Alternative B – Aggressive Action

Biological Environment

Vegetation and Fire Ecology

Potential for Impacts from Catastrophic Fire

Subalpine Forests. Vegetation in this group shows no departure from the normal fire return interval (table 2.1). This indicates that the stand structure and composition and fuel loads are within the natural range of variability. Potential for catastrophic fire is low. Since 1930, the largest fire in these forests was only 773 acres. Because of the increased capability for managed wildland fires than under the No Action Alternative, under Alternative B the amount of subalpine forest burned could increase. Thus, the effects of Alternative B on subalpine forests would be beneficial, short-term, and minor.

Upper Montane Forests. Vegetation in this group shows moderate to high departures from the median fire return intervals (table 2.1) and only about 25% of them are within one return interval of normal. About 75% of the red fir forest and montane chaparral have moderate departures. Western white pine/Jeffery pine forests show larger departures from normal—about 70% of them have missed four or more fires. The structure and composition of these forests now includes higher densities of small, shade-tolerant species so that fuel loads are higher than the natural range. Chaparral has been reduced in size and extent.

Under natural conditions, large stand replacing fires occasionally burn these forests, however, existing vegetative conditions would cause larger and higher-intensity fires. Under Alternative B, the focus on managed wildland fires could increase the area burned in upper montane forests. It also might increase because of the 36% increase of upper montane forest in prescribed fire units compared with the No Action Alternative. However, less than 20% of this group would be burned through prescribed fire so the potential for catastrophic fire would remain high. In general, the potential to restore areas under this alternative would be greater than under Alternative A, thus a decrease in intensity from major to moderate. The effects of Alternative B on upper montane forests would be adverse, long-term, and moderate.

Lower Montane Forests. Vegetation in this group shows moderate to high departures from the median fire return intervals (table 2.1). About 50% of these forests are within two median fire return intervals of natural due to an active prescribed fire program. At the same time, about 50% of these areas are three or more return intervals from normal and some have extremely high departures from the median fire return interval. Of the ponderosa pine/bear clover forest, 36% has missed 17 median return intervals. Fire exclusion has changed these forests from being relatively open, to forests with understories of dense thickets of shade-tolerant tree species at the higher elevations and dense shrub at lower elevations. The structure and composition is considerably outside the natural range of variability. Ponderosa pine/mixed conifer and ponderosa pine/bear clover are undergoing a vegetative type change to white fir/mixed conifer forest. Fire exclusion has significantly increased fuel loads and the potential of catastrophic fire. While large stand replacing fires have occurred historically, under current conditions fire would have much greater intensity and be larger in size and extent than under the natural fire regime. Fire burning in these conditions would alter gap distribution and the vegetative mosaic as well.

By maximizing managed wildland fire, the number of acres burned in lower montane forests could increase under Alternative B. Additional treatment would come from placing 50% more of the lower montane forest into prescribed fire units, compared with the No Action Alternative. The new prescribed fire units would include about 75% of all lower montane forests, and would significantly increase the number of acres that would be restored. Therefore, the potential for catastrophic fire would remain high initially, but would be significantly reduced over time as prescribed burns and managed wildland fire brought these areas into the range of natural variability. The potential to restore significantly greater amounts of forest would be greater than under Alternative A. The effects of Alternative B on lower montane forests would be beneficial, long-term, and major.

Meadows. Vegetation in the dry montane meadows shows high departures from the mean fire return interval (table 2.1). Almost 80% of the area has missed four or more fires. Many meadows in Yosemite are severely encroached upon by conifers and have significant amounts of Kentucky bluegrass and other non-native, cool season grasses. In Yosemite Valley, the hydrologic regime in meadows have been altered. Fuel loads are higher than natural because of conifer encroachment and the lack of fires. Fire exclusion has significantly increased the potential for catastrophic fires in surrounding forests. Maximizing managed wildland fire in Alternative B would increase the number of acres burned in the park. The new prescribed fire units would include about 50% of all meadows. Compared with the Alternative A, there would be about a 60% increase in meadows put into prescribed fire units, which would increase the number of acres that would be restored. Therefore, the potential for catastrophic fire would remain high initially, but would be reduced as the use of prescribed and managed wildland fire brought these areas into the natural range of variability. The potential to restore larger areas under this alternative would be greater than under Alternative A. Thus, the effect of Alternative B on meadows would be beneficial, long-term, and moderate.

Foothill Woodlands. Vegetation in the foothill woodlands shows low to moderate departures from the mean fire return interval (table 2.1). Most of the areas in this type were burned in several large wildland fires during the 1990s. Cheatgrass and other non-native annual grasses have invaded much of the foothills woodlands. High-severity or catastrophic fire are typical fire behaviors for this group, due to the establishment of non-native species. Compared with the No Action Alternative, maximizing managed wildland fire in Alternative B could increase the acres burned while additional treatment would come from about a 25% increase in the amount of foothill woodlands included in prescribed fire units. The new prescribed fire units would include more than 75% of all foothill woodlands and thus would increase the number of acres restored. Based on the increased area of treatment, and potential restoration of native vegetation cover, the effect of Alternative B on foothill woodlands would be beneficial, long-term, and moderate.

Fire Management Treatments

The Aggressive Action Alternative would focus on managed wildland and prescribed fire while allowing the full array of fuel reduction and site preparation techniques, mainly aggressive reduction techniques, in wildland/urban interface areas and along road and utility corridors.

Managed Wildland Fire

Subalpine Forests. Ninety-nine percent of subalpine forest occurs within the Fire Use Unit. Maximizing managed wildland fire in this alternative would increase the amount of subalpine forests. However, because of the small amount of total acres that would burn in this group, the effects of Alternative B would be the same as under Alternative A—beneficial, long-term, and minor.

Upper Montane Forests. Ninety percent of upper montane forest would be in the Fire Use Unit. This would be 5% less than in the Fire Use and Conditional Units under Alternative A. It is expected that managed wildland fire would have a beneficial, long-term, and major effect in the areas that burn. Maximizing managed wildland fire in this alternative would increase the acres burned when compared with Alternative A. Due to the increase in area treated, the overall effect of Alternative B on managed wildland fire in upper montane forest would be beneficial, long-term, and moderate.

Lower Montane Forests. About 35% of lower montane forests would be in the Fire Use Unit. This would be 5% less than in the Fire Use and Conditional Units under Alternative A. It would be expected that managed wildland fire would have a beneficial, long-term, major effect in the areas that burn. Maximizing managed wildland fire in this alternative would increase the acreage burned compared to the existing program. Compared to Alternative A, the overall effect of managed wildland fire on lower montane forest would be beneficial, long-term, and moderate, due to the increase in area treated.

Meadows. About 60% of dry montane meadows would be in the Fire Use Unit, the same as in Fire Use and Conditional Units under Alternative A. Maximizing managed wildland fire in this alternative would increase the number of acres burned compared to Alternative A. Overall, the effect of managed wildland fire on meadows in Alternative B would the same as under Alternative A—beneficial, long-term, and moderate.

Foothill Woodlands. About one quarter of foothill woodlands would be in the Fire Use Unit, the same as is in Fire Use and Conditional Units under Alternative A. Maximizing managed wildland fire in this alternative would increase the number of acres burned compared to Alternative A. Overall, the effect of managed wildland fire in foothill woodlands under Alternative B would the same as under Alternative A—beneficial, long-term, and minor.

Re-ignition clause. While the effects of re-ignition might differ slightly from one vegetation type to another, the general effects of and concerns for re-ignition are similar, thus, all vegetation groups will be analyzed together. Re-igniting forests during the normal fire season would be expected to have the same effects on vegetation as managed wildland fire. When re-ignition was done in the *shoulder season* (just before or just after the normal fire season, when fuels contain more moisture, temperatures are cooler, etc.), there would be the potential for adverse effects on vegetation although the overall effect of these burns would be expected to be beneficial. The impacts of shoulder season burns are hard to quantify and need more research, but generally speaking, the effects would be the same as described for prescribed fire. To mitigate effects, re-ignitions would be carried out within the target condition for season of burn (table 2.4); this would significantly reduce the potential for adverse effects. The re-ignition clause would significantly increase the number of acres treated and would reduce the potential for catastrophic fires compared to Alternative A. The overall impact of re-ignitions on vegetation would be beneficial, long-term, and moderate to major.

Holding Action and Monitoring Effects (water and retardant drops, helispots, and spike camps). The effects of holding actions and monitoring are expected to be similar for all vegetation types, so the vegetation types will be grouped for this analysis. Due to the increased use of prescribed and managed wildland fire, it is expected that impacts from holding actions and monitoring would affect more areas than under Alternative A. However, the overall effect of water and retardant drops on vegetation would remain the same—adverse, short-term, and minor. The effects of helispots and spike camps on vegetation would also the same as under Alternative A—-adverse, short-term, and negligible.

Prescribed Fire

Prescribed fire would typically be used in restoration of areas where the fire return interval is three or more fires out of cycle, or to maintain target conditions in areas within the Suppression Unit or along the margins of the Fire Use Unit. The total acreage in prescribed fire units would be the same in all action alternatives, but under Alternative B, Aggressive Action, the largest number of acres would be burned annually.

Subalpine Forests. Less than 1% of subalpine forests would be within prescribed fire units in Alternative B. The effect of prescribed fire would be the same as under Alternative A—beneficial, short-term, and minor.

Upper Montane Forests. Less than 20% of upper montane forests would be in prescribed fire units in Alternative B— twice the acreage included in prescribed fire units under Alternative A. The impact of prescribed fire in these forests would be the same as under Alternative A, but the larger area burned would decrease the potential for catastrophic fire, compared with Alternative A. Overall, the impacts of prescribed fire on upper montane forests would be beneficial, long-term, and moderate.

Lower Montane Forests. These forests would be a primary focus of the prescribed fire program. About 75% of the park's lower montane forest would be in prescribed fire units in Alternative B. This would be twice the area in prescribed fire units in Alternative A. The effect of prescribed fire in these forests would be the same as under Alternative A, but the greater number of acres treated would reduce the potential for catastrophic fire. The increase in area burned would increase the benefit compared to Alternative A. Overall, the effect of prescribed fire in lower montane forests, under Alternative B, would be beneficial, long-term, and major.

Meadows. Meadows have the shortest fire return intervals of all vegetation types described for the park. About 50% of the park's dry montane meadows would be in prescribed fire units under Alternative B. This would represent a 60% increase in area to be treated, compared to Alternative A. The effects of prescribed fire would be the same as under Alternative A, but the significant increase in area treated would restore more meadows than under Alternative A. The potential to restore more area under this alternative would be greater than under Alternative A, thus the beneficial effect. Overall, the effect of Alternative B would be beneficial, long-term, and major.

Foothill Woodlands. More than 75% of park's foothill woodland would be in prescribed fire units under this alternative. This is nearly four times more than under Alternative A. The effects of fire would be the same as in the existing program for Alternative B, but overall, under Alternative B the benefits would increase, due to the amount of treatment and shorter time frame for restoration. Effects would be beneficial, long-term, and major.

Site Preparation Associated with Managed Wildland Fire and Prescribed Fire (hand line, snagging, mop-up)

The effects of holding actions and monitoring would be similar for all vegetation types, so they will be grouped for this analysis. Due to the increase in treatment acreage for prescribed fire and managed wildland fire, it would be expected that site preparation work would be more wide spread than under Alternative A. Given the increased amount of site preparation, mitigation measures would be used to the greatest extent possible. Overall, the effect of site preparation on vegetation would be the same as under Alternative A—adverse, short-term, and minor.

Fuel Reduction by Hand or Machine

Effects of Reducing or Removing Biomass from Sites

While the removal of cut trees and shrubs from treated sites can reduce the intensity of future fires, it can have other effects on ecosystems, such as a loss of stored nitrogen and other vital plant nutrients. Table 4.9 presents a comparison of methods used to remove cut trees and shrubs and a qualitative analysis of the movement and availability of nitrogen and other nutrients.

Table IV.9
Qualitative Effects Of Different Methods Of Tree And Shrub Removal In Relation To Nutrient Availability

Methods	Pile/Burn [c]	Pile/Leave [d]	Lop and Scatter	Chip and Broadcast	Chip and Haul Away
Fuel Load [a,f]	Decrease	Increase	Increase	Increase	Decrease
Nutrient Cycling and Return [b]	Increase	Increase	Increase	Increase	Decrease
Fire Behavior [a]	Decrease	Increase	Increase	Decrease	Decrease
Positive Visual Impacts	Increase	Temporary Decrease [d]	Increase	Increase	Increase
Feasibility [e]	Would be determined for each project.				

a van Wagtendonk 1996.

b Graham and Associates 1999.

c Based on the assumption that piles would be burned from November through March in the year following treatment.

d Piles would be visible until the prescribed fire unit is broadcast burned within the following 5 years.

e Includes physical constraints, project cost and time, labor, and other factors.

f Amount of fuel (expressed in tons per acre) available for combustion on the site after treatment.

In Table IV.9, nutrient cycling and return implies the movement and availability through decomposition of nitrogen and other vital plant nutrients. It is an indicator of the amount of nutrients returned to soils in the project site following treatment. Fire behavior denotes the expected fire behavior during a wildland or prescribed fire after mechanical fuel reduction. Positive visual impacts indicate the stand appearance and aesthetic value as perceived by visitors after completion of the project. This often is best described in historical accounts as “natural and park-like.” Feasibility would be evaluated for each project and include labor, physical barriers, and project time and costs. All scenarios assume that a prescribed fire would take place in the unit within 5 years after the fuel treatment.

Aggressive Reduction Techniques

Mechanical Tree and Shrub Removal. These activities would occur primarily around the wildland/urban interface. It would be used in areas where both plant community structure has been altered by years of fire exclusion and communities and developed areas are at risk from catastrophic fire. Less than 1% of the park, or 6,425 acres, lies within the six inner wildland/urban interface boundaries. Approximately 1,285 acres would be treated each year. These activities usually would be followed by prescribed fire (effects discussed above). To restore plant community structure to within its natural range of variability, large machines (i.e feller-bunchers) would be used. Only lower montane forest and meadows would be treated in large enough areas to have more than a local effect. Less than 5% of lower montane forest and less than 20% of meadows would be targeted for this treatment in Alternative B.

Effects of biomass removal would include the increased potential for trampling and burial of sensitive plants and communities (e.g. riparian areas), the appearance of cut stumps, and the loss of fuel ladders (see also table 4.9). All of these impacts would be mitigated through project planning and coordination with resource management staff. Surface and soil disturbance and compaction would also be caused by tracked vehicles and cutting, dragging, or crushing materials (depending on the treatment used). This disturbance would provide potential sites for invasion of non-native species.

Trees up to 20” dbh (diameter breast height) would be removed according to the structural target conditions for density and frequency, by vegetation type (see table 2.3). Removal of trees would alter tree density and canopy cover in the immediate area. However, canopy cover reduction should change fire behavior so that a high-intensity fire would be likely to be slowed and move on the ground rather than to move in the canopy (crown fire). This treatment would not reduce the surface fuel load, which can be greater than half the total down and dead fuel load on a site. In fact, it would actually increase the surface fuel load until the area was broadcast burned. The intensity of fire would be temporarily greater due to this loading of fuels. Overall, the adverse effects of biomass removal by mechanical means would be short-term and minor to moderate. Long-term impacts would be beneficial and negligible to moderate, due to the lower potential for catastrophic fire in treated areas.

Conventional Tree and Shrub Removal. Surface and soil disturbance and compaction would be associated with the use of wheeled and/or tracked vehicles and dragging materials. This would provide potential sites for the invasion of non-native species. Skidding would be used in some locations. Mitigation would include running the equipment over snow or heavy brush and restricting equipment use to certain areas and paths. Overall, the effect of skidding and grappling would be adverse, short- to long-term, and minor to moderate, depending on the intensity of treatment.

Passive Reduction and Lower Profile Techniques

Low-Impact Skidding. This would include the use of draft animals and four wheel, all-terrain vehicles, in combination with fetching arches, to skid trees of approximately 10 to 20” dbh, to reduce locally heavy fuels. In this alternative, the treatment would be used infrequently and only in areas with sensitive resources, as a substitute for other, heavier types of equipment. This would cause limited compaction and scarification of the upper duff and topsoil layers. Mitigation, when needed, could include skidding over snow, frozen soil or a bed of crushed materials, as with heavier equipment. Adverse effects of use would be short-term and negligible to minor. Because of its limited application in this alternative, the benefits of reducing fuels using low-impact methods would be short-term and minor.

Hand Cutting. Hand cutting would be used as needed in the Fire Use Unit and in some parts of the Suppression Unit and Special Management Areas. Because this work is labor-intensive, accomplishments would likely remain at approximately 100 acres treated each year, as in Alternative A. Amount of work would depend on how much was treated by other methods. Overall, the effects of hand cutting on vegetation would be adverse, short-term, and minor—the same as under Alternative A.

Pile Burning. The effects of pile burning would be similar for all vegetation types, so vegetation types will be grouped for this analysis. The impacts of pile burning would be the same as under Alternative A. But, the increase in amount of treatment would affect a larger area. The impacts of pile burning on vegetation would be adverse, short-term, and negligible to minor.

Chipping. Chipping is one method for reducing the overall fuel loads in areas where hand thinning and/or biomass removal (by mechanical means) has occurred. There are several options for reducing or removing biomass from sites. The loss of nitrogen in the ecosystem is the greatest adverse effect of biomass removal. According the *Vegetation Management Plan* (1997), chips should not be applied at depths greater than 3 inches. Since that document was developed, further evidence has indicated that chips, due to their high cellulose content and the lack of moisture and nutrients in local soils to facilitate rapid breakdown, should be applied at depths no greater than 1 inch. Chips can cause localized denudation by burying soils and seed banks, and robbing soils of available nutrients during the decomposition process. Chips would be spread more thickly in some areas (e.g. road shoulders in the El Portal Administrative Site) to manage non-native species such as yellow star-thistle.

Overall, the impacts of chipping on vegetation would depend on whether chips were broadcast or removed from the site. If chips were broadcast, the impacts would be adverse, short-term, and negligible to minor, depending on the area treated. If chips were removed, the impacts on vegetation would be adverse, short-term, and negligible. Careful project planning and coordination with resource management staff would occur prior to project implementation, to select the appropriate treatment.

Girdling. Girdling would not be a part of this alternative.

Helibase Upgrades

Crane Flat: The removal of approximately 7,500 square feet of red fir forest and montane chaparral (primarily green manzanita) and periodic maintenance of trees in the glide path would result in a adverse, long-term, and minor impact to vegetation, due to potential invasion of the cleared site by non-native plant species, loss of topsoil (from wind and water erosion from lack of vegetation and subsequent decline in vigor and cover of existing vegetation.

El Portal: There would be no additional impact to vegetation because the helibase area is already paved or part of the road shoulder.

Wawona: There would be no additional impact to vegetation in Wawona Meadow because there would be no change in the current use of the area by helicopters. There would be a long-term negligible, beneficial impact to the stand of trees adjacent to Wawona Meadow because the parking area would be better defined and parking amongst the trees would lessen. There would be a long-term negligible, beneficial impact to the stand surrounding the driveway as tree removal and trimming would bring the stand closer to target conditions.

Cumulative Impacts

The past, present, and reasonably foreseeable projects effecting vegetation at Yosemite National Park would be the same as discussed under Alternative A. The overall affect of past activities on the structure, composition, and fuel loads have been adverse, long-term, and major. Past and reasonably foreseeable future projects would have a beneficial, long-term, and minor to moderate effect on vegetation. These impacts, in combination with the impacts of Alternative B, would result in beneficial, long-term, and moderate cumulative impacts.

Conclusion

In aggregate the effect of Alternative B would be beneficial, long-term, and moderate to major, based upon a significant increase in the amount of area treated by prescribed fire and managed wildland fire. The period of time required to restore park ecosystems (10 to 15 years) and reduce risks in and restore wildland/urban interface (5 years) would be within the normal range of fire return intervals for all but two vegetation types (ponderosa pine/bear clover forest and dry montane meadows). This would significantly reduce the threat of large, high severity, catastrophic fire in all areas of the park, and would reduce the potential for vegetation type conversion. This would be a beneficial effect, compared with Alternative A. Large, high-severity fires would likely occur during the life of the plan, but the size and extent of the fires would be reduced compared to Alternative A. The potential for catastrophic fire still exists, but the intent of the alternative is to reduce the risk, thus impairment would not result from the implementation of this alternative.

The Mariposa Grove of Giant Sequoias is one of the resources specifically identified in the enabling legislation for Yosemite National Park. If catastrophic fire were to eliminate or severely damage this grove, the impact would be impairment.

Wetlands

Potential for Impacts from Catastrophic Fire

Effective implementation of this alternative would likely result in the greatest amount of change over the shortest time. It would not eliminate the potential for catastrophic fire, but would significantly reduce the likelihood of high-intensity fires that are outside the range of tolerance for wetlands and associated species. This reduction in the potential for large or unusually intense fires would result in beneficial, moderate to major, long-term impacts for park wetlands.

Fire Management Treatments

Managed Wildland Fire

Same as Alternative A—beneficial, long-term, and moderate.

Re-ignition clause. Some managed wildland fires would be suppressed and later (within 3 years) re-ignited within the Fire Use Unit. Wetlands in this unit, particularly meadow types, could be affected. Given ecologically based criteria for re-ignition, adverse effects would be kept at a negligible level and moderate to major ecological benefits may be generated from fires burning at ecologically desirable times.

Holding Action and Monitoring Effects (water and retardant drops, helispot, and spike camps). The effects of holding actions would be negligible in this alternative. Ground-disturbing activities would be kept to a minimum in and around wetlands, but fires would be allowed to burn into and across wetlands where fires are managed for resource benefit. Wetland habitats would be avoided to the greatest extent possible during holding actions and monitoring, and only a minimal amount of line would be constructed in wetland areas—in part because wetlands are often natural barriers. Retardant would not be applied within 300' of wetland areas and water drops would be kept to a minimum. While meadows might be used as temporary helispots, this would only be done at dryer sites. Impacts associated with holding actions on wetlands would be adverse, short-term, and negligible.

Prescribed Fire

The large number of acres treated annually and the distribution of treatments would result in specific impacts to wetlands. In some areas, wetlands would be targeted for treatment, because of the need to control tree encroachment or change species composition. Treatments would provide significant ecological benefit. Although the total number of acres targeted would be well within the normal range of variability for fire regimes within the Yosemite landscape, the distribution of wetlands treated could potentially be un-naturally concentrated. Fragmentation of wetlands and fires burning at compressed intervals rather than at natural fire return intervals could result in adverse, short-term and minor impacts.

Wildland/urban interface areas, such as El Portal and Yosemite West, would likely receive mechanical pretreatment, followed by prescribed fire. Treatments would be implemented with the intention of avoiding impacts to wetlands (see hand cutting, below). Specific impacts of treatments would differ little from the No Action Alternative, but the intensity would be expected to increase because of the increase in the number of acres treated. Overall, the effects of prescribed fire on wetlands in Alternative B would be beneficial, long-term, and minor due to emphasis toward restoration of vegetative structure and function. Short-term adverse impacts would be minimized through mitigation measures of planning and coordination with Resource Management staff.

Site Preparation Associated with Managed Wildland Fire and Prescribed Fire (hand line, snagging, mop-up)

Site preparation for managed wildland fires and prescribed burns would include the use of wetlands as natural barriers and water sources for pumps where water is available. When a wetland area is being used for a boundary, line construction and some snagging might occur in the adjacent uplands. Minimum Impact Management Techniques would be used which can include flattening grasses and sedges, and creating wetlines from which to burn. Burns would be allowed to back into and burn around wetlands and meadows or through them if the vegetation were dry enough to carry fire. Wetland habitats would be avoided to the greatest extent possible during implementation of confinement and containment strategies. If the objectives of a prescribed burn were to reduce conifer invasion of meadow, some established trees might be cut. Since no actual disturbance to the wetland characteristics would be realized, the impacts would be beneficial, minor to moderate, and short-term.

