

SUMMARY OF THE SCIENCE EVALUATION of ALTERNATIVES for the SUPPLEMENTAL DRAFT ENVIRONMENTAL IMPACT STATEMENT

Interior Columbia Basin Ecosystem Management Project March 2000

Background

In July of 1993, President Clinton directed the Forest Service to develop a scientifically sound and ecosystem-based strategy for eastside forests. In response, the Forest Service and Bureau of Land Management (BLM) initiated the Interior Columbia Basin Ecosystem Management Project (ICBEMP) with the goal of creating a long-term, comprehensive strategy for managing the public lands in the Basin. The Project released two Draft Environmental Impact Statements (EISs) for public comment in May, 1997 and received over 83,000 public comments during the 335 day comment period.

A Supplemental Draft EIS (SDEIS) that responds to the public and agency comments and new scientific information is now being prepared. The Environmental Impact Statement (EIS) team has developed three alternatives for the SDEIS: S1, S2 and S3. A group of Forest Service and Bureau of Land Management scientists known as the Science Advisory Group (SAG) has reviewed and analyzed these draft alternatives to determine the environmental and social effects of implementing these alternatives.

The EIS team is now using the evaluation prepared by the SAG to complete the environmental consequences chapter (Chapter 4) of the SDEIS. The Project will release the SDEIS for public comment in the spring of 2000.

In evaluating the alternatives, SAG focused on the effects of implementing the alternatives on landscape ecology, terrestrial and aquatic ecosystems, and social and economic conditions. Science looked at current conditions and also the effects of the alternatives over a 100 year time frame. The SAG used a variety of models, influence diagrams, and analyses in characterizing the effects of the alternatives including the Columbia River Basin Successional Model (CRBSUM) and the Vegetation Dynamics Development Tool (VDDT).

This Summary of the Science Evaluation begins with an overview of the overall effects of the alternatives referred to as the integrated effects. This is followed by a more detailed summary of the main components of the evaluation: landscape, aquatic, terrestrial, and socio-economics. This Summary has been taken from the complete Science Evaluation (totaling over 600 pages). The complete evaluation will be made available at the Bureau of Land Management, Oregon State Office, Public Room for review and copying.

Integrated Effects - Story of Momentum

To put the science evaluation findings in context, it is important to understand the story of momentum that influences the lands of the interior Columbia Basin. These lands have been shaped by factors such as fire, drought, human uses, and evolving forests and grasslands. During the past two centuries, rapid increases in human use have altered the natural succession and disturbance regimes of the Basin and have created a momentum of uncharacteristic events that make improving the health of these lands difficult. The momentum, which mimics a snowball gaining both speed and mass as it rolls down a mountain, has involved increases in the intensity and extent of uncharacteristic events such as the spread of noxious weeds across rangelands, insect and disease infestations of forests, and the increasing likelihood of wildfire. Stopping and reversing the effects of these compounding events is much like trying to stop the snowball that has become an avalanche.

When looking at Forest Service and Bureau of land Management administered lands, long-term trends in ecological integrity showed stable or improving conditions when compared to current conditions for 91 percent of the Forest Service and Bureau of Land Management administered lands in Alternative S2, 87 percent in Alternative S3, and 80 percent in Alternative S1. No subbasins in any of the alternatives showed moderate or strong declines when compared to current conditions. Those subbasins showing decreasing trends were generally a result of continued downward trends in succession/disturbance regime conditions and where aquatic and terrestrial systems were projected as stable. Thus, the

downward contribution to overall integrity trends arising from succession/disturbance regimes was not offset, as it was in many subbasins, by improving aquatic and road density trends.

Although individual areas benefit from restoration in Alternatives S2 and S3, when aggregated across the Basin these improvements are small. The Science Evaluation suggests that after 100 years of implementation, current trends in uncharacteristic wildfire, insect and disease mortality and the adverse effects of livestock grazing are not reversed when summarized across the entire basin. (These alternatives were modeled at funding levels modestly higher than current funding levels. If additional funding were to be made available for restoration activities, greater benefits from the restoration strategies in Alternatives S2 and S3 would be realized.)

