	1.9	13
North Fork Desolation [3](36H)	13	36.5	2.8	7316	350	4.8	20
South Fork Desolation [3](36I)	11	1.5	0.1	5781	0	0.0	70
TOTALS	109	228.8	2.1				

Notes:

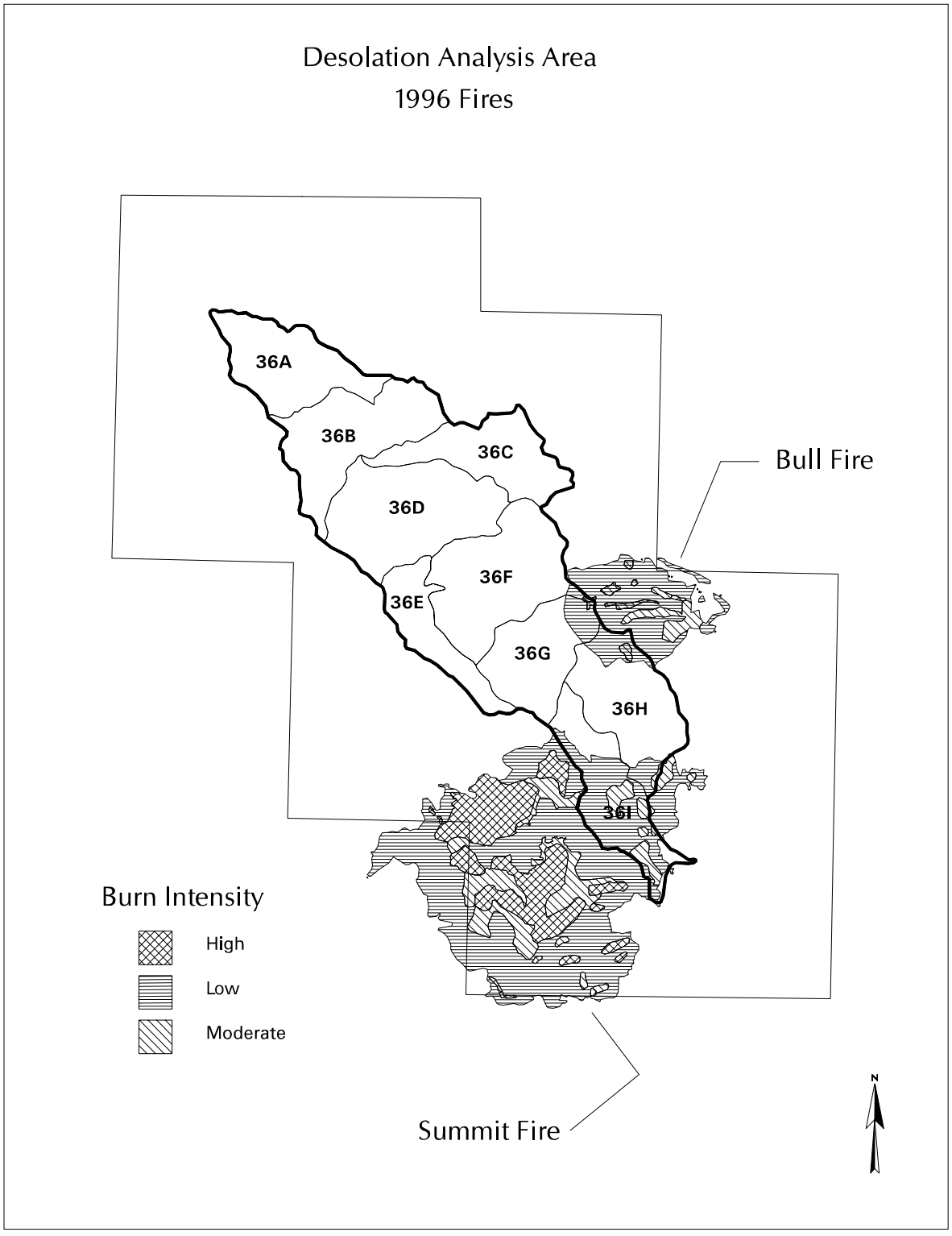
[1] subwatersheds with private ownership; data only for publicly-managed lands.

[2] Road miles are publicly-owned roads; Forested acres are National Forest potentially forested.

[3] Subwatersheds with area burned in 1996 Bull and Summit fires.

Other management activities in Desolation watershed include livestock grazing, mining, and recreation. Of all management activities, grazing has the widest possible range of watershed effects. These include upland soil compaction and displacement, physical damage to streambanks from trampling, loss or reduction in vegetation from herbivory, and increases in nutrients and bacteria from animal wastes. Cattle grazing has been ongoing in the Desolation watershed since the late 19th century. Forest Service records indicate cattle numbers peaked in the 1950's and have declined since then. There are no records available on sheep use but their numbers probably peaked earlier in the century as cattle moved to dominance. Overall, current conditions in the watershed reflect present and past livestock grazing use. Grazing impacts have been observed and monitored at key areas in the Desolation watershed.

Figure 18. Area of 1996 wildfires in the Desolation drainage.



The BLM-Forest Service "Proper Functioning Condition" assessment was conducted by Ranger District personnel on five stream reaches in 1995 (Table 14). Observer notes indicate some streams had evidence of grazing, logging, and road impacts.

Table 14. "Proper Functioning Condition" riparian survey results (1995).

		RATING				
STREAM NAME	SURVEY REACH (MI)	PFC	FAR	NF	TREND*	ACTIVITY/ IMPACT
Battle	0.5	X			S	G/L
Kelsay	0.5		X		D	G/M;L/L
Kelsay	0.2		X		D	G/M;R/M
L Kelsay	4.0	X			S	G/L;L/L;R/L
North Fork Desolation	0.3	X			S	G/M

* Rating: PFC=Proper Functioning Condition; FAR=Functioning at Risk; NF=Not functioning
**Trend Code: S=Stable; I=Improving; D=Degrading
***Activity Codes: G=Grazing, L=Logging, R=Roads / Impact Codes: L=Low, M=Moderate, H=High

Mining is a lesser and more localized activity in Desolation watershed. Mining activities have been ongoing in the watershed on a limited basis, with localized effects, since the 1800's. Currently, one active lode mine and three inactive placer mines are located within the watershed. Several other lode and placer mines occur on private lands within the watershed; their status is unknown. Placer mining typically disturbs stream channel deposits, leaving waste rock in mounds, as tailings. Mining has occurred in subwatersheds 36E Junkens/Beeman; 36F Battle; 36H North Fork Desolation; and, 36I South Fork Desolation (private, headwaters).

Recreation uses involve developed and dispersed camping, and motorized and nonmotorized trails use. These activities have localized effects which can include upland and streambank compaction, and vegetation alteration. Increased runoff and erosion is occurring on some sections of trail and campsites. Trails in riparian areas are also problem sites; minor shade loss in the trail right-of-way as well as increased erosion and sediment delivered to streams may occur.

Several aquatic habitat enhancement projects, typically log-rock weirs, were installed on Desolation Creek between 1985 and 1989, and on Kelsay Creek in 1996/1997 to improve pool habitat for late summer fish survival. Field surveys in 1997 found some of the structures to be impairing channel and riparian function by accelerating bank erosion.

Processes

Watershed-scale disturbances, including recent fire and floods are influencing runoff, erosion, and channel processes; land uses are, in some areas, accelerating impacts. Increased water yields and peak flows accelerate erosion rates and delivery of sediment to stream channels. Streams adjust to changes in streamflow and sediment loads by cutting and filling. The South Fork Desolation is an example of a stream system responding to a watershed-scale disturbance (the Summit Fire) in the absence of land use impacts (Table 15). The North Fork Desolation Creek has multiple land use impacts and watershed-scale disturbance. The North Fork Desolation channel in the meadow downcut sometime in the past 50 years and has actively-eroding banks. Increased peak flows from cumulative effects could accelerate bank erosion.

Table 15. Desolation Subwatersheds by Burn Intensity (BAER).

WATERSHED	SWS	TOTAL ACRES IN SWS	LOW BURN INTENSITY ACRES	MOD. BURN INTENSITY ACRES	HIGH BURN INTENSITY ACRES	TOTAL BURNED ACRES	% BURNED
Lower Desolation	36A	7,156	-----	-----	-----	-----	-----
Lower Desln / Wassen	36B	8,731	-----	-----	-----	-----	-----
Kelsay	36C	6,546	-----	-----	-----	-----	-----
Middle Desln / Bruin	36D	10,815	-----	-----	-----	-----	-----
Junkens / Beeman	36E	4,455	-----	-----	-----	-----	-----
Upper Desln / Battle	36F	10,261	124	28	0	152	1.5
Upper Desln / Howard	36G	6,511	837	30	0	867	13.3
North Fork Desolation	36H	8,058	1,437	193	0	1,630	20.2
South Fork Desolation	36I	7,139	3,942	1,059	0	5,001	70.1
	TOTALS	69,672	6,340	1,310	0	7,650	11

Cumulative Effects

The combined effects of land uses and recent disturbance have increased upland erosion and sedimentation rates. Some stream reaches have unstable and eroding streambanks. Effects are most pronounced in areas previously overgrazed by livestock, adjacent to roads and at road-stream crossings, and in moderately burned areas that have experienced high intensity spring storms.

Cumulative impacts to water quality include elevated stream temperatures from loss of streamside shade, channel changes, and lowered baseflows. Overall, climatic and hydrologic conditions control water temperatures: maximum stream temperatures typically occur in August, during low flow when air temperatures are at maximum. Stream temperature monitoring on tributaries and the mainstem of Desolation Creek show maximum summer water temperatures ranging from 56 degrees Fahrenheit on Junkens Creek (1993) to 83 degrees Fahrenheit on Desolation near the mouth (1995). Junkens and South Fork Desolation are the coldest tributaries, Kelsay Creek is the warmest (Table 15). Desolation Creek at the mouth ranging from 68 to 80 degrees Fahrenheit. Desolation Creek does not appear to consistently contribute cooler water to the NFJD, but is likely to be influencing NFJD water temperatures. In 3 out of 4 years of monitoring, Desolation Creek contributed cooler water than Camas Creek, a major tributary downstream.

Table 16. Maximum Water Temperatures on the North Fork John Day River, Camas Creek, Desolation Creek, and Tributaries: Annual 7-Day Moving Average of the Daily Maximum (degrees Fahrenheit).

STATION	SWS	1992	1993	1994	1995	1996	1997
NFJD @ Big Cr			71	76		74	72
NFJD @ Camas Cr					72	76	
Camas Creek			74		77	78	78
Desolation near Mouth	36A		70	80	83	68	74
Kelsay @ FSB	36C	74	67	72	68	73	72
Kelsay above exclosure	36C				68	65	65
Kelsay @ 5505 road	36C	70	73				
Desolation @ ISCO	36D		69			73	73
Bruin @ mouth	36D		67		60		
Junkens @ mouth	36E		56	59		68	60
Battle @ mouth	36F		60	64	62	*	*
Sponge @ mouth	36F			70	65		
Howard @ mouth	36G		66	69	73		
North Fork Desolation @ mouth	36H		63	69	65		
North Fork Desolation below exclosure	36H				62	66	63
North Fork Desolation above exclosure	36H				59	62	*
South Fork Desolation @ mouth	36I		58	68	59	62	61

* sensor problems

Forest Overstory Vegetation

Forest Cover Types

This section describes forest cover types as they *currently exist on the landscape*, regardless of whether they represent the potential natural ("climax") community or a seral stage resulting from wildfire, timber harvest, windstorms, or another disturbance.

Table 17 summarizes forest cover types for the Desolation ecosystem analysis area (data are current as of 1997 and reflect post-fire conditions for the Bull and Summit wildfire areas). The predominant forest cover type is grand fir (38% of the analysis area), followed by lodgepole pine (21%), Douglas-fir (12%), and subalpine fir (8%). Forests dominated by whitebark pine, western larch or western juniper are rare, occupying less than 3 percent of the analysis area in aggregate.

Table 17. Forest cover types of the Desolation ecosystem analysis area (1997).

CODE	COVER TYPE DESCRIPTION	ACRES	PERCENT
CA	Forests with a predominance of subalpine fir trees	5,667	8
CB	Forests with a predominance of whitebark pine trees	116	<1
CD	Forests with a predominance of Douglas-fir trees	8,203	12
CE	Forests with a predominance of Engelmann spruce trees	2,916	4
CJ	Forests with a predominance of western juniper trees	21	<1
CL	Forests with a predominance of lodgepole pine trees	14,598	21
CP	Forests with a predominance of ponderosa pine trees	3,902	6
CT	Forests with a predominance of western larch trees	1,501	2
CW	Forests with a predominance of grand fir trees	26,459	38
CX	Forests with a mixed composition; < 50% of one species	1,921	3
Other	Non-vegetated and non-forested cover types (see appendix 1)	4,232	6

Sources/Notes: Summarized from the 97veg database (see appendix 1 for more information). Acreage figures include private land located within the analysis area. Forest cover types are based on a plurality of stocking and are seldom pure – the grand fir type (CW), for example, has a predominance of grand fir trees (50% or more) but also contains minor proportions of ponderosa pine, Douglas-fir and other species.

The Desolation analysis area contains a relatively high proportion of forests dominated by Engelmann spruce and subalpine fir, which is unusual for the Umatilla National Forest. A large acreage of spruce-fir forest reflects the fact that about 20 percent of the Desolation area occurs above 6,000 feet, and those elevations typically support Engelmann spruce, subalpine fir, whitebark pine, and other species commonly found in the subalpine vegetation zone.

Canopy Cover

Very little of the Desolation analysis area has been recently examined using field surveys such as stand examinations. Consequently, quantitative data suitable for characterizing stand density (such as trees per acre or basal area per acre) is unavailable. Lacking these data, canopy cover values derived from interpretation of aerial photography were used for analyses that required information about stand density.

Table 18 summarizes existing canopy cover for forests of the Desolation ecosystem analysis area (data are current as of 1997 and reflect post-fire conditions for the Bull and Summit wildfire areas). The predominant situation is low-density forest (≤40% canopy cover; 48% of the analysis area), followed by moderate density (41-55% cover; 23%) and high density (56-70%; 19%). Very high density forest (>70% canopy cover) is rare, occupying only 3 percent of the analysis area.

Table 18. Forest canopy cover classes of the Desolation ecosystem analysis area (1997).

CODE	CANOPY COVER DESCRIPTION	ACRES	PERCENT
≤40	Live canopy (crown) cover of trees is 40 percent or less	33,668	48
41-55	Live canopy cover of trees is between 41 and 55 percent	16,190	23
56-70	Live canopy cover of trees is between 56 and 70 percent	13,142	19
>70	Live canopy cover of trees is greater than 70 percent	2,304	3
Other	Non-vegetated and non-forested cover types (see appendix 1)	4,232	6

Sources/Notes: Summarized from the 97veg database (see appendix 1 for more information). Acreage figures include private land located within the analysis area.

Forest Canopy Layers

Table 19 summarizes existing forest canopy layers for the Desolation ecosystem analysis area (data are current as of 1997 and reflect post-fire conditions for the Bull and Summit wildfire areas). The predominant situation is a two-layer stand structure (71% of the analysis area), followed by single-layer forest (19%) and a highly-complex layer structure (3 or more layers; 4%).

Table 19. Forest canopy layers of the Desolation ecosystem analysis area (1997).

CODE	CANOPY LAYER DESCRIPTION	ACRES	PERCENT
1	Live canopy (crown) cover of trees occurs in l layer (stratum)	13,467	19
2	Live canopy cover of trees occurs in 2 layers or strata	49,194	71
3	Live canopy cover of trees occurs in 3 or more layers or strata	2,643	4
Other	Non-vegetated and non-forested cover types (see appendix 1)	4,232	6

Sources/Notes: Summarized from the 97veg database (see appendix 1 for more information. Acreage figures include private land located within the analysis area.