Fuel Reduction by Hand or Machine

Aggressive Reduction Techniques.

Mechanical Tree and Shrub Removal. No biomass removal by mechanical means would occur in wetlands.

Conventional Tree and Shrub Removal. If fallen debris needed to be removed from meadows, attempts to move the material would be done when the water table had dropped and the surface was dry or in winter when snow would protect the meadow surface. Methods used would mitigate the possibility of material digging into the soil surface and causing soil disturbance. Impacts would be adverse, short-term, and negligible.

Passive Reduction and Lower Profile Techniques.

Hand Cutting. In most areas of the park, no hand cutting would be conducted near wetlands. Small conifers along the dry margins and edges of meadows in Yosemite Valley might be cut to reverse conifer encroachment. At the interface of the large meadows some trees might be cut to restore the visibility of meadows from scenic viewpoints and forest trails. These actions would occur in conjunction with restoration burning. Exclusion of fire has allowed an unnaturally dense wall of conifers to grow at the interface between meadow and forest in some areas. Meadow burning has been part of the program for many years and was commonly done by American Indians. Cutting trees to open this "wall" of trees is desirable to the restoration of meadows. Burning would kill additional trees and as areas are restored, burning would be the preferred treatment. The impacts to wetlands associated with hand cutting would be beneficial, short-term, and minor to moderate.

Pile Burning. Piles would be sited to avoid wetland areas wherever possible. When fuel reduction work is done on the edge of a meadow wetland, piles might be put on the upland areas adjacent to the wetland, where they would then be burned. Some movement of ash particles could subsequently wash into the wetland area, resulting in an increase of nutrient levels. The impact of pile burning on wetlands would be beneficial, minor to moderate, and short-term.

Chipping. No chipping would occur in wetlands.

Cumulative Impacts

Cumulative effects to wetland and aquatic resources discussed herein are based on analysis of additional wetlands activities within the Yosemite region and the potential effects of this alternative. The past, present, and reasonably foreseeable projects that might affect local wetland patterns and large-scale or regional wetland patterns would be the same as evaluated in Alternative A. These and park projects would result in both short-term and long-term adverse and beneficial impacts on wetlands in the areas. Overall, impacts would be beneficial, long-term, and moderate effects for reasonably foreseeable future projects. Considered in combination with the impacts of Alternative B cumulative impacts would be beneficial, moderate and long-term, due to the emphasis on restoration of vegetation structure and natural processes through the use of fire.

Conclusion

Current threats to park wetlands are most strongly characterized by the continued, ongoing diversion of water from wetland areas and the potential for catastrophic fire. Reduction of these threats results in clear benefit for a number of ecological communities, including wetlands. The process of returning the park landscape to fuel conditions in which natural fire processes could take place would result in some minor or moderate, adverse impacts to wetlands. The combined treatment acreages represent a significant portion of the landscape and avoiding wetlands would be potentially difficult or impossible. Although the long-term impacts should result in moderate benefits to wetland resources, negligible to moderate adverse impacts may occur over the short-term. Because of the aggressive program to reduce fuels and reduce the threat of catastrophic fire in Alternative B, impacts would be beneficial, moderate, and long-term. The potential for catastrophic fire would still exist, but the intent of the alternative is to reduce the risk, thus there would be no impairment from the effects of this alternative.

Wildlife

Potential for Impacts from Catastrophic Fire

Under Alternative B, catastrophic fire would have the same effects as described under Alternative A. However, the risk of such events would be substantially reduced over the 10 to 15 years proposed for achieving target conditions in areas that exhibit high fuel loads. In the Suppression Unit, areas that deviate four or more intervals would be targeted first for prescribed fire, with 2,520 to 12,872 acres burned per year. The total acreage would depend upon acreage burned in the Fire Use Unit and the environmental conditions, but this alternative proposes ecosystem restoration within 10 to 15 years. As compared to other alternatives, wildlife habitat would most rapidly be returned to a more natural condition. Under Alternative B, rapid reduction of the threat of catastrophic fire and the rapid return of habitats to natural, target conditions would result in beneficial, long-term, major impacts to wildlife and their habitat.

Fire Management Treatments

In Yosemite and in surrounding forests, many mid- to low-elevation forests are overgrown with dense shrubs and young trees because of a history of fire exclusion. Some areas are at high risk of unnatural high-intensity fire events. These conditions affect the abundance and diversity of wildlife species directly by creating unfavorable habitat conditions for some species. For example, dense understory growth may adversely affect habitat quality for California spotted owls and northern goshawks by limiting their access to prey (Weatherspoon et al. 1992, Maurer 2000, respectively). The combination of wildland fire, prescribed burning, and fuel reduction proposed in this alternative would result in increased habitat and species diversity as gaps would be created in continuous forest and the edge along the forest/gap interface recovered with important understory plants that had been crowded out by shade tolerant species. Mitigation: Use MIMT for fire management; identify sensitive wildlife resources to minimize adverse impacts; and apply mitigations identified during consultation with USFWS (see Appendix 9).

Managed Wildland Fire

The goal to restore ecosystems in a 10 to 15 year period under Alternative B means that annual acreage treated with fire would increase, through an increase in managed wildland fire and re-ignition of suppressed fires in the Fire Use Unit. Under the action alternatives, suppressed wildland fires could be re-ignited when conditions are favorable for a burn, up to 3 years after they were suppressed which would increase the number of acres burned on average. Conditions for wildland fires would vary among years, resulting in years with few acres burning and years with many acres burning. In years of more wildland fire activity, large areas of dense forests with fairly homogenous habitat would be changed to a mosaic of diverse habitats, thus the forest would support a larger array of wildlife.

The aggressive action proposed in Alternative B would provide a valuable tool in restoring natural, fire-influenced wildlife habitat. Because natural ignitions are somewhat random events, areas burned may not be those of highest management priority (i.e., high FRID areas). Also, some areas are likely to burn at higher than natural intensities due to high levels of fuel accumulation, even when fire prescriptions and management are designed to minimize these events. As a result, forest gaps, and consumption of large woody debris (which provides habitat diversity), would be greater than under the natural range of variation in some areas of a burn. This could adversely affect species that favor dense, complex forest, such as hermit thrush, northern flying squirrel, and marten. While these effects would be greater under Alternative B than under the other alternatives, such impacts must be weighed against the benefit of reduced risk of catastrophic fire, which would be much more damaging to wildlife and their habitat.

Under Alternative B, impact of managed wildland fire on wildlife would be beneficial, long-term, and major, due to the resulting restoration of wildlife habitats and the relatively rapid rate of reducing the potential for catastrophic fire. Mitigation: Use MIMT for fire management; identify sensitive wildlife resources to minimize adverse impacts; and apply mitigations identified during consultation with USFWS (see Appendix 9).

Re-ignition. Managed wildland fires might be re-started when conditions were favorable for their control. This could be done during summer or could be in the spring or fall, which would be outside the period when most natural fires occur (summer when lightning strikes and dry fuels combine). Igniting fires in the shoulder seasons would have an adverse effect on some species of wildlife that are adapted to the natural timing of fires. For example, small mammals that hibernate in leaf litter could suffer higher mortality. Overall, however, re-ignition would enhance the beneficial effects of wildland fire by increasing the amount of habitat returned to a more natural, fire-influenced structure and composition.

Prescribed Fire

The use of prescribed fire provides the greatest potential to restore wildlife habitat and reduce the threat of catastrophic fire in areas furthest from natural conditions. Fire can also be planned to occur under conditions that maximize benefit to resources, including wildlife and habitat, and minimize fire-related impacts to sensitive wildlife resources (e.g., spotted owl nesting sites).

Under Alternative B, prescribed fire would be used to the greatest extent, especially in the Suppression Unit, which comprises some of the forests most severely altered from fire exclusion. Much of this area is in mid-elevation mixed-conifer forest, which is among the most productive and diverse wildlife habitat in the park. High levels of fuel loading in some areas would cause prescribed fires to burn at higher than natural intensities, even when fire prescriptions and management were designed to minimize this effect. As a result, forest gaps and consumption of large woody debris (which provide habitat diversity) would be greater than typical within the natural range of variation for ecosystems of this type. This could adversely affect species such as hermit thrush, northern flying squirrel, and marten. Such impacts, however, must be weighed against the benefit of reducing the risk of catastrophic fire, which would cause a greater detrimental change in wildlife habitat.

Also, prescribed fires would be started when conditions were favorable for their control. This would often be in the spring or fall, which would be outside the dry season when most natural fires would occur. This could have an adverse effect on some species of wildlife that are adapted to the natural timing of fires. For example, small mammals that hibernate in leaf litter could suffer higher mortality.

In habitats near developed areas, where protection of human-built structures and facilities is a concern, prescribed fire would be used to reduce fuel loads to the lower end of the natural variability. If forests became more open (less understory vegetation) and contained less down wood, the effect on animal species that depend on these features, such as salamanders, small mammals, and ground-nesting birds, would be adverse. However, overall a larger number of species would benefit from restoration of forests to a more natural condition.

Conditions for prescribed fires would vary among years so that little burning occurs in some years, and, when conditions were favorable, many prescribed burns take place. In years of high prescribed fire activity, large areas would likely be affected. Habitat would be no longer suitable to species that favor dense forest structure, but would be more suitable to species that favor open forests and more diverse habitats. Under Alternative B, impact to wildlife would be beneficial, long-term, and major due to the restoration of wildlife habitats and reduction in the potential for catastrophic fire. Mitigation: Use MIMT for fire management, identify sensitive wildlife resources to minimize adverse impacts; and apply mitigations identified during consultation with USFWS (see Appendix 9). Where possible, limit fire size and/or provide burn intensity heterogeneity and maintain wildlife species diversity.

Holding Action and Monitoring Effects (water and retardant drops, helispots, and spike camps) and Site Preparation Associated with Managed Wildland Fire and Prescribed Fire (hand line, snagging, mop-up)

Adverse effects from fire control actions, such as hand lines, spike camps, helispots, and water drops (described under Alternative A) would increase in under Alternative B because of the greater use of managed wildland and prescribed fire and the re-ignition clause.

Water Drops. The types of impacts associated with water drops would be the same as described under Alternative A, but the increased use of wildland fire under this alternative could increase the use of water drops. Impacts to wildlife could therefore, be greater than under Alternative A, but adherence to mitigation measures would limit impacts. Threat of disease transmission, spread of non-native species, and effects on declining amphibians from water drops would still result in minor, adverse, long-term impacts. Mitigation: Avoid dipping from waters known to contain mountain yellow-legged frogs or bullfrogs; avoid dipping from small bodies of water. Water drops will occur over land to prevent spread of non-native fishes

Fire Retardant. The impacts of fire retardant (released by aircraft) would be the same as described under Alternative A, but the larger number of wildland fires under Alternative B could increase its use, but use of standard mitigation measures would limit adverse effects. Impact of retardant drops on wildlife under Alternative B would be adverse, short-term, and minor. Mitigation: Adhere to established protocols for retardant use; limit use in park.

Helispot Construction. The types of impacts associated with helispot construction would be the same as under Alternative A, but the greater use of wildland fire under Alternative B could result in a greater chance of impacts on wildlife, through habitat destruction and direct disturbance. Impact under this alternative would be adverse, long-term, and negligible. Mitigation: Limit helispot construction, place helispots away from sensitive resources, use natural clearings for helispots.

Spike Camps. Under Alternative B, the types of impacts associated with the establishment and use of spike camps would be the same as under Alternative A. The greater use of wildland fire could however, result in more spike camps to manage and monitor fires. Mitigating impacts would result in negligible, adverse, short-term effects on wildlife. Mitigation: place spike camps away from sensitive resources, maintain strict control over the availability of food to wildlife.

Handline. The greater use of wildland and prescribed fire in Alternative B would likely include reduction in the use of hand lines that would be necessary during suppression of catastrophic fires. Impact of hand line construction under Alternative B would be adverse, short-term, and minor. Mitigation: Use MIMT in hand line construction, identify sensitive wildlife resources to minimize adverse impacts, rehabilitate areas.

Snagging. Impacts from snagging under Alternative B would be the same type identified under Alternative A, but like hand line construction, snagging would likely increase under Alternative B, due to increased use of fire. This would have a local, adverse effect on those species using the snags that were removed, such as some bat species and woodpeckers. Prescribed fire, however, would likely generate additional snags that, over the long-term, would benefit these species. In addition, the reduction in the threat of catastrophic fire from use of prescribed fire would provide benefit for a wide range of wildlife species. Under Alternative B, impact on wildlife from snagging would be adverse, short-term, and minor, based upon the greater use, but the relatively small area that is likely to be affected along the periphery of fires. Mitigation: Use MIMT, limit snag removal to those snags identified as a clear threat to human safety and fire line integrity, identify sensitive wildlife resources to minimize adverse impacts.

Mop-up. The impacts to wildlife from mop-up activities under Alternative B would be of the same type identified under Alternative A, but the greater use of prescribed fire under Alternative B would increase such impacts. The small, dispersed areas that would be affected, however, would limit adverse effects. Impact of mop-up under Alternative B would be adverse, short-term, and negligible. Mitigation: Use MIMT and identify sensitive wildlife resources to minimize adverse impacts.

Fuel Reduction by Hand or Machine

Aggressive Reduction Techniques.

Under Alternative B, annual treatment of forests in wildland/urban interface areas and along road and utility corridors would be greatest of all alternatives, primarily through the use of heavy machinery to cut and remove trees and reduce biomass. To provide protection for developed areas, prescriptions for wildland/urban interface areas would thin forest structure to the lower end of the natural range of variability for tree density and fuel loading. This would affect the species composition of wildlife in these areas. For example, species that depend upon habitat complexity on the forest floor and in the understory, such as marten and some small mammals, would be adversely affected. The conditions achieved, however, would benefit a larger number of species by restoring a forest structure that is within the range of natural variability for fire-influenced habitat.

Mechanical Tree and Shrub Removal. Heavy equipment would be used where critical fuel conditions demand immediate, efficient action, and where natural resources can acceptably withstand the impacts associated with this method. The use of tracked vehicles in forest habitat would create ground disturbance that would affect animals that live in the forest litter, such as salamanders, reptiles, and small mammals. Removal of trees and snags to reduce forest density would affect animals using these habitat features, such as bats and nesting birds. This is especially true for snags, which would be valuable to a wide range of species. Also, adjacent habitat would remain unaffected and thus be a source for recolonization. If debris were piled for later burning, some mortality of animals that take up residence in piles, such as reptiles and small mammals, would occur, although most of these animals would likely flee. The noise of heavy machinery would cause some short-term disturbance of wildlife in treatment sites and in adjacent areas.

Biomass removal by feller-bunchers would result in minor, beneficial, long-term impact to wildlife due to the rapid return of forest structure to a more natural, open condition near developed areas, although these areas would be relatively small on a landscape scale, and some adverse, short-term impacts would occur from use of heavy machinery. Mitigation: avoid use of machinery in wet areas, identify and avoid impact to sensitive wildlife resources in treatment areas, and allow snags to stand where possible.

Conventional Tree and Shrub Removal. Under Alternative B, rubber tired or tracked log loaders and grapplers would be used to remove hand-thinned trees and naturally downed trees and fuels. It has the potential for damage through ground disturbance that would affect animals such as salamanders and small mammals. Grappling and skidding would also result in the removal of large logs which provide habitat and structural diversity on the forest floor, with possible adverse effects on wildlife that use these features, such as marten, shrews, and dark-eyed juncos. Use of heavy machinery would cause high noise levels that would disturb local wildlife. Short-term impacts on wildlife from grappling and skidding under Alternative B are expected to be minor and adverse because of the small, disperse areas impacted. However, in the long-term, restoration of park ecosystems would be beneficial to park wildlife.

Passive Reduction and Lower Profile Techniques

Hand Cutting. Same as Alternative A—beneficial, long-term, and minor.

Pile Burning. In some cases, removed material would be piled and burned on-site, although some materials may be removed for later burning or sale. With on-site burning, the impacts would be the same types as described under Alternative A, but would be somewhat greater since areas would be treated more quickly. Some mortality of animals that would take up residence in the piles may occur, although such effects are still expected to be adverse, short-term, and negligible. Mitigation: burn piles as soon as possible to minimize the number of animals living in them.

Chipping and Shredding. Impacts to wildlife would be of the same type as under Alternative A, but the larger acreage treated under Alternative B would result in greater impacts. Such impacts would be limited by use of standard practices such as thinly distributing chips over a site or removal of chips, both of which would limit suppression of plant growth and depletion of soil nutrients from decomposition. Removal of chips, however, would also remove nutrients from the system. The machinery used for chipping and shredding would be loud, which would disturb wildlife, such as nesting birds, in the short-term. Impacts to wildlife from chipping and shredding would be negligible; adverse, and short-term. Mitigation: follow established protocols for limiting the depth of chips distributed on a site.

Girdling. Trees would be girdled to benefit wildlife species that need snags or standing dead trees as a habitat component. Its use would be limited and would be combined with other techniques to reduce fuels to more natural levels. Impact on wildlife, under Alternative B, would be beneficial, long-term, and minor. Mitigation: Allow snags created by girdling to stand.

Peregrine Falcon

Same as Alternative A—adverse, short-term, and negligible.

Helibase Upgrades

Crane Flat: The removal of vegetation would have a long-term, negligible, adverse impact to wildlife due to additional fragmentation or loss of wildlife habitat. The area represents a small area in proportion to the surrounding habitat that would remain unaffected.

El Portal: There would be a long-term, negligible, adverse impact to wildlife due to increased helicopter use in the Railroad Flat area, potentially disrupting wildlife behavior. Disturbances would be infrequent and no habitat would be directly affected.

Wawona: There would be a long-term, negligible, beneficial impact to wildlife from clearing vegetation adjacent to Wawona Meadow, which would increase habitat quality by moving the stand toward structural targets. The meadow is a wintering and staging area for great gray owls, and one of the last places where willow flycatchers are known to nest in the park. Disturbances would be infrequent and no riparian habitat would be directly affected.

Cumulative Impacts

The past, present, and reasonably foreseeable projects that would have the most direct relationship to Alternative B would be the same as listed under Alternative A. The impacts of these actions, considered in combination with the impacts of Alternative B, would result in cumulative effects on park wildlife and habitat that would be beneficial, long-term, and moderate to major. This is because projects with a beneficial impact would affect large areas of habitat in the central Sierra Nevada in ways that would compliment the beneficial effects of the *Yosemite Fire Management Plan*. The Sierra Nevada Forest Plan Amendment would affect virtually all U.S. Forest Service land around the park through ecosystem-based management. In comparison, projects with adverse impacts involve small areas and/or have minor effects over larger areas.

Conclusion

Alternative B would result in major, long-term, beneficial impacts on wildlife and habitat by rapidly restoring a more natural forest structure to areas of the park that have severely deviated from a natural fire regime. The threat of catastrophic fire and its impacts on wildlife and habitat would be greatly and quickly reduced. The potential for catastrophic fire would still exist, but the intent of the alternative is to reduce the risk. Thus, there would be no impairment from the effects of this alternative.

Special-Status Species – Plants

A total of four plant species known to occur in Yosemite National Park and the El Portal Administrative Site have been listed as rare by the state of California. All are at lower elevations in the lower montane and foothills woodlands vegetation zones—mainly near El Portal. Plants and their habitats are listed in table 3.5, see also discussion in Alternative A, Special-Status Species – Plants.

Potential for Impacts from Catastrophic Fire

Increased amounts of mechanical and hand cutting treatments in the El Portal Administrative Site would reduce the potential for catastrophic fire within El Portal and ecological restoration burning would reduce the potential for high-intensity fire beyond the bounds of the El Portal Administrative Site. If a catastrophic fire were to occur, there would be adverse impacts from non-native species encroachment. The probability of non-native species encroachment into sites burned by catastrophic fire would remain high, as in Alternative A, due to the impacts of high-intensity burning on soils and on understory and overstory vegetation. However, under this alternative, the potential for catastrophic fire would be reduced, therefore the amount of non-native species encroachment would likely be less and direct impacts to special-status species plants would be reduced (compared to Alternative A). Regarding catastrophic fire, under Alternative B impacts would be adverse, long-term, and negligible to minor.

Fire Management Treatments

Managed Wildland Fire

Under the Aggressive Action Alternative, all of the plant special-status species described in this document occur within the Suppression Unit, and only isolated populations of Yosemite onion grow in the Fire Use Unit. During fire events, input from a Resource Advisor would continue to be used to minimize or eliminate impacts to these species (see Chapter 2, Mitigation under Actions Common to All Alternatives and Appendix 3). Under Alternative B, the natural fire regime in areas inhabited by these species would quickly approach the natural range in variability over the landscape, and there would be a reduced potential for catastrophic fire events. Therefore, impacts of managed wildland fire on special-status species under this alternative would be beneficial, long-term, and minor, due to return to natural fire return intervals with associated benefits to ecosystem function.

Re-ignition clause. Re-ignition effects on special-status plants would only apply to isolated populations of Yosemite onion within the Fire Use Unit. This species would neither benefit nor be adversely affected by re-ignition due to its isolated locations on sparsely vegetated outcrops. Actions during re-ignition procedures would adhere to mitigation measures and avoid these populations or habitats (see Chapter 2, Mitigations under Actions Common to All Alternatives).

Holding Action and Monitoring Effects (water and retardant drops, helispots, and spike camps). Special-status plant species are in areas that would be only minimally affected by the proposed actions in Alternative B. These actions would have effects similar to Alternative A, despite increased burning and associated activities. Mitigations would be as described in Alternative A. Impacts of these actions taken in conjunction with mitigation measures would be adverse, short-term, and negligible.

Prescribed Fire

Effects would be similar to those described under Alternative A, however, in Alternative B potential effects to special-status species through prescribed burning would increase with the creation of a larger defensible perimeter around developed areas. This is especially true in the El Portal area because many of these plants grow there. Species would be potentially affected by burning in the shoulder seasons and the probability of non-native species encroachment into sites burned out of season would remain high, as in Alternative A. Appropriate mitigation measures would be developed by the park Vegetation Ecologist and Fire Ecologist. Mitigation measures common to all alternatives (Chapter 2) discusses the common practices for dealing with these situations. Park vegetation personnel may recommend that some areas not be burned. Impacts would be adverse, long-term, and minor to moderate.

Site Preparation Associated with Managed Wildland Fire and Prescribed Fire (hand line, snagging, mop-up)

With the mitigations mentioned in Alternative A, impacts would be similar—adverse, short-term, and negligible to minor.

Fuel Reduction by Hand or Machine

Aggressive Reduction Techniques. These techniques would be unlikely to occur in areas inhabited by special-status species. Mitigations to avoid special-status plant species would be employed therefore there would be no effect.

Passive Reduction and Lower Profile Techniques

Low-Impact Skidding. Low-impact skidding would not be done in areas inhabited by special-status plant species therefore there would be no effect.

Hand Cutting. Hand cutting might affect special-status plant species only within the El Portal Administrative Site. Mitigations (as described in Alternative A) would be used to limit impacts. Yosemite onion and Congdon's lewisia would not be affected by these activities, due to the location of populations. Both Tompkin's sedge and Congdon's woolly-sunflower would be potentially affected by increased activities in wildland/urban interface areas, because of greater amounts of ground disturbance (through foot traffic, dragging cut materials, etc.) and subsequent changes in species composition if non-native species were to become established within the rare plant populations. The impact of hand cutting, if mitigated to the extent possible, would be adverse, long-term, and minor.