Under Alternative S1, federal lands continue to drift into more uncharacteristic wildfire, insect and disease mortality, and adverse affects due to past grazing. Alternatives S2 and S3 also do not reverse the downward trends in many of the landscape conditions when summarized across the entire basin. Landscapes that are currently very different from historic conditions will have substantial increases in uncharacteristic wildfire, insect and disease mortality, invasion of exotic plants, and adverse effects from past grazing and drought. Landscapes that are currently similar to historic conditions will also steadily decline. The cost of reversing the trends in the Basin through restoration on federal lands is substantial, making it infeasible to implement actions everywhere desired. With limited funds, it is imperative that restoration be prioritized and conducted in areas where the greatest ecological and socioeconomic gains can be made.

In counties where both socioeconomic resiliency and ecological integrity are on a downward trend, there is likely to be considerable pressure to improve either socioeconomic resiliency or ecological integrity or both. The number of counties likely to experience these pressures under each alternative are 11, 0, and 3 for Alternatives S1, S2, and S3 respectively. Counties where ecological integrity and socioeconomic resiliency trends are moving in opposite directions are also likely to be areas of considerable public concern. The public concern associated with these areas stems from the real or perceived perception that the tradeoff of improvements in either socioeconomic resiliency or ecological integrity comes at the expense of the other. This may create special challenges for Forest Service and Bureau of Land Management managers in these counties. The number of counties likely to experience these pressures in each alternative are 10, 4, and 9 for Alternatives S1, S2 and S3 respectively. Thus, Alternative S1 is likely to generate the greatest number of counties with implications leading to considerable public concern, followed by Alternative S3.

Alternatives S2 and S3 do prioritize restoration activities in areas where there are opportunities to improve ecological integrity and at the same time benefit local communities and tribes. In Broad-scale High Restoration Priority Subbasins, or other areas where restoration treatments are prioritized, declines are reversed or halted. The effects of active, prioritized restoration in Alternatives S2 and S3 demonstrate the potential to improve the health of federal lands in the Basin.

All outcomes are significantly affected by the fundamental differences in the design of the management strategies for each alternative. Each alternative is intentionally designed to address the critical and compelling basin-wide issues in a different way. This becomes most clear when alternatives are compared at the same funding level. For example, with respect to old forests, rangelands and roads, it is the different management direction found in each alternative which creates different effects and not different budget levels. When the alternatives were compared at both low and high funding levels, the ranking of the alternatives remained the same. Funding does affect the rate at which restoration can occur. Increasing budget levels for active restoration under all of the alternatives results in substantially improved conditions for those issues that benefit from active restoration.

Landscape

Across the Basin, landscape health conditions are currently low or moderate in status for nearly all Forest Service and Bureau of Land Management administered lands. (Our definition of landscape health includes human uses, biological diversity and ecosystem conditions that are in balance with the limitations of the biophysical system and inherent disturbance processes.) Over a hundred year period, under all three SDEIS alternatives, landscape health improves for specific areas. Alternative S2

improves landscape health the most, closely followed by Alternative S3. Alternative S1 produces improvements as well, but at a substantially lower rate. Alternatives S2 and S3 put landscape health into stable or improving trends in the great majority of Broad-scale High Restoration Priority Subbasins over 100 years while Alternative S1 produces substantially fewer stable or improving trends in those areas. The Supplemental Draft EIS Alternatives have generally similar effects at the broad scale of the project area, but differ substantially in focused, active restoration areas. Focused, active restoration efforts in the Broad-scale High Restoration Priority Subbasins will substantially improve landscape health and are projected to move conditions closer to restoration objectives for these areas under Alternatives S2 and S3. Dispersed restoration efforts in Alternative S1 are projected to achieve fewer of the restoration objectives due to the magnitude of successional momentum influencing the lands in the Basin.