Forest Size Classes

The Desolation analysis used size class definitions that reflect tree size (using diameter rather than height). Table 20 summarizes forest size classes for the Desolation ecosystem analysis area (data are current as of 1997 and reflect post-fire conditions for the Bull and Summit wildfire areas). It shows that the predominant overstory size class is small trees ranging from 9 to 15 inches in diameter (49% of the analysis area), followed by poles and small trees mixed (21%), and small trees ranging from 15 to 21 inches in diameter (10%). Forest overstories dominated by large or medium trees (those with diameters of 21 inches or more), or saplings (trees from 1 to 5 inches in diameter) are rare; each of those size classes occupies 1 percent or less of the Desolation area.

Table 20. Forest size classes of the Desolation ecosystem analysis area (1997).

CODE	SIZE CLASS DESCRIPTION	ACRES	PERCENT
1	Seedlings; trees less than 1 inch in diameter	1,559	2
2	Seedlings and saplings mixed	1,403	2
3	Saplings; trees from 1 to 4.9 inches in diameter	228	<1
4	Saplings and poles mixed	439	<1
5	Poles; trees from 5 to 8.9 inches in diameter	1,853	3
6	Poles and small trees mixed	14,625	21
77	Small trees; trees from 9 to 14.9 inches in diameter	34,317	49
88	Small trees; trees from 15 to 20.9 inches in diameter	7,035	10
8	Small trees and medium trees mixed	2,805	4
9	Medium trees from 21 to 31.9 inches in diameter	344	<1
10	Medium and large trees mixed	689	1
11	Large trees from 32 to 47.9 inches in diameter	7	<1
Other	Non-vegetated and non-forested cover types (see appendix 1)	4,232	6

Sources/Notes: Summarized from the 97veg database (see appendix 1 for more information). Acreage figures include private land located within the analysis area. Forest size classes are based on the predominant situation and are seldom pure – the pole size class (5), for example, has a predominance of pole-sized trees (50% or more) but may also contain minor proportions of other size classes. For multi-layered stands, this information pertains to the overstory layer (tallest stratum) only.

Forest Structural Stages

Table 21 summarizes forest structural stages for the Desolation ecosystem analysis area (data are current as of 1997 and reflect post-fire conditions for the Bull and Summit wildfire areas). The predominant structural stage is *stand initiation* (52% of the analysis area), followed by *young forest multi strata* (13%), *stem exclusion open canopy* (10%) and *understory reinitiation* (10%). Old forest structures (*old forest multi strata* or *old forest single stratum*) are rare, occupying one percent or less of the analysis area.

Table 21. Forest structural stages of the Desolation ecosystem analysis area (1997).

CODE	STRUCTURAL STAGE DESCRIPTION	ACRES	PERCENT
OFMS	Old Forest Multi Strata structural stage	781	1
OFSS	Old Forest Single Stratum structural stage	800	1
SECC	Stem Exclusion Closed Canopy structural stage	5,195	7
SEOC	Stem Exclusion Open Canopy structural stage	7,021	10
SI	Stand Initiation structural stage	35,944	52
UR	Understory Reinitiation structural stage	6,761	10
YFMS	Young Forest Multi Strata structural stage	8,802	13
Other	Non-vegetated and non-forested cover types (see appendix 1)	4,232	6

Sources/Notes: Summarized from the 97veg database (see appendix 1 for more information). Acreage figures include private land located within the analysis area. Veg Table 8 describes the forest structural stages.

Landscape Patches

Landscape patterns affect how living organisms use large land areas. Characteristics of landscape patterns, such as connectivity or the quality and quantity of edges between different landscape elements, can be measured and analyzed to reveal how well different plant and animal species may survive or move through an area. "FRAGSTATS," "UTOOLS" and other computer programs have been developed to aid in the analysis of landscape characteristics (Ager 1997, McGarigal and Marks 1995).

Due to time and computer constraints, it was not possible to complete a robust analysis of landscape patterns for the Desolation watershed. However, a rudimentary analysis was completed using the UTOOLS program (Ager 1997). For the Desolation analysis, two categories of forest vegetation were included in the analysis: cover types (which reflect plant composition at a broad scale) and structural stages (which represent how that composition is arranged in both a vertical and horizontal sense).

Table 22 summarizes patch characteristics for forest cover types and structural stages for the Desolation analysis area (data are current as of 1997 and reflect post-fire conditions for the Bull and Summit wildfires). Lodgepole pine has the most cover type patches in the Desolation landscape, followed by grand fir and then Douglas-fir. The largest patches are those comprised of *grand fir*; ranging in size from 3 to 15,475 acres, with an average patch size of 401 acres. *Grand fir forest* would be considered the matrix from a plant composition standpoint.

Table 22 also shows that the *stem exclusion open canopy* structural stage has the most patches in the Desolation watershed (excluding the non-forest patches (NF) that were ignored in terms of the structural stage analysis), followed by *stand initiation* and then *young forest multi strata*. The largest patches are those comprised of young, single-layer forest (*stand initiation*), range in size from 1 to 21,544 acres. Average patch size is 476 acres. Thus, *stand initiation* would be considered the matrix from a structural viewpoint.

Table 22. Patch analysis for the Desolation analysis area (1997 conditions**).**

PATCH TYPE	NUMBER OF PATCHES	MINIMUM PATCH SIZE	AVERAGE PATCH SIZE	MAXIMUM PATCH SIZE	TOTAL ACRES
Cover Types					
CA	28	1	192	3,119	5,667
CB	1	21	21	21	21
CD	63	3	130	997	8,203
CE	15	21	194	1,015	2,916
CJ	1	117	117	117	117
CL	77	1	189	3,792	14,598
CP	24	7	162	2,096	3,902
CT	41	4	36	246	1,501
CW	66	3	401	15,475	26,459
CX	15	23	128	453	1,921
Total	331				65,305
Structural Stages					
OFMS	14	1	56	252	781
OFSS	22	2	36	129	800
SECC	49	1	106	796	5,195
SEOC	100	1	70	1,305	7,021
SI	75	1	476	21,544	35,944
UR	35	2	193	2,344	6,761
YFMS	60	2	146	1,728	8,802
Total	503				65,305

Sources/Notes: Based on information contained in the 97veg database (see appendix 1 for more information), including private land located within the analysis area. Refer to Veg Table 5 for a description of the cover type codes; refer to Veg Table 9 for a description of the structural stage codes. Patches were calculated using the UTOOLS program (Ager 1997).

Forest Disturbances

Table 23 summarizes forest disturbances for the Desolation ecosystem analysis area (data are current as of 1997 and reflect post-fire conditions for the Bull and Summit wildfire areas). The predominant disturbances (totalling 55% of the watershed) have been associated with timber harvest – clearcuts (15% of the analysis area), partial cuts (16%, including sanitation/salvage), and thinnings (11%) could all be distinguished on recent aerial photography for the analysis area. Wildfire was also a common disturbance (13% of the analysis area). Although insects and diseases were not specifically noted, they have been important disturbance agents in the past. Some portion of the timber harvest occurred in response to insect or disease problems, such as removal of insect-killed trees (sanitation/salvage harvest).

Table 23. Forest disturbances of the Desolation ecosystem analysis area (1997).

CODE	DISTURBANCE DESCRIPTION	ACRES	PERCENT
CC	Recent clearcut timber harvest	1,943	3
CR	Old clearcut, now regenerated	8,256	12
FI	Evidence of recent fire	8,850	13
PC	Recent partial cutting timber harvest (selection, seed-tree, etc.)	2,283	3
PR	Old partial cut, now regenerated	8,187	12
SS	Evidence of sanitation/salvage timber harvest	848	1
TH	Evidence of a thinning silvicultural treatment	7,442	11
Blank	No discernible evidence of disturbance (on air photos)	27,495	40
Other	Non-vegetated and non-forested cover types (see appendix 1)	4,232	6

Sources/Notes: Summarized from the 97veg database (see appendix 1 for more information). Acreage figures include private land located within the analysis area.

Table 24 summarizes overstory mortality for the Desolation area (data are current as of 1997 and reflect post-fire conditions for the Bull and Summit wildfire areas). Sixty-nine percent of the analysis area has forests with low overstory mortality (10 or fewer dead trees per acre). Approximately 25 percent of the analysis area currently supports forests with moderate, high, or very high overstory mortality.

Table 24. Forest overstory mortality of the Desolation ecosystem analysis area (1997).

CODE	OVERSTORY MORTALITY DESCRIPTION	ACRES	PERCENT
L	Low overstory mortality; 10 or fewer dead trees per acre	47,653	69
M	Moderate overstory mortality; 11-20 dead trees per acre	12,356	18
H	High overstory mortality; 21-60 dead trees per acre	2,315	3
V	Very high overstory mortality; greater than 60 dead trees/acre	2,980	4
Other	Non-vegetated and non-forested cover types (see appendix 1)	4,232	6

Sources/Notes: Summarized from the 97veg database (see appendix 1 for more information). Acreage figures include private land located within the analysis area.

A computerized model was used to estimate current risk (susceptibility) for 14 insects and diseases present in the analysis area. Results of the analysis are summarized in Table 25.

Table 25. Insect and disease risk ratings for Desolation watershed.

INSECT OR DISEASE	RISK RATING	1997 (ACRES)
Douglas-fir Beetle	High	27,812
	Moderate	1,505
	Low	37,022
Douglas-fir Dwarf Mistletoe	High	15,727
	Moderate	7,088
	Low	43,524
Fir Engraver	High	19,220
	Moderate	1,100
	Low	46,019
Indian Paint Fungus	High	8,937
	Moderate	32,727
	Low	24,657
Mountain Pine Beetle (Lodgepole Pine)	High	2,892
	Moderate	1,736
	Low	61,711
Mountain Pine Beetle (Ponderosa Pine)	High	736
	Moderate	691
	Low	64,912
Ponderosa Pine Dwarf Mistletoe	High	7,811
	Moderate	4,400
	Low	54,128
Mixed Conifer Root Diseases	High	28,614
	Moderate	37,359
	Low	366
Schweinitzii Root and Butt Rot	High	38,836
	Moderate	26,779
	Low	724
Spruce Beetle	High	0
	Moderate	0
	Low	56,499
Western Spruce Budworm	High	49,206
	Moderate	12,768
	Low	2,828
Tomentosus Root and Butt Rot	High	3,109
	Moderate	143
	Low	63,087
Douglas-fir Tussock Moth	High	0
	Moderate	52,176
	Low	14,163
Western Larch Dwarf Mistletoe	High	16,226
	Moderate	14,005
	Low	36,108

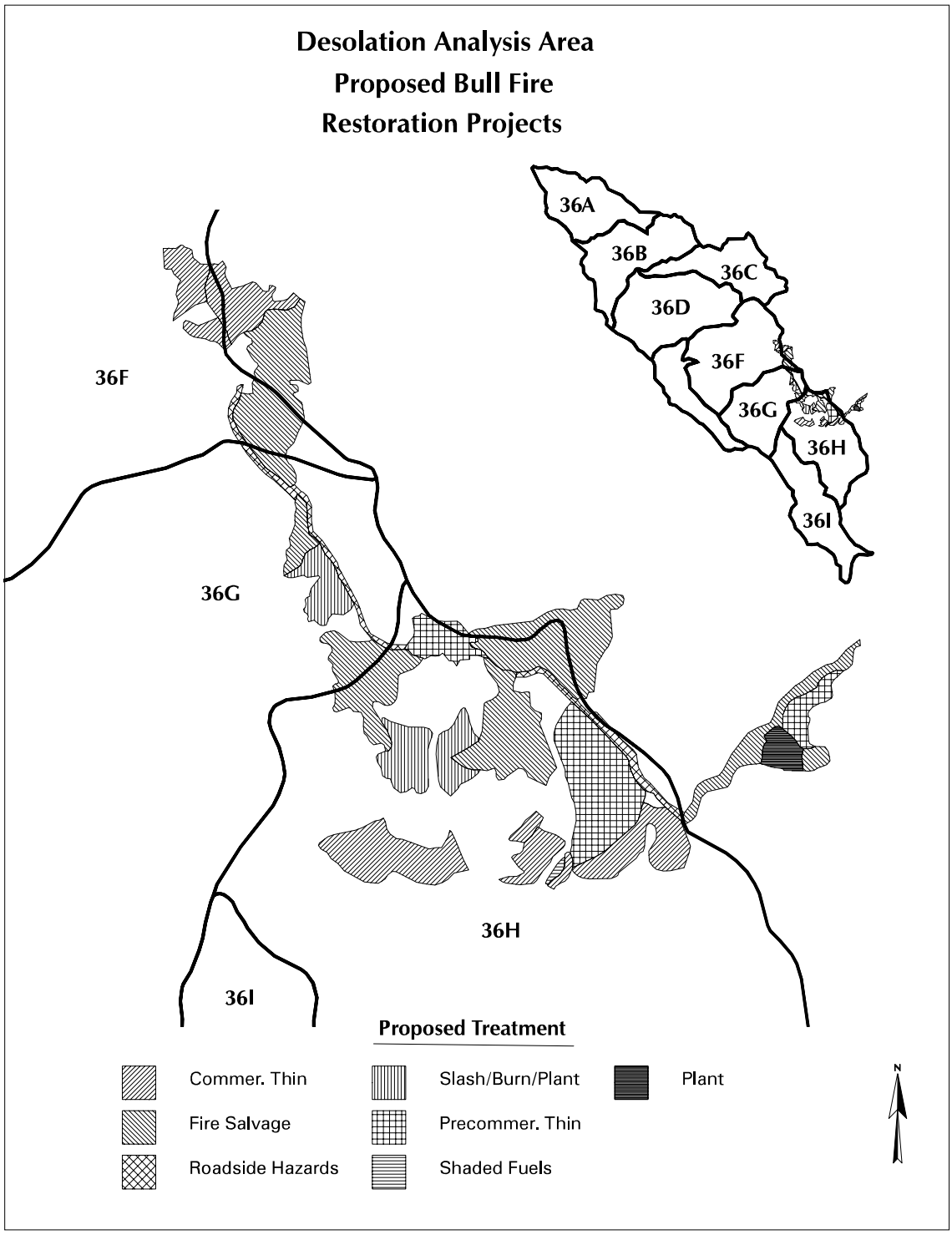
Near-Term Proposed Projects

Several types of proposed vegetation treatments are included in the Environmental Assessment for the Bull Fire Restoration Project. Proposed treatments included in the preferred alternative (as currently developed) are shown in Table 26 and Figure 19.

Table 26. Proposed Bull Fire Restoration Projects within Desolation Analysis Area.

SWS	Proposed Treatment	Acres
36F	Commercial Thinning	86
36F	Fire Salvage	90
36F	Roadside Hazards	9
	Subwatershed Sub-total	185
36G	Fire Salvage	109
36G	Roadside Hazards	34
36G	Slash/Burn/Plant	68
	Subwatershed Sub-total	211
36H	Commercial Thinning	328
36H	Fire Salvage	352
36H	Roadside Hazards	42
36H	Slash/Burn/Plant	132
36H	Precommercial Thinning	284
36H	Desolation Guard Station Fuels	5
	Subwatershed Sub-total	1,143
	Watershed Total	1,539

Figure 19. Proposed Bull Fire Restoration Projects.



Fire/Fuels

The intense burning conditions of the 1996 fires necessitated extensive use of fire-fighting tools such as heavy mechanized equipment (dozers), and aerially-applied fire retardant (outside of wilderness or roadless areas). Although these tools can increase productivity and efficiency of fire suppression efforts, their use is not without risk. Dozer-constructed fireline can create erosion pathways that require extensive mitigation. Exotic plant species (e.g., annual grasses, nitrogen fixing forbs) are often seeded to reduce erosion potential. Aerially-applied fire retardant can be deadly to fish if it reaches a stream or other fish-bearing water source.

