

Table 10—National and Basin federally-listed threatened and endangered plant and animal species.

Area	Number of taxa		
	Threatened	Endangered	Threatened or Endangered
United States			
Plants	92	434	526
Animals (including fish)	114	320	434
[Fish only]	[40]	[65]	[105]
US total	206	754	960
Basin Assessment area			
Plants	1	3	4
Animals (not including fish)	5	9	14
Fish	4	7	11
Basin total	10	19	29

Note: "Animals" category includes invertebrates as well as vertebrates.

Sources: Marcot and others (1996); U.S. Fish and Wildlife Service (1996)

Including subspecies, the assessment area supports 88 native fish taxa, of which 28 are narrowly distributed endemics. Of the 88, 11 are listed as threatened or endangered [out of 100 Threatened or Endangered taxa nationwide as of 8/20/94; 50 CFR 17.11 (U.S. Government 1994b)]. Of the 88, 13 are listed by the Federal or state governments as Threatened or Endangered; 47 of the 88 are listed as Threatened/Endangered by the Federal or state governments, and/or as sensitive or candidate species by the Federal or state governments.

### Water supply

Eighty-seven percent of the world's fresh water goes into agriculture (Giampietro 1994). In the United States, India, and many other countries, the decreasing level of water in aquifers affect food production (Brown 1995). Irrigation is by far the dominant off-stream use of water in the Basin, accounting for over ten times the combined vol-

umes of water withdrawn by public supply, industry, and thermoelectric power plants (Jackson and Kimerling 1993). As elsewhere, competition for water in the Basin will likely become more contentious as demands mount for agricultural, industrial, and residential uses, as for recreation, fish and wildlife, and other in-stream uses.

### Energy

World energy consumption was about 350 quadrillion ( $10^{15}$ ) British Thermal Unit (BTUs) in 1990 and is expected to increase by a third by 2010 (Switzer 1994). United States energy consumption was 81.5 quadrillion BTUs in 1991, four percent of which was attributable to hydropower (Wright 1994). Hydropower production on the Columbia and Snake Rivers represent 40 percent of the nation's total hydropower production (Dietrich 1995). This source of energy will likely remain a substantial contributor to the region's energy demands.

## Environmental initiatives

The FS and BLM, as part of a larger Federal Government system, are often connected to government-wide efforts to increase international coordination in the protection and maintenance of environmental quality. The Clinton Administration has made public commitments to manage the forests of the United States in a sustainable manner by the year 2000. The meaning of this commitment was clarified in February 1995, with the signing of the "Santiago Declaration" by representatives of the U.S. State Department in Santiago, Chile (*Component Assessment--Social*, McCool and others 1996). The Santiago Declaration is a non-binding agreement among the nations in the temperate and boreal forest zones to identify "Criteria and Indicators" for "the sustainable management of all types of forests," and it offers seven major criteria and 67 indicators to measure progress toward this goal.

Other types of non-binding, bilateral (two-nation) and multilateral (more than two nations) agreements have been signed to promote coordination among nations on specific issues. These agreements include protocols on the inspections for pests for international shipments of wood products, cross-boundary fire suppression (with Mexico and Canada), and management objectives for migratory species, such as Neotropical migratory birds. These agreements have been effective as long as there is voluntary compliance, and their major purpose has been to build a greater mutual understanding among nations on the various interests and problems in an increasingly interdependent world (*Component Assessment--Social*). Finally, the ICBEMP does not cover the Canadian portion of the Columbia River Basin, but it does parallel Canada's Okanagan Desert ecosystem conservation project and other efforts.

## Current Status of the Basin

This section provides highlights of the *Component Assessment* as it relates to the current status of the Basin. More in-depth discussions and detail are provided in the specific chapters of the *Component Assessment* report.

### Landscape ecology<sup>9</sup>

The Landscape Ecology staff summarized the major biophysical patterns and hydrologic processes for each Ecological Reporting Area within the Basin. Each of the ERU summaries contains interpretations of subsection, lithology, potential vegetation, historical and current vegetation, basic climatic and morphometric descriptions; generalized soil characteristics and evaluation of productivity; stream type groups, valley bottom settings, and wetland complexes. Each summary describes upland erosion processes and sediment sources, vulnerability of stream channels to disturbances, channel recovery potential, and sensitivity of subwatersheds to disturbances. Summaries also include descriptions of terrestrial disturbances such as fire, succession, and grazing. The information delineates and describes terrestrial and aquatic ecosystems that behave in a similar manner given their potential ecosystem composition, structure, and function; delineates areas with similar production potentials for management; provides a basis for interpreting hazards and limits to management; outlines the natural disturbance processes that create finer-scale ecosystem patterns; and sets context for predictive models of ecosystem patterns and processes.