Different effects can also be detected in aquatic and terrestrial core areas. Active restoration in the A2 Subwatersheds and Broad-scale High Restoration Priority Subbasins improves their condition over the long term under Alternatives S2 and S3 in comparison to the passive approach taken in A1 Subwatersheds and wilderness and wilderness-like areas (e.g., Areas of Critical Environmental Concern, Research Natural Areas, and Wilderness Study Areas). These areas continue to depart from historic conditions. Those portions of the Terrestrial (T) Watersheds within wilderness and wilderness-like areas will also continue to depart from historic conditions, while the portions in active restoration areas will be maintained or restored similar to A2 Subwatershed areas.

Forests - There are increasing departures from historic forest conditions across the Basin for much of the Forest Service and Bureau of Land Management administered lands as a result of vegetation succession under all three SDEIS alternatives. Decades of fire suppression have changed the role of fire, making it an infrequent and more intense disturbance over more of the land. Past management also often favored shade-tolerant tree species which can produce more timber volume on a per acre basis over a shorter period of time. The result is an altered forest condition with more early and mid-seral stands and more dense stands. These changes have occurred on a large scale, involving millions of acres, generating significant successional momentum.

In the face of continued fire suppression across most of the lands in the Basin, these changes will eventually result in a new dynamic; one with much more of the land in infrequent, stand-replacement disturbances and a dominance of multiple-layered stands. These changes will alter wildlife habitat and inputs of wood and sediment to aquatic systems. Under Alternatives S2 and S3, departures from historic conditions are slowed, especially in areas where active restoration is focused.

Insect and Disease - The vulnerability of forests to uncharacteristic insect and disease tree mortality will be higher than present for all SDEIS alternatives over the next 100 years. This is a consequence of the continuing successional development of forests and the changes in fire dynamics. While prescribed fire does reduce fuels and fire risk, there is a considerable time lag when moving forests to historic stand conditions. As a consequence, the high levels of prescribed fire under Alternatives S2 and S3 will not slow uncharacteristic insect and disease mortality as much as might be expected. The prescribed fire treatments of Alternatives S2 and S3 do, however, reduce insect and disease levels more than Alternative S1.

Late-Seral Forests - The SDEIS alternatives promote the recovery of late-seral forests in moist and productive environments to near historic levels over the next 100 years. Most of these will be multi story forests.

Single story, late-seral forests in dry environments, will continue to be well below historic levels over the long term, but will also be recovering. In Broad-scale High Restoration Priority Subbasins in Alternatives S2 and S3, single story, late seral forests recover to near historic levels. Under Alternative S1, they remain substantially below historic levels.

Early seral forests will be below historic levels over the long term on Forest Service and Bureau of Land Management administered lands, while mid-seral forests will be well above historic levels. These two forest conditions will be nearer historic levels in Broad-scale High Restoration Priority Subbasins.

Large Snags and Down Wood - Outside roadless areas, large snags will recover toward historic conditions on most forest lands under all SDEIS alternatives. Large snags will not return to historic

levels in 100 years because it takes a long time to grow big trees and, once they die, the resulting snags fall over quickly. Alternatives S2 and S3 will produce more substantial increases in large snags than Alternative S1. Alternative S2 will produce slightly more large snags than Alternative S3. Large down wood will continue to increase from current levels and will be above historic levels for all SDEIS alternatives.

Rangelands - Historic vegetation has changed on most of the Forest Service and Bureau of Land Management administered rangelands as a result of changes in fire, soil properties and plant communities caused by past livestock grazing and the invasion of non-native plants. The SDEIS alternatives will have a small affect on the condition of these lands because changes have been extensive and long lasting.

Alternatives S2 and S3 achieve more weed control than Alternative S1 because they put a greater emphasis on integrated weed management. Integrated weed management provides the most positive and perhaps only effective approach to weed management and control. However, weeds will continue to increase over the next 100 years under all of the SDEIS alternatives.

Uncharacteristic Wildfire - The potential for uncharacteristic wildfire will remain relatively high in dry forests and rangelands for the next 100 years under all SDEIS alternatives. Over the next 100 years, Alternatives S2 and S3 substantially reduce the potential for uncharacteristic wildfire events in Broad-scale High Priority Restoration Subbasins and in aquatic and terrestrial core areas. Due to the magnitude of past changes to vegetation, there is a considerable time lag in reducing uncharacteristic wildfire across other lands.