Past management practices, and the intense burning conditions affected the behavior of the Bull and Summit (Umatilla National Forest portion) fires. Large areas of relatively homogenous stand structures resulted in extensive areas for the fires to move across, as well as fewer opportunities for effective suppression.

The severity of fire in the moderate-high severity natural fire regimes is not beyond what might be expected, from a historical perspective. There are still extensive areas within the mixed fire regime area with homogenous stand structures of multiple canopy layers and overstocked conditions which will continue to increase the fuels loading as interstand mortality occurs.

As the Desolation Watershed Analysis Area is assessed for fire and fuels concerns in the immediate future, the impact of past fire occurrence and potential for additional fires in the future must be considered. It is commonly thought that the concerns associated with high fuel loads or dense multistoried forest structure would no longer be a factor in management within areas recently impacted by wildfire, such as Bull or Summit Fires. This is partially correct; a large amount of the available fuel has been consumed by the wildfire, and in areas of moderate to high intensity burning, the multistoried forest structure is gone. The new issue is how to manage (within the fire areas and outside) recovering stands in such a way as to avoid setting the stage again for this flammable mix of available fuel and forest structure that promotes the development of crown fires over such an extensive area.

The low severity natural fire regime sites within the drainage have not been as heavily impacted by wildfire in the last few decades. A large portion of this area is private land that has been harvested extensively, and fuels treated. These areas have greater amounts of road access for suppression resources. Areas within this fire regime are lacking in the single-storied stand structures, dominated by early seral species such as ponderosa pine, which would exist in a natural disturbance regime.

Understory and Non-Forest Botanical Resources

Floristic Richness

The total number of species present in Desolation is the highest of any watershed analyzed to date, even though this watershed is the second smallest analyzed. This is attributable in part to more diversity in the watershed, and in part to more, better and/or more recent species lists than the other watersheds.

The ratios of percentages of natives/introduced plant species in watersheds analyzed so far on the Umatilla National Forest are within a fairly narrow range (5.2%). Desolation has the second lowest proportion of introduced species overall (88.2%/11.8%). The proportion of introduced grasses is much higher than the proportion of introduced plant species as a whole (36.47% introduced/total grasses in the watershed, compared to 11.22% introduced/total plant species in the watershed-Table 27). Not only are the

proportions of introduced grass species high, their overall cover is a large proportion of the total grass cover.

It is not uncommon to find drier meadows composed of *Poa pratensis* (Kentucky bluegrass), and slightly moister ones completely dominated by *Alopecurus pratensis* (meadow foxtail), both introduced species. Additional introduced grasses present in the watershed include, *Phleum pratense* (timothy)*, Poa compressa* (Canada bluegrass), various *Agropyron* species (wheatgrass), *Bromus* species (bromes) and *Arrhenatherum elatius* (tall oatgrass) in road cuts, closed roads, and timber sale units, and the ubiquitous *Dactylis glomerata* (orchard grass).

Table 27. Comparisons between numbers, percentages, and types of plants between the Desolation Watershed, the North Fork John Day Ranger District, and the Umatilla National Forest as a whole.

Forest	District	Watershed
1323 total species	*988 total species*	*723 total species*
1124 natives (85%)	867 natives (87.75%)	638 natives (88.2%)
199 introduced (15%)	121 introduced (12.25%)	85 introduced (11.8%)
27 trees	*19 trees*	*16 trees*
22 natives (81.5%)	17 natives (89.5%)	16 natives (100%)
5 introduced (18.5%)	2 introduced (10.5%)	0 introduced (0%)
123 shrubs	*92 shrubs*	*67 shrubs*
116 natives (94.5%)	89 natives (96.75%)	65 natives (97%)
7 introduced (5.5%)	3 introduced (3.25%)	2 introduced (3%)
943 forbs	*702 forbs*	*509 forbs*
809 natives (87.75%)	623 natives (88.75%)	457 natives (89.75%)
134 introduced (14.25%)	79 introduced (11.25%)	52 introduced (10.25%)
143 grasses	*111 grasses*	*86 grasses*
91 natives (63.6%)	74 natives (66.67%)	55 natives (63.9%)
52 introduced (36.4%)	37 introduced (33.33%)	31 introduced (36.1%)
86 "grasslikes"	*63 "grasslikes"*	*44 "grasslikes"*
86 natives (100%)	63 natives (100%)	44 natives (100%)
0 introduced (0%)	0 introduced (0%)	0 introduced (0%)

Culturally-Significant Plants

One hundred and nine species of plants that either currently or historically occurred in the Desolation watershed have (had) some use for food or medicinal purposes. A complete listing of these species is found in Appendix FLOR1.

Prior to white settlement, huckleberry (*Vaccinium* spp.), serviceberry (*Amelanchier alnifolia*), chokecherry (*Prunus virginiana*), bitter cherry (*Prunus emarginata*), and elderberry (*Sambucus cerulea*) were widespread, large, highly productive, and made up a significant portion of Native Americans' food source (see Kay 1994 for a more complete discussion and further references).

Ungulates have had a major impact on these shrubs. They are favored browse species for native ungulates, and are often eaten by cattle. Other than the plants found adjacent to major roads, where traffic tends to frighten the elk and deer away, most elderberry plants observed have few leaves and badly chewed stems by early to mid-summer. It is rare to find a serviceberry or chokecherry over a couple of feet tall - they can reach 20-30 feet tall under the best conditions, and 10 feet in harsher sites. It is almost impossible to find any of them with fruit. The loss of fruiting berry bushes has undoubtedly impacted birds that rely on berries for fall and winter food.

Willow and alder have been virtually eliminated from the watershed as a result of the loss of beaver and extreme grazing pressure. It is still present in occasional patches, usually heavily browsed, but large willow thickets are gone from the watershed and the District as a whole.

Special Forest Products

Special Forest Products (SFP) include plants collected for use as medicinals or foods, in addition to boughs and trees for Christmas decorations, floral greens, mosses, lichens, pine cones, live trees and plants for landscaping, and many other plants are collected for floral and ornamental purposes. Some of these products have international markets, with medicinal plants, mushrooms, floral greens, and beargrass being shipped to Europe and Asia.

Mushrooms, especially morels and, to a very small extent, huckleberries are currently the only Special Forest Product plants that are known to be collected in quantity in Desolation watershed. The watershed is too far away from major population centers to have the collection pressures currently being experienced by more “urban” forests on the west side of the Cascades, but demand is increasing, and likely to continue. There have been occasional requests for restoration planting propagation material and medicinal plants, such as Pacific yew (*Taxus brevifolia*) for cancer-treating taxol, and valerian (*Valeriana sitchensis*) as an effective sleep aid and doubtful aphrodisiac.

Assessing the biological impacts of special forest products collection without botanical personnel or even baseline data of what is present would be difficult, at best.

Some research is being done on the ecological implications of mushroom harvests. Because the array of plants and products is potentially so huge, and because of limited funding, ecological effects are often a best guess. Mosses and lichens can be particularly problematic, since sensitive species can grow intermixed with common species. Without specific bryophyte training and microscopes, most botanists, let alone the general public, can't distinguish the various species. Almost all work done on identifying which bryophyte and lichen species are sensitive has been done on the west side of the Cascades. Information for east side species is lacking. Even if a species is identified, the status of its population may not be known.

Massive collecting of bryophytes may have significant ecological effects. Some lichens shelter blue-green, nitrogen fixing algae. Nondescript soil lichens in desert communities have been shown to be the major source of nitrogen input in desert systems (B. Ryan, R. Rosentreter, BLM, pers. comm., 1998). Lichens are very slow growing. Growth measurements vary from a centimeter or two per year in rapid growing species, to millimeters per decade in slow growing species. Most occur in older communities, and the arboreal species need to have a nearby source of propagules for the lichens to reestablish once the stands

have matured enough to support them, which often takes 200-400 years (B. McCune, R. Rosentreter, BLM, pers. comm., 1998).

For medicinal plants, the long term overall situation can be grim. High value medicinal plants that are difficult to grow commercially are almost always collected to or near extinction. American ginseng and Echinacea are examples of plants not native to the Umatilla that are already overcollected in other parts of the United States. The rarer the plant is, the more the price goes up. Although ginseng is being grown commercially, the opinion in Asia (where most of it is marketed) is that the wild-collected plants are far superior, and therefore are worth more.

While hard to predict exactly which plants could experience high collection pressure, there are a few broad categories of effects that give plants the potential to become commercially viable:

1. Toxicity is one indicator. Any plant that stimulates the immune system, or fights viruses or bacteria is and/or could experience heavy demand, especially if it was shown to be effective against cancer or HIV.

2. Aphrodisiacs, and plants with sedative, euphoric, energizing or antidepressive properties.

3. Plants that can effectively reduce the need for insulin or treat specific types of diabetes. The commercial demand for these plants hasn't developed yet and the research is still fairly spotty, but with diabetes rapidly increasing in the US population , the research will eventually be done and any plant that shows commercial potential will be in demand.

4. A final category is plants with similar chemical makeup to plants that are already commercialized, but themselves don't have a commercial demand yet. As the known commercial species is depleted or more specific research is done, these "alternative" plants will come under increased harvesting pressure.

The following is a partial listing of plants that are found in the Desolation watershed, and are commonly commercially available in general drug store herb sections and smaller health food stores. Massive quantities of these are grown or collected, but it is unknown where or whether or not the amounts are sustainable. Larger health food stores or specialty herb suppliers could easily triple this species listing:

Hypericum perforatum (St. John's Wort)
cascara (*Rhamnsu purshiana*)
dandelion (*Taraxacum officinale*)
nettle (*Urtica dioica*)
juniper berry (*Juniperus* spp.)
valerian (*Valerian* spp.)
red clover (*Trifolium pratense*)
scullcap (*Scutellaria* spp.)
yellow dock (*Rumex crispus*)
mullein (*Verbascum thapsus*)
strawberry leaf (*Fragaria* spp.)
huckleberry leaf (*Vaccinium* spp.)
gentian root (*Gentiana* spp.)
cleavers (*Galium* spp.)
sanicula (*Sanicula* spp.)
burdock (*Arctium minus*)
chickweed (*Stellaria medea*)
elderberry (*Sambucus* spp.)
ladyslipper (*Cypripedium* spp,)
horsetail (*Equisetum* spp.)
hawthorn (*Crataegus* spp.)
red raspberry (*Rubus idaeus*)
uva ursi (*Arcostaphylos uva-ursi*)
astragalus, Chinese (*Astragalus* spp.)
wild cherry bark (*Prunus virginiana*)
rose hips (*Rosa* spp.)
horehound (*Marrubium vulgare*)
chicory root (*Cichorium intybus*)
coltsfoot leaf (*Petasites* spp.)

The following are plants that currently have, or are expected to have commercial collecting demands that could jeopardize the resource if collected on a large scale:

Orchids. Some of these have already been commercialized. These have some of the tiniest seeds in the vascular plant world, and must immediately form a mycorrhizal connection after germination to survive. They only grow in very particular habitats, and none of them are found in large quantities on the Forest. We have the potential to have a Federally Listed plant species, *Spiranthes diluvialis*, on this Forest. Any proposal to collect orchids should be carefully scrutinized (see Recommendations).

Ligusticum canbyi root. Related to *Ligusticum porteri*, or oshá (which has a long record of use in the Southwest (and is becoming hard to find there) as an antiviral and antibacterial), and *L. wallichii* (which is used clinically in China for lowering blood pressure, and during labor and delivery). Researchers are starting to show a great deal of interest in this plant for pharmaceutical uses. This plant is also a very important cultural plant to the local Tribes, and they should be consulted before any commercial harvesting, especially on a large scale, is contemplated. This plant is a "wildling" that so far has not grown in cultivation. Most of the plants on the Forest are present but widely scattered along some creek sides and meadows, almost nowhere in large numbers, and would likely not be sustainable if subjected to large-scale commercial collecting.

Gentian root. Already commercialized. Collected from wild plants in the genera *Gentiana*, *Gentianopsis*, and *Gentianella*, which are all higher elevation meadow or alpine plants. Some plants have been cultivated, but they are a difficult group to grow in settings outside of their natural high elevation haunts. These plants are present but seldom encountered on this Forest, and likely would not be sustainable if commercially collected.

Wild cherry bark, elderberry. Both of these are available commercially, though which species was not stated. These are also culturally significant plants. Both of these shrubs are present on the Forest, but because of browsing pressure almost nowhere in large size or large numbers, and because of this commercial collecting would likely not be sustainable.

Valerian. Available commercially, and the Forest has already had a commercial collecting permit request for this species. This plant grows in meadows and moist forest habitats, and could be cultivated, although most of the plants in the commercial trade are wildcrafted. More common on the North half of the Forest than the South, it maybe could withstand personal use collecting or an infrequent and very small commercial request, but likely not large-scale commercial harvest.

Scullcap. A mild sedative useful for stress relief that is showing up in more and more commercial herbal blends, as well as used by itself. It is unknown whether the commercial plants are wildcrafted and/or cultivated. There are two species (we have one of them on the Forest) usually used in the commercial trade, but they all work more or less interchangeably. *Scutellaria galericulata*, one of the two most commonly utilized commercial species, is occasionally on the Forest growing in small numbers in water in small streams and some ponds. Our other two *Scutellaria* species are usually found on somewhat to fairly steep harsh sun baked slopes. While fairly common in their preferred habitat, their extremely small size would make collection of thousands to millions of whole plants necessary to be commercially viable, and collecting on that scale in the fairly fragile habitat they grow in would likely lead to extirpation of the plants locally, as well as potentially cause soil disturbance, slope instability, and erosion.

Cascara. *Rhamnus purshianus*. The bark of this small tree, known also as chittim or shittim bark, for years was the only good laxative available, and there is still a high demand for it. While most of the bark collected comes from the west side of the Cascades, it is becoming scarce and there have been an increasing number of requests for information on collecting it from the Umatilla National Forest. The Forest has so few of these trees present that commercial collecting would potentially extirpate the species.

Baneberry. *Actaea rubra*. While not in common use (the berries are very poisonous and the entire plant has the reputation of being poisonous), this plant has similar medicinal uses to black cohosh (*Cimicifuga*

elata in the west and *Cimicifuga racemosa* in the east). The demand for black cohosh is rapidly increasing, and the western species at least grows in a limited area of west Cascades old-growth forests with intricate mycorrhizal and pollination connections, and has not been successfully cultivated on a commercial scale. Black cohosh probably cannot sustain the collection pressure it is currently under in the wild, and as it is depleted, the demand may turn to baneberry to take its place.

Arnica spp. *Arnica montana* (from Europe) is the main commercial species, but all of the species are more or less interchangeable, and *Arnica cordifolia* is the most likely native to take up any increased collection pressure. Usually the flowers are used commercially, but the leaves and roots can also be used. These plants are mostly used externally for bruises, muscle and joint soreness, and arthritis, and with the population aging and arthritis becoming more common, the demand may increase. Since it is a fairly common species, limited commercial collection of the flowers could probably be done on a sustainable basis (leaving enough to reseed), but huge demand and/or root collection could detrimentally affect the species.

Arrow-leaf balsamroot. *Balsamorhiza sagittata.* This plant is a mild immunostimulant, similar to *Echinacea*. Echinacea is experiencing a tremendous growth in use, with increased mainstream acceptance and many herbal blends containing the plant. While it is slowly coming under cultivation, the majority of the plants used are wildcrafted, and they are becoming rare in their natural habitat. *Balsamorhiza* species may be the "old growth" of the grass steppe--efforts by members of the Oregon Native Plant Society to propagate them have found that a plant has to be at least 10 years old before it first blooms.