Throughout most forested ERUs, native herblands, shrublands, and old multi-layered and single-layered forests have declined substantially in area and connectivity since the Basin was first settled by European-Americans. In the last 100 years, exotic plant species have expanded throughout native forests and range-

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<sup>9</sup>The material in this section is drawn from the material in the *Component Assessment--Landscape Dynamics* chapter and from the *Component Assessment--Biophysical Environments* chapter (Hann and others 1996; Jensen and others 1996).

lands, but most especially in areas that were once dry native herblands and shrublands (fig. 11). Over that same timeframe, area and connectivity of early-seral forests declined especially where historical fire regimes were predominantly mixed severity or lethal as in the Northern Glaciated Mountains. Intermediate-aged forest increased dramatically in area and connectivity as did the volume of timber in small-diameter classes. Affected by fire exclusion, selective harvesting, and grazing, forests expanded in areas of historical woodland and shrubland, and forest canopies became more complex and layered. Additionally, forests became more densely stocked, developed increasing dominance of shade-tolerant species, and became more susceptible to severe fire, insect, and pathogen disturbances.

Forest composition and structures have largely become more homogeneous. At the same time that late-seral structures have been declining, early-seral structures have also been declining

(fig. 11). These structures have been replaced to a substantial degree with mid-seral structures, resulting in homogeneous forest structures. Although early-seral forests of shade-intolerant species have been fragmented, late-seral shade-tolerant forests have grown more contiguous. Consequently, many forest landscapes are now more homogeneous.

Fire severity has generally increased (lethal fires have increased by approximately 17%), and fire frequency has generally decreased (very frequent and frequent fire intervals have declined by approximately 32%) over the last 200 years (figs. 12 and 13, and table 11). The primary causative factors behind fire regime changes are effective fire prevention and suppression strategies, selection and regeneration cutting, domestic livestock grazing, and the introduction of exotic plants. Fire suppression costs, firefighter fatalities per year, and the proportion of high intensity fires have doubled between the periods of 1910 to 1970 and 1970 to 1995.