Pile burning. Pile burning would increase under Alternative B. Increased activity near populations of Tompkin's sedge and Congdon's woolly-sunflower would increase the potential to harm these species. Yosemite onion and Congdon's lewisia would be unaffected by these activities due to the location of populations. The expanded area of intensively managed vegetation surrounding El Portal would increase levels of disturbance in sites that currently receive no management attention. Efforts would continue to be made to avoid individual plants and populations, by identifying their locations during planning. Piles would be placed in areas that would be unlikely to support these species. Therefore, impacts of pile burning on plant special-status species would be minor, adverse, and potentially long-term, due to the larger area of disturbance and increased potential for spread and establishment of non-native plants. Appropriate mitigations as described in Alternative A and Chapter 2 (Mitigation Measures) would be applied prior to execution of each project.

Chipping. Similar to Alternative A, although amounts of activity would increase. By using measures described in Alternative A (planning, avoidance, depth of chips), effects would be mitigated, thus, effects would be adverse, short-term, and negligible to minor.

Girdling. This action would not occur in areas inhabited by special-status plant species, therefore, there would be no effect.

Helibase upgrades

There would be no impact to special-status species because these species do not occur in the project areas of Crane Flat, El Portal, or Wawona.

Cumulative Impacts

Projects generating cumulative impacts that may affect special-status plants would be the same as those identified in Alternative A. Impacts of increased mechanical treatments within known and potential habitats for special-status plant species, as well as actions associated with implementation of the Yosemite Valley Plan in El Portal, would have increased impacts from non-native plant species introduction and alteration of native plant habitat. Overall, these effects, in combination with the effects of Alternative B, would result in adverse, long-term, and minor cumulative impacts.

Conclusion

Implementation of Alternative B, with increased mechanical thinning and removal, increased management of fuels around developed areas and increased burning would have an overall minimal effect on these species, due to their relative isolation, sparsely vegetated habitats, and occurrence beyond areas that would be managed aggressively. The effect of Alternative B would be adverse, long-term, and minor. There would be no impairment of the park's resources or values.

Special-Status Species – Animals

Sierra Nevada Bighorn Sheep (Ovis canadensis sierrae) – Federal Endangered

Potential for Impacts from Catastrophic Fire

Catastrophic fire would be highly unlikely in bighorn sheep habitat. Lightning strikes that do start fires would help open up the landscape, making it more suitable for bighorns.

Fire Management Treatments

Managed Wildland Fire

Although use of wildland fire would greatly increase under Alternative B, its application on bighorn habitat would be limited since these areas are well within the natural fire return interval. Managed wildland fire would have a negligible, beneficial, long-term effect on bighorn sheep.

Prescribed Fire

Prescribed fire would be unlikely to occur in bighorn sheep habitat, thus would have a negligible, beneficial, long-term effect on bighorn sheep.

Holding Action and Monitoring Effects (water and retardant drops, helispots, and spike camps) and Site Preparation Associated with Managed Wildland Fire and Prescribed Fire (hand line, snagging, mop-up)
The improbability of these actions happening in bighorn habitat, however, limit their expected impact to adverse, short-term, and negligible.

Fuel Reduction by Hand or Machine
Fuel reduction treatments would not occur in bighorn sheep habitat.

Cumulative Impacts

The past, present, and reasonably foreseeable projects that could affect bighorn sheep would be the same as identified in Alternative A. Cumulative impacts from these projects, in combination with the impacts of Alternative B, would remain beneficial, long-term, and negligible.

Conclusion

The impact of Alternative B on Sierra Nevada bighorn sheep would be beneficial, long-term, and negligible based primarily on the continued, though rare, influence of fire on their habitat.

Valley Elderberry Longhorn Beetle (*Desmocerus californicus dimorphus*) – Federal Threatened

Distribution of the valley elderberry longhorn beetle in the area administered by Yosemite National Park is restricted to the El Portal Administrative Site. The entire life cycle of the valley elderberry longhorn beetle is connected to the elderberry plant (*Sambucus sp.*). Adverse effects on elderberry plants would therefore have an adverse effect on this beetle. Current management of vegetation in El Portal follows U.S. Fish and Wildlife Service guidelines for protection of valley elderberry longhorn beetle and their host plants (USFWS 1999).

Potential for Impacts from Catastrophic Fire

Under current conditions, accumulations of fuel in some areas of El Portal could lead to catastrophic fires that would have an adverse effect on valley elderberry longhorn beetle and their host plants. Valley elderberry longhorn beetles and elderberry plants have existed under natural fire regimes for thousands of years, and chaparral and oak woodland communities where elderberry plants are found can burn at an extent and intensity that would cause high mortality of both beetle and host plant. Actions taken under Alternative B, with a goal to treat all wildland/urban interface areas within 5 years, would greatly reduce the potential for catastrophic fire in El Portal. Reduction of the threat of catastrophic fire would therefore, be beneficial, long-term, and moderate.

Fire Management Treatments

Managed Wildland Fire
El Portal Administrative Site, where valley elderberry longhorn beetle habitat occurs, is entirely within the Suppression Unit where wildland fires would be suppressed.

Prescribed Fire
Effects of prescribed fire would be similar to those described under Alternative A, but under Alternative B, prescribed fire use in El Portal would greatly increase in order to reach goals for wildland/urban interface areas within 5 years. Its effect on valley elderberry longhorn beetles

would be beneficial, long-term, and moderate by reducing the risk of catastrophic fire and because long-term benefit to elderberry plants through regeneration and reduced fuel loads would offset the unintentional, short-term impacts from beetle mortality. Mitigation would include following USFWS guidelines for protection of valley elderberry longhorn beetle and their host plants (e.g. see Alternative A).

Holding Action and Monitoring Effects (water and retardant drops, helispots, and spike camps) and Site Preparation Associated with Managed Wildland Fire and Prescribed Fire (hand line, snagging, mop-up)
With the greatly increased use of wildland and prescribed fires under Alternative B, the amount (but not the type) of impacts associated with management of these fires would likely increase, compared to Alternative A. The following fire management actions would be unlikely to occur in valley elderberry longhorn beetle habitat and, therefore, would not affect the species: water and retardant drops, helispot construction, spike camps, and snagging.

Impact on valley elderberry longhorn beetles of actions taken to manage prescribed fire under Alternative B would be adverse, short-term, and negligible, based upon their increased use, and therefore, greater chance of inadvertent effects. Impacts would be limited by the application of mitigation measures in accordance with USFWS guidelines.

Fuel Reduction by Hand or Machine
Aggressive Reduction Techniques.

Mechanical Tree and Shrub Removal. Heavy machinery, such as feller-bunchers would be used to achieve target conditions near developed areas. This aggressive approach would result in a more open forest structure, with removal of some trees in the 15-20” dbh size range. Compliance with U.S. Fish and Wildlife Service guidelines would minimize damage to elderberry plants, but some damage could occur. However, there would be a reduction in the threat of catastrophic fire, which would in the long-term, help protect valley elderberry longhorn beetles and their host plants. Impact of heavy machinery on valley elderberry longhorn beetles under Alternative B would be adverse, short-term, and minor. In the planning area, host plants for the valley elderberry longhorn beetle only occur in El Portal area where minimal mechanical use would be anticipated.

Conventional Tree and Shrub Removal. After cutting, downed trees in some areas would be removed with skidders and grapplers. This could have an adverse effect on valley elderberry longhorn beetles if elderberry plants were damaged or destroyed. However, mapping of elderberry plants in the treatment areas and adherence to park protocols and U.S. Fish and Wildlife guidelines would avoid all but accidental damage. Impact to valley elderberry longhorn beetles from skidding and grappling would be adverse, long-term, and negligible.

Passive Reduction and Lower Profile Techniques.
Hand Cutting. Hand cutting to reduce fuels that threaten developed areas in El Portal would not likely adversely affect the valley elderberry longhorn beetle. Standard mitigation requires the mapping of all elderberry plants in a treatment area. All elderberry plants with stems greater than 1-inch diameter at ground level would be left. This would protect the plants most likely to be inhabited by valley elderberry longhorn beetles. Hand cutting could affect the recruitment of small plants into the larger, valley elderberry longhorn beetle-suitable size class. The reduction in fuels by hand cutting, in combination with other treatments, would help reduce the threat of

catastrophic fire, which would help protect valley elderberry longhorn beetles and their host plants. Impact on valley elderberry longhorn beetles from hand cutting under Alternative B would be beneficial, long-term, and moderate.

Pile Burning. Cut trees and brush would, in some cases, be piled and burned. Impact to valley elderberry longhorn beetles and their host plants would occur if materials were piled and burned too closely to elderberry plants. Park protocols and U.S. Fish and Wildlife guidelines would however, minimize the chance of damage. Impact of pile burning on valley elderberry longhorn beetles under Alternative B would be adverse, short-term, and negligible.

Chipping. In some cases, when logistical, administrative, or ecological reasons made on-site burning unsuitable, cut materials would be chipped. Effects would be the same as described in Alternative A—adverse, long-term, and negligible.

Girdling. Girdling of trees would be used to reduce stand density in some areas. This technique would eventually reduce fuel loading in some areas, but is unlikely to have much effect on valley elderberry longhorn beetles. Impact of this technique on valley elderberry longhorn beetles would be beneficial, long-term, and negligible.

Cumulative Impacts

Specific past present and reasonably foreseeable projects that could adversely affect valley elderberry longhorn beetles near the El Portal Administrative Site would be the same as described under Alternative A. Impacts to valley elderberry longhorn beetle from present and reasonably foreseeable actions would be beneficial, long-term, and minor. Considered in combination with the effects of Alternative B, cumulative impacts to valley elderberry longhorn beetle would be beneficial, long-term, and minor.

Conclusion

Impact of Alternative B on valley elderberry longhorn beetles is expected to be beneficial, long-term, and minor due primarily to the reduction in the threat of catastrophic fire, through an intensive program of prescribed fire and thinning.

California Red-Legged Frog (*Rana aurora draytonii*) - Federal Threatened

California red-legged frogs have nearly disappeared from the Sierra Nevada—only two populations are known to exist in the northern extent. Recent surveys have found none in Yosemite (Knapp 2000) although habitat does exist. Red-legged frog habitat was identified through wildlife habitat relationships analysis (Mayer and Laudenslayer 1988).

Potential for Impacts from Catastrophic Fire

Under the median fire return interval, approximately 92% of the high-quality habitat has missed more than four fires. Most effects of catastrophic fire would be similar to under Alternative A, but actions under Alternative B would reduce fuel accumulations in 10 to 15 years and reduce the risk of catastrophic fire. The effect on red-legged frog habitat from catastrophic fire would be reduced, compared to Alternative A. Impacts would be beneficial, long-term, and negligible. Mitigation: Identify potential red-legged frog habitat and focus fuel-reduction efforts on those areas.

Fire Management Treatments

Managed Wildland Fire

Managed wildland fire would be the primary method for managing high-quality red-legged frog habitat, because approximately 84% of it is in the Fire Use Unit. Fuel loads and the risk of catastrophic fire would be reduced by allowing natural ignitions to burn under strict management protocols. Because target conditions would be achieved in a 10 to 15 year period under Alternative B, the use of wildland fire would increase, through managing some lightning fires and re-igniting some suppressed fires. Decisions about whether lightning fires would be managed or suppressed would be based upon the same decision elements as in Alternative A. However, under Alternative B, suppressed wildland fires could be re-ignited when conditions were favorable for a burn (up to 3 years after they were suppressed). Under the aggressive action proposed in Alternative B, this would be a valuable tool in restoring natural, fire-influenced wildlife habitat. This would have a beneficial effect on red-legged frog habitat by quickly reducing the threat of catastrophic fire.

Re-ignited fires would be started when conditions were favorable for their control. This would generally be in spring or fall, which is outside the period when most natural fires occur (summer when lightning strikes and dry fuels combine). Burning in the shoulder seasons could have an adverse effect on frogs hibernating in riparian areas that would be burned. However, no California red-legged frogs are known to exist in Yosemite. Under Alternative B, managed wildland fire would have a minor, beneficial, long-term impact on California red-legged frog habitat by helping to restore the natural structure and fuel loading in riparian areas, and quickly reducing the threat of catastrophic fire.

Prescribed Fire

Prescribed fires would be started in the shoulder seasons, when conditions were favorable for their control. This would have an adverse effect on red-legged frogs hibernating in riparian areas when they were burned. However, no red-legged frogs are known to exist in the park. Most effects of prescribed fire would be similar to those under Alternative A, but the greater amount of burning would reduce the potential for catastrophic fire. Impact to California red-legged frog habitat from prescribed burning under Alternative B would be beneficial, long-term, and minor, because of the relatively rapid treatment of habitats that have severely deviated from their natural fire return interval. However, the area of high-quality red-legged frog habitat that would be affected would be relatively small.

Holding Action and Monitoring Effects (water and retardant drops, helispots, and spike camps) and Site Preparation Associated with Managed Wildland Fire and Prescribed Fire (hand line, snagging, mop-up)

With the greatly increased use of prescribed and wildland fires under Alternative B, the effects from actions used to manage these fires would also increase. Most effects would be similar to those described in Alternative A, but amount of effect would increase. Mitigations would be the same as in Alternative A. Impact of prescribed and wildland fire management actions on California red-legged frogs under Alternative B would be adverse, long-term, and minor, primarily from the threat of the bullfrog spread because of water drops. This could be mitigated by prohibitions against dipping water from waters known to contain bullfrogs.

Fuel Reduction by Hand or Machine

Aggressive Reduction Techniques.

Mechanical Tree and Shrub Removal. Under Alternative B, the use of feller-bunchers and other heavy machinery would be the primary method for achieving target conditions in wildland/urban interface and other areas associated with development and roads. Such equipment would cause considerable ground disturbance, but would be unlikely to affect red-legged frog habitat, because it would not be used in wet environments. If red-legged frogs were present, use of heavy equipment in riparian areas would have an adverse effect on frogs sheltering under shrubs and leaf litter. However, no red-legged frogs are known to occur in the park so impact to red-legged frogs from mechanical thinning with heavy machinery would be beneficial, negligible, short-term, due to the reduction in unnaturally high levels of forest fuels.

Conventional Tree and Shrub Removal. Under Alternative B, cut and down materials would be removed from some treatment sites using grappling and skidding equipment. Disturbance of soil and forest litter would occur, which could affect red-legged frogs sheltering in riparian areas. Impact, however, would be negligible, because no red-legged frogs are known to inhabit the park. The habitat would benefit from the reduction in fuel loading facilitated by skidding and grappling. Impact of grappling and skidding on red-legged frogs under Alternative B would be beneficial, long-term, and negligible.

Passive Reduction and Lower Profile Techniques.

Hand Cutting. Site-specific effects would be similar to those under Alternative A. Impact of hand cutting, in combination with other treatments, on red-legged frogs under Alternative B would be beneficial, long-term, and minor, due to the possible reduction in the threat of catastrophic fire near potential habitat.

Chipping. The distribution of chips in riparian areas could suppress vegetation, but current park guidelines would reduce this risk, resulting in negligible impacts.

Cumulative Impacts

The past, present, and reasonably foreseeable projects that would have a potential to affect red-legged frog would be the same as evaluated in Alternative A. Beneficial impacts from present and reasonably foreseeable projects in combination with effects of Alternative B would result in beneficial, long-term, and minor cumulative impacts, due to implementation of land management plans that would protect habitat and species conservation plans that would protect the species.

Conclusion

Impact of Alternative B on California red-legged frogs would be beneficial, long-term, and minor, due primarily to a rapid reduction in the threat of catastrophic fire through use of prescribed and wildland fire.

Bald Eagle *(Haliaeetus leucocephalus)* - Federal Threatened

Bald eagles are rare and transient in the Yosemite area, and while they have been seen in many areas of the park, they are most frequently seen near large rivers and lakes. Fish are the primary prey of bald eagles, and large trees and snags for perching are important habitat components. Nesting by bald eagles is not known to occur in the park or El Portal. Bald eagle habitat was identified through wildlife habitat relationships analysis (Mayer and Laudenslayer 1988).

Potential for Impacts from Catastrophic Fire

Approximately 66% of high-quality eagle habitat has missed more than four fires. This means a substantial portion of the park's bald eagle habitat is at risk of catastrophic fire. Under Alternative

B, treatment of these severely deviated areas would proceed at a relatively rapid pace through the use of wildland and prescribed fire, with a goal of achieving target conditions within 10 to 15 years. This would help protect the large trees and snags that are important bald eagle habitat components. Impact of the reduction of the threat of catastrophic fire on bald eagles under Alternative B would be beneficial, long-term, and moderate.

Fire Management Treatments

Managed Wildland Fire

Approximately half of the high-quality bald eagle habitat in the park would be in the Fire Use Unit and would benefit from low-intensity, lightning fires that are allowed to burn. Fire would open up the forest, making it more navigable by bald eagles. It would reduce the threat of catastrophic fire, which could destroy the large, old growth trees and snags that are important habitat components to bald eagles. Under Alternative B, the increased use of wildland fire and the use of re-ignitions of suppressed wildland fires (up to 3 years afterward) would greatly increase the amount of habitat burned. Reaching target conditions in 10 to 15 years would quickly reduce the potential for catastrophic fire. Because of high levels of fuels in some areas, managed wildland fires could burn at unnaturally high intensities, which could cause the death of some large trees. This adverse effect, however, must be weighed against the reduced threat of catastrophic fire. Impact of managed wildland fire on bald eagles under Alternative B would be beneficial, long-term, and major, due to the relatively rapid rate at which the threat of catastrophic fire would be reduced.

Prescribed Fire

Approximately half of the high-quality bald eagle habitat in the park would be in the Suppression Unit. This means prescribed fire would be the primary tool for fuel reduction and restoration of natural forest structure in a substantial portion of the park's bald eagle habitat. Habitat in the Suppression Unit would also include that most severely deviated from the natural fire regime. Under Alternative B, the liberal use of prescribed fire would quickly restore natural forest structure and reduce the threat of catastrophic fire. The current high levels of fuel accumulation could cause high intensity fires that would kill some of the larger trees. This adverse effect, however, must be weighed against the reduced threat of catastrophic fire over large areas that would result from prescribed fire use. Impact of prescribed fire on bald eagles under Alternative B would be beneficial, long-term, and major, due to the relatively rapid rate at which the threat of catastrophic fire would be reduced and the natural forest structure restored.

Holding Action and Monitoring Effects (water and retardant drops, helispots, and spike camps) and Site Preparation Associated with Managed Wildland Fire and Prescribed Fire (hand line, snagging, mop-up)

Because wildland and prescribed fire use would increase greatly under Alternative B, impacts associated with management of these fires would also increase over Alternative A. Construction of hand lines would have an adverse effect on bald eagles if large trees or snags were cut in areas used by eagles. This would generally not occur, since the management goals of this plan would be to retain old growth forest attributes, and hand lines would avoid these features to the greatest extent feasible. Water or retardant drops would have an adverse effect on eagles if a nest were struck or if nesting birds were disturbed by aircraft. However, no eagles currently nest in the park, and any future nests would be identified as a sensitive resource to avoid. Helispots would generally be constructed in open areas away from the tall trees favored by eagles. Snagging would have an adverse effect on eagles if important perching or roosting snags were cut, but snags would only be cut if they represented a threat to life and safety, were a threat to control of a wildland fire, or presented a hazard to property or park resources. Some snags would be lost in fires, but new snags would be created from fire mortality. Overall, impact of fire management actions under Alternative B would be adverse, short-term, and minor, primarily from actions affecting snags.

Fuel Reduction by Hand or Machine
Aggressive Reduction Techniques.
Mechanical Tree and Shrub Removal. Heavy machinery, such as feller-bunchers, would be used for forest thinning in wildland/urban interface and other special treatment areas. This could have an adverse effect on bald eagles if large, old-growth trees were removed, but prescriptions would only allow the removal of trees no greater than 20" in diameter. This would have localized adverse effects on bald eagles in Yosemite Valley, since trees of this size may be the largest ones in some areas, although bald eagles are very rare in the Valley. Neither pile burning in association with these operations nor chipping would affect eagles. Thinning by use of heavy machinery under Alternative B would have a negligible, adverse, long-term impact on bald eagles.

Conventional Tree and Shrub Removal. Skidding and grappling would be used to remove cut material for wildland/urban interface and other Special Management Areas. Such operations would generally cause a considerable amount of ground disturbance, but such impacts would not adversely affect bald eagles. The eagles, however, would benefit from the reduced risk of catastrophic fire from the removal of fuels. Impacts of skidding and grappling on bald eagles under Alternative B would be beneficial, long-term, and negligible.

Passive Reduction and Lower Profile Techniques.
Hand Cutting. Same as Alternative A—negligible, adverse, short-term.

Girdling. Girdling of trees, which would occur under Alternative B, could be used as a treatment to create more snags for use by bald eagles, although eagles are seldom seen in the treatment areas. Effects would be beneficial, long-term, and negligible.

Cumulative Impacts
Past, present, and reasonably foreseeable projects that could affect bald eagles would be the same as under Alternative A with beneficial, long-term, and minor impacts, based upon the continuing recovery of the species and implementation of broad-ranging plans that would further benefit the species. Considered in combination with the effects of Alternative B, cumulative impacts would be beneficial, long-term, and moderate.

Conclusion
Alternative B would have a moderate, beneficial, long-term effect on bald eagles, primarily from a rapid reduction in the threat of catastrophic fire that exists over much of their habitat.

Mountain Yellow-Legged Frog *(Rana muscosa)* - Under Review for Federal Listing

The USFWS has determined that listing of this species is warranted but precluded. Mountain yellow-legged frog habitat was identified through wildlife habitat relationships analysis (Mayer and Laudenslayer 1988).

Potential for Impacts from Catastrophic Fire

Conditions would be the same as in Alternative A. Effects would be beneficial, short-term, and negligible, due to the gradual reduction in the risk of catastrophic fire.

Fire Management Treatments

Managed Wildland Fire

Over 98% of high-quality mountain yellow-legged frog habitat would occur in the Fire Use Unit, but over 90% of this habitat has not deviated from its natural fire regime. Managed wildland fire would have little effect on mountain yellow-legged frogs, other than maintaining the natural fire regime. Managed wildland fire would increase greatly under Alternative B. Some benefit to mountain yellow-legged frogs would be derived from reduction in the risk of catastrophic fire in the small proportion of the habitat that has been altered from fire suppression. Impact of managed wildland fire on mountain yellow-legged frogs under Alternative B would be beneficial, long-term, and minor.

Prescribed Fire

Use of prescribed fire would increase greatly under Alternative B, but with only 2% of mountain yellow-legged frog habitat occurring in the Fire Suppression Unit, and so little of its habitat in need of burning, prescribed fire would have a minor effect on the species. Some benefit to mountain yellow-legged frogs would be derived from reduction in the risk of catastrophic fire in the small proportion of habitat out of its natural fire return interval. Impact of prescribed fire on mountain yellow-legged frogs under Alternative B would be beneficial, long-term, and minor.

Holding Action and Monitoring Effects (water and retardant drops, helispots, and spike camps) and Site Preparation Associated with Managed Wildland Fire and Prescribed Fire (hand line, snagging, mop-up)

Because use of wildland and prescribed fire would increase greatly under Alternative B, impacts from actions taken to manage these fires would also increase. Effects from water dipping and water drops would likely increase under Alternative B, but would be mitigated by avoiding dipping from waters containing mountain yellow-legged frogs, bullfrogs, or non-native fish. Likewise, helispots, spike camps, and hand lines would be sited away from mountain yellow-legged frog habitat. Overall impact of prescribed and wildland fire management actions on mountain yellow-legged frogs under Alternative B would be adverse, long-term, and minor, due primarily to the risks associated with water drops. Mitigation: Comply with established protocols to protect resources; identify locations of sensitive resources to avoid impacts; use MIMT.

Fuel Reduction by Hand or Machine

Aggressive Reduction Techniques.

Mechanical Tree and Shrub Removal. This treatment would not be used in or near any mountain yellow-legged frog habitat.

