Alternative C – Passive Action

Biological Environment

Vegetation and Fire Ecology

Potential for Impacts from Catastrophic Fire

Among the action alternatives, Alternative C proposes carrying out the least amount of prescribed fire and wildland/urban interface treatment each year. Thus, it would take the longest time to restore ecosystems (25 years) and wildland/urban interface (10 years). This implies that the risk for catastrophic fire would remain high for longer than under the other action alternatives, but not as long as under the current program, as described in the Alternative A, No Action.

The impacts would be the same as the Alternative B, Aggressive Action, except in lower montane forest. In all action alternatives, these forests would have the largest acreage targeted for prescribed fire. The relatively short fire return intervals found in lower montane forests, combined with existing moderate to high departure from normal fire return interval and the length of time it will take to restore the fire regime under this alternative, creates the conditions for increases in the departure from the natural fire regime during most of the restoration period. The potential for catastrophic wildland fire would not decline until near the end of the 25-year period. Mariposa Grove of Giant Sequoias occurs in lower montane forest and could be one of the areas converted by catastrophic fire. Overall, the impact of Alternative C would be beneficial, long-term, and minor to moderate, due to the reduction in the risk of catastrophic fire. This is still improved over the adverse impacts that would occur under Alternative A.

Fire Management Treatments

Treatments utilized in Alternative C include managed wildland fire, prescribed fire, and fuel reduction treatments comprised of a combination of passive reduction and lower fuel profile treatments (table 2-6, Chapter II). None of the aggressive treatment strategies (i.e., feller-bunchers, tractors, or skidders for moving cut fuels from burn units) would be used. Low-impact skidding techniques would be widely used in this alternative in areas where burning or burning without prior fuel reduction is needed to protect life and property and/or resource values. Livestock and all terrain vehicles (ATVs) would be used to remove dead and down and freshly cut trees. Because of the limitations of these techniques, few large downed trees would be removed and few large trees would be cut and removed. The inability to remove large, dead and down trees would require burning them on site which could create prescribed burns of higher intensity than desired. By leaving too many large, standing trees it would not be possible to restore areas to the lower end of vegetative structure targets which are desired in the wildland/urban interface—especially near communities most at risk from unwanted wildland fire. This could mean again that prescribed fires would burn at a higher intensity than desired.

Managed Wildland Fire

Impacts would be the same for each vegetation zone as under Alternative B.

Re-ignition clause. Same as under Alternative B— beneficial, long-term, and moderate to major.

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

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 as in Alternative B, Aggressive Action, but the number of acres burned annually would be less.

Subalpine Forests. In all alternatives, less than 1% of subalpine forests would be in prescribed fire units. The impacts of prescribed fire would be expected to 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 C. However, it is twice the acreage as is in prescribed units under Alternative A. The impact of prescribed fire in these forests would be expected to be the same as under Alternative A. But the large acreage would decrease the chance of catastrophic fire, compared to Alternative A. Due to the longer fire return intervals in this vegetation group, the longer time frame for restoration would have a negligible effect. Impacts of prescribed fire on upper montane forests would be the same as under Alternative B, Aggressive Action—beneficial, long-term, and moderate.

Lower Montane Forests. These forests would be a primary focus of the prescribed fire program. The acreage to be restored would be the same as in Alternative B, but fewer acres would be treated per year. The relatively short fire return intervals, combined with the present moderate to high departure from normal fire return interval, would mean that during most of the restoration period, these forests would continue to increase in departure from normal fire regime. Compared to Alternative A, this alternative would increase the area restored and reduce the potential for catastrophic fire. However, potential for catastrophic wildland fire would not decrease until near the end of the 25-year period. The impact of prescribed burns in these forests would be expected to be the same as under Alternative A. Under this alternative, the effect of prescribed fire on lower montane forests would be beneficial, long-term, and minor to moderate. This would be an increase in intensity, compared to Alternative A, because of the increase in area treated.

Meadows. Meadows have the shortest fire return intervals of all vegetation types described for the park. Short fire return intervals found in this group, combined with their moderate to high departure from normal fire return interval, would suggest that during most of the restoration period, the meadows would continue to increase in departure from normal fire return intervals. The acreage to be restored would remain the same as in Alternative B, Aggressive Action, but fewer acres would be treated per year. The potential for catastrophic wildland fire would not decrease until near the end of the 25-year period. The effects of prescribed fire would be expected to be the same as under Alternative A. Overall, the effect of Passive Action would be beneficial, long-term, and minor to moderate. The increase in acreage and the amount of time used to achieve restoration objectives would have benefits that would last longer and cause substantial change in community structure, composition, or fuels, compared to Alternative A.

Foothill Woodlands. More than 75% of foothill woodlands would occur in prescribed fire units under Passive Action, the same amount as under Alternative B, Aggressive Action. This would be nearly four times the acreage in prescribed fire units as under Alternative A. Fire effects would be expected to be the same as under Alternative A. Overall, the effects of Passive Action would be the same as under Aggressive Action because fire return intervals in this group are long enough that the longer time frame in this alternative would have no appreciable effect. The impacts of prescribed fire in foothill woodlands would be beneficial, long-term, and major. The increase in benefit intensity, compared to Alternative A, would be due to the increase in the amount of work and the time frame for achieving restoration.