Uncharacteristic Soil Disturbance - Uncharacteristic soil disturbance will remain at current levels (which are generally low) over the long term under all SDEIS alternatives. Restoration activities may cause a very small increase in moderate levels of uncharacteristic soil disturbance in the Broad-scale High Restoration Priority Subbasins under Alternatives S2 and S3 compared to Alternative S1. This change should be slight if the restoration activities are designed to minimize soil disturbance and produce effects similar to those of natural wildfire.

Road Density - Long-term increases in road density will be less than 1% under all SDEIS alternatives. Road density will decrease under Alternatives S2 and S3; especially in areas of interest. Road density is higher under Alternative S1.

Aquatic

Six salmonid species were analyzed by the Science Advisory Group: Yellowstone cutthroat trout, bull trout, westslope cutthroat trout, redband trout, stream-type spring and summer chinook salmon, and steelhead. With the exception of Yellowstone cutthroat trout, most of the watersheds containing potential habitat for these species are on federal lands; making the management of these lands extremely important. This is especially true for bull trout, stream-type chinook salmon and westslope cutthroat trout.

All aquatic species and habitats show positive trends across all SDEIS alternatives at 100 years. The positive trends were strongest for Alternative S2, followed by Alternative S1 and Alternative S3. Alternatives S2 and S3 focus restoration and conservation activities more effectively than Alternative S1. However, under Alternative S3 there is higher uncertainty concerning the outcome of restoration activities resulting from less emphasis on and weaker riparian protection. These factors reduce the overall benefit of Alternative S3 relative to Alternatives S2 and S1.

The trends and differences summarized across all Forest Service and Bureau of Land Management administered lands are relatively small compared to differences that can occur in individual subwatersheds. As trends are averaged over larger and larger areas, differences become smaller and less obvious. For example, the average increase in the probability of strong bull trout populations was approximately 8% for Alternative S2. However, changes in individual subwatersheds ranged negative to an increase of more than 30%.

Aquatic Habitat - Alternative S2 consistently produced larger positive changes in aquatic habitat than

either Alternatives S1 or S3. Improvements under S1 were generally greater for federal lands than for Alternative S3. All three alternatives result in increased high habitat capacity when compared to current conditions. Bureau of Land Management and non-wilderness Forest Service lands are projected to experience the greatest increases in high habitat capacity under Alternatives S2 and S3.

Trends in habitat were stronger than trends in population status. This is due to the influence of exotic species, the impacts of dams, isolation, and other biological factors affecting the salmonid populations analyzed. Although these effects varied across the Basin, they did not change among the alternatives or affect the magnitude of the differences among the alternatives.

Aquatic A1 and A2 Subwatersheds -The Aquatic A2 Subwatersheds identified in Alternatives S2 and S3 would see more positive changes in habitat capacity and fish status than other areas as a result of the conservation and restoration emphasis in those areas. The Aquatic A1 and A2 Subwatersheds contains about 1/3 of the distribution of resident salmonids, 1/2 of the distribution of anadromous salmonids, and 2/3 of the subwatersheds with high aquatic community integrity. The Aquatic A1 and A2 Subwatersheds in Alternative S3 cover about 6% less of those distributions than do the aquatic areas in Alternative S2. Approximately 2/3 of the Aquatic A1 and A2 Subwatersheds are currently in a protective land allocation or in areas with no or low potential for intensive management.

Freshwater Fishes -Trends varied among species and locations, but all three alternatives would result in positive status and habitat trends for bull trout, westslope cutthroat trout, Yellowstone cutthroat trout, and redband trout when compared to current conditions.

The alternatives, particularly Alternative S2, generally conserve portions of the species range that are currently strong. There are also positive trends in the portions of the species= ranges that are currently classified as depressed;however, those changes were not large enough to result in a substantial expansion in the number of strongholds for these species.