Conventional Tree and Shrub Removal. These techniques would cause considerable ground disturbance, but would be unlikely to affect mountain yellow-legged frogs because they would not be used in wetland areas. Impact to mountain yellow-legged frogs from skidding and grappling under Alternative B would be adverse, short-term, and negligible.

Passive Reduction and Lower Profile Techniques.

Hand Cutting. No populations of mountain yellow-legged frogs are known to occur in areas where hand-cutting would be applied. Therefore, this action, along with pile burning, would have no effect on mountain yellow-legged frogs.

Cumulative Impacts

Past, present, and reasonably foreseeable projects that would affect yellow-legged frog habitat would be the same as in Alternative A. Impacts from these projects would be beneficial, long-term, and moderate, based primarily on active efforts to protect and restore the species, and the implementation of land management plans that would provide more ecosystem-based management of habitats. In combination with the effects of Alternative B, cumulative impacts would remain beneficial, long-term, and moderate.

Conclusion

Impact to mountain yellow-legged frogs from Alternative B would be beneficial, long-term, and minor, due primarily to the return of a natural fire regime to the small area of habitat that has departed from a natural fire return interval.

Yosemite Toad (*Bufo canorus*) - Under Review for Federal Listing

The USFWS has determined that listing of this species is warranted but precluded. Yosemite toad habitat was identified through wildlife habitat relationships analysis (Mayer and Laudenslayer 1988).

Potential for Impacts from Catastrophic Fire

Catastrophic fire has a low potential for impact on Yosemite toads. The majority of lodgepole and whitebark pine forests that surround the meadows and pond habitats have not seriously diverged from a natural fire return interval. Over 67% of suitable Yosemite toad habitat and 79% of high-quality habitat are within one median fire return interval. This, coupled with the preference of the species for moist habitats, makes it unlikely that catastrophic fire would have an appreciable effect on Yosemite toads. Conceivably, fires adjacent to occupied habitat would have an adverse effect if sedimentation increased, but such effects have not been demonstrated. Impact of the reduction in risk of catastrophic fire on Yosemite toads under Alternative B would be beneficial, short-term, and negligible.

Fire Management Treatments

Managed Wildland Fire

Use of wildland fire would increase greatly under Alternative B. Over 95% of Yosemite toad habitat occurs in the Fire Use Unit, but over 67% of this habitat is within one median fire return interval. Managed wildland fire would have a minor effect on Yosemite toads and would help maintain the natural fire regime. Yosemite toads would benefit from reduction in the risk of catastrophic fire in the proportion of habitat that has deviated from the natural fire regime. Impact of managed wildland fire on Yosemite toads under Alternative B would be beneficial, long-term, and minor.

Prescribed Fire

Same as Alternative A—beneficial, long-term, and negligible.

Holding Action and Monitoring Effects (water and retardant drops, helispots, and spike camps) and Site Preparation Associated with Managed Wildland Fire and Prescribed Fire (hand line, snagging, mop-up)
Because use of wildland and prescribed fire would increase greatly under Alternative B, impacts associated with management of these fires would be expected to increase, but the types of effects would be the same as described in Alternative A. Overall impact of prescribed and wildland fire management actions on toads under Alternative B would be adverse, long-term, and minor, due primarily to the risk to remaining populations from water drops and retardant contamination. Mitigation: Identify locations of Yosemite toad populations and avoid involvement of these areas in water and retardant drops.

Fuel Reduction by Hand or Machine
Aggressive Reduction Techniques
Mechanical Tree and Shrub Removal. The use of heavy machinery, such as feller-bunchers would not affect Yosemite toads because the equipment would not be used in wet habitats, and no known Yosemite toad populations occur in hand or machine treatment areas.

Conventional Tree and Shrub Removal. Skidding and grappling techniques would not be used in the remote areas where Yosemite toads occur. Impact would be adverse, short-term, and negligible.

Passive Reduction and Lower Profile Techniques
Hand Cutting. Same as Alternative A—beneficial, long-term, and negligible.

Cumulative Impacts

Past, present, and reasonably foreseeable projects would be the same as described in Alternative A. Impacts on the Yosemite toad would be beneficial, long-term, and moderate, based primarily on active efforts to protect and restore the species, and the implementation of land management plans that would provide more ecosystem-based habitat management. Considered in combination with the impacts of Alternative B, cumulative impacts would be beneficial, long-term, and moderate.

Conclusion

Impact to the Yosemite toad from Alternative B would be beneficial, long-term, and minor, due primarily to the return of a natural fire regime to habitat that has departed from a natural fire regime, although the wet habitats of Yosemite toads would unlikely be directly affected.

California Spotted Owl (Strix occidentalis occidentalis)

California spotted owls are found throughout the Sierra Nevada, from lower elevation oak and ponderosa pine forests up to 7,600 feet elevation red fir forests. There are approximately 100 known and probable spotted owl sites in Yosemite National Park. While spotted owls can coexist with extensive fires of varying intensities within their habitats, severe wildland fire in mixed-conifer forests may represent the greatest threat to existing spotted owl habitat in Yosemite (Weatherspoon et al. 1992). California spotted owl habitat was identified through wildlife habitat relationships analysis (Mayer and Laudenslayer 1988).

Potential for Impacts from Catastrophic Fire

Under a natural fire regime, much of the spotted owl habitat in the Sierra was subject to frequent, low-intensity fires. Under current conditions, approximately 49% of high-quality spotted owl habitat has missed over four fires under the median fire return interval departure criteria. About 54% of high-quality spotted owl habitat would occur in the Fire Suppression Unit, where the greatest threat of catastrophic fire would exist from severely high fuel loads. Without treatment, these conditions would likely result in large stand-replacing fires, which would destroy spotted owl habitat by reducing the canopy closure that defines good habitat. In addition, the growth of dense understory vegetation could affect habitat quality by making foraging by spotted owls more difficult. Under Alternative B, these conditions would be rapidly reduced through prescribed and managed wildland fire. Impact of the reduction of risks of catastrophic fire on California spotted owls under Alternative B would be beneficial, long-term, and major.

Fire Management Treatments

Managed Wildland Fire

Effects would be similar to those described in Alternative A, except under Alternative B managed wildland fire would greatly increase. Adverse effects from wildland fire could be minimized through reduction of fuel loading in known nesting and roosting areas through the use of spring prescribed fires, which would disrupt fuel continuity and reduce the chance of stand-replacing fires in these areas (Weatherspoon et al., 1992). The impact of managed wildland fire on California spotted owls would be beneficial, long-term, and major, based on lessening the threat of catastrophic fires, over a 10 to 15 year period.

Prescribed Fire

Effects would be similar to those described in Alternative A. The use of prescribed fire under Alternative B would have major, beneficial, long-term impact on California spotted owls, primarily through the reduction of the threat of catastrophic fire and the restoration of a more natural forest structure. Reduction of fuels in spotted owl roosting and nesting habitat through low-intensity burns or mechanical thinning at appropriate times of the year would minimize adverse impacts.

Holding Action and Monitoring Effects (water and retardant drops, helispots, and spike camps) and Site Preparation Associated with Managed Wildland Fire and Prescribed Fire (hand line, snagging, mop-up)

Same effects as Alternative A. Overall, actions taken to manage wildland and prescribed fire under Alternative B would have a minor, adverse, long-term effect on spotted owls through possible disturbance and habitat alteration in roosting and nesting sites. Adverse effects could be mitigated by locating all spotted owl sites in a treatment area and avoiding impacts to them.

Fuel Reduction by Hand or Machine

Aggressive Reduction Techniques.

Mechanical Tree and Shrub Removal. Under Alternative B, forests in wildland/urban interface areas would be thinned and biomass would be reduced with the use of heavy machinery, such as feller-bunchers. To provide protection for developed areas, wildland/urban interface areas would be thinned to the lower end of the range of natural variability (as described in Chapter 2, table 2.3). This would result in the removal of many secondary canopy trees up to 20” in diameter, and removal of some snags. The reduction in canopy cover and number of snags would affect the quality of these areas to spotted owls. Knowing and avoiding spotted owl roosting and nesting sites in treatment areas would allow impacts to be minimized resulting in adverse, long-term, and minor impacts.

Conventional Tree and Shrub Removal. The use of skidding and grappling to remove cut and down fuels in wildland/urban interface and other Special Management Areas would help reduce fuel loading and the risk of catastrophic fire. The clearing of understory vegetation would also create more favorable foraging conditions for spotted owls. Adverse effects on spotted owls would occur if many large, downed logs were removed from the forest, because this could result in a decrease in northern flying squirrel, an important prey item of spotted owls. Impact of biomass removal on spotted owls under Alternative B would be adverse, long-term, and minor, through localized effects on forest habitats.

Passive Reduction and Lower Profile Techniques.
Hand Cutting. Under Alternative B, hand cutting near developments and roads would have an adverse effect on spotted owls if canopy closure were reduced enough to affect its quality to spotted owls. This is especially true for roosting and nesting sites, which require a high degree of canopy closure, and where developed areas interface with dense forest. Adverse impacts could be avoided through determining whether spotted owls were present in the treatment area. The clearing of understory vegetation would improve foraging conditions for spotted owls. Impact of hand cutting and burning on California spotted owls under Alternative B would be beneficial, long-term, and minor, based upon possible return of treated areas to a more natural forest structure.

Chipping. The equipment used to chip material would be extremely loud and would disturb nearby spotted owls. Such impact, however, would be adverse, short-term, and negligible.

Girdling. Girdling of trees as a thinning technique would create snag habitat for spotted owls, an effect that would be beneficial, long-term, and moderate to major. An adverse effect would occur if the snags were removed while the owls are using them.

Cumulative Impacts

Past, present, and reasonably foreseeable projects would be the same as described in Alternative A. Effects of reasonably foreseeable projects would be beneficial, long-term, and moderate. Considered in combination with the effects of Alternative B, cumulative impacts would be beneficial, long-term, and moderate to major.

Conclusion

Alternative B would have major, beneficial, long-term impact on spotted owls, from a rapid reduction in the threat of catastrophic fire and restoration of natural forest structure through wildland and prescribed fire. Fuels management in known spotted owl roosting and nesting habitat would minimize adverse impacts.

Pacific Fisher *(Martes pennanti)* - Under Review for Federal Listing

Pacific fisher habitat was identified through wildlife habitat relationships analysis (Mayer and Laudenslayer 1988).

Potential for Impacts from Catastrophic Fire

Catastrophic fire has the potential for severely altering fisher habitat by reducing canopy closure and forest floor features that are important components of suitable fisher habitat. Thirty-five percent of all potential fisher habitat and 32% of high-quality fisher habitat has missed more than four fires. This indicates that catastrophic fire could have a substantial effect on fishers. Studies, observations, and roadkills of fishers in Yosemite indicate that the highest density of fishers is found south of Yosemite Valley; especially along the Wawona Road and Glacier Point Road corridors. Much of the area along Wawona Road has missed more than four fire return intervals (map 2-5), making it among the areas at highest risk of catastrophic fire. As such, catastrophic fire in Yosemite has a high potential for adverse impacts on fishers. Under Alternative B, through increased use of managed wildland and prescribed fire fuel loading would be rapidly reduced, thereby restoring natural forest structure, and maintaining a natural fire regime. The effect of Alternative B to fishers would be beneficial, long-term, and major, because of the reduced potential for catastrophic fire.

Fire Management Treatments

Managed Wildland Fire

The area treated with fire would greatly increase under Alternative B, through the increase in managed wildland fires and the re-ignition of suppressed fires in the Fire Use Unit. Seventy-seven percent of all fisher habitat and 69% of high-quality habitat in the park would occur in the Fire Use Unit. Managed wildland fire, therefore, would have the potential for achieving and maintaining reduced fuel loading and natural forest structure, as a benefit to fishers. Current high levels of fuel loading in some areas, however, indicate that fire intensity would be great in some areas, reducing the large, woody debris, and large snags that are important habitat components. Also, over the short-term, shrub cover would be reduced. Overall, wildland fire would be beneficial to fishers. Under Alternative B, managed wildland fire would have a major, beneficial, long-term effect on fishers.

Prescribed Fire

Use of prescribed fire would greatly increase under Alternative B. Because prescribed fires could be used to target habitats that have been most severely altered by a history of fire suppression and are at the greatest risk of catastrophic fire, Alternative B would have the potential to yield great resource benefit. This would be especially true for fishers, because the area of the park believed to support the highest density of this species is in the Fire Suppression Unit, which is among the most severely deviated from a natural fire regime.

High fuel loading in some areas could result in prescribed fires of high enough intensity to consume large woody debris, which is an important component of fisher habitat. Also, large snags, which are of high value to fishers, would be consumed. Prescribed fires conducted with a concern for fishers would minimize these losses. While reduction in the risk of catastrophic fire would yield the greatest, long-term benefit to fishers, fire prescriptions should strive to conserve habitat elements that are important to fishers (e.g., large trees, snags, and large woody debris). Impact of prescribed fire on fishers under Alternative B would be beneficial, long-term, and major, based on a rapid reduction in the threat of catastrophic fire and ecosystem restoration. Care, however, must be taken to preserve habitat features that are important to fishers.

Holding Action and Monitoring Effects (water and retardant drops, helispots, and spike camps) and Site Preparation Associated with Managed Wildland Fire and Prescribed Fire (hand line, snagging, mop-up)

Same as Alternative A—adverse, long-term, and minor effect on fishers, primarily from possible reduction in the number of snags.

Fuel Reduction by Hand or Machine

Aggressive Reduction Techniques.
Mechanical Tree and Shrub Removal. Under Alternative B, some forests in wildland/urban interface areas would be treated using heavy machinery to thin forests and reduce biomass. To provide protection for developed areas, prescriptions for wildland/urban interface areas would produce forest habitat at the lower end of the natural range of variability (in the target values for tree density and fuel loading). This could have an adverse effect on fisher habitat in these areas by reducing habitat complexity, and by removing key habitat features, such as snags and large down woody debris. Heavy equipment would also cause short-term impact associated with noise and disturbance. Biomass removal under Alternative B would have a minor, adverse, long-term effect on fishers.

Conventional Tree and Shrub Removal. The use of skidding and grappling machinery to remove large, woody debris would have an adverse effect on fishers by reducing habitat complexity; especially from the loss of large, down trees. There would also be a reduction in the threat of catastrophic fire from the resulting fuel reduction. Impacts would be adverse, long-term, and negligible.

Passive Reduction and Lower Profile Techniques.
Hand Cutting. Same as Alternative A—adverse, long-term, and negligible.

Chipping. The noise of chipping machines would cause short-term disturbance near developed areas. Chips spread too thickly would suppress understory vegetation, which would adversely effect fishers, but the areas where this technique would be used are already marginal habitat due to existing levels of human disturbance and habitat fragmentation. Impacts would be adverse, short-term, and negligible.

Cumulative Impacts

Past, present, and reasonably foreseeable projects would be the same as in Alternative A. Effects of reasonably foreseeable projects would be beneficial, long-term, and moderate. Alternative B would reduce the potential for catastrophic fire, thus, considered in combination with the impacts of Alternative B, the cumulative impact would be beneficial, long-term, and moderate to major.

Conclusion

Overall, Alternative B would have a major, beneficial, long-term effect on fishers by quickly reducing the threat of catastrophic fire and restoring natural forest structure through the use of wildland and prescribed fires, especially in the southwest part of the park where fisher densities are believed to be highest and where fuel loading has reached critical levels. Fuel-reduction actions, however, must take into account preservation of habitat features, such as snags and large down woody debris, which are important to fishers.

Great Gray Owl *(Strix nebulosa)* – California Endangered

Great gray owl habitat was identified through wildlife habitat relationships analysis (Mayer and Laudenslayer 1988).

Potential for Impacts from Catastrophic Fire

Approximately 35% of all great gray owl habitat and 19% of high-quality great gray owl habitat has missed more than four fires, under the median analysis. This means, overall, catastrophic fire has the potential for substantial effects on the park population of great gray owls. Shading of nest sites is an important factor affecting nest site selection and nesting success because here, at the furthest southern extent of the species range, overheating of incubating adults and nestlings can occur (Reid 1989). In a catastrophic fire, nesting snags would be lost, and trees shading surviving snags would be sparse. More snags would be created in a fire, but they would not be suitable without shade, and with few living trees, long-term recruitment of snags would be reduced.

At lower elevations, on wintering areas, catastrophic fire would have little effect on great gray owls. The A-Rock fire that burned over Foresta in 1990 has had no detectable effect on the use of Big Meadow by wintering great gray owls, and may have actually opened up more foraging habitat (Thompson, personal observation). The rapid treatment of accumulated fuels under Alternative B through prescribed and wildland fires would greatly reduce the threat of catastrophic fire. The impact of Alternative B would be beneficial, long-term, and moderate, given the substantial portion of great gray owl habitat over which there is a threat of catastrophic fire.

Fire Management Treatments

Managed Wildland Fire

Effects would be similar to those in Alternative A, except under Alternative B managed wildland fire would be greatly increased. Resource protection measures in great gray habitat should take into account preservation of habitat features that are important to the owls. Considerations regarding adverse effects, however, must be weighed against the risk of catastrophic fire, to prevent an emphasis on fire suppression in the Fire Use Unit. The effect of managed wildland fire on great gray owls under Alternative B would be beneficial, long-term, and major, based upon the large amount of great gray owl habitat that has large departures from the median fire return interval and the rapid treatment of this habitat that would occur.

Prescribed Fire

Under Alternative B, use of prescribed fire would greatly increase and would concentrate on areas that have most severely deviated from the natural fire cycle. Impact of prescribed fire on great gray owls under Alternative B would be beneficial, long-term, and major, based upon the improvement of habitat, and the reduction in the threat of catastrophic fire that would occur. Prescriptions for fires in great gray owl habitat would take into consideration the preservation of large, old snags that are important to the owls.

Holding Action and Monitoring Effects (water and retardant drops, helispots, and spike camps) and Site Preparation Associated with Managed Wildland Fire and Prescribed Fire (hand line, snagging, mop-up)

Effects would be similar to those in Alternative A, but the number of treatment acres would be greater. Overall, actions taken to manage wildland and prescribed fires would have a minor, adverse, long-term effect on great gray owls under Alternative B. This is primarily based upon possible impacts associated with snag removal, which would be strictly limited in great gray owl habitat.

Fuel Reduction by Hand or Machine

Aggressive Reduction Techniques.

Mechanical Tree and Shrub Removal. Under Alternative B, heavy machinery would be used to thin forests and reduce biomass in wildland/urban interface areas. To provide protection for developed areas, prescriptions for wildland/urban interface areas would produce forest habitat at the lower end of the range of natural variability (for target values for tree density and fuel loading).

This could have an adverse effect on great gray owls in these areas by reducing the density of snags and nest-shading trees. Heavy equipment would also cause short-term impact associated with noise and disturbance. Before such treatments were used in an area, the occurrence of great gray owls would be determined, and steps taken to preserve important habitat features and minimize disturbance. The potential for adverse effects on great gray owls would be most likely at Crane Flat, Hodgdon Meadow, Wawona Meadow, and along the Glacier Point Road, where the species is known to occur. Impact to great gray owls from thinning by heavy machinery would be adverse, short-term, and minor.

Conventional Tree and Shrub Removal. The use of skidding and grappling equipment to reduce fuel loading would have an adverse effect on great gray owls if it were to occur in nesting and foraging habitat, where disturbance could cause reproductive failure. Before such operations were undertaken in potential great gray owl habitat, it would be necessary to determine if the owls are present. Impact to great gray owls from thinning by heavy machinery would be adverse, short-term, and minor if actions were taken into account for protection of the owls.

Passive Reduction and Lower Profile Techniques.
Hand Cutting. Effects would be similar to those in Alternative A, but would be in combination with other biomass removal activities. Impact of hand cutting on great gray owls under Alternative B would be adverse, long-term, and minor, based upon potential disturbance of hunting and nesting owls, and reduction in snag density.

Chipping. Same as Alternative A—adverse, short-term, and minor.

Girdling. Girdling would be used as a tool for maintaining snag density, resulting in minor to beneficial, long-term, and moderate impacts.

Cumulative Impacts

Past, present, and reasonably foreseeable projects that would affect great gray owls would be the same as in Alternative A. The effects of reasonably foreseeable projects would be beneficial, long-term, and moderate. Considered in combination with the effects of Alternative B, cumulative impacts would be moderate, beneficial and long-term.

Conclusion

The impact of Alternative B on great gray owls would be beneficial, long-term, and moderate, based primarily on a rapid reduction in the threat of catastrophic fire. Actions taken to manage wildland and prescribed fires, and mechanically manage fuels would have locally adverse effects on great gray owls if they reduced snag density or caused disturbance of nesting or hunting owls.

Willow Flycatcher *(Empidonax trailii)* – California Endangered

Willow flycatcher habitat was identified through wildlife habitat relationships analysis (Mayer and Laudenslayer 1988).

Potential for Impacts from Catastrophic Fire

Sixty percent of all potential willow flycatcher habitat and 60% of high-quality habitat in the park has missed more than four fires. This means a large proportion of Yosemite's willow flycatcher habitat is vulnerable to catastrophic fire, although local conditions (i.e., moisture in meadows) would have the greatest influence on the potential for fire to affect specific habitat components – willow and their consumption by fire – that most directly affect the flycatchers.

The risk of catastrophic fire would be rapidly reduced under Alternative B through the widespread use of wildland and prescribed fires thus the impact of Alternative B would be beneficial, long-term, and minor, based on the amount of habitat that is outside of the natural fire regime, but moderated by the inherent low fire frequency and intensity associated with meadow habitats.

Fire Management Treatments

Managed Wildland Fire

Effects would be similar to those in Alternative A, except that more acres would be treated. Use of wildland fire under Alternative B would result in minor, beneficial, long-term impact on willow flycatchers because managed wildland fire would reduce the threat of catastrophic fire. Alternative B would return fire to its role in maintenance of willow habitat as well. Fires that occur in habitat occupied by willow flycatchers would cause possibly adverse effects, because of accumulated fuels. In meadows known to be occupied by willow flycatchers, protection measures would be taken to protect individual nests and local habitat. The amount of decayed and decadent grown of willows in the immediate area would be reduced because of the regeneration of lightly-burned willows Other mitigation measures would include timing re-ignitions to occur outside of the nesting season. .

Prescribed Fire

Effects would be similar to those in Alternative A, but the amount of prescribed fire would be greater. Prescribed fire would help restore habitat and protect it from catastrophic fire, and would be liberally applied under Alternative B. Impact of prescribed fire on willow flycatchers would be beneficial, long-term, and moderate, based upon the reduction in the threat of catastrophic fire that would occur, and regeneration of lightly-burned willows. Prescribed fires likely to affect meadow habitats known to be occupied by willow flycatchers should be evaluated for potential adverse effects and managed to minimize impacts. Burning at specific sites would not occur during the period of nesting and fledging (May – September), and willows would be protected from intense fires by clearing dead and decadent fuels from around and within willow shrubs. If possible, meadow habitats with recent flycatcher nests would be burned in stages, so not all potential nest shrubs would be damaged at once. Surveys would be conducted to locate willow flycatchers in the park, so appropriate fire management actions can be taken.

Holding Action and Monitoring Effects (water and retardant drops, helispots, and spike camps) and Site Preparation Associated with Managed Wildland Fire and Prescribed Fire (hand line, snagging, mop-up) Same as Alternative A—minor adverse, short-term effect on willow flycatchers, mostly from potential impacts of conducting helicopter operations out of Wawona Meadow.

Fuel Reduction by Hand or Machine

Aggressive Reduction Techniques

Mechanical Tree and Shrub Removal. Under Alternative B, use of heavy machinery to thin forests and reduce biomass in wildland/urban interface areas would be greatest. To provide protection for developed areas, prescriptions for wildland/urban interface areas would produce forest habitat at the higher end of the range of natural variability (for target values for tree density and fuel loading). Biomass removal, however, would not affect willow flycatcher habitat, since fuels in these areas do not need thinning. Equipment noise might cause some disturbance. Impact of biomass removal on willow flycatchers under Alternative B would be adverse, short-term, and negligible.