St. John's wort. *Hypericum perforatum* The "Prozac of the vegetable kingdom", *Hypericum* has an established history of use in Europe, especially Germany, and is rapidly gaining acceptance in this country. It can treat many forms of depression without the side-effects usually encountered in prescription medications. It is also considered a highly invasive noxious weed. Some efforts are being made to cultivate it, but many people don't want to plant a crop they may never be able to get rid of if the demand goes away. Because it is a noxious weed, commercial collection will bring increased scrutiny of the Forest's noxious weed program in general and herbicide spraying in particular. While overcollecting may help control the plant, increased commercial value may prompt some people to spread the seed widely through the Forest, making the invasiveness problem worse.

Fernleaved desert parsley. *Lomatium dissectum* root. A strong anti-microbial (effective against most gram-positive bacteria and many influenza viruses) and a mild immunostimulant, this plant is extremely useful for treating the flu, pneumonia, bad colds, and has the potential to help with HIV treatment. This, combined with the growing immunity of many microbes to antibiotics almost guarantees a potential strong commercial interest in this plant. The plants are sporadic and localized and grow in steep, dry, hot talus slopes and in rock fissures, making collection difficult. Talus slopes aren't a habitat easily duplicated in cultivation, so all the plants collected are wildcrafted. Already a sensitive species on the Idaho Natural Heritage Program lists, this plant probably would not survive commercial-scale collection.

Pipsissewa and Pyrola. Both of these plants have similar pharmacologies, and both grow in relatively undisturbed forest floors under dense canopy coverage. They are both mycorrhizal (especially the *Pyrola* spp.), so don't transplant, and cultivation would require duplicating the fungal and root components of the forest floor. Pipsissewa (*Chimaphila* spp.) is currently being collected by the semi-truck loads for use as a flavoring in root beer and other soft drinks. While in the appropriate habitats these plants are fairly common, the delicate interdependence of species within the community and their slow growth means that recovery from collection impact would be difficult, and large-scale collections would deplete the species.

Pink elephant's heads. *Pedicularis* spp., especially *P. groenlandica*. One of the most showy and well-loved of our native wildflowers, and an effective sedative for children and tranquilizer for adults. Not in common commercial use---yet. The entire aboveground flowering plant is collected. The meadows that

they grow in are usually fairly pristine, extremely diverse, and are saturated with water when the plants are in flower, so collecting could have a tremendous trampling impact on all the plants present in the habitat. While currently relatively common, large-scale commercial collection could devastate the species.

Noxious Weeds

Fourteen noxious weeds have been identified in the watershed. Of those, five species are currently being treated, and population status/spread monitored (Table 28).

Table 28. Noxious Weeds in the Desolation Watershed: species in *italics* are currently tracked and treated on the NFJD Ranger District

ALPHA CODE	SPECIES	COMMON NAME
AGRE	Agropyron repens	quackgrass
CEMA	*Centaurea maculosa*	*spotted knapweed*
CEDI	*Centaurea diffusa*	*diffuse knapweed*
CHLE2	Chrysanthemum leucanthemum	oxeye daisy
CIAR	Cirsium arvense	Canada thistle
CIVU	Cirsium vulgare	bull thistle
CYOF	*Cynoglossum officinale*	*hound's tongue*
DACA4	Daucus carota	wild carrot; Queen Anne's lace
EQAR	Equisetum arvense	western horsetail
HYPE	Hypericum perforatum	common St. John's wort
LIDA	*Linaria dalmatica*	*bastard toadflax*
PORE	Potentilla recta	sulfur cinquefoil
SEJA	*Senecio jacobaea*	*tansy ragwort*
VETH	Verbascum thapsus	common mullein

Source: Noxious Weed Policy and Classification System, Oregon Department of Agriculture, Noxious Weed Control Program, 1996.

Equisetum arvense is on the Oregon list of noxious weeds even though it is a native plant. It can be highly invasive on disturbed sites under ideal conditions, but has not shown "noxious weed characteristics" (extreme invasiveness and displacement of the native vegetation) on the Umatilla National Forest. It is very good at holding soil in place, making it a useful plant to have along road cuts and portions of some stream banks. It is one of the very few plants that will grow on the edge of highly mineralized mining ponds, which could make it extremely useful for mine reclamation.

Centaurea maculosa, *Centaurea diffusa*, *Chrysanthemum leucanthemum*, *Daucus carota*, *Linaria dalmatica*, *Potentilla recta*, and *Verbascum thapsus* tend to grow in open, gravelly or rocky areas, dry meadow and "scab flats". These are often initial colonizers of disturbance areas if the seed source is present. They will grow in all other habitats, but tend to be spindly if they don't get any sun, and can be out-competed by better adapted vegetation in very wet habitats.

Agropyron repens, *Cirsium arvense*, *Cynoglossum officinale*, *Equisetum arvense*, and *Senecio jacobaea* prefer good soil, and some moisture or shade. They will grow in any habitat with enough moisture, including apparently dry road edges where the water runoff from the road is enough to sustain them.

Cirsium vulgare and *Hypericum perforatum* will grow almost anywhere the seeds land. They tend to be small and stunted in deep shade or extremely dry habitats, large and robust with good soil and adequate moisture.

Botrychium spp.

Botrychium species, commonly known as moonworts or grapeferns, are small upright ferns usually with a common stalk bearing one leaf and one spore cluster that looks like a tiny green grape cluster when immature. While a few species are relatively common with circumboreal distribution, most of the smaller ones have only been described in the last 10-15 years as botanists started purposefully looking for these tiny, hard-to-find plants.

The Desolation watershed contains all 11 of the 12 *Botrychium* species present on the Umatilla National Forest (the twelfth is most likely present but its identity is unconfirmed). Within the watershed, Desolation Meadows contains the fifth most significant population in the world of *Botrychium* spp. as of 1994 (Dr. Herbert Wagner, pers. comm.). These populations occur in drier, warmer, and more stressed sites than other major regional population centers (the Wallowa Mountains of Oregon and the Colville National Forest in Washington). *B. crenulatum* is represented by a population of a single plant on the Umatilla National Forest, and *B. paradoxum* is represented by a population composed of a single plant in Desolation Meadows and one other small population on the Walla Walla Ranger District.

Six *Botrychium* species are currently on the Regional Forester's List of Sensitive Plant Species for Oregon. Sensitive species include *Botrychium pinnatum, B. lanceolatum, B. paradoxum* (one plant, only known from approximately seven locations in the world as of 1994), *B. crenulatum* (one plant on the Forest, which is on the northwestern edge of its range), and *B. minganense*.

One, and possibly two "new to science" *Botrychium* species occurring in the watershed were discovered after the Regional Forester's List was last updated in June, 1991. *"Botrychium glaucum* sp. nov.", found in Desolation Meadows in 1992, is also known from six plants on the Walla Walla Ranger District and a possible but unconfirmed population on the Wenatchee National Forest (Dr. David Wagner, pers. com. 1996). Although originally determined to be a legitimate new species, isoenzyme studies determined that this "new species", is very similar to *B. pedunculosum*, which is present on the Wallowa-Whitman National Forest, but has not been documented from the Umatilla National Forest. If the Desolation watershed plants are indeed *B. pedunculosum*, they represent a morphologically distinct dry site form, as opposed to the typical *B. pedunculosum.* If the Desolation watershed plants are not *B. pedunculosum*, then they may prove to be a new-to-science species found almost exclusively on the Umatilla National Forest, with almost all the plants present in the Desolation watershed.

Botrychium fenestratum sp. nov. is currently being described by Dr. Wagner, and is suspected to be present in Desolation Meadows. It is currently found on the Colville National Forest, the Wallowa-Whitman National Forest, and on the Walla Walla District of the Umatilla National Forest. The voucher specimen for the suspected *B. fenestratum* from Desolation Meadows is currently deposited at the Oregon State University herbarium, although it has yet to be confirmed.

Historically-listed and Presently-listed Sensitive Plant Species

Table 29 presents the most recent information on listed plant species in the Desolation watershed:

Table 29. Historic and Presently Listed Plant Species of the Desolation Watershed

SCIENTIFIC (COMMON) NAME	REGIONAL FORESTER'S IST[1]	ORNHP LIST[2]	DISTRICT OCCURR.[3]
Allium validum (Pacific onion)	HSO		H, N, P, W
Botrychium crenulatum (crenulate moonwort)	PSO, PSW	List 1	N
Botrychium fenestratum sp. nov.			N?, W
"Botrychium glaucum sp. nov." (Desolation meadows moonwort), or		List 3	N, W
Botrychium pedunculosum (stalked moonwort)[4]		List 1	N, W
Botrychium lunaria (moonwort grapefern)	HSO, PSW	List 2	N
Botrychium minganense (Mingan grapefern)	PSO, HSW	List 2	N, W
Botrychium montanum (mountain grapefern)	PSO, PSW	List 2	N, W
Botrychium paradoxum (two-spiked moonwort)	PSO, PSW	List 1	N, W
Botrychium pinnatum (pinnate grapefern)	PSO, PSW	List 2	N, W
Botrychium simplex (least moonwort)	HSO, PSW		N, W
Calypso bulbosa (calypso orchid)	HSO		H, N, P, W
Carex interior (inland sedge)	Proposed	List 2	N
Carex subnigricans (nearlyblack sedge)	Proposed	List 3	H, N, P, W
Castilleja glandulifera (glandular Indian-paintbrush)	HSO	List 4	N
Corallorhiza trifida (yellow coral root)	HSO		H, N, P, W
Cypripedium montanum (mountain ladyslipper)	HSO	List 4	H, N, P, W
Gentianella tenella ssp. tenella (Dane's dwarfgentian)		List 2	N-extirpated
Hierochloe odorata (sweetgrass)		List 3	H, N
Lupinus polyphyllus var. burkei (Burke's lupine)	HSO		H, N, P, W
Lycopodium annotinum (stiff clubmoss)	HSO	List 4	N, W
Penstemon pennellianus (Pennell's penstemon)	HSO, HSW		N, P, W
Polystichum lemmonii (Shasta fern)	HSO	List 4	N
Ribes hudsonianum (stinking currant)	HSO		H, N, P, W
Ribes oxycanthoides ssp. cognatum (Umatilla gooseberry)	HSO, PSW		H, N, P, W
Trifolium plumosum (pussy clover)	HSO		H, N, W

[1] HSW = historically sensitive in Washington PSW = presently sensitive in Washington HSO = historically sensitive in Oregon PSO = presently sensitive in Oregon)

[2] Oregon Natural Heritage Program, 1998. List 1 is threatened or endangered throughout range. List 2 is threatened, endangered, or extirpated from Oregon, secure elsewhere. List 3 is review. List 4 is watch.

[3] N=North Fork, W= Walla Walla, P=Pomeroy, H=Heppner

[4]This plant is either an extreme dryland form of Botrychium pedunculosum, or a new species. see discussion below.

In addition, *Delphinium stachydeum* has low enough population numbers that it should be listed, but it has not because the genus Delphinium is difficult to key and there is resistance to adding them to sensitive species lists.

Extirpated Species

Within the last 15 years, three species, each represented by a single population on the Forest, and all three of them within about 6 miles of each other, were extirpated from the Forest due to management activities. Two of these were sensitive species:

> *Gentianella tenella* ssp. *tenella* (slender gentian). (Regional Forester's List for Washington, ORNHP List 2--threatened, endangered, or possibly extirpated from Oregon, but more common or stable elsewhere). Only known occurrence on the Umatilla National Forest was along Desolation Creek, where it was collected and brought in to Karl Urban for identification by some of the people installing rock and log fish structures in the creek. The plant apparently was extirpated during the fish structure construction.
>
> *Ranunculus oresterus* (Blue Mt. buttercup). (Regional Forester's List for Oregon, ORNHP List 4--taxa of concern which are not currently threatened or endangered. These are either very rare but currently secure, or else declining in numbers and habitat but still too common to be proposed as threatened or endangered). Only known occurrence on the Umatilla National Forest was just outside the Desolation Watershed at Olive Lake. The population was extirpated when the road was moved back from the edge of the lake, and through the marshy area where it grew. While more common on the Wallowa-Whitman National Forest, this population represented the westernmost edge of its distribution.
>
> *Menyanthes trifoliata* (common buckbean). Only known occurrence on the Umatilla National Forest was at Lost Lake, and was extirpated when heavy equipment went in to try to raise the lake level so that stocked fish could survive the winter.

The only place *Carex scopulorum* is found on the Forest is on gravel bars along one stretch of Desolation Creek, and the only place on the Forest *Betula nana* is found (and is severely browsed) is in Desolation Meadow. In addition, two of our sensitive plant species (*Botrychium paradoxum* in the watershed and *B. crenulatum* on the Forest) are represented by one population each, with one plant in that population. Historically listed *Botrychium lunaria* is represented by one possible population on the Forest (the identity needs to be confirmed with the new plant keys), which is east of the Desolation watershed. These plants are tiny and hard to see, having one stalk that in a good year gets up to 4" tall in the midst of the meadow grasses and forbs. Any misplaced management activity, from large disturbances like bulldozing in roads or fire lines to seemingly insignificant ones like digging a soil test hole or putting in a fencepost or tent stake, if done on the spot where these plants occur, would extirpate the species from the watershed and/or Forest.

Fish and Aquatic Habitat

Fish Populations

Spring chinook salmon rarely spawn in Desolation Creek, and then only during years when streamflows are high (Mike Gray, pers. comm.,1997). However, Oregon Department of Fish and Wildlife surveys (ODFW, 1995) have found juvenile chinook throughout the lower two-thirds of the mainstem (Figure 20). Additionally, USFS snorkeling surveys report juvenile chinook in the lower 1.5 miles of the South Fork of Desolation Creek (P. Howell, pers. comm., 1998). This confirms its use as juvenile chinook rearing habitat, but the stream's small size in late summer makes it only marginal as chinook spawning habitat (John Sanchez, pers. comm., 1998).

Rainbow trout and steelhead also spawn and rear in Desolation Creek and some of its tributaries (Figure 21). Oregon Department of Fish and Wildlife has stocked catchable sized rainbow trout in Desolation Creek for some years. The practice was discontinued by 1995.

The John Day River stock of spring chinook salmon has declined over the years to the point that it is not presently a strong, healthy stock (Huntington et al, 1996). Nevertheless, it is still the strongest wild, native, stock in the interior Columbia Basin. Although specific fish figures for population strengths of salmonids in the Desolation Creek watershed are not available, anadromous subpopulations most likely reflect the same declines as seen in the remainder of the Basin. Numbers of resident rainbow/redband trout are probably somewhat more stable, but the native strains have likely been altered by introduced hatchery fish and numbers may have been reduced by habitat alteration.

The Desolation Creek bull trout population probably consists of a few migratory individuals in the mainstem and a small resident population in the South Fork and lower North Fork of Desolation Creek (Figure 20). Bull trout were apparently once widespread in the John Day River system, but now are restricted to about 25 percent of their former range (Buchanan, Hanson and Hooton 1997), occupying primarily the higher elevation and upper headwaters streams. Presently, stronger populations inhabit the upper North Fork of the John Day River and some of its tributaries and the Upper Mainstem of the John Day River above Prairie City (P. Howell, USFS, pers. comm., 1998). The extent of genetic interchange between these populations and Desolation Creek bull trout is not known at this time.

A few brook trout also occupy the Desolation Creek watershed (Figure 22). Brook trout are exotic to the John Day Basin but are classified in the same genus (*Salvelinus*) as bull trout and may cross with bull trout. Such crosses have been observed in the North Fork John Day River (P. Howell, USFS, pers. comm., 1997) and ODFW surveys (1990) report a bull trout X brook trout hybrid from the South Fork of Desolation Creek. These crosses produce sterile hybrids, and reduce the biotic potential of the bull trout population. This is cause for concern in this watershed.