Salmon and Steelhead - All of the SDEIS alternatives produce positive trends in habitat capacity for salmon and steelhead. Trends were generally similar for Alternatives S1 and S2 and lower for Alternative S3. The status of anadromous salmonids is so strongly impacted by the network of Columbia River dams that habitat changes associated with the alternatives do not produce changes in overall population expectations or in the number of subwatersheds with strong or present populations. Rehabilitation of these salmonids will require actions which address all of the causes of mortality in all life stages. Although rehabilitation of depressed anadromous fish populations cannot be accomplished through habitat improvement alone, securing and restoring freshwater habitats may be critical to the short-term persistence of many of the remaining anadromous fish populations.

Terrestrial

Animals - To determine the effects of the SDEIS alternatives on terrestrial animal species, population outcomes for 28 terrestrial vertebrates species (31 species/season combinations) of conservation concern that depend on upland environments were evaluated. These are species whose populations have declined significantly from historic periods. In evaluating the effects of the SDEIS alternatives on these species, the following types of population outcomes were identified:

- Outcome A - Suitable environments broadly distributed and abundant across historical range.
- Outcome B - Suitable environments as in A, but some gaps where environments are absent or of low abundance.
- Outcome C - Suitable environments are distributed frequently as patches and/or exist at low abundance; some isolation of patches and possible reduction in species= historical range.
- Outcome D - Suitable environments are frequently isolated and/or exist at very low abundance; species= populations are isolated with a reduction in historical range likely.
- Outcome E - Suitable environments exist at very low abundance with little or no possibility of

population interactions among patches; strong potential for extirpation within isolated patches.

Evaluations were conducted across all lands in the basin and separately for lands administered by the Forest Service and Bureau of Land Management. Environmental index scores among all 31 species for all alternatives were approximately 10 to 15 percent higher on Forest Service and Bureau of Land Management administered lands. These results suggest that population outcomes would be more favorable for these species if conditions on Forest Service and Bureau of Land Management lands existed on all lands in the Basin.

Source habitat (key cover types and seral stages) for most species have declined from historical to current conditions. For species dependent on old-forest conditions, source habitat generally increased from current under all alternatives; sometimes approaching historical levels. For rangeland species, the decline from historical to current is projected to remain under all alternatives.

Population outcomes for nearly all species (90%) have declined from historical to current periods. Most species 68% (21 of 31) were associated with outcome A historically, whereas 52% (16 of 31) are associated with a D or an E currently. Compared with current outcomes, expected values of population increase over the next 100 years for 55% (16 of 31) of the species under Alternatives S1 and S3. For Alternative S2, outcomes increase for 62% (18 of 31) of the species. Expected values decline for 7% (2 of 31) of species under all alternatives. For 45% of species (13 of 31) there is no change under Alternatives S1 and S3. For Alternative S2 there is no change for 38% of species (11 of 31). Most species (11 of 31) are associated with outcome C under all alternatives, compared with outcomes D and E currently.

Population outcomes for species dependent on old-forests are currently in Outcomes C, D, or E and move to Outcomes B, C, or D under all alternatives. Species in Outcomes D or E under the current period were typically projected to improve by one outcome class over the next 100 years (e.g., move from E to D or from D to C). In contrast, population outcomes for species dependent on rangeland conditions are generally in Outcomes D or E and do not improve under any of the alternatives.

Population outcomes for threatened and endangered species (grizzly bear, gray wolf, woodland caribou) are either in Outcomes D or E currently and are not projected to improve under any of the alternatives. The exception is woodland caribou, which is projected to shift from Outcome E to outcome D under all alternatives.

Alternatives S2 and S3 identify Terrestrial (T) Watersheds. To determine the potential effect of these T Watersheds on terrestrial species, six species were analyzed (grizzly bear, Lewis= woodpecker [migrant], American marten, Columbian sharp-tailed grouse, sage grouse [summer], and striped whipsnake). The index of habitat quality increased by less than 5% for all species except Lewis= woodpecker, which experienced a 15% increase. These relatively small increases are attributed to the fact that greater than 55% of the T Watersheds are within wilderness areas, where environmental conditions are already in relatively good condition and are projected to stay in relatively good condition. The T Watersheds also do not overlap extensively with ranges of many species of concern, particularly species that depend on habitats at lower elevations or on rangelands. For these reasons, projected improvements in habitat conditions within the T watersheds, although important in contributing to better habitat conditions at specific locations, are not of sufficient area to alter overall population outcomes for the 31 species analyzed.