Conventional Tree and Shrub Removal. The use of skidding and grappling to reduce fuel loads adjacent to developed areas would have little effect on willow flycatchers because the meadow habitats the flycatchers use would not be subject to this treatment. Impacts would be adverse, short-term, and negligible.

Passive Reduction and Lower Profile Techniques

Hand Cutting. Same as Alternative A—negligible effect on willow flycatchers, because these operations would not usually occur in meadow habitats, where large fuels are already sparse, and the moist conditions would typically not carry fire.

Chipping. Chipping would occur, but well away from willow flycatcher habitat.

Cumulative Impacts

Past, present, and reasonably foreseeable projects would be the same as in Alternative A. In aggregate the effects of reasonably foreseeable future actions would be minor, beneficial and long-term. Other foreseeable projects with adverse impacts would affect small areas and/or have minor effects over larger areas. The *Yosemite Fire Management Plan* under Alternative B would affect habitats changed by years of fire exclusion by reducing the risk of catastrophic fire in some areas. Considered in combination with the effect of Alternative B, the cumulative impacts would be beneficial, long-term, and minor.

Conclusion

The impact of Alternative B on willow flycatchers would be beneficial, long-term, and moderate based primarily on rapid reduction of the threat of catastrophic fire through use of wildland and prescribed fires. These techniques, however, must be carefully applied to avoid adverse impacts on the few remaining willow flycatchers remaining in Yosemite.

Summary Conclusion, Special-Status Species – Animals

The greatest threat to special-status species would be catastrophic fire. This alternative would reduce the potential of catastrophic fire, compared to Alternative A. Special measures, as identified, would be used to mitigate impacts. There would be no impairment from the effects of this alternative. See Appendix 9 for mitigation developed in consultation with USFWS.

Physical Environment

Alternative B would have the greatest amount of annual prescribed fire and wildland/urban interface treatment among the alternatives, consequently this alternative will provide the quickest path toward accomplishing ecosystem restoration and fuel reduction objectives in many areas of the park and El Portal.

Watersheds, Soils, and Water Quality

In the action alternatives, the majority of the park (621,059 acres) would be in the Fire Use Unit where natural processes would be at the core of the fire management program. Approximately

25% of the Merced River watershed and 19% of the Tuolumne River watershed show moderate to high departures from median fire return intervals. These are the areas with the greatest potential for catastrophic fire and thus the areas where ecosystem restoration and fuel reduction treatment may be needed to restore the natural fire regime and provide protection to people and developed areas. The Suppression Unit would comprise 76,664 acres of the Merced River watershed and 51,379 of the Tuolumne River watershed. Prescribed fire units, some of which are in the Fire Use Unit, would include 77,154 acres in the Merced River watershed and 79,094 acres in the Tuolumne River watershed.

Potential for Impacts from Catastrophic Fire

Because of aggressive actions that would be used in the burn units to reduce fuels, there is the potential for creating strategically located burns to break up the continuity of fuels and vegetation along the vertical gradients within the watersheds. These burned areas would not eliminate the potential for high-severity fires in the watershed, but they would reduce the potential for large fires burning all along the vertical gradient (from ridge, down through mid-slope and bottom-slope/riparian) over large areas of a watershed. This in turn would reduce the potential for large, high-severity fires during the life of the plan.

Areas of hydrophobic soils would exist, but with breaks in the vertical gradient, smaller increases in water yield and peak flows would result, compared to Alternative A. Likewise, the increase in sediment and nutrient yields would be less than in Alternative A, because of the smaller amounts of intrusion by fire into the lower slopes of the watershed. Fire intrusion would create less stable banks and channel margins, but the effects would be localized, and less than under Alternative A, with less severe stream channel response and a quicker recovery of riparian vegetation which would stabilize the stream system. This would benefit water quality. The potential would continue to exist for high-severity fires with adverse, moderate, and potentially long-term effects but the overall effects of Alternative B on soil and watershed conditions in regards to catastrophic fire would be beneficial, long-term, and moderate.

Fire Management Treatments

Managed Wildland Fire

Approximately 243,811 acres of the Merced River watershed, and 377,099 acres of the Tuolumne River watershed would be within the Fire Use Unit. Burn units would make up 21,261 acres in the Merced River watershed and 27,650 acres in the Tuolumne River watershed. Most of the vegetation in this area is within its natural range of variability or has only missed one fire. Fire in the duff layers would continue as it has, to spread within the watershed under variable conditions, ranging from generally light to locally severe, creating only small patches of extremely hydrophobic soils. In areas of high fuel loading, soils would be exposed to longer resident time and higher temperature than would occur within the natural range of variability. Fire would also keep plant communities within their natural range of variability. The effects would not typically be on a watershed-wide scale; fire would typically burn along ridge tops and upper slopes, with only partial intrusion into slope bottoms and riparian areas. Water yield and peak flows would increase only slightly, over a short-term, and within a small range of variability, thus sediment and nutrient yield would generally only see short-term fluctuations. As a result, there would be negligible channel widening, with short-term recovery of riparian systems. Overall, the soil and watershed effects within these areas would be beneficial, short-term, and moderate, as in Alternative A.

Re-ignition clause. The effects under the re-ignition clause would be the same as effects described under managed wildland fire.

Holding Action and Monitoring Effects (water and retardant drops, helispots and spike camps). Helispots would be located more than 150 feet away from any river, and generally much further away. Because of the relatively small surface area of a helispot, they would typically have little effect upon water quality or other watershed attributes. Spike camps for monitoring and holding crews would have the potential to be larger under Alternative B, however, effects of camps would be generally local. These actions would be potentially more widespread due to the increase in managed wildland fire, but impacts to soils and watersheds would be the same as under Alternative A, adverse, short-term, and minor.

Retardant and suppressant compounds would not typically move into ground water or into surface water from runoff. They would be used carefully around surface waters because of potential effects upon aquatic organisms. When retardants and suppressants are in use, pilots and engine crews would be directed to avoid dropping retardants within 300 feet of wetlands, streams, and lakes. Most fire retardants contain fertilizer type compounds, including ammonia and nitrogen that can cause changes in pristine terrestrial and aquatic ecosystems, especially those otherwise low in nitrate/ammonia type nutrients. Additionally, ammonia itself can be quite toxic in aquatic habitats. Some retardants have contained preservatives that release cyanide. Impacts to soils and watersheds would be the same as under Alternative A, making the effect of using retardant and suppressant adverse, short-term, and negligible to minor.

Prescribed Fire

Prescribed fire would typically be used in areas with unnaturally high fuel buildup and in Special Management Areas. The total acreage in prescribed fire units is 77,153 acres in the Merced River watershed and 79,094 acres in the Tuolumne River watershed. This alternative would result in a more aggressive program of prescribed fire use (2,520 to 12,872 acres burned per year), but this would also accompany similarly aggressive actions to restore plant community structure through mechanical thinning and hand thinning (both are discussed below). Due to the controlled conditions of prescribed fire (fuel moisture, weather conditions, time of day, spatial pattern of ignition and other factors), the effects of projects on a local scale would be similar to those under Alternative A. However, because of the greater number of acres being treated through prescribed fire, Alternative B would reduce the potential for large, high-severity fires on a watershed scale. Burns would reduce the continuity of fuels on the vertical gradient in more areas throughout the watershed, compared to that of Alternative A. Fire in the duff layers would spread under variable conditions, but not with enough severity to cause extensive areas of hydrophobic soil. Consequently, wildland fire would have less of an affect on water yield, peak flows, sediment yield, and nutrient yield in this alternative than under Alternative A. Because of these treatments, the effects of prescribed fire on watershed conditions would be beneficial, long-term, and major.

Site Preparation Associated with Managed Wildland Fire and Prescribed Fire (hand line, snagging, mop-up)

These activities would have the potential to increase soil erosion, because vegetation and organic litter would be removed in order to stop or hold a fire. Erosion would be greatest along hand line that follows steep gradients. Soil compaction and disturbance would occur with both hand line and mop-up. Waterbars and check dams would continue to be used as mitigation, to reduce runoff and erosion. The downed snags would make locally heavy areas of fuel and would affect water temperature and residence time on very small scales. These actions would be potentially more widespread than under Alternative A, due to the increased use of prescribed fire. Impacts to soils and watersheds would be the same—adverse, short-term, and minor.

Fuel Reduction by Hand or Machine

Aggressive Reduction Techniques.

Mechanical Tree and Shrub Removal. These activities would likely occur primarily around the wildland/urban interface, in areas where plant community structure has been altered because of the absence of fire. Of the approximately 1,285 acres of wildland/urban interface treated per year in this alternative, about half is slated for mechanical thinning. These activities generally would be followed by prescribed fire, as discussed above. The extensive use of tracked machinery in small areas would cause soil compaction and alter the biological and physical functions. Second entries into WUI areas, to remove trees up to 20 inches in diameter if prescribed fire has failed to achieve desired results, could result in long-term compaction, unless mitigations are effectively utilized. Mitigation would include running the machinery only over snow, frozen soil, or a bed of crushed vegetation. While aggressive reduction techniques would reduce the potential for high-severity fire, the impacts on soils would be adverse, long-term, and minor. Mitigation, including limiting activities within 150 feet of a stream to less than five percent of the total area, should buffer the effects of ground disturbance on the aquatic community. In combination with the prescribed burn program, the effects of mechanical treatment, in terms of reducing the potential for watershed impacts (on water yield, peak flow, sediment yield, nutrient yield and stream system response) of large, high-severity fire over the long-term, would be beneficial and major

Conventional Tree and Shrub Removal. Skidding would be used in parts of the wildland/urban interface. The extensive use of tracked or rubber tired machinery in small areas would cause soil compaction and alter the biological and physical functions of these areas. Second entries into WUI areas, to remove trees up to 20 inches in diameter if prescribed fire has failed to achieve desired results, could result in long-term compaction, unless mitigations are effectively utilized. Mitigation would include running the machinery only over snow, frozen soil, or a bed of crushed vegetation. These activities and equipment-use combinations could disrupt the duff and topsoil layers, causing erosion and increasing sediment and nutrient yield, as well as affecting water quality. However, treatment areas would not combine ridges, mid-slopes, and bottom-slopes, thereby mitigating the impact to adverse, short-term, and minor for watersheds. The impacts on soil would be adverse, long-term, and minor to moderate.

Passive Reduction and Lower Profile Techniques.

Low-Impact Skidding. This would include the use of draft animals and four wheel, all-terrain vehicles, in combination with fetching arches, to skid trees of approximately 10-20” dbh. Skidding with this technique would be infrequently used as a substitute for other, heavier types of equipment in some sites with sensitive resources. This technique would cause limited compaction and scarification of the upper duff and topsoil layers and would have only negligible effects on topsoil and duff layers. The most significant effect from dragging one end of a tree might be a skid trench less than a foot wide and a few inches deep; this impact could be lessened by using fetching arches or skidding over snow, frozen soil, or a bed of crushed vegetation. Second entries into WUI areas, to remove trees up to 20 inches in diameter if prescribed fire has failed to achieve desired results, could result in long-term compaction, unless mitigations are effectively utilized. Because of the limited use of this technique in this alternative, in most locations scarification could be raked out with hand tools, which would retard soil erosion and limit the effect upon sediment and nutrient yield in the watershed. Treatment areas would be small and would not occur in ridge, mid-slope, and bottom-slope combinations, thus effects of use would be adverse, short-term, and negligible for watersheds and soils.

Hand Cutting. These activities would be used in the Fire Use Unit and in some areas of the Suppression Unit and Special Management Areas. Because the work is labor-intensive, about 100 acres would be treated per year, although the amount would depend on how much was treated by other methods. Hand cutting activities would likely lead to soil compaction in small areas, but would have a negligible effect on duff and topsoil layers, resulting in negligible direct impacts upon watershed characteristics, including water yield, peak flows, sediment yield, nutrient yield, and stream system response. However, because of the small number of acres treated annually, the potential for large, high severity fires would remain high. Thus, the effects of hand thinning would be beneficial and potentially long-term and minor.

Pile burning. Piles would burn under variable conditions, ranging from light to locally severe, creating only patches of extremely hydrophobic soils. These patches would be expected to have altered biological and physical characteristics. Because of the small size of the areas, the biological function would return very quickly. The impact of pile burning on soils would be adverse, short-term, and minor. Overall, the watershed effects within these areas would be beneficial, short-term, and minor to moderate. The effects would not be on a watershed-wide scale; projects would be limited in scale, with boundaries typically associated with only one portion of the slope (top, mid-slope, or bottom). Water yield and peak flows would increase only slightly, and within a small range of variability, thus sediment and nutrient yield would only see short-term fluctuations. As a result, there would be negligible channel response, with short-term effects, if any, in riparian systems. Compared to Alternative A, due to the increase in area treated, the impact of pile burning on soils would be adverse, short-term, and minor to moderate. Overall, the watershed effects within these areas would be beneficial, short-term, and minor to moderate.

Chipping. Chipping would be used to reduce fuels, promote nutrient cycling, and achieve air quality objectives. Fire in chipped fuels would be generally light to moderate in intensity and would be used in project areas with boundaries that would not be of watershed or landscape scale. Effects of chipping in this alternative would be beneficial, short-term, and minor or moderate. Chips would be applied up to 1” deep. This mitigation would make the effects of chipping on soils adverse, short-term, and negligible to minor.

Girdling. The intensive nature of the work necessary to complete this action would lead to soil compaction and disturbance in small areas. Girdling would have an adverse, short-term, and negligible to minor effect on soils, watersheds, and water quality.

Cumulative Impacts

The past, present and reasonably foreseeable projects effecting the Merced and Tuolumne River watersheds would be the same as discussed under Alternative A. While the actions would reduce the potential for high severity fire, the impact on soils would be adverse. These actions would have net beneficial impacts on watershed values through either reducing the potential for high severity fire, or through reduction of watershed effects caused by restoration activities.

When considered in combination with the minor to moderately beneficial impacts of projects on lands administered by other agencies in the upper Tuolumne and Merced watersheds, the cumulative impacts of Alternative B would be beneficial, long-term, and moderate to major.

Conclusion

The actions of this alternative would have beneficial, long-term, and major impacts to watersheds, soils, and water quality. This is based upon a combination of beneficial, long-term, moderate to major impacts in Fire Use Units and the potential for areas of beneficial, long-term, and major impacts in Suppression Units. High-severity fires would likely occur during the life of the plan, but the treatments proposed would reduce the size and effects upon soils and watersheds, including the potential for adverse effects upon water yield, peak flow, nutrient yield, sediment yield, and stream system response. The potential for catastrophic fire would still exist, but the intent of the alternative would be to reduce the risk, thus there would be no impairment from the effects of this alternative.

Air Quality

Emissions

Wildland and Prescribed Fire Emissions

Air emissions associated with the amount of burning under Alternative B were estimated using the FOFEM model (see Methodology for an explanation). The results are summarized and compared to air emission levels under the current program (Alternative A) in table 4.10a. Separate estimates were made for each year from 2003 to 2009 to analyze the trends in impacts over the years. The emissions shown represent the worst-case scenario; it was assumed that all acres are being burned for the first time. In the event that a prescribed fire unit is burned more than once in the 7-year period, the emissions from that unit would be reduced by approximately 33%. Table 4.9 provides an example of the magnitude of this type of emission reduction.

Prescribed Fire Emissions Summary

To compare the estimated emissions from the various alternatives, the emissions from prescribed burns were averaged for the modeled 7-year period. These data are provided in table IV.10b.

Table IV-10a
Projected Air Emissions Associated with Various Fire Types in Yosemite National Park Under Alternative B (Alternative A emissions for comparison).

Alternative A (1991-2000 average)							
Fire Type	Acres	Fire Emissions (tons/yr) [a]					
		PM_{10}	$PM_{2.5}$	VOC	CO	NO_X	CO_2
Prescribed Burns [b]	1,495	1,087	6,551	719	12,945	370	58,557
Managed Wildland Fire [b]	2,152	1,564	9,432	1,034	18,637	532	84,305

Wildfire	5,759	6,920	5,864	3,529	76,930	2,198	387,446
Total	**9,406**	**9,571**	**8,103**	**5,282**	**108,512**	**3,100**	**530,308**

a PM_{10} = Suspended Particulate, $PM_{2.5}$ = Fine Particulate Matter, VOC = volatile organic compounds (as methane), CO = Carbon Monoxide, NOx = Nitrogen Oxides, CO_2 = Carbon Dioxide

b Based on composite emission factor for prescribed burning

Alternative B – 2003

Fire Type	Acres	Fire Emissions (tons/yr) [a]					
		PM_{10}	$PM_{2.5}$	VOC	CO	NO_X	CO_2
Prescribed Burns [b]	10,584	8,507	7,209	4,352	95,052	2,716	450,156
Managed Wildland Fire[b]	3,165	2,301	1,943	1,522	27,417	783	124,020
Wildfire	5,759	6,920	5,864	3,529	76,930	2,198	387,446
Total	**19,508**	**17,728**	**15,016**	**9,403**	**199,399**	**5,697**	**961,622**

Alternative B – 2004

Fire Type	Acres	Fire Emissions (tons/yr) [a]					
		PM_{10}	$PM_{2.5}$	VOC	CO	NO_X	CO_2
Prescribed Burns [b]	13,418	9,000	7,628	4,613	100,904	2,883	456,880
Managed Wildland Fire[b]	3,165	2,301	1,943	1,522	27,417	783	124,020
Wildfire	5,759	6,920	5,864	3,529	76,930	2,198	387,446
Total	**22,342**	**18,221**	**15,435**	**9,664**	**205,251**	**5,864**	**968,346**

Alternative B – 2005

Fire Type	Acres	Fire Emissions (tons/yr) [a]					
		PM_{10}	$PM_{2.5}$	VOC	CO	NO_X	CO_2
Prescribed Burns [b]	16,117	17,136	14,442	12,641	210,683	6,020	926,813
Managed Wildland Fire[b]	3,165	2,301	1,943	1,522	27,417	783	124,020
Wildfire	5,759	6,920	5,864	3,529	76,930	2,198	387,446
Total	**25,041**	**26,357**	**22,249**	**17,692**	**315,030**	**9,001**	**1,438,279**

Alternative B – 2006

Fire Type	Acres	Fire Emissions (tons/yr) [a]					
		PM_{10}	$PM_{2.5}$	VOC	CO	NO_X	CO_2
Prescribed Burns [b]	9,577	6,378	5,406	3,268	71,477	2,042	325,656
Managed Wildland Fire[b]	3,165	2,301	1,943	1,522	27,417	783	124,020
Wildfire	5,759	6,920	5,864	3,529	76,930	2,198	387,446
Total	**18,501**	**15,599**	**13,213**	**8,319**	**175,824**	**5,023**	**837,122**

Alternative B – 2007							
Fire Type	Acres	Fire Emissions (tons/yr) [a]					
		PM_{10}	$PM_{2.5}$	VOC	CO	NO_X	CO_2
Prescribed Burns [b]	11,059	8,810	7,466	4,505	98,376	2,811	469,254
Managed Wildland Fire[b]	3,165	2,301	1,943	1,522	27,417	783	124,020
Wildfire	5,759	6,920	5,864	3,529	76,930	2,198	387,446
Total	**19,983**	**18,031**	**15,273**	**9,556**	**202,723**	**5,792**	**980,720**
Alternative B – 2008							
Fire Type	Acres	Fire Emissions (tons/yr) [a]					
		PM_{10}	$PM_{2.5}$	VOC	CO	NO_X	CO_2
Prescribed Burns [b]	18,562	10,016	8,487	5,127	112,104	3,203	518,805
Managed Wildland Fire[b]	3,165	2,301	1,943	1,522	27,417	783	124,020
Wildfire	5,759	6,920	5,864	3,529	76,930	2,198	387,446
Total	**27,486**	**19,237**	**16,294**	**10,178**	**216,451**	**6,184**	**1,030,271**
Alternative B – 2009							
Fire Type	Acres	Fire Emissions (tons/yr) [a]					
		PM_{10}	$PM_{2.5}$	VOC	CO	NO_X	CO_2
Prescribed Burns[b]	11,743	10,798	9,088	8,608	135,467	3,870	620,111
Managed Wildland Fire[b]	3,165	2,301	1,943	1,522	27,417	783	124,020
Wildfire	5,759	6,920	5,864	3,529	76,930	2,198	387,446
Total	**20,667**	**20,019**	**16,895**	**13,659**	**239,814**	**6,851**	**1,131,577**

a PM_{10} = Suspended Particulate, $PM_{2.5}$ = Fine Particulate Matter, VOC = volatile organic compounds (as methane), CO = Carbon Monoxide, NOx = Nitrogen Oxides, CO_2 = Carbon Dioxide

b Based on composite emission factor for prescribed burning

Table IV-10b
Average Prescribed Fire Estimated Emissions by Alternative for 2003 – 2009

Alternative B						
	Acres Burned	**Emissions (tons/year)** [a]				
		PM_{10}	**$PM_{2.5}$**	**VOC**	**CO**	**CO_2**
Historical Average (Alt A)	1,495	1,087	917	719	12,945	58,557
Alternative B Average	13,009	10,092	8,532	6,159	117,723	538,239
Potential Increase in Alt. B	**11,514**	**9,005**	**7,615**	**5,440**	**104,778**	**479,682**

a PM_{10} = Suspended Particulate, $PM_{2.5}$ = Fine Particulate Matter, VOC = volatile organic compounds, CO = Carbon Monoxide, CO_2 = Carbon Dioxide

Mechanical Thinning Emissions

Air emissions would be generated by machinery used in site preparation and fuel reduction activities. Motorized equipment used for cutting and removing fuels would include chainsaws, chippers, feller/bunchers, skidders, and haul trucks. Emissions from the operation of this machinery have been figured based on estimated operating hours of this equipment by park personnel clearing an average of 1,533 acres per year, which is more than fifteen times the number of acres cleared historically. Estimated air emissions are summarized in table 4.11 (for emissions factors, etc., see Methodology, Air Quality). *The Final Yosemite Fire Management Plan/EIS* would result in a smaller size of trees thinned in WUI than was considered in *the Draft Yosemite Fire Management Plan/EIS*. Actual operating hours would potentially be less, but because of the possibility of second entry, the analysis in the Draft was retained as a worst-case analysis. These emissions would be minor when compared to fire emissions and, as forests were restored, would decrease.

Table IV-11
Air Emissions Associated with Mechanical Thinning Activities

Alternative B							
Equipment	**Operating Hours**	**Motorized Equipment Emissions (tons/yr)** [a]					
		PM_{10}	**$PM_{2.5}$**	**VOC**	**CO**	**NO_X**	**CO_2** [b]
Chainsaws	15,834	0.40	0.40	8.36	27.12	0.10	ND
Chippers	3,016	0.64	0.64	0.27	40.31	0.02	ND
Feller-bunchers	362	0.10	0.10	0.17	0.79	0.53	ND
Skidders	362	0.10	0.10	0.17	0.79	0.53	ND
Haul Trucks	1,086	0.31	0.31	0.51	2.38	1.60	ND
Total Emissions (tons/yr)		**1.56**	**1.56**	**9.49**	**71.39**	**2.79**	**ND**

a PM_{10} = Suspended Particulate, $PM_{2.5}$ = Fine Particulate Matter, VOC = volatile organic compounds (as methane), CO = Carbon Monoxide, NOx = Nitrogen Oxides, CO_2 = Carbon Dioxide
b No data

Mitigation of Air Emissions

There is a management commitment to use available measures to mitigate the adverse effects of smoke and other air emissions on air quality and visibility associated with prescribed fire and managed wildland fire. Along with firefighter and public safety and other priorities, prescribed fire, wildland fire, and suppression actions would be managed to minimize unacceptable air quality and smoke impacts. Air emissions would be reduced almost exclusively by reducing the area burned, reducing fuel loads, or reducing fuel consumption (the amount of each log or tree that is consumed by fire). Suppressing wildland fires only delays the generation of smoke emissions—it does not reduce or eliminate them. Removal of trees and woody debris leaves less to burn—it reduces the volume of forest fuel and thus emissions.