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

Impacts 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 nitrogen and other vital plant nutrients. Table *IV*-9 under Alternative B 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.

Aggressive Reduction Techniques. These treatments would not be used in this alternative.

Passive Reduction and Lower Profile Techniques.

Low-Impact Skidding. In Alternative C, this technique would be relied upon as the principle means of skidding in areas where it was necessary to remove trees to reduce fuel loads. The total area is estimated to be half of the approximately 6,425 acres of the inner wildland/urban interface and in some places along road and utility corridors. This treatment would include the use of draft animals and four wheel, all-terrain vehicles (ATVs), in combination with fetching arches, to skid dead and down and freshly cut trees of approximately 10 - 20" dbh. Low-impact skidding would cause localized compaction and scarification of the upper duff and topsoil layers. Knobby tires and the feet of draft animals would have negligible to minor local effects on topsoil and duff layers. The most significant effect would result from dragging one end of the tree which could create a skid trench less than a foot wide and a few inches deep. Soil disturbance could create potential sites for invasion of non-native species. Because this treatment would be widely used in this alternative, impacts would be visually apparent, but not so great as to result in changes in species composition or invasion of non-native plant species, if site rehabilitation is not completed and monitored. With rehabilitation and follow-up monitoring and removal of non-natives, effects would be minor. Other mitigation, when needed, could include skidding over snow, frozen soil, or a bed of crushed vegetation. Many areas would be burned subsequent to fuel reduction. Most projects would be extensive enough that adverse effects could be potentially greater than localized, thus effects would be adverse, minor to moderate, and short-term. However, because of the inability of this equipment to haul large trees, it would be difficult to achieve the levels of fuel reduction needed to return some areas to target condition (conservative, and repeated burning techniques would be needed to achieve objectives).

Hand Cutting. Types of effects would be the same as under Alternative A, but this activity would be the predominant one for restoring plant community structure in areas that were unsafe to burn.

This work is labor intensive, which would limit the amount of work that could be accomplished annually, compared to other alternatives that utilize a full range of machinery for reducing plant growth. In the wildland/urban interface, only around 766 acres would be treated annually. This would lengthen the time needed to accomplish wildland/urban interface restoration and risk reduction compared to other action alternatives, but this would still be more restoration than would occur under Alternative A. Work would focus on removing small diameter trees and ladder fuels with resultant decreased risk of catastrophic fire and stand-replacing events. Thus, unless hand-thinned fuels are broadcast burned after thinning, the effects of hand thinning on lower montane forests would be adverse, short-term, and minor. If these fuels are also burned, under controlled conditions the effects of hand thinning would be beneficial, long-term, and minor to moderate.

Pile Burning. Same as under Aggressive Action—adverse, short-term, and negligible to minor.

Chipping. Same as under Aggressive Action.

Girdling. The impact of girdling, to kill individual trees and create wildlife habitat, would be adverse, short-term, and negligible to minor.

Helibase Upgrades

Upgrades would be made in helibases at Crane Flat, El Portal, and Wawona. Effects for each of these would be the same as in Alternative B.

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 effects of past activities on vegetative structure and composition and on fuel loads have been adverse, long-term, and major. Present and reasonably foreseeable future projects would have a beneficial, long-term, and minor to moderate effect on vegetation.

The actions of Alternative C would have beneficial, long-term, and minor to major effects in aggregate. When considered in combination with the minor to moderately beneficial impacts of projects on other lands in the area, the cumulative impacts would be beneficial, long-term, and minor to moderate.

Conclusion

Taken together, the impacts of Passive Action would have beneficial, long-term, and minor to major effects on vegetation. This is based on the increase in area treated using prescribed fire and managed wildland fire. The intensity will change from minor to major over the life of the plan as more acres are treated and moved into the maintenance category. By using the estimates of the time required to restore park ecosystems (25 years) and to reduce risks in and restore wildland/urban interface (10 years), the time frame for restoration would be within the normal range of fire return intervals for all but five vegetation types. At the end of the restoration period there would be a significant reduction in the threat of large, high-intensity wildland fires in all areas of the park. This would reduce the potential for vegetation type conversion. This would change effects from adverse to beneficial, 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 when compared with Alternative A.

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

Alternative C would result in a decreased risk of catastrophic fire over a 25-year period. The likelihood of fires of high intensity and/or large size would be reduced with corresponding beneficial impacts on park wetlands. Depending on the specifics associated with individual events and considering effects at multiple scales, impact levels would vary from negligible to moderate, which is an improvement over Alternative A.

Fire Management Treatments

Managed Wildland Fire

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

Re-ignition clause. Same as Alternative B.

Holding Action and Monitoring Effects (water and retardant drops, helispots, and spike camps). Same as Alternative B—adverse, short-term, and negligible.

Prescribed Fire

Under this alternative, limited amounts of prescribed fire would be proposed in and around wetlands. Direct benefits would include desired structural conditions for specific habitats and well-timed prescribed fire to enhance wetlands species. These impacts would be considered beneficial. In the absence of a need for fire, through changes in the prescribed fire boundary or firing patterns, wetlands would be excluded from prescribed fire units to avoid adverse impacts. Thus, impacts would be beneficial, minor to moderate, and typically short-term.