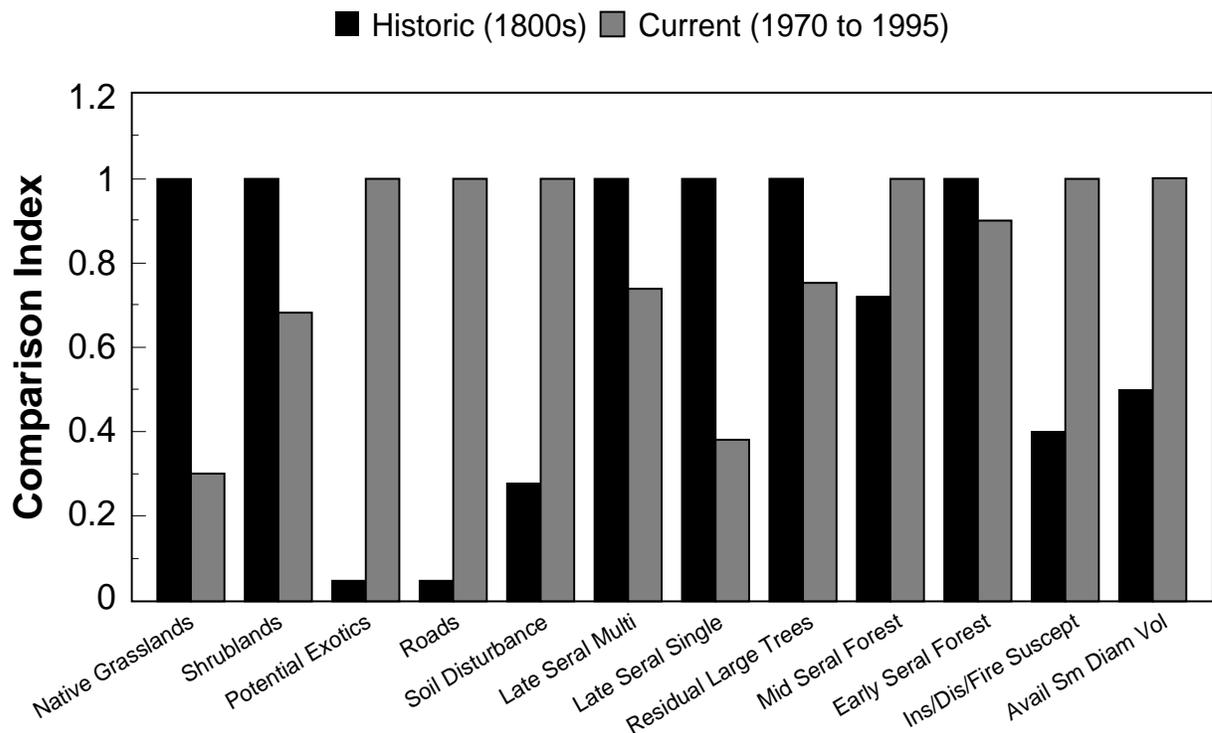


Figure 11—Comparison of historic and current selected landscape elements.

Table 11—Fire regime severity/frequency classes within the Basin Assessment area.

Frequency Severity Class	Historic	Current	Change
	----- percent -----		
Lethal very frequent	0.0	14.2	14.2
Lethal frequent	21.5	6.0	-15.6
Lethal infrequent	20.4	34.5	14.1
Lethal very infrequent	3.2	8.1	4.9
Lethal extremely infrequent	2.2	1.5	-0.8
Mixed very frequent	0.6	0.0	-0.6
Mixed frequent	6.2	3.8	-2.5
Mixed infrequent	9.3	16.8	7.5
Mixed very frequent	1.3	0.0	-1.3
Nonlethal very frequent	24.3	1.4	-22.9
Nonlethal frequent	6.9	2.3	-4.6
Nonlethal infrequent	2.7	10.0	7.3
Rarely	1.3	1.5	0.2
No Data	0.1	0.1	0.0
<b>Total</b>	100.0	100.0	

Comparing fire severity between historic and current times for forested potential vegetation groups on FS- and BLM-administered lands show an increase in lethal fire from 20 to 50 percent of the area and a reduction in non-lethal fires from 40 to 15 percent (fig. 14). Subregional differences exist; although eastern Oregon and Washington as well as Idaho and western Montana show decreases in non-lethal fire, and increases in lethal fire, the drop in non-lethal fires in Oregon and Washington is greater than in Idaho and Montana. The increase in lethal fires has been greater in Idaho and Montana than in Oregon and Washington.

Altered fire regimes have been largely responsible for more homogeneous forests and rangeland landscapes. Large wilderness or unroaded areas

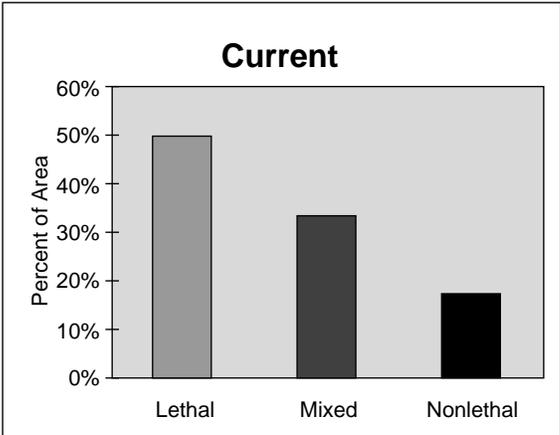
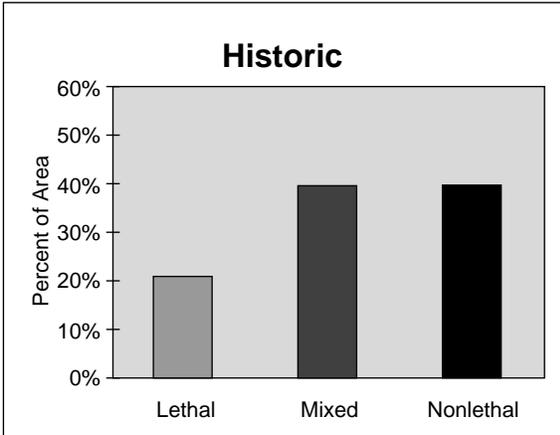
prevail in ERUs such as the Central Idaho Mountains, Northern Glaciated Mountains, Northern Cascades, and Owyhee Uplands. Even in wilderness and unroaded areas, where fire exclusion alone has been the primary management influence, fire, insect, and pathogen disturbance regimes have been significantly altered. Despite these disturbance regime changes, wilderness and unroaded areas are among those least altered by management. Predicted road densities vary greatly across the Basin (fig. 15). Examples of road densities within subwatersheds are shown in figure 16. Roads are correlated with many changes in vegetation, land use, and hazards, yet a consistent inventory of roads across all ownerships within the Basin does not exist. Roads are important from both an ecological and socioeconomic perspective.