The South Fork of Desolation Creek contains some west-slope cutthroat trout (P. Howell, USFS, pers. comm., 1999) and ODFW also reports finding a cutthroat in the upper mainstem of Desolation Creek (above the mouth of Battle Creek). Native west-slope cutthroat trout inhabit the upper mainstem of the John Day River. Cutthroat are known to have been introduced to Desolation Creek (J. Sanchez , USFS, pers. comm., 1999). Cutthroats are probably interfertile with rainbow/redband trout, and may have crossed with the resident species and altered the gene pool.

Figure 20. Chinook and Bull Trout Distribution

Figure 21. Distribution of Steelhead/Rainbow/Redband Trout

Figure 22. Brook Trout Distribution

Habitat

Oregon Department of Fish and Wildlife biologists inventoried fish habitat in the mainstem of Desolation Creek from the mouth to the confluence of the north and south forks in 1994. U. S. Forest Service contract teams surveyed most of the major tributaries in the summers of 1992 and 1993. Because of differences in the survey protocol, some of the data gathered by the two agencies is not directly comparable, but pool frequencies and riffle depth/width ratios can readily be converted to equivalent units.

Pool Frequency

Pool frequency is one of several commonly used measures of salmonid habitat quality. In this watershed, average pool frequencies appear generally highest in the South Fork of Desolation Creek (subwatershed 36I, Figure 23) and lowest in the Junkens subwatershed (subwatershed 36E), although pool frequency of single reaches of other streams may be even lower (Figures 24, 25).

Large Wood Frequency

Large wood frequency is another parameter commonly used as a habitat quality indicator. Among the Desolation Creek tributaries, streams in subwatershed 36C (Kelsay) have the highest average large wood frequency (Figure 26) and 36f (Battle) the lowest.

Riffle Depth/Width

Subwatershed 36C also shows the highest riffle depth/width ratios (Figure 27) while mainstem Desolation Creek has the lowest average values for this parameter. Riffle depth/width ratios may vary widely between reaches in the same stream or subwatershed. For example riffle depth/width ratio of reach one of Kelsay Creek is about half that of reach two or of Little Kelsay Creek (Figures 28, 29).

Water Temperature

One of the most important salmonid habitat parameters in the Blue Mountains is probably water temperature. Over the period of record, (1992-1997) maximum water temperatures in the Desolation watershed have varied from 56 to 80 degrees Fahrenheit with Junkens Creek and South Fork Desolation usually showing the coolest temperatures, and Kelsay Creek and Desolation near the mouth, the warmest (refer to Table 16).

Figure 23. Average Pool Frequencies in Desolation Mainstem and Subwatersheds.

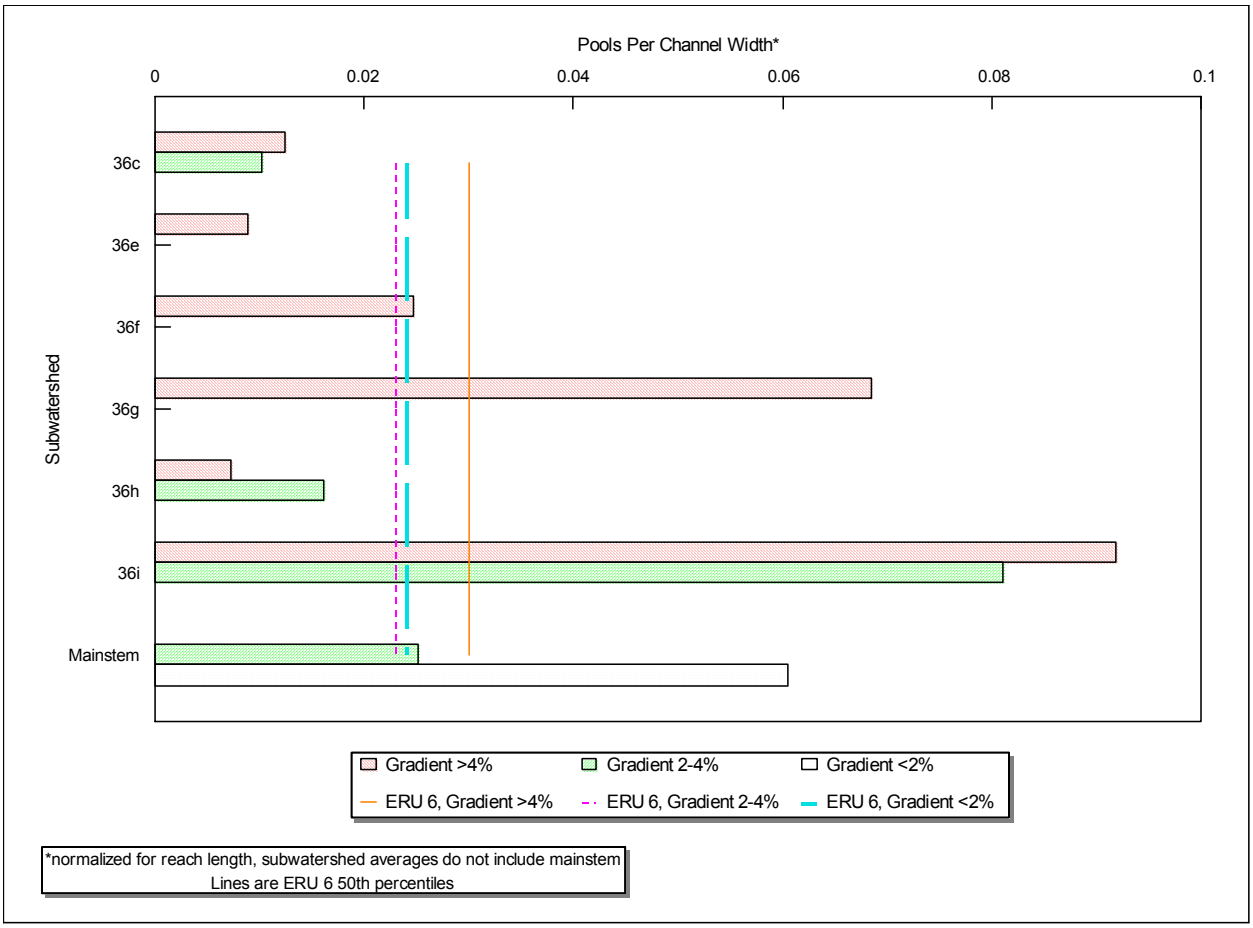


Figure 24. Total Pool Frequency in Desolation Creek, Moderate Gradient Tributaries.

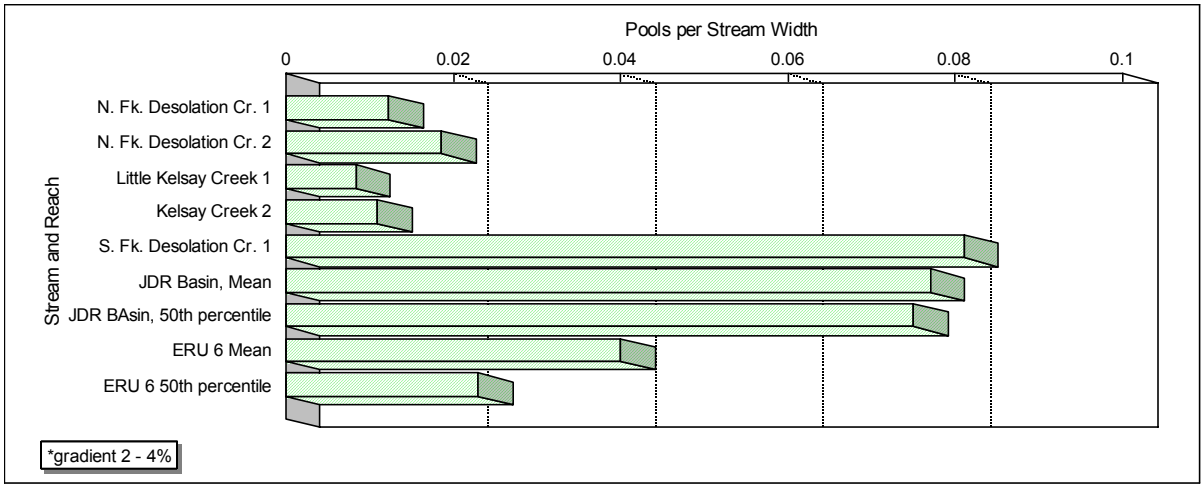


Figure 25. Total Pool Frequency in Desolation Creek High Gradient Tributaries.

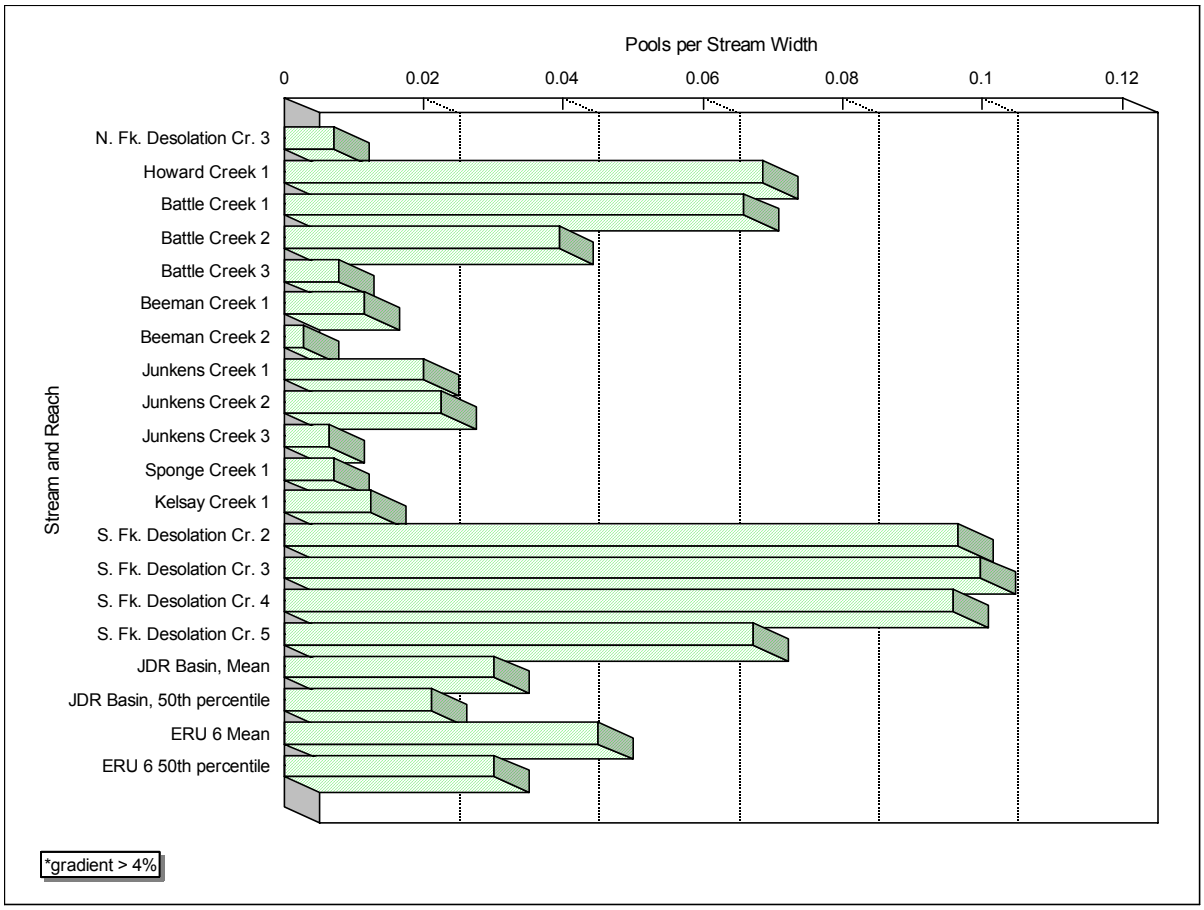


Figure 26. Average Large Wood Frequency in Desolation Creek Tributaries.

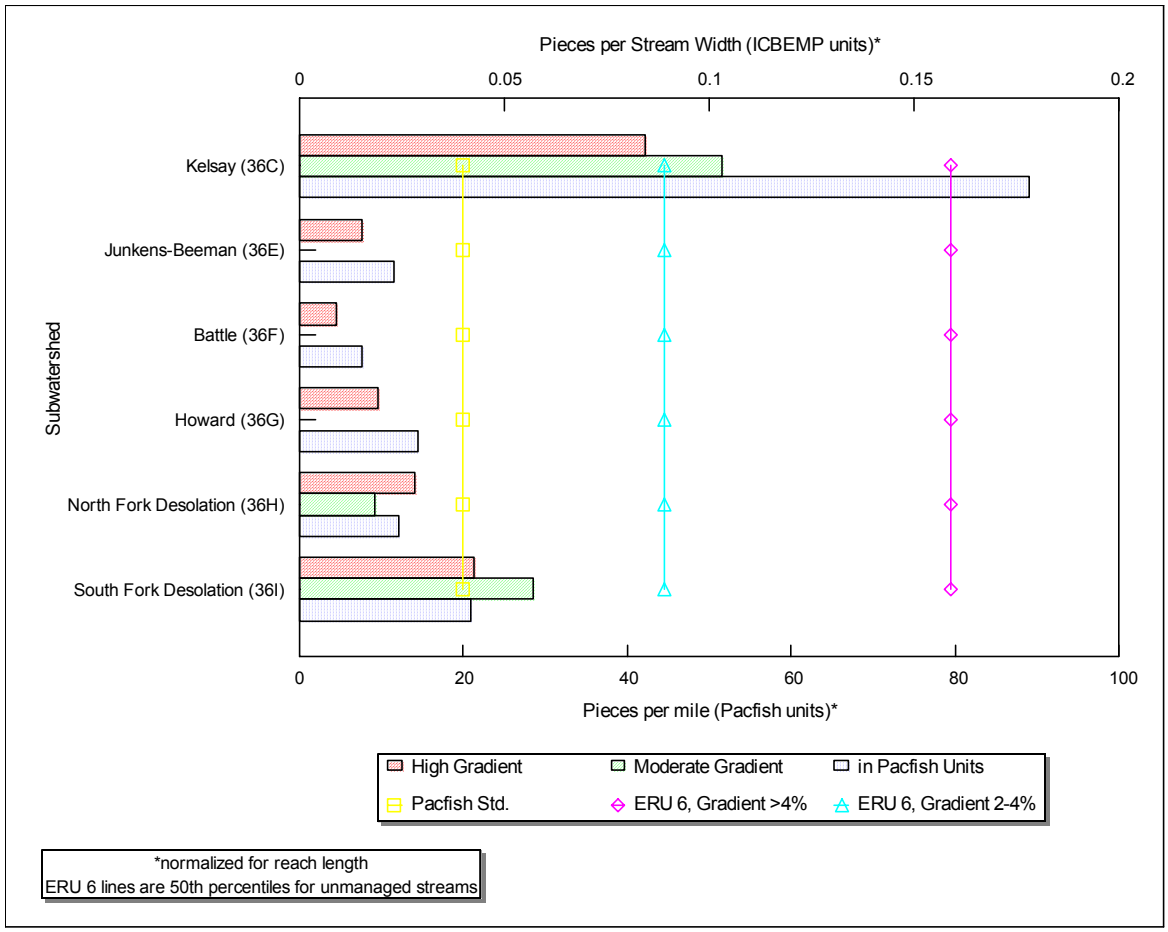


Figure 27. Desolation Mainstem and Subwatersheds, Average Riffle Depth/Width Ratios by Gradient Category.