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. Therefore, the effects of prescribed fire on wetlands in Alternative C would be beneficial, long-tern, and minor to moderate.

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

Same as Alternative B, although with smaller annual impacts.

Fuel Reduction by Hand or Machine

Aggressive Reduction Techniques. Would not be used under this alternative.

Passive Reduction and Lower Profile Techniques.
Low-Impact Skidding. If for some reason 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.

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

Pile Burning. Same as Alternative B—beneficial, minor to moderate, and short-term.

Chipping. No chipping of wetland vegetation will take place under this alternative.

Girdling. No girdling of wetland vegetation would take place under this alternative.

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 would potentially affect local wetland patterns and large-scale or regional wetland patterns would be the same as evaluated in Alternative A.

Present and reasonably foreseeable future projects within and outside of the park would result in both short-term and long-term impacts on wetlands in the area. Overall, effects would be beneficial, long-term, and moderate for reasonably foreseeable future projects. Considered in combination with the impacts of Alternative C, cumulative impacts would be beneficial, long-term, and minor to moderate, due to the emphasis on restoration of vegetative structure and processes through fire and the long time-frame proposed to accomplish the work.

Conclusion

Alternative C would have some impact on wetland resources, including reducing the potential for catastrophic wildland fire and its effects. Overall, these effects would be beneficial, long-term, and minor to moderate, with minor to moderate ecological benefits for park wetlands. There would be no impairment from the effects of this alternative.

Wildlife

Potential for Impacts from Catastrophic Fire

Under Alternative C, catastrophic fire would have similar effects as described under Alternative A, however the risk would decrease over time. Forests that have deviated from the median fire return interval by four or more intervals would be gradually brought into more natural conditions over 25 years, more time than in the other action alternatives. Areas most outside of the natural fire regime would be restored first. This alternative proposes , about 1,260 to 6,436 acres of restoration burning per year. Alternative C would also rely upon natural ignitions to achieve target conditions in the Fire Use Unit. Some areas would likely miss more fires, potentially becoming more at risk from the impacts of high-intensity fire. Even though stand-replacement fires would likely occur over the life of the plan, risk of catastrophic fire would be gradually reduced over the proposed 25-

year period. Because catastrophic fire and its adverse effects on wildlife and wildlife habitat would be reduced, compared to Alternative A effects would be beneficial, long-term, and moderate for wildlife and their habitats.

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. At the same time, as explained above, 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 fire 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. 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

Because ecosystem restoration would occur over a period of 25 years in Alternative C, the acreage burned by managed wildland fire would increase only gradually. Actions in the Fire Use Unit and effects of managed wildland fire would be similar to Alternative B, however they would occur over a longer time. Overall, the effects would be beneficial, long-term, and moderate, due to the restoration of wildlife habitats and reduction in the threat of catastrophic fire over a 25-year period. Mitigation: Use MIMT and identify sensitive wildlife resources to minimize adverse impacts.

Re-ignition. Effects would be the same as under Alternative B.

Prescribed Fire

This alternative proposes an increase in prescribed fire over the No Action Alternative. However, when compared to the other action alternatives, this alternative proposes the smallest annual amount of prescribed fire. Effects are similar to those in Alternative B. Impact to wildlife from prescribed burning would be beneficial, long-term, and moderate due to gradual burning schedule over 25 years to restore fire to wildlife habitat and reduce the threat of 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 to 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)

Actions such as hand line construction, snagging, and water drops would be employed before and during prescribed fire and during management of wildland fires. Effects and concerns would be those described in Alternative A. Some adverse effects on wildlife would occur from these actions because of the increased use of prescribed fire under this alternative. These impacts, however,

would be offset by the long-term benefits of fires on ecosystems by reducing the threat of catastrophic fire and restoring a more natural forest structure. Impacts would be similar to Alternative B—adverse, short-term, and minor.

Fuel Reduction by Hand or Machine

Passive Reduction and Lower Profile Techniques.

Low-Impact Skidding. Trees in wildland/urban interface areas and along road and utility corridors under Alternative C would be removed with the use of horses or ATVs and fetching arches. These techniques would be used extensively in this alternative to move smaller sized material (10-20"dbh) from areas where thickets of sub-canopy trees required thinning. It is expected that all the areas in wildland/urban interface and along road and utility corridors could see limited amounts of this treatment. This work would be limited in scope; it would occur over 10 years in less then 1% of the park area (an average of 766 acres per year).

Because horses and ATVs cannot handle large trees, trees larger than approximately 20" dbh would not be removed and would have to be felled prior to broadcast burning. Some drag trails would be created from the smaller diameter material, but the use of fetching arches would reduce the impacts of logs being mechanically skidded across the ground. Drag trails and other disturbance would be raked out following the work and most areas would be broadcast burned as well. Few tire and track scars would be evident and the effects on small mammals and reptiles associated with the forest floor would be minor. Impacts associated with these techniques as the forest was brought closer to natural stand structure would be beneficial, long-term, and minor as the areas would be maintained using prescribed fire. Mitigations: areas proposed for thinning and removal of vegetation using these techniques would be inventoried for the presence of sensitive species that could be affected by proposed project work.