Figure 12—Changes in Basin fire regimes from historic to current by severity class.

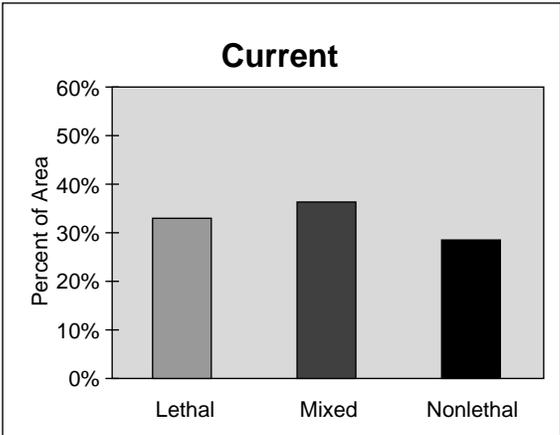
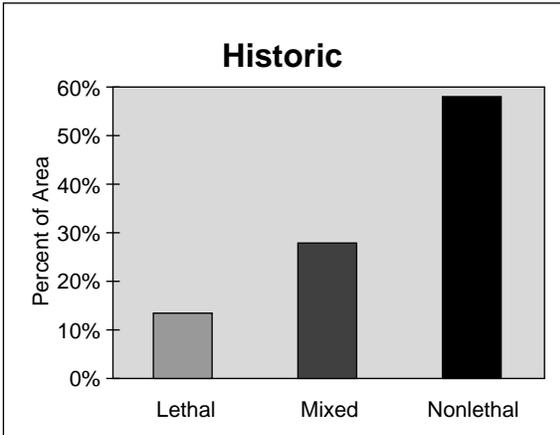
Figure 13—Changes in Basin fire regimes from historic to current by frequency class.

**Fire Severity for FS- and BLM-administered Forested Potential Vegetation Groups**

**Basin**



**Eastern Oregon and Washington**



**Idaho and western Montana**

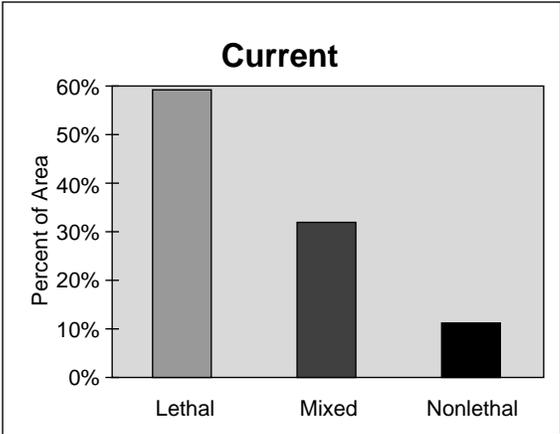
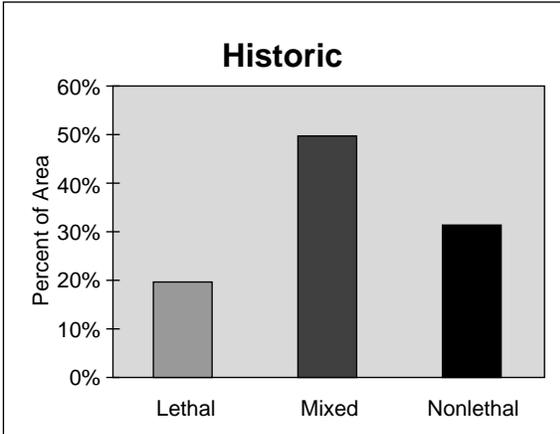


Figure 14—Fire Severity for FS- and BLM-administered Forested Potential Vegetation Groups.

Figure 15—Predicted road density classes.

Figure 16—An example of road density categories for subwatersheds within the Basin.