Big Game - The effects of the alternatives on Elk, Mule Deer, and White-tailed Deer habitat were also analyzed. The adjusted habitat capability for each of the big game species were analyzed for watersheds which range in size from 15,000 - 25,000 acres within each Resource Advisory Council and Provincial Advisory Committee geographic area. The differences among the alternatives are extremely small in the short and long term and when compared to current habitat capability, there is almost no change under any of the alternatives. For White-tailed Deer, the change from current can be expressed as 0 units of change under all alternatives and for Elk and Mule Deer the change is .1 unit under all

alternatives.

Plants - The plant species in all seven major plant groups were judged to remain stable in their likelihood of persistence under Alternatives S2 and S3 relative to current conditions. Species in all seven major plant groups were judged to have a reduced likelihood of persistence under Alternative S1 relative to current conditions. This is based on the absence of conservation strategies and a lack of associated analysis procedures.

Alternative S2 would most likely be more beneficial to plants of interest to Tribes because it requires more analysis in the short term. Alternative S3, while targeting more acres strategically located near reservations for active restoration, does not require as much analysis in the short term. As a result, the restoration activities may not have beneficial effects on plant species populations.

Socioeconomics

Across the entire Basin, the socioeconomic effects of the SDEIS alternatives are limited and local in nature with 28 counties and associated communities likely to experience measurable effects. In the first decade, Alternative S2 provides considerable benefit to counties that are reliant on federal lands. Alternative S2 has a strong positive effect on socioeconomic resiliency for this group of 28 counties while the impacts of Alternative S1 are negative and for Alternative S3 they are mixed.

Ten counties may experience reduced socioeconomic resiliency under Alternatives S1, S2 and S3: Idaho: Adams, Boundary, Clearwater, Idaho, and Owyhee; Oregon: Crook, Grant, Harney, and Lake; and Washington: Ferry. The population of these ten counties makes up 2.5 percent of the Basin's population.

Six counties may experience increased socioeconomic resiliency under Alternatives S1 and S3: Idaho: Blaine, Camas, Custer, Fremont, Lemhi, and Valley. Nineteen counties may experience increased socioeconomic resiliency under Alternative S2: Idaho: Blaine, Boundary, Camas, Clearwater, Custer, Fremont, Idaho, Lemhi, Lewis, Shoshone, Teton, and Valley; Oregon: Crook and Wheeler; Washington: Pend Oreille; and Montana: Granite, Lincoln, Mineral, and Sanders.

When evaluating the alternatives relative to the group of 28 counties, Alternative S1 provides the greatest benefit to communities associated with livestock grazing while Alternative S3 provides the greatest benefit to counties associated with wood products. Overall, Alternative S2 produces higher outputs and is associated with greater socioeconomic benefits.

Alternatives S2 and S3 both provide an economic strategy that promotes the economic participation of the local workforce in management activities, and targets activities in communities and geographic areas that are dependent on the outputs of goods and services from Forest Service and Bureau of Land Management administered lands. Alternative S3 places more emphasis on conducting restoration activities in areas that will benefit communities with greater socioeconomic needs and, therefore, has a greater social benefit than Alternatives S1 and S2. This is especially true for those areas thought to be reliant on federal wood products.

Employment - The alternatives have little effect on the estimated total number of jobs supported by resources from Forest Service and Bureau of Land Management administered lands. In the first decade of implementation, the SDEIS alternatives would affect approximately .1 percent of all the jobs in the Basin or 2 percent of those related to Forest Service and Bureau of Land Management administered lands. Forest Service and Bureau of Land Management administered lands were estimated to support roughly 95,000 jobs or 6.3 percent of all jobs. Of these 95,000 jobs, 81 percent were estimated to be related to recreation, 9 percent were estimated to be in timber, and 2 percent were estimated to be in livestock grazing. The remaining 8 percent were related to forestry services.