Hand Cutting. Hand thinning of understory vegetation, down fuels, and small-diameter trees in the wildland/urban interface would have mixed effects on wildlife and habitat. Hand cutting trees and brush to attain target conditions provides a more natural habitat and helps reduce the threat of catastrophic fire; especially from human-caused ignitions that occur in developed areas. The resulting forest structure, however, tends to be less complex and more homogeneous, because protection of property and safety through fuel reduction is a major consideration in these areas. A few species, such as marten, hermit thrush, and some small rodents may be adversely affected by this reduced complexity, but many more species, such as Cooper's hawk, Hammond's flycatcher, and several bat species, would benefit from a more open forest. During hand-thinning operations, wildlife in the area might be affected in two ways. Removal of trees and other vegetation would adversely affect wildlife, such as insects and nesting birds, currently using these habitat features. Secondly, human presence and use of chainsaws and other tools during thinning operations may disturb wildlife, although such disturbance would be short-lived.

Trees and other vegetation in wildland/urban interface areas and along road and utility corridors under Alternative C would be hand cut with chainsaws. This would limit the amount of work (size of area and number of trees) that could be accomplished annually. Achievement of target habitat conditions in these areas would take longer than with the other action alternatives. Such management would have different effects on wildlife. On one hand, delay in achieving target conditions would allow altered habitat conditions to continue, and the threat of high-intensity fire in those areas would remain. On the other hand, retention of more trees would benefit species that prefer denser forest conditions, such as spotted owls. Impacts on wildlife would be beneficial,

long-term, and minor through eventual return of these small areas to a more natural habitat structure and composition. Mitigation: Avoid damage to sensitive habitat types, such as wetlands; identify and avoid sensitive wildlife resources; and apply mitigations identified during consultation with USFWS (see Appendix 9).

Pile Burning. Under Alternative C, in some areas removed material would be piled and burned on-site, while in other areas materials would be removed for later burning or sale. With on-site burning, the impacts would be the same types as described under Alternative A, but may 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. Same as Alternative B—negligible; adverse, and short-term. Mitigation: Follow established protocols for limiting the depth of chips distributed on a site.

Girdling. Under Alternative C, trees would be girdled to reduce forest density, create snags, and prepare areas for prescribed fire. Girdling trees in Wilderness or away from roads and developed areas would be beneficial to wildlife by creating snag habitat, and facilitating the return of a more natural forest habitat structure. If, however, the snags were eventually felled and removed, wildlife such as bats and woodpeckers that had taken up residence would be adversely affected. This impact would occur if snags created by girdling were removed to reduce fuel loading, or were determined to be hazard trees near roads or developed areas. Impact on wildlife from girdling would be beneficial, long-term, and minor, because of the creation of snag habitat and its use in creating a more natural, fire-influenced habitat structure.

Peregrine Falcon

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

Helibase Upgrades

Same as Alternative B.

Cumulative Impacts

The past, present, and reasonably foreseeable projects that would have the most direct relationship to Alternative C would be the same as listed under Alternative A. The impacts of these actions, considered in combination with the impacts of Alternative C, would result in cumulative effects on park wildlife and habitat that would be beneficial, long-term, and minor to moderate. This is because beneficial projects would impact 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 because of its focus on more ecosystem-based management. In comparison, projects with adverse impacts involve small areas and/or have minor effects over larger areas.

Conclusion

Alternative C would result in moderate, beneficial, long-term impacts on wildlife and habitat through eventual restoration of park habitats to a more natural, fire-influenced condition that would support a more natural abundance, diversity, and distribution of species. Threat of catastrophic fire, and its adverse effects on wildlife, would be reduced, compared to Alternative A, although the period of time over which this alternative would be implemented (25 years) would still lead to unwanted wildland fires. The intent of the alternative is to reduce the risk of catastrophic fire, thus there would be no impairment from the effects of this alternative.

Special-Status Species - Plants

Potential for Impacts from Catastrophic Fire

Wildland/urban interface treatments around the El Portal area would reduce the potential for catastrophic fire conditions within the wildland/urban interface and prescribed fire would reduce the potential for these events beyond the bounds of the administrative site. Regardless of treatment methods, 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. Therefore, in regards to catastrophic fire, impacts to special-status species from implementation of Alternative C beneficial, long-term, and negligible to minor.

Fire Management Treatments

Managed Wildland Fire

Under Alternative C, all of the plant special-status species described in this document would occur within the Suppression Unit, and only isolated populations of Yosemite onion would occur 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 II, Mitigation under Actions Common to All Alternatives and Appendix 3). The departure from natural fire return intervals in areas inhabited by these species would more slowly approach the natural range in variability over the landscape, compared to Alternative B. Therefore, impacts of managed wildland fire on special-status species would be the same as for Alternative B—beneficial, long-term, and minor, due to return to natural fire return intervals with associated benefits to ecosystem function.

Re-ignition clause. Same as Alternative B—negligible effect.

Holding Action and Monitoring Effects (water and retardant drops, helispots, and spike camps). Despite increased implementation of burning and operational activities, effects would be the same as in Alternative A. These special-status species are in areas that would be minimally affected by the proposed actions in Alternative C. Mitigations would be as described in Alternative A (see also Chapter II, Mitigation Measures, Natural Resources). Impacts of these actions taken in conjunction with mitigation measures would be adverse, short-term, and negligible.