Methods to reduce emissions by reducing the area burned include mechanical treatments, chemical treatments, and concentration burning. Mechanical treatment would include removal of standing or downed trees and onsite chipping or crushing of woody material or brush. However, it would be labor intensive and require access to the site. In addition, it would potentially interfere with land management objectives, if the treatment would cause undue soil disturbance or compaction, stimulate invasion by non-native plant species, impair water quality, or remove material needed for nutrient cycling or small animal habitat. Chemical treatments would be effective in reducing or removing live vegetation and/or species from a site, however, these treatments have their own set of potentially adverse effects. They would not be allowed in Yosemite without additional compliance. Concentration burning involves burning part of a larger area slated for treatment. Although this would decrease the total area burned, the smaller area burned would represent a high fuel loading with associated higher emissions.

Techniques to reduce fuel loading would include mechanical fuel removal, burning more frequently, and scheduling burns prior to the appearance of new fuels. Mechanical fuel removal would be the same as described above, but a prescribed fire would follow it. Frequent, low intensity fires can prevent unwanted vegetation from becoming established on the forest floor. This technique would have positive land management effects since it would result in fire regimes that more closely mimic natural fire frequencies. Burning before new fuels appear would also reduce fuel loading. Examples include burning before vegetation drops its leaves in the fall and burning before brushy or herbaceous fuel greens up.

Emission reductions could also be achieved when significant amounts of fuel were at or above the moisture of extinction and therefore unavailable for combustion. Long-term emission reductions, rather than the postponement of emissions generation, would be achieved only if the fuels that were left behind could be expected to decompose or otherwise be sequestered by the time the area was broadcast burned.

Increasing combustion efficiency or shifting the majority of combustion away from the smoldering phase and into the more efficient flaming phase would reduce emissions, except, NO_x, which is produced in greater quantities at higher temperatures. Methods to accomplish this would include pile or windrow burning, rapid mop-up, and shortened fire duration. Pile or windrow burning would generate more heat and burn more efficiently. It would be effective for forest fuel types rather than brush type fuels. However, it could have negative effects on soils and water quality since high temperature extremes can cause soil sterilization. A portable incinerator with air curtain destructor could be used to incinerate brush, slash, and debris. Local on site effects could be reduced by establishing pits for the air curtain in each of the six WUI communities, or using an air curtain with container attachment. Site selection and compliance for the pit/incinerator location will be completed separately for each location (rather than through this document).

The measures discussed above are intended to be actions to minimize or avoid impacts on sensitive receptors that are identified in Chapter 3, Affected Environment. Additional measures that would be adopted could include the avoidance of conducting burns during heavy visitor use periods and the coordination with other regional agencies that also conduct burns and regulatory authorities.

Smoke Communications Strategy

The park also has developed a *Smoke Communication Strategy* (Appendix 4) that provides a blueprint for how to manage future smoke events from prescribed fires, managed wildland fires, suppression actions, and fires occurring outside the park. It provides information on health issues and concerns and, among others, it would be directed to visitors, employees, and residents in affected smoke sensitive areas. The park would also attempt to monitor particulate levels in the park during smoke events. Park air quality technicians would operate air quality monitors that measure particulate levels every hour. These levels are used to compute a 24-hour average that correlates with the Environmental Protection Agency Air Quality Index for particulates.

Agency Coordination

Prior to igniting a prescribed fire, Yosemite National Park must obtain permission through a permit from the appropriate County level Air Quality Management District. The park must also obtain meteorological approval to burn from the California Air Resources Board. It is the responsibility of these permitting agencies to coordinate the numbers of fires burning in one area. As an added measure to mitigate the potential cumulative impacts of prescribed fires, Yosemite fire management staff are members of the Mountain Counties Air Alliance, a Sierra Nevada-wide Fire Management network of National Parks, National Forests, BLM Units, California Department of Forestry, private timber companies, air pollution control districts, and State Parks. The goal of this group is to assure planned ignitions on federal and state lands in the Sierra Nevada do not adversely impact smoke sensitive areas in and around the burn area. The group meets twice a year to discuss issues and register burns for the coming year.

Cumulative Impacts

Past, present, and reasonably foreseeable projects that would have a cumulative impact for Alternative B would be the same as those discussed in Alternative A. The cumulative impacts of Alternative B, considered in combination with the moderate, adverse impact resulting from present and reasonably foreseeable future projects in the region, would be adverse, short-term, and major.

Conclusion

These data indicate that Alternative B would result in greater emissions relative to the No Action Alternative. In particular, Alternative B would generate the largest quantity of emissions among all the alternatives. The intensity of the impact of Alternative B relative to Alternative A would be adverse, short-term, and major, since the increases would be well above 50 percent greater than Alternative A. The effects of the fire management program would not represent an impairment of the park’s resources or values.

Cultural Environment

Archeological Resources

Potential for Impacts from Catastrophic Fire

Compared with Alternative A, this alternative would reduce to the greatest extent the potential for catastrophic fire and its impacts. This would result in beneficial, short- and long-term, major impacts to archeological resources.

Fire Management Treatments

Managed Wildland Fire

Under all action alternatives, 621,059 acres would be in the Fire Use Unit. Burning would consist mainly of managed wildland fire but some prescribed fire would take place. Of the total area, 48,912 acres (or 8%) would be designated as prescribed burn units, which could be burned either under managed wildland fire (natural ignition) or prescribed burns (management-ignited fires). Potential impacts resulting from managed wildland fire under this alternative would be similar to those described under Alternative A, however the potential for adverse impacts would be greater due to the increased acreage targeted for treatment. Overall, it is likely that minor to moderate, long-term, beneficial impacts would result from maintaining natural fuel loading on archeological sites. Adverse impacts would be mitigated (see Mitigation of Impacts, 4-12).

Re-ignition clause. The potential for impacts from re-igniting a managed wildland fire would be identical to those described for managed wildland fire.

Holding Action and Monitoring Effects (water and retardant drops, helispots, and spike camps). Same as Alternative A—adverse, long-term, and minor to moderate.

Prescribed Fire

Under all action alternatives 48,912 acres in the Fire Use Unit and 107,040 acres in the Suppression Unit would be slated for prescribed burning over the life of the plan. This alternative would treat the maximum acreage per year (2,520 to 12,872 acres), focusing on areas of greater than three missed fire return intervals. Impacts resulting from prescribed fire under this alternative would be similar to those described under Alternative A. The potential for adverse impacts would be greater, due to the increased acreage targeted for treatment, but the potential for benefits would also be greater. Moderate, long-term, beneficial impacts would result from maintaining natural fuel loading on and near archeological sites. Adverse impacts would be mitigated to the degree possible.

Site Preparation Associated with Managed Wildland Fire and Prescribed Fire (hand line, snagging, mop-up)

Same as Alternative A—adverse, long-term, and minor to moderate.

Fuel Reduction by Hand or Machine

Aggressive Reduction Techniques.

Mechanical Tree and Shrub Removal. Heavy equipment would be used under this alternative to cut, and either pile or crush, large amounts of vegetation, primarily in wildland/urban interface areas. Areas would be surveyed for archeological resources prior to any treatment. However, because thick vegetation covers many archeological sites, it would be likely that some archeological resources would be missed during inventory. Therefore, all known resources would be avoided during heavy equipment use and piling, but archeological resources obscured by vegetation could be adversely impacted. Second entries into WUI areas, to remove trees up to 20 inches in diameter if prescribed fire has failed to achieve desired results, could result in additional site disturbance or long-term soil compaction, unless mitigations are effectively utilized. Post-treatment inventory would document and stabilize any sites inadvertently disrupted. The intensity of impact would depend upon the nature and significance of the archaeological resource as well as the extent of soil disturbance. Impacts would be potentially adverse, long-term, and moderate to major and would be mitigated to the extent possible. Archeological monitoring would be used to reduce the potential for these impacts.

Conventional Tree and Shrub Removal. Skidding and grappling would be used under both Alternative B and D in the Suppression Unit to remove dead and downed trees. The large machinery and tree skidding would cause soil disturbance and compaction. This could adversely impact archeological sites; the intensity of impact would depend upon the nature and significance of the archeological resource as well as the degree of soil disturbance. These impacts would be mitigated to the extent possible. All areas slated for this treatment would be inventoried for archeological resources prior to heavy equipment use, and known resources would be avoided. However, large amounts of dead and downed trees would obscure some archeological resources, increasing the potential for adverse, long-term, and moderate to major impacts. Archeological monitoring would be used to reduce the potential for these impacts. Second entries into WUI areas, to remove trees up to 20 inches in diameter if prescribed fire has failed to achieve desired results, could result in additional site disturbance or long-term soil compaction, unless mitigations are effectively utilized.

Passive Reduction and Lower Profile Techniques.
Hand Cutting. Same as Alternative A—beneficial, long-term, and minor.

Pile burning. Same as Alternative A—adverse, long-term, and minor to moderate.

Chipping. Same as Alternative A—negligible.

Girdling. Girdling would create standing dead trees or snags. The adverse impacts associated with girdling would include soil disturbance through tree falls and use of heavy equipment, however, impacts to cultural resources would be rare and unlikely. Effects upon archeological sites would negligible, and would be reduced or mitigated.

Helibase Upgrades

Crane Flat: The Crane Flat Lookout is listed in the National Register of Historic Places and therefore is considered a significant cultural resource. There are no archeological sites or ethnographic resources in the project area. Since the project work in the vicinity of the historic structure would only involve creating an additional landing area and would use compatible materials, the project would not impact the historic structure or its setting. The proposed heli-rappel training tower would be constructed in a location that would not impact the historic structure or its setting. Therefore, these helibase improvements would have no impact on the historic Crane Flat Lookout.

El Portal: There are no historic structures, archeological sites, or ethnographic resources in the project area, hence, there would be no impacts to cultural resources.

Wawona: There is one archeological site of unknown data potential in the project area, and portions of the split-rail fence are considered historic. The project would not disturb the fence, therefore there would be no impact to historic structures or cultural landscape resources. The project would entail some grading and perimeter delimiting, which would disrupt soils and artifacts, potentially resulting in a long-term, adverse impact to the archeological site. This impact would be mitigated through archeological testing and, as necessary, data recovery, in accordance with the park's archeological research design. Testing and recovery would reduce the intensity of the adverse impact to minor or negligible. Since information about ethnographic resources for this area is lacking, the park would consult with park-associated American Indian tribes as part of site-specific planning. If previously unknown ethnographic resources were identified, the park would further consult with these tribes and make every effort to avoid or reduce impacts to these resources as part of final project design.

Cumulative Impacts

The cumulative impacts that would result from implementation of this alternative, in conjunction with other past, present, and reasonably foreseeable future actions, would be the same as Alternative A. Implementation of this alternative would significantly reduce the potential for catastrophic fire and associated emergency response actions. The adverse impacts associated with other present, and reasonably foreseeable future projects would be minor to moderate. Considered in combination with the impacts to archeological resources from Alternative B, cumulative impacts would be beneficial, long-term, and minor.

Conclusion

Implementation of this alternative could result in adverse impacts to archeological resources mostly due to the potential for high-intensity fires in areas that are three or more fires away from their natural fire return intervals and the use of heavy equipment to reduce fuel loads. Effects in these areas would be adverse, long-term, and major. These impacts would be mitigated or avoided. However, this alternative would reduce to the greatest extent, compared with Alternative A, the potential for catastrophic fire and its impacts. Of all fire management situations and treatments, catastrophic fire and emergency response actions would result in the most frequent and severe impacts to archeological resources. Overall, the effect of this alternative would be beneficial, moderate, and long-term. The potential for catastrophic fire would still exist, but the intent of the alternative is to reduce the risk, thus there would be no impairment from the effects of this alternative.

Ethnographic Resources

Potential for Impacts from Catastrophic Fire

Compared with Alternative A, this alternative would reduce to the greatest extent the potential for catastrophic fire and its impacts. This would result in beneficial, short- and long-term, moderate impacts to ethnographic resources.

Fire Management Treatments

Managed Wildland Fire

Potential impacts resulting from managed wildland fire under this alternative would be similar to those described under Alternative A, however the potential for adverse impacts would be greater due to the increased acreage targeted for treatment. Still, it is likely that minor to moderate, long-term, beneficial impacts would result from maintaining natural fuel load and plant community conditions near ethnographic resources. Adverse impacts would be mitigated.

Re-ignition clause. The potential for impacts from re-igniting a controlled wildland fire would be identical to those described for managed wildland fire.

Holding Action and Monitoring Effects (water and retardant drops, helispots, and spike camps). Same as Alternative A—adverse, short-term, and minor to moderate.

Prescribed Fire

This alternative treats the maximum acreage per year, focusing on areas of greater than three missed fire return intervals. Impacts resulting from prescribed fire under this alternative would be similar to those described under Alternative A. Due to the increased acreage targeted for treatment the potential for adverse impacts would be greater, but so would the potential for benefits. Moderate, long-term, beneficial impacts would result from maintaining natural fuel loads and plant community structure near ethnographic resources. Adverse impacts would be mitigated to the degree possible.

Site Preparation Associated with Managed Wildland Fire and Prescribed Fire (hand line, snagging, mop-up)

Same as Alternative A—potentially adverse, long-term, and minor to moderate.

Fuel Reduction by Hand or Machine

Aggressive Reduction Techniques.

Mechanical Tree and Shrub Removal. Heavy equipment would be used in Alternative B and D to cut, and either pile or crush, large amounts of vegetation, primarily in wildland/urban interface areas. Potential adverse impacts would include disturbance or destruction of traditionally used plants. Second entries into WUI areas, to remove trees up to 20 inches in diameter if prescribed fire has failed to achieve desired results, would potentially result in site disturbance or long-term soil compaction, unless mitigation are effectively utilized. The intensity and duration of these impacts would depend upon the nature and significance of the resource as well as the extent of disturbance, but all known resources would be avoided during heavy equipment use and piling. Effects would be potentially adverse, long-term, and moderate to major, but impacts would be mitigated or avoided. Long-term beneficial impacts would include restoration of more natural vegetation patterns. These effects would be minor to moderate, and short- to long-term. The National Park Service would continue to consult with park-associated tribal groups to identify areas of concern and implement the most appropriate mitigation measures.

Conventional Tree and Shrub Removal. Heavy equipment and tree skidding would cause soil disturbance and compaction. These activities have the potential to adversely impact ethnographic resources. The intensity of impact would depend upon the nature and significance of the resource as well as the degree of disturbance. Second entries could have additional effects, including soil compaction if not mitigated. Effects would be potentially adverse, long-term, and moderate to major, but these potential impacts would be mitigated to the extent possible by continued work to identify areas of concern prior to implementing projects.

Passive Reduction and Lower Profile Techniques.

Hand Cutting. Same as Alternative A—beneficial, short-term, and minor to moderate.

Pile burning. Same as Alternative A—negligible to moderate, adverse and short-term, but these impacts would be mitigated by avoiding traditionally used plants.

Chipping. Same as Alternative A—negligible.

Girdling. Girdling would create standing dead trees, or snags. The potential adverse impacts associated with girdling could include impacts to traditionally used plants through use of heavy equipment, though these effects would be rare and unlikely. These impacts would be avoided or mitigated.

Cumulative Impacts

The cumulative impacts that would result from implementation of this alternative, in conjunction with other past, present, and reasonably foreseeable future actions, would be the same as Alternative A, except that implementation of this alternative would significantly reduce the potential for catastrophic fire and associated emergency response actions. Considered in combination with the minor to moderate, adverse effects of present, and reasonably foreseeable projects, the cumulative effects of Alternative B, would be adverse, long-term and minor to negligible.

Conclusion

Implementation of this alternative would result in beneficial, long-term, and moderate effects to ethnographic resources. The potential for adverse, long-term, and major impacts would remain, due to the potential for high-intensity fires in areas of three or more missed fire return intervals and the use of heavy equipment to reduce heavy fuel loads. These impacts would be mitigated or avoided to the extent possible. This alternative would reduce to the greatest extent, compared with Alternative A, the potential for catastrophic fire and its impacts. Of all fire management situations and treatments, catastrophic fire and emergency response actions would result in the most frequent and severe impacts to ethnographic resources. The potential for catastrophic fire would still exist, but the intent of the alternative would be to reduce the risk, thus there would be no impairment from the effects of this alternative.

Cultural Landscape Resources, Including Individually Significant Historic Structures

Potential for Impacts from Catastrophic Fire

Compared with Alternative A, No Action, this alternative would reduce to the greatest extent the potential for catastrophic fire and its impacts. This would result in beneficial , short- and long-term, major impacts to cultural landscape resources.

Fire Management Treatments

Managed Wildland Fire

Potential impacts resulting from managed wildland fire under this alternative would be similar to those described under Alternative A, however the potential for adverse impacts would be greater due to the increased acreage targeted for treatment. Still, it is likely that minor to moderate, long-term, beneficial impacts would result from maintaining natural fuel load and plant community conditions in cultural landscapes. Adverse impacts would be mitigated to the degree possible.

Re-ignition clause. The potential for impacts from re-igniting a controlled wildland fire would be identical to those described for managed wildland fire.

Holding Action and Monitoring Effects (water and retardant drops, helispots, and spike camps). Same as Alternative A—potentially adverse, long-term, and minor to moderate. These impacts would be avoided or mitigated.

Prescribed Fire

Impacts resulting from prescribed fire under this alternative would be similar to those described under Alternative A. Due to the increased acreage targeted for treatment, the potential for adverse impacts would be greater, but so would the potential for benefits. Moderate, long-term, beneficial impacts would result from maintaining natural fuel loads and plant community structure in cultural landscapes. Adverse impacts would be mitigated to the degree possible.

Site Preparation Associated with Managed Wildland Fire and Prescribed Fire (hand line, snagging, mop-up)

Same as Alternative A—adverse, short-term, and negligible impacts, which would be avoided or mitigated.

Fuel Reduction by Hand or Machine

Aggressive Reduction Techniques.

Mechanical Tree and Shrub Removal. Heavy equipment would be used to cut, and either pile or crush, large amounts of vegetation, primarily in wildland/urban interface areas. This alternative maximizes use of heavy equipment to restore target vegetation conditions. Wildland/urban interface areas (and all other areas proposed for this treatment) would be surveyed for cultural resources prior to any treatment, but because vegetation grows thickly over some cultural resources, it would be possible that some resources (such as small-scale features) would be missed during inventory. Target conditions would be established with consideration of known cultural landscape resources. All known features would be avoided during heavy equipment use and piling but this treatment could cause adverse impacts to resources obscured by vegetation. Post-treatment inventory would be used to document and stabilize any resources inadvertently impacted. The intensity of impact would depend on the nature and significance of the resource as well as the extent of disturbance. Potential impacts would be adverse, long-term, and moderate to major.

Conventional Tree and Shrub Removal. Heavy equipment and tree skidding would cause soil disturbance and compaction, which has the potential to adversely impact cultural landscape resources similar to the biomass removal described above. The intensity of impact would depend upon the nature and significance of the resource as well as the degree of disturbance, but would be potentially adverse, long-term, and moderate to major. These potential impacts would be mitigated or avoided to the extent possible.

Passive Reduction and Lower Profile Techniques.
Hand Cutting. Same as Alternative A—adverse, long-term, and moderate impacts would be avoided by prescribing a target condition for these areas that would protect and enhance the cultural resource.

Pile burning. Same as Alternative A—negligible.

Chipping. Same as Alternative A—adverse, short-term, and minor.

Girdling. Girdling creates standing dead trees, or snags. This treatment would be used primarily after prescribed burns. The potential adverse impacts associated with girdling would include removal of trees at historic sites or cultural landscapes, and disruption of features through tree falls and use of heavy equipment. These impacts would be avoided by not girdling trees at historic sites or cultural landscapes.

Cumulative Impacts

Past, present, and reasonably foreseeable projects in the area would be the same as under Alternative A. Implementation of this alternative would significantly reduce the potential for catastrophic fire and associated emergency response actions. The adverse impacts associated with present and reasonably foreseeable future projects would be minor to moderate and long-term. Considered in combination with the impacts to cultural landscape resources from Alternative B, cumulative impacts would be beneficial, long-term, and minor.

Conclusion

Implementation of this alternative would result in beneficial, long-term, and moderate effects on cultural landscape resources. Implementation would also potentially result in adverse impacts due to the potential for high-intensity fires in remaining areas of three or more missed fire return intervals and the use of heavy equipment to reduce heavy fuel loads. These adverse effects of equipment use would be mitigated or avoided to the extent possible. However, this alternative would reduce to the greatest extent, compared with Alternative A, the potential for catastrophic fire and its impacts. Of all fire management situations and treatments, catastrophic fire and emergency response actions would result in the most frequent and severe impacts to cultural landscape resources. The potential for catastrophic fire would still exists, but the intent of the alternative would be to reduce the risk, thus there would be no impairment from the effects of this alternative.

Section 106 Summary

Under regulations of the Advisory Council on Historic Preservation (36 CFR 800.9) addressing the criteria of effect and adverse effect, implementation of this alternative would have the potential to adversely affect significant historic properties. Archeological sites, ethnographic resources, and cultural landscape resources (including historic sites and structures) would likely be adversely affected by high-intensity fires and emergency response actions associated with catastrophic fire. The number and significance of resources that could be affected cannot be projected since inventory and evaluation data are lacking for broad tracts of land within Yosemite and El Portal. These impacts would be mitigated to the extent possible through some pre-burn inventory for resources of concern, avoidance of known resources when feasible, reduction of hazardous fuels at significant cultural resource sites, continued documentation and protection of significant resources, post-burn inventory and stabilization, and research on the effects of fire on cultural resources.

Social Environment

Recreation

Potential for Impacts from Catastrophic Fire

Large catastrophic fires are most likely to occur in the Suppression Unit, where fires have been and will continue to be suppressed, contributing to fuel buildup and changes in plant community structure. The large increase in the number of acres burned annually with prescribed fire would help reduce the potential for large and catastrophic fires in this unit. Fuel reduction in the wildland/urban interface, where communities, visitor facilities, and park operations buildings are located, and where the most aggressive suppression activities have historically taken place, would also reduce the threat of catastrophic fire. The potential for large, catastrophic fires like the A-Rock Fire, would be reduced under this Alternative. Consequently, this alternative would greatly reduce the potential for fire-related, park-wide closures, although, during fires, closures in areas of the park would continue. During these closures, the effects will be adverse, short-term, and minor, affecting only the visitors within or wishing to enter that portion of the park. These effects would be less than under Alternative A, but closures and restrictions would still be likely since the fire season and the peak visitation period overlap.

Fire Management Treatments

Managed Wildland Fire

Managed wildland fire would impact recreation in the Fire Use Unit only. Primarily Wilderness users would be affected, but some visitors would be redirected to other parts of the park during closures. Local closures and restrictions could cause changes in trip itineraries and could negatively affect trip quality for these visitors—as it would under Alternative A. Managed wildland fire would enhance the Wilderness experience for some visitors, while it would negatively affect the visit for others, through perceived risk and smoke. However, because of high visitation levels during fire season and trailhead quotas for Wilderness, some visitors would not be able to take a Wilderness trip, thus there would be an adverse, short-term, and major effect on a small proportion of park visitors.

The majority of park visitors would be affected only by the smoke from managed wildland fires, and this would typically occur when down slope and down-valley winds carried smoke into the basins, generally during nighttime and early morning hours. The visitors affected by this would mainly be the overnight campers and lodging users, especially those in Yosemite Valley, which would represent over one third of the visitors to Yosemite Valley. However, smoke could remain in the area all through the day, reducing visibility, especially at scenic vistas (see Scenic Resources). These effects on all park visitors would be potentially adverse, short-term, and moderate, similar to that of Alternative A. In some years, managed wildland fire would be common during the peak season, thus smoke effects would impact a large number of visitors.