The estimated number of resource dependant jobs associated with Alternative S1 is expected to remain

roughly at current levels. Alternatives S2 and S3 are expected to increase the number of resource dependant jobs supported in the next decade by 50 percent. However, the number of livestock grazing jobs is estimated to decrease by 10 percent over the next decade.

Wood Products - The effects on jobs in lumber and wood products industry over the next decade vary by alternative. Due to increased restoration in Alternatives S2 and S3, employment increases an average of 20 percent relative to Alternative S1. In counties most likely to be affected by changes in wood products obtained from federal lands, Alternative S3 provides the most benefit, followed by Alternatives S2 and S1. At 100 years, Alternative S2 is estimated to provide the most benefit, followed by Alternatives S1 and S3.

Forestry Services -The effects on jobs in the forestry service industries vary by alternative. Due to increased restoration in Alternatives S2 and S3, employment increases 400 to 500 percent relative to Alternative S1 over the next decade. The large increases are primarily due to increased fuel management activities included in Alternatives S2 and S3. About 10 percent of the increase in jobs results from increases in traditional forestry services such as tree planting, precommercial thinning, stocking control, and brush control.

Livestock Grazing -Both Alternatives S2 and S3 are expected to reduce livestock grazing jobs by roughly 100 jobs, and increase range restoration jobs by roughly 12 jobs. In looking at counties most likely affected by changes in federal land livestock grazing, Alternative S1 provides the greatest benefit, followed by Alternative S2 and Alternative S3 after 10 years of implementation. At 100 years, Alternative S2 is estimated to provide the greatest benefit, followed by Alternatives S3 and S1.

Recreation -Recreation jobs are assumed to remain constant for each SDEIS alternative.

Environmental Justice -The Supplemental Draft EIS alternatives were evaluated to determine their impact on low income populations. In the short term, Alternative S3 has a better outcome for low income areas but in the long term, Alternative S1 has a better outcome. Due to the extent of expected road closures, Alternatives S2 and S3 have a greater negative impact on subsistence use than Alternative S1.

Outputs - Outputs are expressed as an annual average for the first decade (short-term).

Timber Harvest - In the short term, timber outputs in Alternatives S2 and S3 are estimated to be 20% higher than current board feet. Alternative S1 declines 1% from the current 819 million board feet level annually.

Forest/Woodland Planting & Precommercial Thinning - Acres treated with planting and precommercial thinning under Alternative S2 increases 40% from from annual average for current acres in the first decade. Acres treated with planting and precommercial thinning under Alternative S3 increases by 35%. Alternative S1 remains the same as current, with approximately 142,600 acres treated.

Livestock Grazing - Under Alternatives S2 and S3 as an effect of implementing management direction, there is a projected decrease in the annual average authorized Animal Unit Months (AUMs) in the first ten years of implementation from current conditions. Under both Alternatives S2 and S3 there is a projected 3% decrease from current levels. Alternative S1 remains the same at 3.1 million authorized AUMs. In the long term, authorized AUMs are estimated to decline from current levels by 16% for Alternative S1, 10% for Alternative S2 and 11% for Alternative S3.

Prescribed Fire & Fuel Management - In the short term, under Alternative S2, acres where prescribed fire or mechanical fuel management will be conducted increase from the current 178,000 acres treated to approximately 1,450,000 acres. Under Alternative S3, the number of

annual average acres where prescribed fire will be conducted is approximately 1,100,000. Under Alternative S1, the amount of acres increases slightly to an annual average 181,000 acres.

Tribal - Alternative S1 offers no regionwide consistency in consultation, ecological restoration, economic benefits, or monitoring and lacks a consistent analysis processes. Historic trends of decline in habitats and resources of importance to tribes would be less effectively addressed under Alternative S1.

Alternative S2 includes 11 Broad-scale Functional Restoration Opportunity Subbasins that are identified based on tribal factors. The economic strategies emphasize tribal involvement in restoration through use of tribally-owned businesses and contractors. Analysis processes included in Alternative S2 emphasize tribal involvement in restoration priority areas as well as other phases of planning and decision-making. Overall, greater opportunities and consistency for tribal consultation is offered and basinwide issues would be more adequately addressed than under Alternative S1. Habitat would be improved in some regions and declining trends would be slowed in most others. Alternative S2 offers more long term protection for current values with less short term risk.