Prescribed Fire

Under this Alternative, potential effects to special-status plants through prescribed burning would increase slightly over Alternative A because of the gradual creation of a larger defensible space and perimeter around El Portal. 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 II) discusses the common practices for dealing with these situations. Resource Advisors may recommend that some areas not be burned. However, the more gradual approach in this alternative would allow for improved coordination of mitigation measures to avoid individuals and populations, which would reduce long-term effects to these species. Therefore, impacts would be negligible to minor, adverse, and long-term, the same as in Alternative A.

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

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

Fuel Reduction by Hand or Machine

Passive Reduction and Lower Profile Techniques.

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

Hand Cutting. Same as Alternative B. In the case of special-status species, hand cutting actions would continue to only affect special-status species within the El Portal Administrative site. Mitigations used would be the same as described in Alternative A, with the same effects. Yosemite onion and Congdon's lewisia would not be impacted by these activities due to their locations. Both Tompkin's sedge and Congdon's woolly-sunflower would potentially have increased levels of impact under this alternative due to wildland/urban interface treatments, and the increased potential for ground disturbance (through foot traffic, dragging cut materials) and subsequent changes in species composition if non-native species became established within rare plant populations. Therefore, the impact of hand cutting would be minor, adverse, and long-term.

Pile burning. These activities would increase, compared to Alternative A. Effects would be the same as in Alternative B, minor, adverse, and potentially long-term due to the larger area of disturbance and increased potential for spread and establishment of non-native plant species. Appropriate mitigations as described in Alternative A and Chapter II (Mitigation Measures) would be applied prior to execution of each project.

Chipping. Same as Alternative B—short-term, negligible to minor, and adverse, as a result of using mitigation related to depth of piles.

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

Helibase Upgrades

Same as Alternative B

Cumulative Impacts

Past, present, and reasonably foreseeable projects that might affect special-status plants would be the same at identified in Alternative A. Projects within known and potential habitats for plant special-status 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 C, would result in negligible to minor, adverse and long-term cumulative impacts.

Conclusion

Implementation of Alternative C, with increased manual thinning and removal (as compared to Alternative A), 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 impacts of Alternative C would have a negligible to minor, adverse, and long-term impact to special-status species. The intent of the alternative is to reduce the risk of catastrophic fire, thus there would be no impairment from the effects of this alternative.

Special-Status Species – Animals

Sierra Nevada Bighorn Sheep *(Ovis canadensis sierrae)* - Federal Endangered

Potential for Impacts from Catastrophic Fire

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

Fire Management Treatments

Managed Wildland Fire

The impact of managed wildland fire would be the same as under Alternative A. Although use of wildland fire would greatly increase under Alternative C, its application on bighorn habitat would be limited since these areas are well within the natural fire return interval.

Prescribed Fire

The impact of prescribed fire on bighorn sheep under Alternative C would be the same as under Alternative A—negligible, beneficial, and long-term.

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)

Impact of actions taken to manage wildland and prescribed fire under Alternative C would be the same under Alternative A—adverse, short-term, and negligible.

Fuel Reduction by Hand or Machine

Passive Reduction Techniques Would not occur in bighorn sheep habitat.

Cumulative Impacts

Past, present and reasonably foreseeable future projects would be the same as considered in Alternative A. The resulting cumulative impacts from these actions on Sierra Nevada bighorn sheep are beneficial, long-term, and major because they will help the species recover to larger,

more stable self-sustaining populations. Impacts of these projects in combination with the impacts of Alternative C would result in beneficial, long-term, and major cumulative impacts.

Conclusion

The impact of Alternative C on Sierra Nevada bighorn sheep would be negligible, beneficial, and long-term 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

Similar to Alternative B. Actions taken under Alternative C, with a goal to treat wildland/urban interface areas within 10 years, would reduce the chance of catastrophic fire in El Portal, although some unwanted fires would be likely to occur in that span of time. Impact of Alternative C would, therefore be beneficial, long-term, and minor to moderate, due to the gradual reduction in the threat of catastrophic fire.

Fire Management Treatments

Managed Wildland Fire

The 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, when used, would be similar to under Alternative A, but under Alternative C, prescribed fire use in El Portal would be greater. The goal would be to achieve target conditions in wildland/urban interface areas within 10 years through hand thinning and prescribed fire. The effect of prescribed fire on valley elderberry longhorn beetle would be beneficial, long-term, and minor through the reduction in the potential for 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 U.S. Fish and Wildlife Service 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 increased use of wildland and prescribed fires under Alternative C, impacts associated with management of these fires would likely increase, compared to Alternative A, No Action. Effects of Alternative C would be the same as Alternative B—adverse, short-term, and negligible, based upon their increased use, and therefore, greater chance of inadvertent impacts, and the application of mitigation measures in accordance with USFWS guidelines.

Fuel Reduction by Hand or Machine
Passive Reduction and Lower Profile Techniques.

Low-Impact Skidding. Would not be used in valley elderberry longhorn beetle habitat.