Re-ignition clause. Because re-ignitions would be scheduled, the effects upon Wilderness users could be minimized through the permit process. Some individuals and parties would not be able to go into preferred areas if closures were put in place, but this would generally be determined when the permit was issued. Effects would be adverse, short-term, and minor.

Holding Action and Monitoring Effects (water and retardant drops, helispots, and spike camps). Many Wilderness users would be sensitive to these intrusions into Wilderness. Helicopters are loud and need clear landing spots for safe landings and operations. The adverse and moderate effects of noise and activity would be short-term, during the period when the fire was actively managed and/or monitored. Few people would be directly affected, but for those who were, the impacts would be adverse, short-term, and minor.

Prescribed Fire

Prescribed fires would continue to be scheduled and managed in ways that limit their effects upon visitors. However, the amount of prescribed fire and related activities in this alternative would be highest among the alternatives. Effects upon recreational activities, including hiking, nature study, and scenic touring, would generally be limited to small, local scale closures and site restrictions, with most visitors being able to recreate elsewhere, outside of the prescribed fire boundaries. Very few people would be unable to partake in their chosen activity, although some would have to relocate. Because of the large number of acres treated annually, the potential for adverse effects would increase compared to Alternative A. Smoke would affect more visitors than would closures and restrictions. However, because prescribed fires would be ignited only under certain atmospheric conditions, smoke concentrations would generally affect the area immediately near the fire. Effects would be adverse, short-term, and minor.

Site Preparation Associated with Managed Wildland Fire and Prescribed Fire (hand line, snagging, mop-up)

Site preparation would rarely influence visitor movements or activities. If chainsaws were in use, areas would be closed off, but visitors would likely avoid the immediate area or stay at some distance because of noise (see Noise, below). Under this alternative, most site preparation would have only negligible to minor, short-term, and adverse effects.

Fuel Reduction by Hand or Machine

Aggressive Reduction Techniques.

Mechanical Tree and Shrub Removal. Biomass removal would affect visitors through safety closures and equipment noise, in the Suppression Unit and non-Wilderness portions of the Fire Use Unit only. Visitors would be able to partake in activities, including hiking, nature study, and scenic touring, in other, nearby locations, with limited or no restrictions. Some visitors would have concerns about equipment use in the park, while others would understand the rationale for its use and would be supportive. Overall, the effects upon recreation would be adverse, short-term, and minor.

Conventional Tree and Shrub Removal. Same effects as described under Mechanical Tree and Shrub Removal above.

Passive Reduction and Lower Profile Techniques.
Low-Impact Skidding. Draft animals and four-wheel, all terrain vehicles, in combination with fetching arches would be used to skid trees of approximately 10-20" dbh, but only in areas with sensitive resources as a substitute for other, heavier types of equipment, such as skidders and grapplers. Low-impact skidding would infrequently affect visitors through safety closures and equipment noise in small, contained areas while work was going on. Visitors would be able to partake in their chosen activity, including hiking, nature study, and scenic touring, in nearby areas. Some visitors would have concerns about equipment noise and use in the park, but probably less so than with heavier equipment; other people would understand the rationale for its use and would be supportive. Overall, the effects of low-impact skidding upon recreation, due to limited use, would be adverse, short-term, and negligible.

Hand Cutting. If chainsaws were in use, areas would be closed off and visitors would likely stay at some distance because of noise levels (see Noise, below). Piles of fuels would have the potential to effect scenic quality, but generally, piles would be placed away from areas of high visitor use. Because hand-thinning activities are labor intensive they would not be used extensively in any alternative. Effects would be negligible to minor, short-term, and adverse.

Pile burning. Effects on human activities would generally be limited to small, local scale closures and site restrictions. Most visitors would be able to recreate elsewhere, outside of the prescribed fire unit. Very few people would be unable to partake in their chosen activity, although some would have to relocate. Smoke from burning piles would affect more visitors than would restrictions, but because the piles would be burned under atmospheric conditions specified by the local air quality districts, the smoke effects would generally be localized. Effects would be adverse, short-term, and minor.

Chipping. Chipping would affect visitors through small, localized safety closures that would not limit visitors in their activities. Noise from the chipper would be the greater effect upon visitors (see Noise, above). Some would move to another location to avoid the noise. Effects would be adverse, short-term, and moderate to major.

Girdling. Girdling work would be conducted in a manner and at a time when it would have no effect upon visitors. The evidence of the work would affect some visitors, especially if they did not understand the reason for its use (dead, standing trees benefit wildlife). Overall, effects would be negligible, short-term, and adverse to beneficial, depending upon the acceptance level from the individual visitor.

Cumulative Impacts

Past actions that affect recreation would include the development of visitor use facilities in and around Yosemite National Park. These facilities have provided support to the visitor in beneficial and long-term ways. Several reasonably foreseeable projects have the potential to provide increases in visitor services and facilities, including Hazel Green Ranch, Rush Creek Guest Lodging and Conference facilities, Evergreen Lodge Expansion, and others. These projects have the potential to provide long-term and moderate to major benefits to visitors seeking these services. The effects of present and reasonably foreseeable actions upon recreation would be beneficial, long-term, and major. However, this plan does not propose to remove, increase or modify visitor facilities. Its major influence would be that of local, short-term effects upon the recreational experiences, including hiking, sightseeing by car, and other activities. The impacts of other projects in the region, in combination with the impacts of this alternative, would result in beneficial, long-term, and major cumulative impacts.

Conclusion

More acres would be treated in this alternative than in the No Action Alternative. However, the actions of this alternative would have adverse, short-term, and minor effects upon recreation. The potential for large, catastrophic fire events would decrease, reducing with it the potential for closures. Effects of catastrophic fire on recreation would likely drop to moderate, short-term, and adverse. The potential for catastrophic fire would still exist, but the intent of the alternative is to reduce the risk, thus there would be no impairment from the effects of this alternative.

Scenic Resources

Potential for Impacts from Catastrophic Fire

Important scenic areas like Yosemite Valley and the giant sequoia groves have been high priorities for prescribed fire over the past 30 years. As a result, these are not areas with the highest potential for catastrophic fire. The areas where there is the greatest potential for catastrophic fire would be in the Suppression Unit along the western boundary. The potential for having large, high intensity catastrophic fire in area would be greatly reduced under this alternative, because of the large amount of treatment area that would help to keep wildland fires from reaching the size and having the effects of fires like the A-Rock Fire. Under this alternative, the potential for fires of this size and intensity would decrease. The impacts of Alternative B in regard to catastrophic fire would be beneficial, long-term, and minor to moderate, due to the reduction of risk catastrophic fire and its adverse effects on scenic resources.

Fire Management Treatments

Managed Wildland Fire

Wildland fires would burn the largest number of acres of all the alternative. Most wildland fires would be in Wilderness. To some, the effect of managed wildland fire on scenic resources would be seen as adverse, but to most Wilderness visitors the effects would be seen as acceptable, beneficial, and natural. Fire in forests that are within their natural range of variability rarely exhibit extreme fire behavior that can have major effects on scenic quality. The typical effects of fire would include blackened bark, catfaces on some trees, the opening of the understory, cleaning of the forest floor (burning the litter and duff layer), and the scorching of some trees. The overall effect is scattered kill and opening of the canopy. It is likely that Wilderness users would see these natural effects as beneficial, long-term, and major on a landscape scale.

Re-ignition clause. Re-ignition effects would be similar to those described under managed wildland fire.

Holding Action and Monitoring Effects (water and retardant drops, helispots, and spike camps). These actions would potentially have short-term effects on scenic resources, in the form of evidence of helispots and spike camps. These effects would generally be local in scale and probably not encountered by most visitors. Effects would be adverse, short-term, and minor.

Prescribed Fire

Under this alternative, prescribed fire would be used to maintain scenic resources in places like Yosemite Valley and in the giant sequoia groves. Some project plans would include objectives for restoring open scenic areas or maintain scenic vistas. This acreage would only be a portion of the total acres per year treated on average, but the actions would clear scenic views of meadows and open up stands of trees that have obscured vistas over the past century and a half. Prescribed fire would also cause effects that would be considered adverse to some front country visitors, so education efforts would be needed to explain objectives and the role of fire in natural systems. However, public acceptance of the prescribed fire program has increased to the point that local impacts would not be seen as adverse by most visitors. Effects of prescribed burning on scenic resources would be generally beneficial and long-term, but moderate to major.

Site Preparation Associated with Managed Wildland Fire and Prescribed Fire (hand line, snagging, mop-up)

These actions would be visible to visitors within the immediate area, but would not typically be seen within scenic views, when viewed on a landscape scale. Effects would be greater than under Alternative A, due to the larger number of treated acres under this alternative. Effects would remain adverse, short-term, and minor.

Fuel Reduction by Hand or Machine

Aggressive Reduction Techniques.

Mechanical Tree and Shrub Remova*l*. An average of 1,285 acres of wildland/urban interface would be treated per year. The activity would have at least two potential effects. First, cutting vegetation and removing it would have adverse effects from cut stumps, fuel piles, vehicle tracks, and soil disturbance. Some evidence of activity (e.g., stumps, machine cuts) would be potentially long-term, unless additional actions (use of tub grinders, for example) were taken. However, clean-up activities following a project (raking out vehicle tracks and soil disturbance) would mitigate effects so they would be short-term, minor, and adverse. Second, biomass removal would restore forest stands to a target condition (when applied in combination with prescribed fire) that would be within the natural range of variability for the system. This would have the positive effect of opening up views and improving scenic quality on a landscape scale. This effect would be beneficial, long-term, and potentially major, yielding benefits that would not occur under Alternative A.

Conventional Tree and Shrub Removal. The effects of skidding/grappling would include on-the-ground effects, such as vehicle tracks and soil disturbance. With mitigation, such as clean-up activities at the end of the project (raking out vehicle tracks and soil disturbance), most of these effects would be short-term, minor, and adverse.

Passive Reduction and Lower Profile Techniques.

Low-Impact Skidding. Under Alternative B, this technique would be used to a limited extent in the wildland/urban interface and along road corridors. Paths and scarification caused by horses, ATVs, or fetching arches and dragging trees would be raked out in most areas. Impacts from skidding trees would be mitigated by the use of fetching arches or by skidding over snow, frozen ground, or crushed vegetation. Most areas would be broadcast burned after fuel reduction was finished, lessening the visual impact of skidding. Considering the limited application of this technique in this alternative, and the use of mitigation at the end of the project, most of these effects would be adverse, short-term, and negligible.

Hand Cutting. These actions would be visible to visitors within the immediate area, but would not typically be seen on a landscape scale. On the ground, visual effects would be adverse, short-term, and minor, but would contribute to beneficial, long-term, and major effects through the restoration of open scenic views.

Pile burning. This activity would have two potential effects on scenic resources. First, piles of stacked fuels would be visible, and potentially within major scenic views. Second, piles once burned would leave a pattern of burned area that would not appear natural. As in Alternative A, both effects would be adverse, short-term, and minor, but the amount and distribution of work would increase substantially under this alternative.

Chipping. Chipping would result in local area effects that would be limited to evidence of activity, through concentrations of wood chips left behind. Chipping would not be a major feature on a landscape/scenic view scale. These effects would be adverse, short-term, and negligible.

Girdling. Girdling would cause local effects that would rarely be noticed within a scenic resource. Effects would be adverse, long-term, and negligible.

Cumulative Impacts

The effects of past and present actions on scenic resources are obvious in locations like Yosemite Valley, which includes visitor and support facilities. Major viewpoints, like Tunnel View, have no visual intrusions, while visitors, traffic and facilities can be seen in others. These effects are adverse, long-term, and moderate.

Past, present, and reasonably foreseeable actions include fire management and fuels treatment activities outside the park, many of which would be National Forest administered lands. These would include A-Rock Reforestation, Aspen Fuels Reduction, Orange Crush Fuels Program, Rogge-Ackerson Fire Reforestation, and the Fire Management Plan for Wilderness in Stanislaus National Forest. These actions would result in effects similar to those in the park that result from fire management actions, including burned areas, cut stumps, evidence of holding lines, burned area fire rehabilitation work, and others. Some of these effects would be potentially visible from highways entering the park, if passersby knew where to look for them. Overall, the effects of present and reasonably foreseeable projects would be adverse to beneficial, long-term, and minor. Considered in combination with the impact of Alternative B on scenic resources, cumulative impact would be beneficial, long-term, and major.

Conclusion

Fire management activities would affect scenic resources in generally beneficial ways, because they would contribute to restoring and maintaining open vistas and natural forest structure. The effects in the Suppression Unit would be substantially greater in this alternative, compared to Alternative A, due to the larger amount of annual prescribed fire and biomass reduction. Overall, these effects would be beneficial, long-term, and major, especially if projects in some areas (Yosemite Valley, for example) included objectives related to the restoration and maintenance of open vistas. Under this alternative, there would be a smaller likelihood of having large, high intensity, catastrophic fires with effects like the A-Rock Fire. The potential for catastrophic fire would still exist, but the intent of the alternative would be to reduce risk, thus there would be no impairment from the effects of this alternative.

Noise

Potential for Impacts from Catastrophic Fire

Under this alternative, the potential for large, high-intensity fire would decrease compared to Alternative A, due to the amount of fuel treatment and prescribed fire, especially in the Suppression Unit. With the diminishing potential for large-scale fires, the likelihood and frequency of having to deploy large-scale fire suppression efforts would also diminish, thereby reducing the size and duration of fire operations. When large fire organizations were needed, the noise effects would be similar to under Alternative A, except the duration of operations would likely be shorter. Due to the reduction in risk of catastrophic fire and resultant reduction in duration and extent of noise events, the impact would be beneficial, long-term, and moderate.

Fire Management Treatments

Managed Wildland Fire

During managed wildland fire incidents, helicopters typically would be used periodically for reconnaissance and for moving people and equipment. At least one flight per day would normally be flown over fires, many of which would be in Wilderness. As fires grow, the reconnaissance area and flight duration would increase. Helicopters at 100 feet distance would be as loud as 100 dB, a sound that would be uncomfortably loud. In relative loudness, this would be 128 times as loud as a lower limit, urban daytime ambient noise level of 40 dB (reference loudness, table 3.12). This effect would be adverse, short-term, and major. However, the noise would generally affect only a small number of Wilderness visitors, unless operations occurred near front country areas and major Wilderness corridors.

Re-ignition clause. The effects would be the same as under managed wildland fire.

Holding Action and Monitoring Effects (water and retardant drops, helispots, and spike camps). The effects of helicopter use, as used in water and retardant drops, would be the same as described under managed wildland fire. In the event of a holding action, chainsaws, water pumps, and other equipment would be in use. Chainsaws at close proximity would have sound levels of approximately 100 dB, or 128 times as loud as the reference loudness of 40 dB. The effect, especially at close range, would be adverse, short-term, and moderate to major

Prescribed Fire

Prescribed fire operations typically occur within a defined project area. Between 2,520 and 12,872 acres would be treated in an average year. This amount of acreage would take 75 or more of days of project time, compared to approximately 25 days under Alternative A. Fire engines would commonly be in use along roads and in some cases along burn boundaries. A diesel truck traveling at 40 miles per hour at 50 feet can have sound levels of 80 dB, or 16 times as loud as reference loudness. These effects would be adverse, short-term, and moderate.

Site Preparation Associated with Managed Wildland Fire and Prescribed Fire (hand line, snagging, mop-up)

The equipment used in building control lines, snagging, and mop-up during these operations would be chainsaws, water pumps, and other equipment. Chainsaws at close proximity would have sound levels of approximately 100 dB, or 128 times as loud as the reference loudness of 40 dB. The effect would be adverse, short-term, and moderate.

Fuel Reduction by Hand or Machine

Aggressive Reduction Techniques.

Mechanical Tree and Shrub Removal. During biomass removal operations equipment of various types would be used. Most of the project areas would be in burn units near wildland/urban interface. In an average year, approximately 1,285 acres would be treated, which would take approximately 45 days of work. Some of the equipment used would have noise levels similar to levels of bulldozers, which have noises that are approximately 85 dB at 50 feet. This sound level would be considered loud and would be over 16 times as loud as reference noise levels. The effects would be adverse, short-term, and moderate to major. Possible mitigations would result from scheduling work during winter months when visitation was at the low end of the spectrum.

Conventional Tree and Shrub Removal. These effects would be the similar to those under Mechanical Tree and Shrub Removal.

Passive Reduction and Lower Profile Techniques.

Low-Impact Skidding. This technique would be infrequently used and only as a substitute for heavy machinery in sensitive areas. This would include the use of draft animals and four wheel, all-terrain vehicles, in combination with fetching arches to skid trees of 10-20" dbh. ATVs, which have motorcycle-type engines, would potentially be very loud. Noise levels can be as high as 90 dB at 25 feet—32 times as loud as reference noise levels [although ATVs may have engine sizes and mufflers that could reduce this noise output considerably, motorcycle noise levels (see table 3.12, in Chapter 3) are considered as the basis for comparison]. Distance from the noise source, in heavily wooded areas, would diminish the noise considerably, but close up the effects would be clearly audible. In this alternative, this technique would be used very little, thus the impact of skidding using ATVs would be adverse, short-term, and moderate to major.

Hand Cutting. Chainsaws would be the major piece of equipment used for hand cutting, which would generally be conducted in defined project areas. The effect would be adverse, short-term, and moderate.

Pile burning. The equipment used during these operations would include engines and water pumps. The effects would be similar to that found under prescribed fire above.

Chipping. A pneumatic chipper, at one meter distance can be as loud as 115 dB, which is uncomfortably loud, and over 128 times as loud as reference loudness. This equipment would typically be used in the Suppression Unit and Special Management Areas, particularly in wildland/urban interface areas. Chippers would be used on a defined project basis, over a short time period. The effects of use would be adverse, short-term, and major.

Girdling. If chainsaws were used in these operations, the effects would be the same as under Hand Cutting above, except girdling would be used on a limited basis, thus noise effects would be limited and very short-term.

Cumulative Impacts

The noise effects of past and present actions are manifest in the soundscapes found in places as Yosemite Valley and along major roadways. Vehicular traffic in these areas typically results in sounds that exceed 60 dB at 50 feet. In Yosemite Valley, some locations, such as along Northside

Drive and Southside Drive, about 15 major (noticeable) sound events per hour can occur. These effects would continue to be adverse, long-term, and moderate.

Past, present, and reasonably foreseeable actions include fire management and fuels treatment activities outside the park, many of which are on U.S. National Forest Service administered lands. The types of equipment that would be used would be similar to those used in the park, including helicopters, chainsaws, and water pumps. The noise effects from present and reasonably foreseeable projects would be adverse, short-term, and moderate to major. Considered in combination with the noise effects of Alternative B, cumulative effects would remain adverse, short-term, and major.

Conclusion

Fire management activities would have the potential to introduce noises that have a short-term, adverse, and major effect on ambient noise levels, especially near wildland/urban interface areas and during large, catastrophic fire events. The noise events would be similar to those found under Alternative A, but the number of events and the duration of fuel treatment operations would be substantially greater than under Alternative A. In Wilderness, helicopter and chainsaw noises would continue to introduce short-term intrusions, with adverse and major effects, the same as under Alternative A. There would be no impairment of the park's resources or values.

Local Communities

Potential for Impacts from Catastrophic Fire

The greatest potential for catastrophic fires would be in the Suppression Unit and along the margins of the Fire Use Unit. Because this alternative proposes an aggressive program for prescribed fire and fuel reduction in and near the wildland/urban interface, the risk of catastrophic fire spreading into the wildland/urban interface would be much lower than under Alternative A. Risk near communities and developments in Aspen Valley, Hodgdon Meadow, El Portal, Foresta, Wawona, Yosemite Valley, and Yosemite West would greatly decrease by reducing fuels and restoring ecosystems in the surrounding terrain. In this alternative, catastrophic fire would continue to be a risk, but fire in treated areas would typically show acceptable behavior, making it easier to protect wildland/urban interface areas. Potential effects of catastrophic fire would be lower in terms of both direct impacts (property loss and damage from fire reaching communities), and the indirect impacts of closures and other actions (loss of business and its economic effect), thus the effect of Alternative B would be beneficial, long-term, and moderate.

Potential Direct Effects of Catastrophic Fire. Under this alternative, the risk of catastrophic fire would remain, but, through time, fire behavior would become less severe, because of the amount of annual prescribed fire and wildland/urban interface treatment. There would be between 2,520 and 12,872 acres treated per year with prescribed and managed wildland fire and another 1,533 acres of fuel reduction in the wildland/urban interface. At this level of accomplishment, it would be possible to achieve restoration objectives and the size and impact of unwanted wildland fires would lessen considerably. Any direct effects in wildland/urban interface that would occur because of catastrophic fire would likely be adverse, long-term, and major, but the potential of these effects occurring would be greatly reduced under this alternative.

Potential Indirect Effects of Catastrophic Fire. The potential for large, catastrophic fires would still exist under this alternative, but the potential for indirect effects, in the form of revenue loss due to park closures, would be lower. Adverse economic impacts on the five county area would thus be lessened. It would be difficult to estimate the duration of any possible closures under this alternative, but closures most likely would be fewer and, when they occurred, shorter, because fire behavior in treated areas would generally be more manageable. Economic impacts on a per visitor basis would be the same (estimated at an average of about $32 of lost expenditures per visitor, per day of closure), but closures would likely be of shorter term. A fire like the A-Rock, had it encountered areas where fuels had been reduced (either through prescribed burns or biomass removal), would have possibly been less difficult to control, and it would likely have been possible to contain in a shorter period of time. Thus, the potential economic effects of a closure would be adverse, short-term, and minor—less than under Alternative A, No Action.

It should be noted that total park closures have been rare in the history of Yosemite, but several have occurred in recent years. Also, actual fire conditions (i.e., when and where a fire would occur) would dictate the values at risk, the measures needed to assure public safety, the extent of closure needed to assure public safety, and thus any resulting economic impacts. Actual fire events are very difficult to foresee; but closures under this alternative would likely have adverse, short-term, and minor effects, compared to Alternative A.

Fire Management Treatments

Managed Wildland Fire

Managed wildland fire would accomplish resource management objectives of restoring fire to ecosystems in the Fire Use Unit, as in Alternative A. There would be risk associated with fires of this type, including possible fire escape and extreme fire behavior. However, managed wildland fires burning in plant communities that are within their natural range of variability rarely escape and cause property damage or loss. Additionally, by modeling fire behavior, holding actions can be put in place long before a fire approached any community.

Managed wildland fire more typically affects visitors because under certain fire and atmospheric conditions, a large amount of smoke is generated and funneled into well-populated areas. Smoke-related impacts on local and regional communities can be put into two categories—those that might affect health and those that might affect visibility of scenic resources. Particulates in smoke can adversely affect health, thus, the park would implement a Smoke Communication Strategy (Appendix 4) to inform communities and visitors of smoke events. Second, smoke or smoke combined with air moisture can affect scenic views and the quality of the visitor experience. Since closures due to fire are generally small and short-term, the effects would generally be experiential (see Recreation). It is possible that some visitors would decide not to visit Yosemite because of fire in the park, but the number of these visitors would not likely be large. As in Alternative A, No Action, the effects of managed wildland fire on communities would be adverse, short-term, and negligible.

Re-ignition clause. Effects would be the same as under managed wildland fire.

Holding Action and Monitoring Effects (water and retardant drops, helispots, and spike camps). Holding actions and monitoring do not typically have effects upon local communities. However, there would be risk associated with applying fire management actions, and in the event of a failed holding action, the worst case effects would be the same as described under Potential for Impacts from Catastrophic Fire, above.