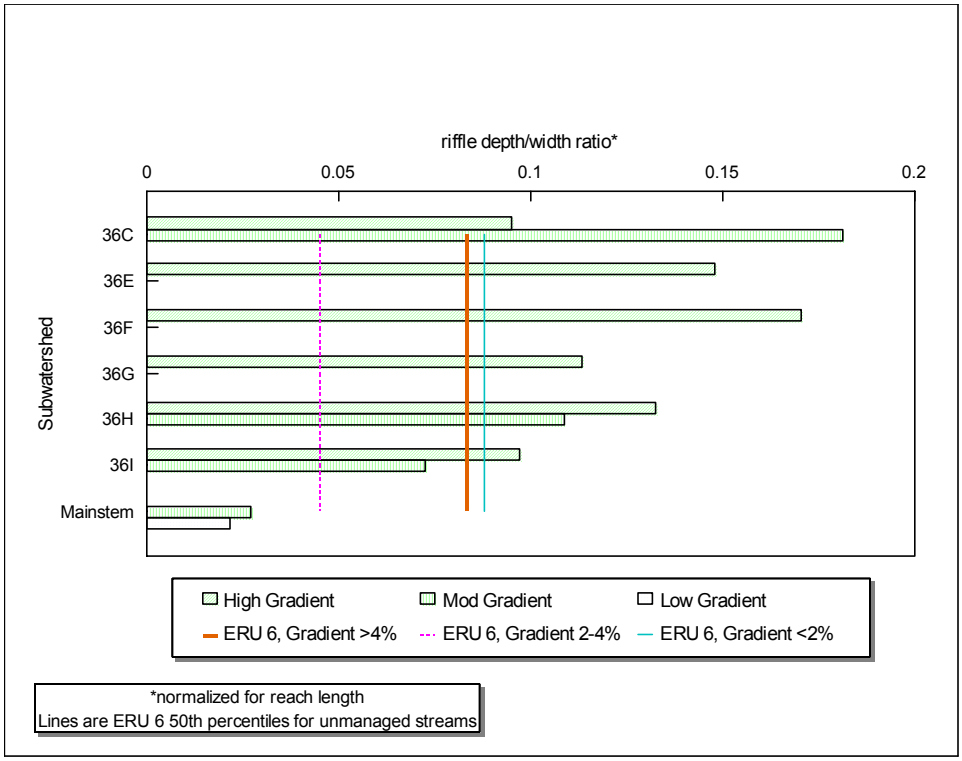


Figure 28. Riffle Depth/Width Ratios in Desolation Creek Tributaries.

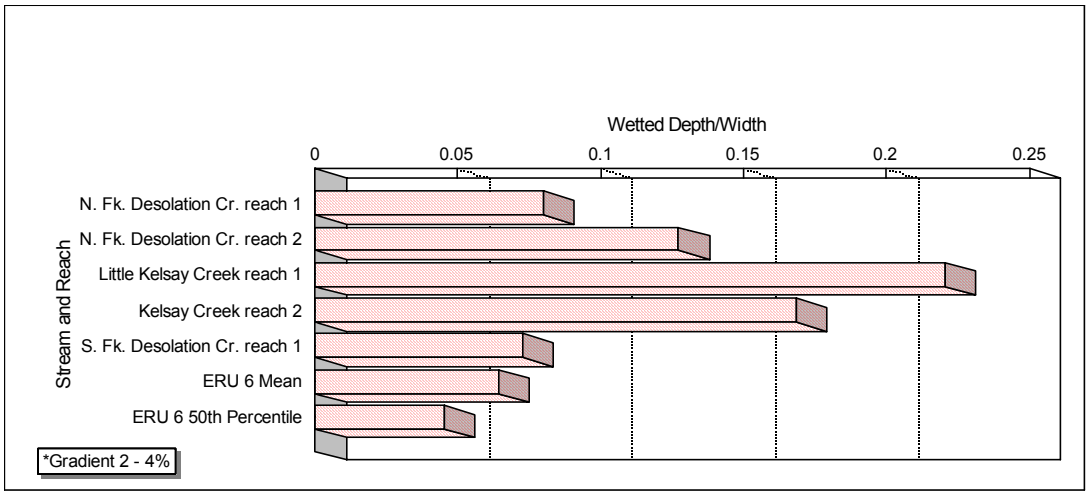
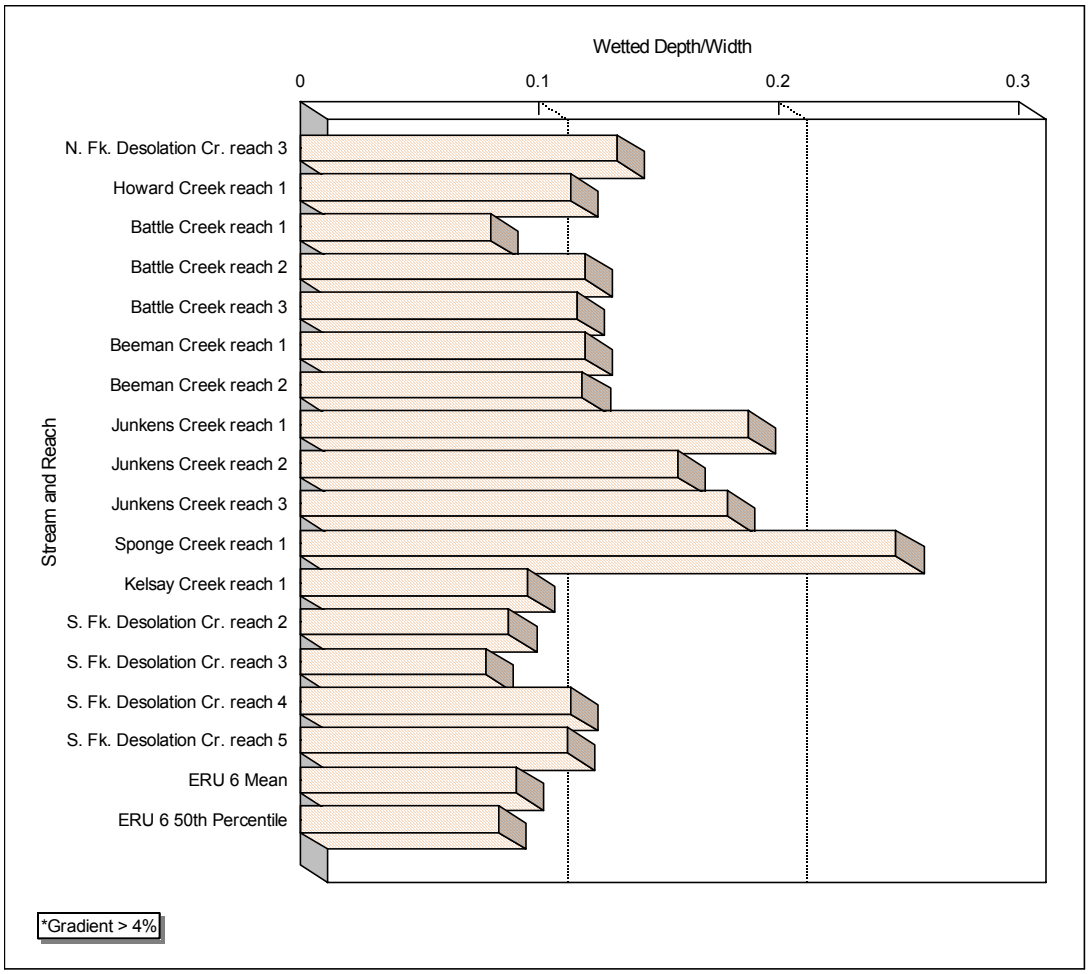


Figure 29. Riffle Depth/Width Ratios in Desolation Creek Tributaries.



Sediment

Large proportions of fine sediments can also indicate poor quality salmonid habitat. Stream survey records gave fine sediments as either dominant or subdominant in all three surveyed reaches in subwatershed 36C (Table 30). Subwatershed 36E (Junkens-Beeman) had two reaches with fine sediment listed as dominant or subdominant and 36F, 36H, and 36I each had one reach with fine sediment as either dominant or subdominant. ODFW reports of mainstem Desolation Creek surveys did not show fine sediment as dominant in any of the 19 reaches listed.

Fish Passage Barriers

USFS stream survey reports list several fish passage barriers and possible fish passage barriers created by management in Desolation Creek tributaries as of the 1992-93 field season. Causes of these barriers are given in Table 31 below.

Table 30. Substrates in Desolation Creek Tributaries.*

STREAM	REACH	SUBWATERSHED	DOMINANT	SUBDOMINANT
N. Fk. Desolation Cr.	1	36h	cobble	small boulder
N. Fk. Desolation Cr.	2	36h	sand & silt	gravel
N. Fk. Desolation Cr.	3	36h	cobble	gravel
Howard Creek	1	36g	gravel	cobble
Battle Creek	1	36f	small boulder	cobble
Battle Creek	2	36f	no data	no data
Battle Creek	3	36f	cobble	small boulder
Beeman Creek	1	36e	cobble	cobble
Beeman Creek	2	36e	sand & silt	gravel
Little Kelsay Creek	1	36c	sand & silt	no data
Junkens Creek	1	36e	cobble	gravel
Junkens Creek	2	36e	cobble	small boulder
Junkens Creek	3	36e	gravel	sand & silt
Sponge Creek	1	36f	sand & silt	gravel
Kelsay Creek	1	36c	small boulder	cobble
Kelsay Creek	2	36c	gravel	sand & silt
S. Fk. Desolation Cr.	1	36I	cobble	gravel
S. Fk. Desolation Cr.	2	36i	cobble	small boulder
S. Fk. Desolation Cr.	3	36i	cobble	small boulder
S. Fk. Desolation Cr.	4	36i	cobble	small boulder
S. Fk. Desolation Cr.	5	36i	sand & silt	gravel

*None of the reaches of mainstem Desolation Creek had sand or silt as the dominant or subdominant substrate.

**Substrate size categories: sand <0.08in, Gravel = 0.08 - 2.5 in, cobble = 2.5 - 10 in, small boulder = 10 - 40 in, large boulder > 40in.

Table 31. Possible Anthropogenic Fish Passage Barriers in Desolation Creek Tributaries.*

STREAM NAME	NSO**	HABITAT UNIT NUMBER**	CAUSE OF BARRIER
Beeman Creek	73	C1	Steep gradient in culvert
Howard Creek	32	C1	Jumping height to culvert
Junkens Creek	5	C1	Steep gradient & swift, shallow current at culvert exit
Junkens Creek	75	C2	1.5ft. drop into culvert (exit jump)
Junkens Creek	98	C3	3 ft. jump onto rocks, no pool below
Junkens Creek	125	C4	No pool below culvert. One ft. jumping height
N. F. Desolation Tributary #1	2	C1	Clogged culvert

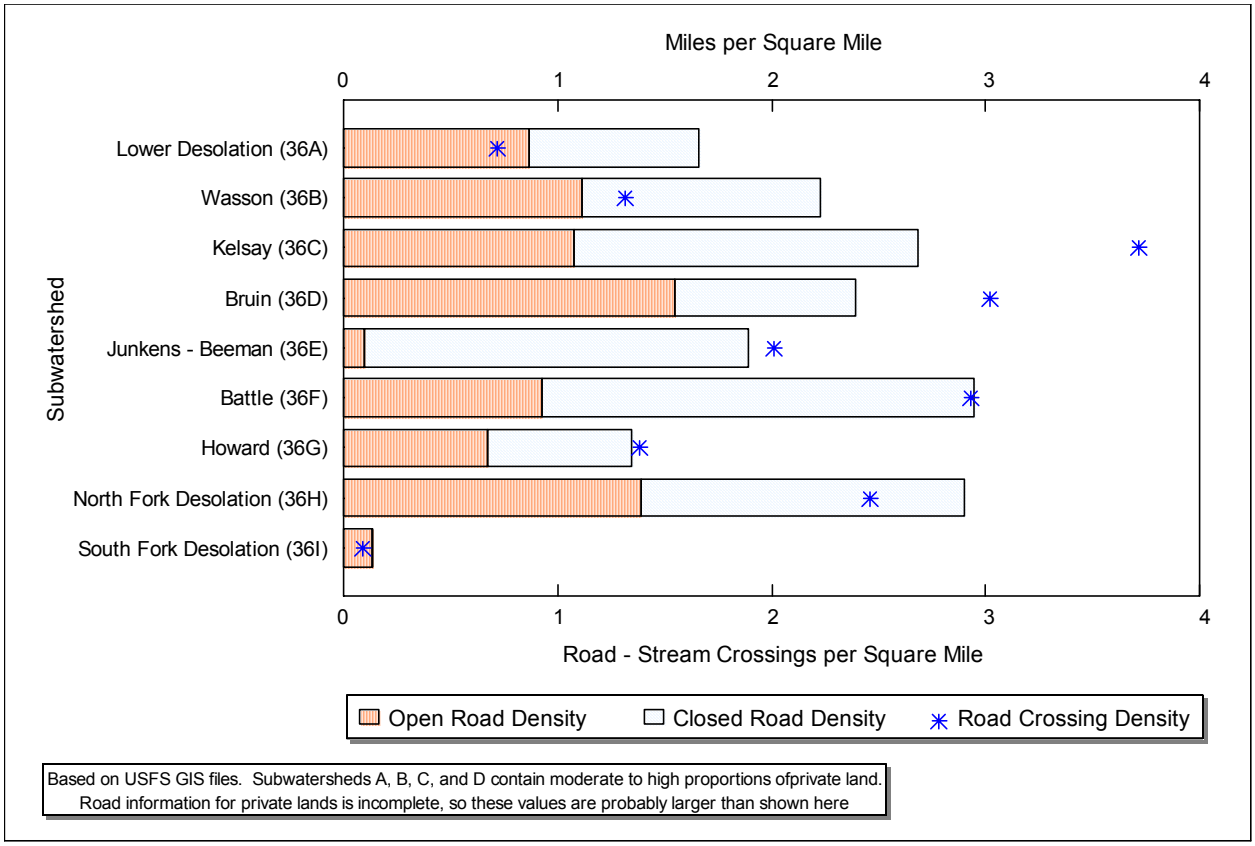
*From USFS stream survey data as recorded in the SMART database.

**NSO & Habitat Unit Number = habitat unit identifying codes used for recording USFS stream survey observations.

Management

Road density over the watershed averages 2.1 miles per square mile (Table 13 and Figure 30). The highest road density (2.94 miles/mile2) is in subwatershed 36F (Battle). The lowest (0.137 miles/mile2) is in subwatershed 36I (South Fork Desolation). Subwatersheds with large proportions of private land may contain more roads than indicated by Forest Service databases: road density in these subwatersheds may be higher than shown in Figure 30.

Figure 30. Desolation Creek Watershed; Various Measures of Road Density



Because differences among reaches in factors such as gradient or riparian vegetation may also affect aquatic habitat parameters, simple correlations between road density and habitat parameters may be inappropriate. It is nevertheless interesting to note that streams in subwatersheds with the lowest road - stream crossing density (South Fork Desolation) also have the highest pool frequencies (Figure 23), and subwatersheds with higher crossing densities also have generally lower pool frequencies.

Aerial photos suggest extensive timber harvest in this watershed. A review of stream survey narrative reports indicates that, in the past, timber was often harvested right down to the stream bank, and that this practice has resulted in degraded fish habitat.

The Indian Creek cattle allotment includes much of the watershed. Stream survey reports suggest that past livestock management resulted in considerable degradation of fish habitat in the Desolation Watershed. New allotment management plans have recently been developed to address some of these problems.

Over 18 percent (12,677 acres) of the watershed is in private ownership. Little data is available concerning management practices on private lands in the watershed. ODFW personnel mentioned condition of the aquatic habitat on the private land at the lower end of the watershed as a matter of special concern.