Hand Cutting. Effects and mitigation would be as in Alternative B. Overall, the reduction in fuels by hand cutting would help reduce the threat of catastrophic fire, which would help protect valley elderberry longhorn beetle and their host plants. Impact on valley elderberry longhorn beetle from hand cutting under Alternative C would be expected to be beneficial, long-term, and moderate.

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

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

Girdling. Effects of girdling of trees would be the same as in Alternative B—negligible, beneficial and long-term.

Cumulative Impacts

Specific foreseeable projects that could adversely affect valley elderberry longhorn beetle near Yosemite National Park 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 C, cumulative impacts would be beneficial, long-term, and minor.

Conclusion

Impact of Alternative C 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 a program of prescribed fire and mechanical fuels management in the El Portal area.

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

California red-legged frogs have disappeared from nearly the entire Sierra Nevada, including Yosemite National Park—only two populations are known to exist in the northern Sierra. The most significant cause of this decline is alteration and destruction of habitat from activities such as urban development, dams, sediment from roads and mines, grazing, and timber harvest 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 intervals. Most effects of catastrophic fire would be similar to those under Alternative A. Alternative C would reduce fuel accumulations and reduce the risk of catastrophic fire, with the goal of reaching target conditions within 25 years. The effect on red-legged frog habitat would be minor, beneficial, and long–term. While no frogs are present in the park, potential habitat could be adversely affected by catastrophic fire. These effects could be mitigated by identification of potential red-legged frog habitat and fuel-reduction efforts in those areas.

Fire Management Treatments

Managed Wildland Fire

Effects would be similar to Alternative B. This would have a beneficial effect on red-legged frog habitat by eventually reducing the threat of catastrophic fire, although some unwanted fires would likely occur over the 25-year span of implementation. Under Alternative C, effects of managed wildland fire would be similar to Alternative B—beneficial, long-term, and minor. California red-legged frog habitat would benefit from the restoration of the natural structure and fuel loading in riparian areas, and reducing the threat of catastrophic fire.

Prescribed Fire

Similar to Alternative B—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)

Effects would be the same as Alternative B—minor, adverse, and long-term. Mitigations would be the same as under Alternative A.

Fuel Reduction by Hand or Machine

Passive Reduction and Lower Profile Techniques.

Low-Impact Skidding. These techniques would not be used in red-legged frog habitat.

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

Chipping. Same as Alternative B—negligible impacts.

Cumulative Impacts

The past, present, and reasonably foreseeable projects that would have a potential effect on red-legged frogs would be the same as in Alternative A. Beneficial impacts from present and reasonably foreseeable projects in combination with effects of Alternative C 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 C on California red-legged frogs would be beneficial, long-term, and minor, due primarily to a reduction in the threat of catastrophic fire through use of prescribed and wildland fires and hand cutting.

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. 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

The impact of Alternative C would be beneficial, long-term, and minor to moderate, due to the gradual reduction in the threat of catastrophic fire.

Fire Management Treatments

Managed Wildland Fire

Similar to Alternative A, except under Alternative C, an increase in managed wildland fires and the use of re-ignitions of suppressed wildland fires, up to 3 years after, would increase the amount of habitat treated with fire, with target conditions reached within 25 years. This would reduce the threat of catastrophic fire, compared to Alternative A. Impact of managed wildland fire on bald eagles under Alternative C would be beneficial, long-term, and moderate, due to the rate at which the threat of catastrophic fire would be reduced.

Prescribed Fire

Effects would be similar to Alternative B, except there would be less use of prescribed fire, and a higher risk of catastrophic fire, so the impact of prescribed fire on bald eagles under Alternative C would be beneficial, long-term, and moderate.

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 B—adverse, short-term, and minor, primarily from actions that may remove snags.

Fuel Reduction by Hand or Machine

Passive Reduction and Lower Profile Techniques.

Low-Impact Skidding. These techniques would be used extensively in this alternative to move smaller sized material (10-20"dbh) from areas where thickets of sub-canopy trees required thinning. It is expected that all the areas in the wildland/urban interface and along road and utility corridors would see limited amounts of this treatment and those listed below. Disturbance could be mitigated through inventories of treatment areas for the presence of sensitive species that could be adversely affected by proposed project work. These techniques are generally quieter and less intrusive than techniques described under Aggressive Reduction, which is proposed under Alternative B and D. Impacts associated with these techniques are beneficial, short- to long-term, and minor, if areas continue to be maintained with prescribed fire following initial thinning treatments.

Hand Cutting. Same as Alternative B—negligible, adverse, short-term.

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

Cumulative Impacts

Past, present, and reasonably foreseeable projects would be the same as under Alternative A. Impacts from present and reasonably foreseeable projects would be beneficial, long-term, and minor, based upon the continuing recovery of the species and implementation of broad-ranging plans that would further benefit the species long-term. Consider in combination with the effects of Alternative C, cumulative effect would be beneficial, long-term, and minor

Conclusion

Alternative C would have a minor, beneficial, long-term effect on bald eagles, primarily from a reduction in the threat of catastrophic fire, compared to Alternative A.

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

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
Same as Alternative B—beneficial, long-term, and minor.