Prescribed Fire

Prescribed fire would be one tool used to reduce risks associated with fire in and near wildland/urban interface (Aspen Valley, Hodgdon Meadow, El Portal, Foresta, Wawona, Yosemite Valley, Yosemite West, and others). Under this alternative, between 2,520 and 12,872 acres would be burned per year, and much of this would be in combination with an average 1,285 acres of wildland/urban interface work (thinning and fuel reduction) per year. This work would accomplish objectives for restoring plant community structure and reducing risks around wildland/urban interface areas. With the amount of wildland/urban interface treatment that would be done annually, it would be likely that risks would be greatly reduced during the life of the plan. The potential for the type of high-intensity, destructive fire that burned in Foresta in 1990 approaching wildland/urban interface areas would be greatly reduced as a result of this alternative. Prescribed fire under this alternative would have beneficial, long-term, and major effects.

Prescribed fire in wildland/urban interface areas would impact residents through smoke and site closures. During prescribed fire activities, residents and visitors would be affected through localized safety closures and equipment noise. Smoke would affect all 'down-wind' and 'in-basin' locations in the area. Some residents would have concerns about the smoke, while others would want the work to move forward, to provide the fire protection and ecosystem restoration benefits. This latter group would be supportive. Overall, these effects upon local communities would be adverse, short-term, and minor.

There is risk and uncertainty associated with implementing a successful fire management strategy that includes prescribed fire. One intent of the program is to reduce enough fuels in enough places to lessen the risk of catastrophic wildland fire. Even when one considers potential smoke emissions and escaped prescribed fires, the risk associated with prescribed fire and mechanical fuel reduction is still lower than the threat of wildland fire, especially in areas where fuel loads are unnaturally high.

Site Preparation Associated with Managed Wildland Fire and Prescribed Fire (hand line, snagging, mop-up)

These actions would have negligible socio-economic effects upon communities.

Fuel Reduction by Hand or Machine

Aggressive Reduction Techniques.

Mechanical Tree and Shrub Removal. Biomass removal operations, primarily in the wildland/urban interface areas (Hodgdon Meadow, El Portal, Foresta, Wawona, Yosemite Valley, Yosemite West), would reduce fuels in approximately 1,285 acres per year. This is a major increase in fuels reduction work compared to Alternative A, and would greatly reduce risks of catastrophic fire and loss of property in the communities in and adjacent to the park. The effect for local communities would be beneficial, long-term, and moderate to major.

Equipment use would occur adjacent to and within wildland/urban interface areas. When equipment is in use, residents and visitors would be affected through local safety closures and equipment noise. Some residents would have concerns about equipment use in the park, while others would want the work to move forward, to provide the fire protection and ecosystem restoration benefits. This latter group would be supportive. These effects upon local communities would be adverse, short-term, and minor.

Cost recovery, through wood sales and other economic considerations, was recommended during public scoping as a way to increase annual accomplishment toward target conditions. At present, the National Park Service does not have an authority for the reinvestment of receipts from biomass removal-related wood sales. Yosemite's designating legislation (Title 16, USC Sec. 54) allows the sale and removal of matured or dead or down timber as needed for the protection of the park, but all proceeds go to General Services Administration for deposit into the General Treasury, as miscellaneous receipts. Although the National Park Service could use available mechanisms in contracts to reduce certain costs related to biomass removal, it would not be able to return proceeds to the park to support additional project work of this type. If the National Park Service had a new authority to allow it to enter cost recovery contracts, this alternative would provide more marketable logs per year than under Alternative A. Partnering with private enterprise could greatly reduce agency costs, but the National Park Service would not likely recover all costs under current or expected market conditions. This effect on local communities would be beneficial, long-term, and probably minor. However, the authority for cost recovery does not exist at present.

Conventional Tree and Shrub Removal. The benefits of skidding/grappling would be associated with biomass removal, the effects of which would reduce risks in wildland/urban interface areas, a beneficial, long-term, and moderate to major impact.

Passive Reduction and Lower Profile Techniques.

Low-Impact Skidding. This alternative has the shortest period for completing fuel reduction projects (5 years for wildland/urban interface work), and low-impact skidding would be used only on a limited basis, thus it would make only a minor contribution in accomplishing these objectives. Effects of low-impact skidding on local communities would be beneficial, long-term, and negligible.

Hand Cutting. Less than 100 acres of hand cutting would likely occur in wildland/urban interface areas. However, because of the amount of biomass removal through mechanical means under this alternative, overall risk in communities would lessen. As a result, hand thinning would contribute to an overall reduction in risk, but its contribution would be similar to that of Alternative A—beneficial, long-term, and minor.

Pile burning. The socio-economic effects of pile burning would be similar to the effects described under Prescribed Fire.

Chipping. Chipping would have beneficial, short-term, and minor socio-economic effects, primarily through rental payments to equipment providers or through wood chip sales.

Girdling. Girdling work would have no socio-economic effect upon local communities.

Cumulative Impacts

As in Alternative A, there are many projects in the five county area that would have a diversity of effects upon local communities. These projects include: Lodging and service projects: utility and infrastructure projects; and other projects of the type described in the proposed action, e.g., projects dealing with fire, fuels, and vegetation management.

Examples of reasonably foreseeable future projects that could have an effect upon visitation within the local communities include: Evergreen Lodge Expansion in Tuolumne County, Hazel Green Ranch in Mariposa County, Rush Creek Guest Lodging and Conference Facilities in Tuolumne County, Yosemite West Thirty-One Acre Bed and Breakfast in Mariposa County, and Yosemite Motel's proposed development in Mariposa County. The Yosemite Motels project, for example, would add 141 new motel units, creating new hotel tax revenues and potential spending impacts from increased visitation. An additional 141 new lodging units would allow for approximately 98,000 additional visitor overnight stays per year. These additional stays would generate a net gain of approximately 5.3 million per year in total (direct and secondary) visitor spending, a long-term, minor, beneficial impact on the local economy.

If new visitors are attracted to the region by the increase in lodging capacity, visitor-spending growth would be higher and the impact would be greater. Whereas these projects could bring about increases in visitation and spending growth, closures during periods of catastrophic fire would bring about short-term decreases in both visitation and spending. Considered in combination with the long-term, minor, and beneficial economic impacts of new development in the communities, the impacts of infrequent closures under Alternative B would remain adverse, short-term, and moderate. However, the frequency of their occurrence would be much less.

Fire management-related projects would include A-Rock Reforestation, Aspen Fuels Reduction, Orange Crush Fuels Program, Rogge-Ackerson Fire Reforestation, the Fire Management Plan for Wilderness in Stanislaus National Forest, and others. These actions would result in effects similar to fire management activities in the park, with the same types of risks. These actions could reduce risks of catastrophic fire and restore resources on and near park boundaries. The long-term, beneficial, and moderate effects of these actions, considered with the impacts of Alternative B, would result in cumulative effects in Yosemite's wildland/urban interface areas that would potentially be beneficial, long-term, and moderate to major.

Conclusion

Because the risks associated with large, catastrophic fires would be greatly reduced in this alternative, direct effects (loss of property during fires) and indirect effects (loss of business during fire-related closures) would be greatly reduced compared to Alternative A. This would be because prescribed fire and mechanical thinning would restore plant community conditions in wildland/urban interface to within the range of target conditions, quickly reducing the risk of catastrophic loss. The potential for fire-related closures and other effects would also be lower. As a result, the overall affect of this alternative on local communities would be beneficial, long-term, and moderate to major.

Environmental Justice

Under this alternative, fire management activities would continue to be directed toward reducing risks in all wildland/urban interface areas in the park, including El Portal, Hodgdon Meadow, Foresta, Wawona, Yosemite West, and Yosemite Valley. Cooperative, interagency prescribed fire activities would also be continued at Yosemite West. Any differences in activity time and effort would be reflective of the complexity of the work required in some areas.

Compared to Alternative A, under Alternative B the greater amount of prescribed burning and fuel treatment would provide greater benefits for each community. Risks associated with each of the wildland/urban interface areas would be lower. In that risks in each of the communities would be targeted, the effects upon minority and low-income populations in those communities would be beneficial, long-term, and moderate to major, the same as effects described under Local Communities above.

Cumulative Impacts

Cumulative effects upon minority and low income populations, as represented in the wildland/urban interface areas, would be the same as described under Local Communities above, beneficial, long-term, and moderate to major.

Conclusion

Prescribed fire and fuel treatment would be focused upon the most immediate risks associated with each of the wildland/urban interface areas. The effects upon minority and low income populations in those communities would be beneficial, long-term, and moderate to major.

Special Designations

Wild and Scenic Rivers

The Wild and Scenic River Act of 1968 requires agencies to protect and enhance the outstandingly remarkable values (ORV) of Wild and Scenic Rivers in Yosemite National Park and the El Portal Administrative Site. Chapter 5 discusses the potential for achieving this end, in light of the actions proposed in the *Yosemite Fire Management Plan*. Impacts of this alternative on river related attributes are discussed in the representative sections (for example, in watersheds, water quality and soils; plant communities and fire ecology; etc.).

Wilderness

All wildland fire management activities within areas being managed as designated Wilderness inside the boundaries of Yosemite National Park will adhere to “minimum tool” requirements of the 1964 Wilderness Act (16 USC 1 1 21). About 704,624 acres or 94% of the park is designated Wilderness. Most of this is in the Fire Use Unit where allowing natural processes of fire to occur is a major goal of Yosemite’s fire management program. Some areas of Wilderness, however, are in the Suppression Unit because years of fire exclusion have created fuel accumulations that would burn at unnaturally high-intensities. These areas would be restored before being considered for inclusion in the Fire Use Unit. Some areas, because of their proximity to populated areas, buildings, roads and utility lines, or historical resources, would never be included in the Fire Use Unit.

Potential for Impacts from Catastrophic Fire

Catastrophic fire would be most likely to occur in the western portion of the park, in areas that are within the Suppression Unit, and along the western margin of the Fire Use Unit. Much of this area is designated Wilderness. The potential for catastrophic fires would be much less than under Alternative A, because of the amount of prescribed fire and various fuel treatment that would be employed. This alternative would have the greatest amount of annual restoration, and thus would result in the lowest potential for large, high-severity fire. Treatments would attempt to restore plant communities to within their natural range of variability, for plant community structure and fuel loading. Fire suppression operations used to control these fires would typically include helicopters, chainsaws, and other motorized equipment, which would be used only after application of the minimum tool test. Their use would have an effect upon Wilderness users and Wilderness values. The effect of these operations on Wilderness would be adverse, short-term, and moderate to major, but the effect of catastrophic fire on the Wilderness landscape would be greatly diminished compared to Alternative A, thus the impact of Alternative B, in regard to catastrophic fire would be beneficial, long-term, and moderate.

Fire Management Treatments

Managed Wildland Fire

Wildland fires could burn well over the 16,000 acre average in any one year, mostly in designated Wilderness. As in Alternative A, the effect of managed wildland fire on Wilderness values would be seen as adverse, but to most Wilderness visitors the effects would be seen as acceptable, beneficial, and natural. Fire in Yosemite plant communities that are within their natural range of variability would rarely result in extreme fire events with major post-fire effects. The typical effects of fire would include blackened bark, catfaces on some trees, a more open understory, reduced litter and duff layer, and the scorching of some trees, resulting in scattered kill and opening of the canopy. Helicopters would be used for reconnaissance and chainsaws would be used during holding actions; these would affect the Wilderness character on a short-term basis. It is likely that Wilderness users would see the natural effects of fire as beneficial, long-term, and major on a landscape scale, and the effects of equipment use on the Wilderness experience as adverse, short-term, and moderate to major.

Re-ignition clause. The effects of re-ignition on Wilderness would be similar to those under wildland fire, except that visitors knowing the source of ignition could have concerns about artificial processes used to accomplish resource management objectives. Evidence of ignition would not likely be apparent. The effects of any evidence at all would be adverse, short-term, and negligible, but the project would net beneficial, long-term, and moderate to major results to other Wilderness and natural values.

Holding Action and Monitoring Effects (water and retardant drops, helispots and spike camps). These actions have the potential to have short-term effects on Wilderness quality. These effects would include hand-constructed fire lines and evidence of helispots and spike camps. These would be generally local in scale and encountered by few visitors in the Fire Use Unit. Effects would be adverse, short-term, and minor.

Prescribed Fire

Prescribed fire would be used as a tool to restore and maintain Wilderness. Between 2,520 and 12,872 acres would be treated with prescribed fire per year, as needed to accomplish restoration and, near communities, fuel reduction objectives. Most of the prescribed fire units would be within the Suppression Unit, although 48,912 acres in 11 prescribed fire units would be in the Fire Use Unit, mainly along the margin of the Fire Use Unit. Where prescribed burning, or a combination of cutting and then burning, would be needed to achieve restoration targets, the effect would be beneficial, long-term, and moderate to major.

Site Preparation Associated with Managed Wildland Fire and Prescribed Fire (hand line, snagging, mop-up)

These actions would be visible to visitors within the immediate area, and would diminish the Wilderness character of the area through evidence of human use. Other than cut stumps and other visible saw cuts, which would be apparent, most effects would be adverse, short-term, and minor. Slash and debris would be scattered to reduce visual effects in Wilderness.

Fuel Reduction by Hand or Machine

Aggressive Reduction Techniques.

Mechanical Tree and Shrub Removal. Would not be used in Wilderness under this alternative.

Conventional Tree and Shrub Removal. Skidding/Grappling would not occur in Wilderness under this alternative.

Passive Reduction and Lower Profile Techniques.

Low-Impact Skidding. The most significant effect of low-impact skidding, from dragging one end of the tree, would be a visible skid trench typically less than a foot wide and a few inches deep. However, because of the limited use of this technique in Wilderness, in most locations this scarification could be raked out with hand tools. Raking would limit the amount of soil erosion and reduce visible marks, thereby limiting adverse effects. Many areas would be burned after skidding activities took place. Considering the limited application of this technique in designated Wilderness, effects would be adverse, short-term, and negligible. This would be done only in the Wilderness part of the Wawona WUI.

Hand Cutting. These actions would be visible to visitors within the immediate area, but would not typically be seen over expansive areas as effects on views of a landscape scale. Effects would be adverse, short-term, and minor.

Pile burning. This activity would have two potential effects on scenic resources. First, piles of stacked fuels would be visible, and could diminish the Wilderness character of the area through the evidence of human use. Second, piles once burned would leave a pattern of burned area that would not appear natural. Both effects would be adverse, short-term, and minor.

Chipping. Chipping would result in local area effects that would be primarily limited to the evidence of activity, through the concentrations of wood chips left behind in the project area. However, the chipper is a loud piece of equipment that would impact Wilderness character on those occasions when it was used. The minimum tool test would be used to indicate whether a chipper was the appropriate tool for accomplishing project objectives. When used, these effects would be adverse, short-term, and moderate to major.

Girdling. This treatment would rarely be used in Wilderness. When it was, girdling would result in very localized effects that would rarely be noticed. Effects would be adverse, long-term, and negligible

Cumulative Impacts

The effects of past and present actions on Wilderness are manifest in the trails, bridges, primitive structures and constructs of man. These facilities have the potential to diminish the Wilderness quality to some visitors, but most depend on many of these features and are tolerant of their presence. Overall, their effects are adverse, long-term, and minor.

Past, present, and reasonably foreseeable actions include fire management and fuels treatment activities outside the park, many of which are national forest lands. These would include A-Rock Reforestation, Aspen Fuels Reduction, Orange Crush Fuels Program, Rogge-Ackerson Fire Reforestation, and the Fire Management Plan for Wilderness in Stanislaus National Forest. These actions would result in effects similar to those in the park that result from fire management actions, including burned areas, cut stumps, evidence of holding lines, burned area fire rehabilitation work, and others. Some of these effects would be within Wilderness. The effects would be beneficial, long-term, and moderate to major on Wilderness values. These effects, considered in combination with the effects of Alternative B, would result in the cumulative impacts on Wilderness would remain beneficial, long-term, and moderate to major.

Conclusion

Fire management activities would affect Wilderness resources in generally beneficial ways, through actions that would restore or maintain plant communities within their natural range of variability, and thus maintain Wilderness values. Amount of ecosystem restoration and fuel reduction in the Suppression Unit would be greater than under Alternative A, which would reduce the potential of having large, high-intensity fires in Wilderness. Helicopter and chainsaw noises would continue to introduce short-term intrusions, with adverse and major effects in Wilderness, the same as under Alternative A. Overall, the effect of Alternative B would be beneficial, long-term, and moderate to major. There would be no impairment from the effects of this alternative.

Energy Consumption

The energy consumption associated with fire management activities is difficult to calculate, because of the great number of variables involved, including the size and complexity of projects. Fire management activities, including monitoring of managed wildland fire, prescribed fire, and hand thinning are considered in the analysis; fire suppression and administrative activities are not.

The same fire management activities considered under Alternative A would be used in this alternative. In addition, biomass removal and chipping would be included in the treatment mix. The number of acres that would be treated, and related energy that would be consumed is estimated in table 4.12 below.

Cumulative Effects

Energy is used in many park operations. For the proposed action for the Yosemite Valley Plan alone, projections included an estimated reduction of 1,341,800 gallons of gasoline consumption per year, and an increase of 335,500 gallons of diesel fuel consumption (for a total of 549,300 gallons per year by 2015), a decrease of 1,006,300 gallons to a total of 1,688,300 gallons of fuel, and a moderate, long-term, beneficial impact. The impact of the amount of fuel consumed during fire management activities in this alternative, over 250,000 gallons of fuel per year, would be adverse, long-term, and major, compared to Alternative A. The cumulative effects would remain beneficial, long-term, and moderate.

Conclusion

Energy would be consumed during fire monitoring and reconnaissance, prescribed fire operations, and fuel reduction activity. Typically more than 250,000 gallons of various fuels per year would be consumed, compared to over 7,000 gallons under Alternative A. The effects of the fire management program's energy demand would be adverse, long-term, and major, compared to Alternative A, No Action. Equipment use during biomass removal operations would be the greatest new source of fuel consumption.

Table IV-12
Projected Energy Consumption Under Alternative B

Fire Management Treatment	Acres Treated per year	Equipment Used	Treatment Rate or Equipment Use	Fuel Use Rate	Fuel Use
Managed Wildland Fire	16,000	Aircraft (recon, transport and water drops)	2 hour per recon flight; est. 180 recon hours per year.	60 gallons of fuel per hour	10,800 gallons of fuel
Prescribed Fire [a]	7,696 (2,520-12,872 per year)	a) Drip Torches [OR in aerial ignition, ignition balls and helicopter]	Approx. 1 acre per hour per torch, 8 acres per day in an 8 hour shift. [Approx. 150 acres per day by aerial ignition; 2 hours flight time per day.]	Approx. 2 gallons per acre burned. [OR approx. one box (1,000 balls) per 150 acres, plus 60 gallons of fuel per hour of flight time, plus ground crews.]	15,392 gallons of drip torch fuel [OR 51,300 ignition balls, and 6,156 gallons of aviation fuel; plus 1,000 gallons drip torch fuel for ground crews.]
		b) Engines	3 to 6 engines/ plus 1 to 2 water tenders per day (5 on average), for an average of 60 project days per year; 12 hour shifts.	8 miles per gallon diesel fuel, at least 50 miles out and back to station per vehicle per day.	1,875 gallons
		c) Chainsaws for site prep.	Approx. 460 acres of prep work. (3 acres site prep/50 acres burn)	2 gallons per day per saw; 10 gallons per crew per day	920 gallons
Hand Cutting	100	Chainsaws	Crew with 5 saws can treat 5 acres per day.	2 gallons per day per saw; 10 gallons per crew per day	200 gallons
Biomass Removal	1,533	Tracked vehicle	20 acres per day	72 gallons per acre, median (16 to 128 gal/acre, depending on terrain and workload).	110,376 gallons
Skidding/ Grappling	1,533	Grapple	8 to 30 acres per day, for 1,131 acres	72 gallons per acre, median (16 to 128 gal/acre, depending on terrain and workload	110,376 gallons
Chipping	300	Chipper	5 acres per day	10 gallons per work day.	600 gallons
Total: 250,339 gallons of various fuels					

a Total fuel includes drip torches, chainsaws, and trucks, not aerial ignition techniques

Sustainability and Long-Term Management

Relationship of Short-Term Uses and the Maintenance and Enhancement of Long-term Productivity

Alternative B would not result in new development (the only development proposed would be expansion of one helibase), thus it would not take lands out of productivity as natural ecosystems. However, fires would continue to have a potential effect upon ecosystem integrity, particularly in the Suppression Unit. This alternative would include the greatest amount of prescribed burning and fuel treatment of all the alternatives. Therefore, it would have the greatest potential to restore forest structure and decrease fuel loads. This would greatly reduce the potential for large, high-intensity fires. Actions would be most influential in upper and lower montane vegetation types, which are furthest away from a natural fire regime. Actions would likely reverse the trend for vegetation type conversion (change over time to a different vegetation type and fire regime) and reduce the potential of returning large areas of the park to early seral stages of ecosystem development, as happened during the A-Rock Fire.

Biomass removal, prescribed burning, and other treatments would not degrade long-term productivity because restoration target conditions would be based upon the natural range of variability for park ecosystems.

Irreversible or Irretrievable Commitments of Resources

Implementation of Alternative B would decrease the threat of large, catastrophic fires more than the other alternatives. The amount of prescribed fire and fuel treatment, particularly in the Suppression Unit and in wildland/urban interface areas, would likely restore target conditions in such a timeframe as to reduce, to the greatest extent, the potential for irreversible or irretrievable loss of resources, except in the earliest years of program implementation. Fire of the magnitude and effect of A-Rock Fire would still be a possibility but the course of action in Alternative B, compared to Alternative A, would not represent an irreversible or irretrievable commitment of resources.

The three giant sequoia groves in Yosemite National Park have been the focus of past fuel treatments and prescribed fire activity. This alternative would assist in protecting them. The increase in prescribed fire and fuel treatment activity in this alternative would reduce the potential for large, high-intensity fires along the margins of these areas and would reduce the risk over time of losing a sequoia grove. The loss of the Mariposa Grove of Giant Sequoia would be considered an irretrievable loss of resources, and impairment, under the definition in National Park Service Management Policies 1.4.5, but the potential for this would be lowest in this alternative.

Historic resources in Yosemite Valley, Wawona, and in other wildland/urban interface areas, if burned during catastrophic fire, would be irreversibly and irretrievably lost. However, the potential for such a loss is lowest under this alternative.

As in Alternative A, No Action, the effects of managed wildland fire upon wildlife and other park values would generally not be considered irreversible or irretrievable, in that effects would typically be within the natural range of variability for park ecosystems and wildlife habitat, and adverse effects would be short-term. Habitat would typically become suitable to wildlife shortly after a fire.

Under this alternative, no appreciable irreversible or irretrievable commitments of resources would be associated with air quality.

Adverse Impacts that Could Not be Avoided if the Action Were Implemented

The potential for catastrophic fire would exist, but would be less than under Alternative A, and the lowest among the action alternatives. This is because of the large amount of prescribed fire and fuel treatment work proposed under this alternative. Treatments would attempt to restore plant community structure and reduce the risk of catastrophic fire. This would reduce the potential for adverse effects from both unwanted wildland fire and fire exclusion. Thus, the potential for adverse effects is lowest in this alternative.

Biomass removal and other fuel treatments would not be considered adverse in that target conditions would be based on the natural range of variability for those systems. The adverse effects of treatments would be short-term, while beneficial effects, such as ecosystem restoration, would be long-term.

Under this alternative, there would be short-term, unavoidable, adverse impacts to air quality due to the increase in prescribed burning in areas where fuel loads are high from decades of fire exclusion. As park forests are restored to their natural vegetative state and natural fire regime, fuel loads will be lighter and thus, less smoke will be produced when forests burn. The need to burn in the park's forests through prescribed and managed wildland fire will never go away, however, adverse impacts on air quality would decrease over the long-term as forests fuels are reduced.