Alternative S3 includes 16 Broad-scale Functional Restoration Opportunity Subbasins that are identified based on tribal factors. This increase over Alternative S2 would lead to greater economic and ecological benefits to the tribes. However, there is less analysis called for in Alternative S3 and this decreases the level of certainty in desired long term outcomes. Although Alternative S3 may offer greater short term results and more quickly approach harvestability goals, long term results are diminished as a result of less analysis and coordination. As in Alternative S2, opportunities and consistency for tribal consultation is offered and basinwide issues would be more adequately addressed than under Alternative S1.

Key terms used by the Science Advisory Group in their evaluation:

Aquatic and Terrestrial Core Areas: *References the geographic areas identified in the SDEIS Alternatives S2 and S3: Aquatic A1 Subwatersheds, Aquatic A2 Subwatersheds, and Terrestrial (T) Watersheds.*

Aquatic Habitat Capacity: *Represents the projected effects of the alternatives on the habitats of aquatic species at 10 and 100 years expressed as high, moderate, or low capacity. The physical components of habitat capacity are sediment, riparian condition, and fire/flood events. Habitat capacity is summarized for individual species and for all federal lands.*

Disturbance: *An event that changes the trend of ecosystem development. Disturbances are inherent to ecological processes. When disturbance regimes occur with an intensity outside their accustomed character, evolutionary trends are compromised. Examples of disturbance events are floods, fire and succession.*

Down Wood: *Fallen dead trees.*

Dry Forest: *Forests in dry environments often dominated by ponderosa pine.*

Ecological Integrity: *The presence and functioning of ecological components and processes within a system.*

Broad-scale Functional Restoration Opportunities: *Broad-scale restoration opportunities are shown for six functional areas: landscape, aquatic, water quality, terrestrial, economic, and tribal. These areas are mapped and intended to be used to provide broad-scale context when determining local restoration priorities.*

Broad-scale High Restoration Priority Subbasins: *These subbasins were identified based on their: landscape health, hydrologic processes, aquatic and terrestrial habitat, and their economic value to*

people and communities. These areas have high natural resource risks and the opportunity to make improvements through restoration exists. These subbasins are also often areas where there are opportunities to address tribal treaty and trust responsibilities and benefit communities. The overall intent is to concentrate restoration efforts and to make restoration activities more effective and efficient.

Isolated Communities: A third of the communities in the basin were identified as being isolated. That is, they are geographically isolated from larger population centers (>9000 people).

Late Seral Forest: Forests that have tree sizes, tree ages, snags and down logs that are characteristic of at least the early stages of old-growth.

Long-term: One hundred years or more from present.

Moist Forest: Forests in relatively moist and productive environments, dominated by various species including ponderosa pine.

Multi Story Forest: Forests with a wide variety of tree heights and canopy layers.

Population Outcomes: Projected effects of the alternatives on the status of an aquatic species. The outcome is expressed as the number of subwatersheds where the most likely state is present (strong or depressed) or absent and as the change in the probability that the species will be either strong or present. The principal components are habitat capacity, biological potential, and migrant survival for anadromous species.

Single Story Forest: Forest in which most of the trees and their canopies are similar in height.

Short-term: Ten to 30 years from present.

Snags: Standing dead trees.

Source Habitat: The composite of vegetation characteristics that contribute to terrestrial species population maintenance or growth in a specified time and space. The source habitats for terrestrial species referenced in the alternatives provide the range of vegetation conditions required by these species for food, reproduction and other needs.

Subbasins: Subbasins are 4th field hydrologic units that cover an area between approximately 800,000 - 5 million acres.

Uncharacteristic: Uncharacteristic effects are outside the normal intensity, severity, size or landscape pattern of historic disturbances. Uncharacteristic is not a value judgement in this context. It merely means that effects are not typical or characteristic of a normal range of conditions during a 400 year period prior to Euro-American settlement.

Watersheds: Watersheds are 5th field hydrologic units that cover an area between approximately 10,000 - 130,000 acres.