Prescribed Fire
Same as Alternative B—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)
Same as Alternative B—minor, adverse, and long-term, due primarily to the risk to remaining populations from 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
Passive Reduction and Lower Profile Techniques.
Low-Impact Skidding. These techniques would not be used in mountain yellow-legged frog habitat.

Hand Cutting. Same as Alternative A—no effect on mountain yellow-legged frogs.

Cumulative Impacts

Past, present, and reasonably foreseeable projects would be the same as in Alternative A. Effects 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 C, cumulative impacts would remain beneficial, long-term, and moderate.

Conclusion

Impact to mountain yellow-legged frogs from Alternative C 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

Potential for Impacts from Catastrophic Fire

Same as Alternative B—beneficial, short-term, and negligible effect.

Fire Management Treatments

Managed Wildland Fire
Same as Alternative B—beneficial, long-term, and minor.

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

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)
Overall impact of prescribed and wildland fire management actions on toads under Alternative C would be the same as in Alternative B—minor, adverse, and long-term, due primarily to the risk to remaining populations from water drops and retardant contamination. Mitigation: Identify locations of Yosemite toad and mountain yellow-legged frog populations and avoid these areas during water and retardant drops.

Fuel Reduction by Hand or Machine
Passive Reduction and Lower Profile Techniques.
Low-Impact Skidding. This techniques would not be used in Yosemite toad habitat.

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

Cumulative Impacts
Past, present, and reasonably foreseeable projects would be the same as under Alternative A. Impacts to 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 C, cumulative impacts would be moderate, beneficial and long-term.

Conclusion
Impact to Yosemite toads from Alternative C would be beneficial, long-term, and minor due primarily to the return of a natural fire regime to the area of habitat that has departed from a natural fire return interval, although the wet habitats of Yosemite toads are unlikely to 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
Types of effects would be the same as in Alternative B. Under Alternative C, the goal is to reach target conditions within 25 years and over that span of time, some catastrophic fires would likely occur. However, impact of Alternative C would be moderate, beneficial, and long-term, due to the reduced threat of catastrophic fire.

Fire Management Treatments
Managed Wildland Fire

Effects would be similar to those described in Alternative A, except under Alternative C, managed wildland fire would 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 moderate, based upon the mitigation of the threat of catastrophic fire. However, over a 25-year period, some catastrophic fires would likely occur.

Prescribed Fire

Effects would be similar to those described in Alternative A. The use of prescribed fire under Alternative C would have moderate, beneficial, long-term impact on California spotted owls, primarily through the reduction in the threat of catastrophic fire and the restoration of a more natural forest structure over a 25-year period. 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 as Alternative A. Overall, actions taken to manage wildland and prescribed fire under Alternative C would have a minor, adverse and long-term effects on spotted owls through possible disturbance and habitat alteration in roosting and nesting sites. Such impacts would be mitigated by locating all spotted owl sites in a treatment area and avoiding impacts to them.

Fuel Reduction by Hand or Machine

Passive Reduction and Lower Profile Techniques

Low-Impact Skidding. ATVs, horses, and fetching arches would be used to remove standing and dead and down trees to reduce fuel loading and the risk of high-intensity fire. It is expected that about half of the acreage in wildland/urban interface and many areas along road and utility corridors would see limited amounts of this treatment. Areas proposed for these techniques represent less than 1% of the park. These techniques would be used extensively in this alternative to move smaller sized material (10-20”dbh) from areas where thickets of sub-canopy trees required thinning. Most sites would be broadcast burned after fuel reduction treatments Clearing understory vegetation would provide favorable foraging conditions for spotted owls. Impact of low-impact skidding on spotted owls under Alternative C would be adverse, long-term, and negligible.

Hand Cutting. Similar to Alternative A, except the amount of area treated would be much greater. Clearing understory vegetation would provide more favorable foraging conditions for spotted owls. Adverse effects on spotted owls would occur if many large, down logs were removed from the forest, because this would result in a decrease in northern flying squirrel, and important prey of spotted owls. Impact of hand cutting and burning on California spotted owls under Alternative C would be beneficial, long-term, and moderate, based on possible return of treated areas to a more natural forest structure.

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

Girdling. Same as Alternative B—major, beneficial, and long-term.

Cumulative Impacts

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

Conclusion

Alternative C would have moderate, beneficial, long-term impact on spotted owls from a reduction in the threat of catastrophic fire and restoration of natural fire structure through use of wildland and prescribed fire. Care, however, would have to be taken with fuels management in spotted owl roosting and nesting habitat to minimize adverse impacts. This would require extensive knowledge of the distribution of spotted owls in the park.

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

Potential for Impacts from Catastrophic Fire

Similar to Alternative B, except under Alternative C this dangerous situation would be reduced through the application of wildland and prescribed fire to reduce critical fuel loading, restore natural forest structure, and maintain a natural fire regime. Some high-intensity fires would likely occur over the 25-year implementation of Alternative C. Impact of Alternative C on the threat of catastrophic fire would therefore, be major, beneficial, and long-term.

Fire Management Treatments

Managed Wildland Fire

Under Alternative C, effects would be similar to Alternative B, but with potentially fewer acres of managed wildland fire, which would have a moderate, beneficial, long-term effect on fishers.