The Desolation Creek drainage is a popular big game area. Hunters have established dispersed camps along mainstem Desolation Creek, especially near the mouths of the tributaries entering from the North. These have degraded aquatic habitat quality. The North Fork John Day Ranger District has attempted to mitigate the effects of these camps by moving them back from the stream, and "hardening" heavily-used sites (see Recommendations section).

The drainage contains both active and abandoned mines. None of them are known to cause water quality degradation.

Some man-made habitat improvement structures have been installed in the mainstem of Desolation Creek and in Kelsay Creek. A headcut stabilization structure has been installed in upper South Fork of Desolation Creek.

Terrestrial Wildlife

Habitat Structure and Quality

Late/Old Forest Habitat

Old forest habitat availability is quite limited. For several species, reproductive habitat is currently at extremely low levels. Only 1,581 total acres of forest having late/old structure remain in the Desolation drainage, accounting for approximately 2.4 percent of the currently forested acres within the analysis area (Table 32).

Compounding the overall lack of old forest acres is the extreme *fragmentation* of old forest stands, and a concurrent enlargement of patch size in the stand initiation structural stage. While some degree of fragmentation is a natural feature of forests in the Blue Mountains (resulting from fire, insects and/or disease, etc.), today's highly fragmented old forest stands are largely a function of human manipulation; through harvest, roading and/or the altered plant communities that result from fire suppression.

Table 32. Old Forest Acres, Desolation Watershed, 1997.

PVG	STRUCTURAL STAGE	TOTAL 1997 ACRES
Cold Upland Forest	OFMS	264
	OFSS	632
	Total	896
Dry Upland Forest	OFMS	300
	OFSS	75
	Total	375
Moist Upland	OFMS	217
	OFSS	93
	Total	310
Grand Total		**1581**

Current Strategies for Old Forest Management/Protection

The goal of C1 old growth management, as stated in the Umatilla Forest Plan, is to provide and protect sufficient suitable habitat for wildlife species dependent upon mature and/or overmature forest stands, and promote a diversity of vegetative conditions for such species. Desired future conditions for old growth areas, as described in the Forest Plan, includes areas characterized by "stands of naturally appearing overmature trees", with multiple tree canopies in two or more age classes, and an abundance of standing and down dead wood. Stands having these characteristics are recognized as contributing to forest biodiversity and aesthetic values. Forest Plan management direction specifies that activities are not allowed except to enhance or perpetuate old growth forest habitat conditions (Umatilla Forest Plan, pg. 4-144).

The *goal* of C2 Management Areas was identical to that of the C1 strategy, but aimed at mature and overmature lodgepole pine forests. In these areas, however, management activities were expected and intended to be used to move stands towards maturity. C1 and C2 areas were established under the Forest Plan for the Desolation area, and subsequently revised at the District level (although not formalized in a Forest Plan revision). The C1/C2 MA currently includes approximately 3,512 acres, of which virtually none was currently in the "old forest" structural stage (as described in the Desolation vegetative database (Figure 31).

An intensive field review of the C1 and C2 areas in the Desolation watershed was conducted during the summer of 1995. Results of that review indicate that conditions within individual old forest reserves varied widely: most did not provide adequate habitat for target species; due to small patch size, high degree of fragmentation of old forest within and among reserve areas, high levels of mortality, or a combination of factors (Table 33). Canopy closure, number of canopy layers, and amounts of down woody material, all important components of old forest habitats, varied from stand to stand. Mean canopy closure averaged 54.9 percent in C1 areas and 45.3 percent in C2 areas. In C1 stands, average density of large diameter snags (>21") varied from 0/acre (12 stands) to 18/acre (1 stand). In most stands, down wood was abundant in the smaller size classes, however, 15 of 26 stands had zero pieces per acre in the >21 inch class.

Pileated, black-backed and three-toed woodpeckers have all been observed in the drainage, however, no quantitative information is available on the status of these species (i.e. nesting locations, reproductive success, population size etc.). In the course of the C1/C2 inventory, sign of recent or past use by pileated woodpeckers was noted in fewer than half of the C1 areas, and in the C2s, evidence of use by three-toed woodpeckers was found in only 38 percent of the units. Given the lack of overlap between identified C1 areas and old forest stands, this is not surprising (Figure 31; E. Larson, 1995; Desolation Old Growth Survey, on file at NFJD Ranger District).

Figure 31. C1/C2 Network - Old Forest Comparisons, Desolation Watershed, 1997.

Table 33. Current Status of Designated Old Growth (C1 and C2) Areas, Desolation Watershed.

C1/C2 Area #	Target Species [1]	Status [2]	Total Acres	OG Scorecard Score [3]	Condition/Comments [4]
1183	M	S	177	39.81	Includes portion of Kelsay meadows and old harvest units, patchy overstory, green trees mostly small, few large snags
1232	PW	C	752	69.5	
1265	PW	S	274	74.05	Surrounded by HCC, fairly extensive mort., canopy closure variable. Large dbh fir , Good snags & LWD. Prob. Suitable, use by PW and TTWP apparent, need to add foraging area. Also suitable for goshawks, should be re-surveyed.
1273	M	S	72	49.91	Poor condition, extensive overstory mort. in younger fir, many large PIPO snags and logs. Few options for replacing stand, but look to north to expand. PW and TTWP foraging sign noted.
1283	M	S	175	58.04	Does not meet min # TPA> 21" dbh. No evidence. of woodpecker use.. Replace or expand
1293	M	S	185	46.85	Few snags, but high LWD and high % canopy closure. PICO, LAOC, spruce mix. Large trees along Bruin Cr. PW and TTWP foraging sign noted . Distr. review recommended expansion to west.
1303	M	S	202	73.14	Surrounded by HCC, plus 35 ac. Harvested within C1. Lots of unsuitable PICO, recommended addtn. is not currently suitable habitat.
1543	M	S	302	40.50	Large area of this C1 was burned in 1986. . Distr. review recommended expansion to north. Replace?
2222	PW	C	353	46.65	Combined C1/C2, mostly PICO. Woodpecker sign in stand
2278	TTWP		99	47.57	
2257	TTWP		104	49.16	Fragmented by harvest units and road, all understory fir dead. PW and TTWP foraging sign noted.
2288	TTWP		85	---	Mostly lodgepole, with a few LAOC. No large trees, lots of jackstrawed PICO. No woodpecker sign.
2297	TTWP		77	---	Mostly young PICO, some larger trees along creek.
2438	TTWP		104	---	Portions of area HCC, no evidence of woodpecker use.
2447	TTWP		84	---	
2448	TTWP		71	---	No large PICO, large larch and fir-not really suitable for TTWP; perhaps add to C1 network?
2457	TTWP		67	---	Poor condition, ¾ of area HCC. Distr. review recommended expansion to 2X current size.
2477	TTWP		66	---	Impacted by cattle, timber harvest . Distr. review recommended expansion to south
2517	TTWP		90	---	Good overstory, but fragmented and limited number snags avail. for nesting. District review recommended expansion.
2427	TTWP		73	---	Old harvest unit, very open and small. No woodpecker sign evident.

C1/C2 AREA #	TARGET SPECIES [1]	STATUS [2]	TOTAL ACRES	OG SCORECARD SCORE [3]	CONDITION/COMMENTS [4]
Total (revised) C1/C2 Network Acres			3,512		

1 M=American marten, PW=pileated woodpecker, TTWP=northern three-toed woodpecker
2 C1 areas were originally classified as either "Suitable"; currently supporting habitat suitable for the target species, or "Capable"; areas which did not currently support adequate habitat, but were thought to be capable of providing suitable habitat at some point in the future.
3 The Old Growth Scorecard survey score is a field-inventory based analysis which is used to assess the habitat value of individual old growth habitat areas relative to each other, in the same local area.
4 HCC=clearcut, LWD=large woody debris, PIPO=lodgepole pine, TPA= trees per acre, LAOC=western larch

Dead Standing and Down Wood and Green Tree Replacement Resources

Snags, green tree replacements and down wood resources were inventoried within the Desolation drainage as part of the Continuous Vegetation Survey (CVS) plots. Based on data compiled from the inventory, snag densities appear to be in good supply, in all size classes, *at the watershed scale.* In the Bull and Summit fire areas, snag densities are currently quite high, but the opposite may be true within the decade, as salvage operations and/or blowdown occur. In the unroaded portion of the Summit Fire (South Fork Desolation), burned snags are already beginning to fall, resulting in very high densities of large and small down logs. Black-backed and three- toed woodpeckers were observed foraging in these burned stands in September, 1998. Existing snag and green tree replacement levels in the drainage (based on CVS plot data) are compared to Umatilla Forest Plan standards and proposed ICBEMP guidelines in Tables 34 and 35.

Table 34. Dead standing (snags) tree densities in the Desolation Watershed.

PVT	LMRP, UMATILLA NF		DESOLATION WATERSHED	
	Working Group	*Density*	*Working Group*	*Density*
Dry Forest	*Ponderosa pine*	0.75 snags/ac. >10" dbh 1.36 snags/ac. >12" dbh 0.14 snags/ac. >20" dbh 2.25 snags/ac. Total	*Dry Forest*	1.0 snags/ac. >10" dbh 4.4 snags/ac. >12" dbh 3.3 snags/ac. >20" dbh **8.7 snags/ac. Total**
Moist Forest	*South Associated (Mixed conifer)*	0.75 snags/ac. >10" dbh 1.36 snags/ac. >12" dbh 0.14 snags/ac. >20" dbh 2.25 snags/ac. Total	*Moist Forest*	10.8 snags/ac. >10" dbh 10.3 snags/ac. >12" dbh 3.3 snags/ac. >20" dbh **24.4 snags/ac. Total**
Cold Forest	*Lodgepole pine*	1.21 snags/ac. >10" dbh 0.59 snags/ac. >12" dbh 1.8 snags/ac. Total	*Cold Forest*	4.7 snags/ac. >10" dbh 11.6 snags/ac. >12" dbh **16.3 snags/ac. Total**
	Subalpine Zone	1.21 snags/ac. >10" dbh 0.59 snags/ac. >12" dbh 1.8 snags/ac. Total		

Table 35. Densities for "Green" tree replacement in the Desolation Watershed

PVT	LMRP, Umatilla NF		Desolation Watershed	
	Working Group	Density	*Working Group*	Density
Dry Forest	*Ponderosa pine*	7.5 trees/ac. >10" dbh 13.6 trees/ac. >12" dbh 1.7 trees/ac. >20" dbh 22.8 trees/ac. Total	*Dry Forest*	7.6 trees/ac. >10" dbh 17.3 trees/ac. >12" dbh 4.4 trees/ac. >20" dbh **29.3 trees/ac. Total**
Moist Forest	*South Associated (Mixed conifer)*	5.6 trees/ac. >10" dbh 9.1 trees/ac. >12" dbh 1.1 trees/ac. >20" dbh 15.8 trees/ac. Total	*Moist Forest*	15.4 trees/ac. >10" dbh 19.7 trees/ac. >12" dbh 6.5 trees/ac. >20" dbh **41.6 trees/ac. Total**
	North Associated (Grand fir)	1.5 trees/ac. >10" dbh 6.8 trees/ac. >12" dbh 1.1 trees/ac. >20" dbh 9.4 trees/ac. Total		
Cold Forest	*Lodgepole pine*	10.1 trees/ac. >10" dbh 4.3 trees/ac. >12" dbh 14.4 trees/ac. Total	*Cold Forest*	12.6 trees/ac. >10" dbh 28.6 trees/ac. >12" dbh **33.4 trees/ac. Total**
	Subalpine Zone	13.9 trees/ac. >10" dbh 5.3 trees/ac. >12" dbh 19.2 trees/ac. Total		

Riparian Habitats

Inventoried aspen stands in the Desolation watershed (Figure 32, circled polygons) are generally small in size (less than 1 acre), spatially discontinuous, and consist of a deteriorating mature overstory. The larger and healthier remaining stands are located at the mouths of Howard and Sponge Creeks. In other areas, single trees or very small clumps are all that remain of historic clones.

Aspen restoration includes treatments to mimic natural disturbance and stimulate re-sprouting, such as removal of conifer encroachment, underburning, root ripping, and creation of natural refugia with existing slash. Natural regeneration may also be augmented by transplanting root suckers from nearby stands or by outplanting nursery stock. To date, none of these treatments have been applied to aspen stands in the Desolation drainage, although "buck and pole" fence exclosures were built in 1995 around the Park and Howard Creek stands to protect aspen regeneration from browsing by cattle and wild ungulates. All other aspen stands in the drainage are currently unprotected.

In 1997, an isozyme study was conducted to determine landscape patterns of genetic diversity in aspen stands on the North Fork John Day Ranger District. Information from this study is being used to devise gene conservation strategies, and to develop stand prescriptions and prioritize stands in need of cultural treatment or protective measures. Three aspen stands in the Desolation drainage were included in this study: Desolation Creek, Howard Creek, and Park Creek. Results from the study indicate that the Desolation and Park Creek stands are genetically quite similar. As with most other aspen stands on the east side of the NFJD District, they each were comprised of one genotype (monoclonal). The Howard Creek stand, however, is comprised of at least two clones: one inside the fence exclosure, and a second large clonal cluster outside the fence. When compared with other aspen stands on the District, none of the sampled Desolation stands were genetically unique or considered high priority for gene conservation protection.

Compared with other drainages on the southern end of the Forest, black cottonwood is relatively abundant in the Desolation watershed, even at higher elevations (Figure 32, stippled areas; not to scale). Individual trees appear to be relatively healthy, and stands are generally a mix of older trees with young stem recruitment.

In 1998, a black cottonwood gene bank was established at Clarno, OR, in cooperation with the BLM and other eastside R-6 National Forests. The purpose of the gene bank is to preserve native black cottonwood germplasm and to produce high quality planting materials for restoration projects. Cuttings from 57 black cottonwood on the North Fork John Day RD have been established at the Clarno facility thus far. Of these, 23 clones originated from parent trees in five subwatersheds in the Desolation drainage. Material for outplanting projects will become available starting in Spring 1999.

Desolation and Kelsay meadows provide important (and scarce) wet meadow conditions for riparian-associated species. Review of older aerial photos indicates that the wet meadows along Desolation and Kelsay Creeks are being slowly encroached upon by the surrounding coniferous forest in the absence of stand-replacement fire.

Figure 32. Riparian Hardwood Stands, Desolation Watershed.

Roads

Roads affect terrestrial wildlife and their habitats in a variety of ways. Direct mortality from collision with vehicles or hunting are certainly the most obvious, but other effects can be much more subtle and difficult to quantify. High road densities and their related disturbance may cause individuals or local populations to leave an area entirely. Roads create access for an increasing number of humans intent on hunting, gathering, recreation, timber harvest etc. These uses can increase wildlife displacement, vulnerability to mortality, habitat fragmentation and the spread of noxious weeds.

Total road densities in the Desolation drainage vary widely from one subwatershed to another, but in general are fairly low compared to other areas of the District. Total and Open road densities are reported by Subwatershed in Table 36. Road densities are miles of road per square mile. The Very Low rating for SWS 36E reflects the large Roadless area in that subwatershed. Open road densities could increase in the short term if roads are re-opened for salvage harvest in the Bull fire area.

Table 36. Total and Open Road Densities, Desolation Analysis Area.

SUBWATERSHED (36)	TOTAL ROAD DENSITY (MI/MI^2)	OPEN ROAD DENSITY (MI/MI^2)
A: Lower Desolation	1.66	0.87
B: Wasson	2.23	1.11
C: Kelsay	2.68	1.08
D: Bruin	2.39	1.55
E: Junkens/Beeman	1.89	0.10
F: Battle	2.94	0.93
G: Howard	1.35	0.67
H: North Fork Desolation	2.9	1.39
I: South Fork Desolation	0.14	0.14

Trails in the watershed are open to Off Road Vehicles (OHVs), as well as mountain bikes, hikers and horses. These trails, located along several tributary streams and Sharp's Ridge (a major elk migration corridor), have some potential for disturbance and fragmentation, depending on the season and intensity of use. Concern was voiced by ODFW personnel that OHV closures, as currently managed, do not meet the stated intent of protecting wildlife habitat (C. Foster, ODFW, pers. comm. 9/98).

Species

Most species known to occur or having the potential to occur historically still occur within the Desolation drainage, with some notable exceptions. Grizzly bear and wolves were native to northeastern Oregon, and survived in the Blue Mountains until the 1930s. Some species have probably declined in numbers (i.e. bald eagles, some Neotropical birds), while others have become established or increased in number (starlings, species that thrive in early forest structural stages).

Lacking either historic or current estimates of population sizes for individual species, only an indirect assessment of the health of terrestrial wildlife communities was possible. The results and discussion that follow were based on a compilation of several disparate forms of available data, the intent being to display the most obvious changes in habitat quantity and quality over the last 60 years. Results of this analysis should not be viewed as having statistical significance. Table 37 shows the evaluation criteria used to formulate Paradox queries for this analysis. Current conditions are summarized in Table 38. Relative changes in habitat availability for individual species, based on queries illustrated in Table 37, are summarized in the Reference Conditions section.

Table 37. Selected species and habitat indicators used to model current and historic habitat availability in the Desolation Watershed.

SPECIES	HABITAT	COVER TYPES	STRUCTURAL STAGES	MINIMUM PATCH	OTHER HABITAT FEATURES
Rocky Mountain Elk	F	ABLA2, PSME, PIEN, PICO, LAOC, PIPO, ABGR, MixConf., MM, MS, MW, SS	SI, SEOC, OFSS, NF		
	WR	FM, GB, MD, SD, SL, ST, GX	NF		<4,500' Elev.
	MC	ABLA2, PSME, PIEN, PICO, LAOC, PIPO, ABGR, MixConf.	SECC, UR, YFMS, OFMS	>40 Ac.	Canopy Cover 40-69%
	SC	ABLA2, PSME, PIEN, PICO, LAOC, PIPO, ABGR, MixConf.	SECC, UR, YFMS, OFMS	>250 Ac.	Canopy Cover >70%, 2 or 3 Layers
Pileated Woodpecker	F	PSME, PIEN, LAOC, PIPO, ABGR, MixConf.	YFMS, OFSS, OFMS		
	R	PSME, PIEN, ABGR, MixConf.	OFMS	>40 Ac.	
Northern Three-toed Woodpecker	F	ABLA2, PSME, PIEN, PICO, ABGR, MixConf.	OFMS, OFSS		>4,500' Elev.
	R	ABLA2, PICO, MixConf.	OFMS	>20 Ac.	
Pine Marten	F	ABLA2, PSME, PIEN, PICO, MixConf.	YFMS, OFSS, OFMS		>4,000' Elev., Canopy Cover >40%
	R	ABLA2, PSME, PIEN, PICO, Mix Conf	OFMS	>30 Ac.	Habitat next to streams
Wolverine	F	ABLA2, PSME, PIEN, PICO, ABGR, MixConf	SEOC, SECC, UR, YFMS, OFSS, OFMS		>4,000' Elev.
	R	NT, NR	N/A		Aspect: Level, N, NE, E, NW
Lynx	F R	ABLA2, PSME, PIEN, PICO, MixConf ABLA2, PSME, PIEN, PICO, MixConf	SI, UR, SEOC, OFSS, OFMS OFSS, OFMS		>5,500' Elev.
Northern Goshawk	F	PSME, PIEN, PICO, LAOC, PIPO, ABGR, MixConf	SI, SEOC, SESCC, UR, YFMS, OFSS, OFMS		
	R	PSME, PIEN, PICO, LAOC, PIPO, ABGR, MixConf	OFSS, OFMS	>20 Ac.	

F=Foraging, WR=Winter Range, MC=Marginal Cover, SC=Suitable Cover, R=Reproductive

Management Indicator Species

Pileated Woodpecker, American Marten

These two species are closely associated with old forest habitats. Both have very large home range sizes and are dependent on snags and down logs for either food, reproductive habitat, and/or escape from predators. Habitat for martens is further limited by elevation and an affiliation for riparian habitats—thus the estimates of habitat shown here are probably overly generous.

Northern Three-toed Woodpecker

Three- toed woodpeckers depend on a different type of old forest habitat at higher elevations than pileated woodpeckers. Less of this forest type (lodgepole and mixed fir/lodgepole) is naturally available in the drainage; this natural scarcity, compounded by management (harvest and salvage) makes nesting habitat for northern three-toed woodpeckers almost non-existent in the drainage.

Primary Cavity Excavators

This group includes a number of large and small woodpeckers having a variety of habitat requirements. Analysis capabilities were not adequate to assess current habitat conditions for this group.

Rocky Mountain Elk (and mule deer)

Located completely within the Desolation Hunting Unit (administered by ODFW), approximately 30 percent of the watershed is delineated as Winter Range, with 600-700 elk wintering in the Case Ridge and Onion Flats areas. During severe winters, these animals may move as far south as Ritter or Sumpter. Approximately 2000 elk summer in the watershed, at elevations above 6,200 feet. South Fork Desolation Meadow stills provides good summer habitat, despite the loss of some of the adjacent timber in the Summit fire, as evidenced by numerous beds in the long meadow grasses and heavy ungulate use of the South Fork trail (field review, 9/98).

Elk numbers are currently near ODFW Management Objectives for the Desolation Unit. Mule deer numbers continue to be slightly below Management Objectives for the unit. The recent fires in the watershed are expected to improve forage conditions for deer and elk in the next few years.

Sharp's Ridge is an important migration corridor for elk moving up and down the drainage between summer ranges high in the watershed and wintering areas at Case Ridge, Onion Flats, and the Bridge Creek Wildlife Management Area (managed by ODFW). As noted above, a recreational trail open to OHVs runs the length of Sharp's Ridge where it forms the analysis area boundary.

High quality calving habitat, probably some of the best on the North Fork John Day District, occurs in the drainage, especially in moist riparian habitats of tributary streams (particularly Sponge and Howard Creeks), and the South Fork Meadows. While the Summit fire did affect calving habitat around South Fork meadows, ODFW personnel expect elk to return to calving habitat there in the near future (C. Foster, ODFW, pers. comm. 9/98).

Mule deer are highly migratory in this area and, therefore, very difficult to census (C. Foster, ODFW, pers. comm. 9/98). It is estimated that perhaps 1,000 mule deer winter in the Desolation Unit, sharing important winter ranges with elk. During especially hard winters, Desolation deer will move to lower elevations along the Middle Fork John Day.

Table 38. 1997 Potential Habitat Availability for Selected Species, Desolation Analysis Area.

SPECIES	HABITAT COMPONENT	1997 ACRES
Rocky Mtn. Elk	F[1]	45,647
	W R	2,030
	M C	17,208
	S C	4,331
Pileated Woodpecker	F	7,552
	R	608
No. 3-toed Woodpecker	F	1,103
	R	114
American marten	F	5,044
	R	275
Lynx	F	14,551
	R	275
Wolverine	F	24,758
	R	26
No. Goshawk	F	58,296
	R	1,204

F=Foraging, WR=Winter Range, MC=Marginal Cover, SC=Suitable Cover, R=Reproductive
[1] "Foraging" habitat acres are inclusive of reproductive habitat.

Other Species of Concern

Neotropical Migrant Birds

This group includes bird species which nest in North America and migrate to the neotropics for the winter. Over the past two decades, declines in many of these species, including many songbirds, have been noted. Causes for the declines include habitat degradation and predation by domestic cats in North America, compounded by both habitat destruction and continued use of toxic chemicals in Central and South America (Sharp 1992).

Neotropical migrants account for a significant portion of the avian biological diversity in the Desolation Creek watershed. Of the 122 species of birds known or suspected to occur in the Desolation Analysis Area, 57 species, or approximately 47 percent, are NTMBs. Neotropical migrants occupy a variety of habitats within the area: 40 species are associated with riparian habitats, while 32 species use old growth. Twenty-eight species of NTMBs select aspen groves for nesting or foraging habitat. Twenty-nine species use sapling/pole stands for either nesting or foraging. Nineteen species use the stand initiation structural stage: many of these are generalist or edge-associated species. (See the Terrestrial Vertebrate Appendix for a list of all NTMB species in the analysis area with their habitat associations).

The status of several Desolation area NTMBs is of concern (Table 39). Breeding Bird Survey trends for five species that occur in the drainage (of nine total) are significantly negative (indicative of declining populations).

Table 39. Neotropical bird species of local concern, Desolation Ecosystem Analysis Area.

SPECIES	NEGATIVE BREEDING BIRD SURVEY TRENDS	SIGNIFICANTLY NEGATIVE TRENDS
Hammond's flycatcher	X	
Chipping sparrow	X	
Olive-sided flycatcher	X	
American kestrel	X	
Cooper's hawk	X	
Mountain bluebird	X	
Mourning dove	X	
Western wood peewee	X	
Northern oriole	X	
American goldfinch	X	
Swainson's thrush	X	
Ruby-crowned kinglet		X
Turkey vulture		X
Calliope hummingbird		X
Red-eyed vireo		X
Tree swallow		X

An increasing number of studies indicate that fragmentation of forested habitats, and overgrazing of grassland habitats can have serious detrimental impacts on NTMBs (Dobkin 1994). Both fragmentation and the lingering effects of streamside grazing are concerns within the Desolation watershed, and could affect the ability of NTMBs to successfully reproduce in the area.

Goshawk
Currently, only about 1200 acres of suitable goshawk nesting habitat remain in the drainage. District Wildlife Observation records note the presence of goshawks in the analysis area, and a single adult bird was observed near Onion Flats during a 1996 WA field trip, however, standardized field surveys in 1995 failed to locate either nests or individual birds.

Wolverine
Wolverine have very large territories, require isolated rocky areas for their natal dens, and demonstrate a marked aversion to human disturbance (Banci 1994). A few acres of rock outcrops and talus located along the southern boundary of the Analysis Area above South Fork Desolation Creek provide the only potential reproductive habitat in the drainage; however, this habitat type extends further south outside the watershed boundary. Annual winter surveys have yet to reveal any evidence of wolverine within the drainage.

Lynx
The Canada lynx is a medium-sized, long-legged cat similar in appearance to the bobcat, but having large paws (helpful when hunting in deep snow), long, dark ear tuffs, and a distinctive "ruff" around the face (Koehler and Brittell 1990). The range of the lynx formerly included much of Washington and Oregon; the species is now very rare in Oregon (Region 6 memorandum 12/98) Preferred habitat for the lynx is coniferous forests, especially Engelmann spruce, subalpine fir and lodgepole pine (Koehler and Brittell

1990, Banci 1994). Mature and old forests provide cover for denning, escape cover and shelter. Lynx tend to avoid open spaces, preferring to travel in corridors that provide hiding cover. The primary prey of lynx is the snowshoe hare. In the Desolation drainage, subwatersheds at the higher elevations have the potential to support lynx (C. Foster, ODFW, pers. comm. 1998).

Recreation

Over 200 dispersed campsites are located on National Forest land throughout the watershed. About 100 additional campsites are located on private land. Dispersed campsites are used throughout the spring, summer and fall months, especially during the mushroom and big game hunting seasons. The entire watershed provides an estimated 40,000 RVDs annually.

Within the watershed, there are seven trailheads, and 45.2 miles of trail (21.3 miles of non-motorized and 23.9 miles of motorized). Depending on the weather, trail use generally begins in late May or early June, and tapers off by mid-November. Peak use occurs from mid-July to the end of October. Two factors have lead to an increase of motorized use within the Desolation area: 1) all trails were shown on the 1994 District Access and Travel Management Plan, and 2) use of all terrain vehicles (ATVs) by recreationists, mushroom pickers, and hunters has increased.

Welch Creek Campground, because of its location, has become the main staging area for Off Highway Vehicles (OHVs). All motorized trails in the Desolation system are accessible from this trailhead. Changes in Oregon Department of Transportation regulations have opened most Level II and Level III maintenance roads to OHV use, increasing the number of available road miles.

Use of Scenic Area trails has increased since 1990. The highest use period is traditionally from late August to late October, which coincides with big game bow and rifle hunting seasons. Horse and mountain bike use has increased throughout the summer season.

Winter recreation activities are popular. The North Fork John Day Winter Recreation Plan designates over 50 miles of snowmobile trails. The Ranger District has a volunteer agreement with the Sumpter Snowmobile Club who annually grooms primary routes through the area.

Jumpoff Joe Lake is a secluded 5-acre lake located in the Junkens-Beeman SWS (36E). A short, one-quarter mile trail provides access. Special fishing regulations apply to this lake, and it receives quite a bit of use during the summer season. No developed camping or picnicking sites are located near the lake. The lake has an estimated 800 annual RVDs.

Lost Lake is another small (7 ac.), secluded lake, located in the North Fork Desolation SWS (36H). ODFW stocks the lake with trout. In 1990, the size and depth of the lake were expanded. The ROS setting for the lake is “Semi-Primitive Non-Motorized”. The road and trail accessing the lake were designated for non-motorized use in 1992. The lake is now about 3 miles from an open road. Four tent sites and a hiking trail are located around the lake. The lake has an estimated annual 300 RVDs. RVDS are expected to increase after the trout population in the lake stabilizes.

Scenic Area (Management Area A8)

One licensed outfitter guide is permitted to provide day trips into the Scenic Area. While the Scenic Area is experiencing increased recreational use in the summer months, the largest concentration of recreational

visitors occurs during the big game hunting seasons. The Scenic Area has an estimated 8,000 annual RVDs.

Minerals

Currently, there is one active mine, and three mining claims in need of restoration, on National Forest System land in the Desolation Watershed. The Portland Mine (T9S R34E, Section 34) is on private land in South Fork Desolation Subwatershed (36I).

Active Claim:
Claim Name: Hard Luck
Status: Active
Type: Lode
Stream: no stream nearby
Subwatershed: 36E Junkens/Beeman
Location: T8S, R32E, Section 24
Date of Plan of Operation: Notice of Intent
Activities Approved under the Plan of Operation: none
Reclamation Plan: Efforts to begin solving some of the impact problems should include: repairing facilities at mines with free-flowing contaminants, repairing hillsides with extreme erosion potential, continue water quality studies, and continue to monitor active claims for compliance with approved operating plans.

Rangeland Resources

Two allotments have area within the Desolation Watershed; Central Desolation and Indian Creek. Small portions of all five units of Central Desolation (Case, Ridge, Deep Canyon, Outlaw, and Turner, with Turner and Outlaw accounting for most of the area). All four of the Indian Creek units have area within the watershed. These are the west units, Bully and Indian, and the east units, Battle and Meadows. Virtually all of the east units are inside the watershed and only the east 1/4 to 1/3 of the west units are inside.

Central Desolation (Outlaw and Turner units): One hundred eighty8eight cow/calf pairs are permitted between 6/1 to 9/30 under a deferred rotation system (the sequence is reversed each year so each unit receives early rest every other year). The current Allotment Management Plan (AMP) was completed in 1981; however, there is no formal EA. Ten-year permits were issued to the permittees in 1990 and 1992.

Indian Creek: There are 888 cow/calf pairs permitted 6/16 to 9/30. Meadow Unit is in the second year of a 10-year rest. There are 496 pairs in Bully Unit until 8/16 when they move into Battle Unit until 9/30. There are 392 pair in low (east half) of Indian Unit until 7/16 when they are moved to the high (west half) until 9/30. There is no division fence in the Indian Unit so compliance to these dates are dependent on the range rider. A new 10-year permit was issued to each of the permittees in 1996 with a permit issuance EA approved in 1996.