Prescribed Fire

Use of prescribed fire would increase under Alternative C, with effects similar to Alternative B, but fewer acres would be treated. Impact of prescribed fire on fishers under Alternative C would be beneficial, long-term, and moderate, based upon a reduction in the threat of catastrophic fire, and restoration of a more natural forest structure, although it would occur over a relatively long period (25 years). Care would 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. In total, actions taken to manage wildland and prescribed fire would have a minor, adverse, long-term effect on fishers, primarily from possible reduction in the number of snags.

Fuel Reduction by Hand or Machine

Passive Reduction and Lower Profile Techniques.

Low-Impact Skidding. In this alternative, these techniques would be used to reduce fuels in the wildland/urban interface areas and along road and utility corridors. The removal of woody debris would have an adverse effect on fishers by reducing habitat complexity; especially from the loss of down trees. However, because of the limitations of ATVs and livestock to remove large trees, the largest (greater than 20" dbh) trees would be left. The removal of fuel would reduce the threat of high-intensity fire that would also decrease habitat complexity for fishers. Thinned areas would be

maintained in an open forest condition through prescribed burning. Given that the areas where this technique would be used would not exceed 1% of the park, and that such areas are in and around developed areas, the impacts from this treatment it would be negligible, adverse, and long-term.

Hand Cutting. Same as Alternative A— adverse, long-term, and negligible.

Chipping. Same effects as Alternative B—adverse, short-term, and negligible.

Cumulative Impacts

Past, present, and reasonably foreseeable projects would be the same as in Alternative A. Impacts of reasonably foreseeable actions would be moderate, beneficial and long-term. Alternative C would reduce the potential for catastrophic fire in Pacific fisher habitat, compared to Alternative A. Considered in combination with the moderate, beneficial and long-term impacts of Alternative C, the cumulative impact would be moderate, beneficial and long-term.

Conclusion

Overall, Alternative C would have a moderate, beneficial, long-term effect on fishers by 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 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

Potential for Impacts from Catastrophic Fire

Effects would be similar to those described in Alternative B, except the reduction in accumulated fuels under Alternative C through prescribed and wildland fires would reduce the threat of catastrophic fire over a 25-year period. Given the substantial portion of great gray owl habitat over which there is a threat of catastrophic fire, the impact of Alternative C to great gray owls would be beneficial, long-term, and moderate.

Fire Management Treatments

Managed Wildland Fire

Effects would be similar to those in Alternative A, except under Alternative C managed wildland fire would increase in the Fire Use Unit. The effect of managed wildland fire on great gray owls under Alternative C would be beneficial, long-term, and moderate, based upon the large amount of great gray owl habitat that has deviated from natural conditions due to fire suppression, and the treatment of this habitat that would occur.

Prescribed Fire

Effects would be similar to those described in Alternative B. Under Alternative C, use of prescribed fire would concentrate on areas that have most severely deviated from the natural fire cycle, and over a 25-year restoration period. Impact of prescribed fire on great gray owls under Alternative C would be beneficial, long-term, and moderate, based upon the amount of habitat improvement, and the reduction in the threat of catastrophic fire that would occur over a 25-year

period. Prescriptions for fires in great gray owl habitat must take into consideration the preservation of habitat features 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)

Same as Alternative B. Overall, actions taken to manage wildland and prescribed fires would have a minor, adverse, long-term effect on great gray owls under Alternative C. This is primarily based upon possible impacts associated with snag removal, which should be strictly limited in great gray owl habitat.

Fuel Reduction by Hand or Machine

Passive Reduction and Lower Profile Techniques.

Low-Impact Skidding. The use of low-impact skidding using ATVs, horses and fetching arches 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 determined if the owls were present. Snag removal in nesting and foraging areas would have an adverse impact as well. As the areas for this proposal are limited to wildland/urban interface areas and road and utility corridors, the overall impact would be minor. 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. The impacts from low-impact skidding would be adverse, short-term, and minor.

Hand Cutting. Effects would be similar to those in Alternative A, but would be in combination with fuel reduction using passive techniques. Impact of hand cutting on great gray owls under Alternative C would be minor, adverse, and long-term, 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 and creating wildlife habitat. Effects would be beneficial, long-term, and minor to moderate.

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 C, cumulative impacts would be beneficial, long-term, and minor to moderate.

Conclusion

The impact of Alternative C on great gray owls would be beneficial, long-term, and minor, based primarily on a reduction in the threat of catastrophic fire over a 25-year period. Wildland and prescribed fires and their management and mechanical reduction of fuels would have localized adverse effects on great gray owls, if snag density were reduced or nesting or hunting owls disturbed.

Willow Flycatcher *(Empidonax trailii)* – California Endangered

Potential for Impacts from Catastrophic Fire

As in Alternative B, the risk of catastrophic fire would be reduced under Alternative C, through wildland and prescribed fires. Impact on willow flycatchers under Alternative C would be beneficial, long-term, and minor, based upon the inherent low fire frequency and intensity associated with meadow habitats and the reduced threat from catastrophic fire.

Fire Management Treatments

Managed Wildland Fire

Effects would be similar to those in Alternative B. Use of wildland fire under Alternative C would result in minor, beneficial, long-term impact on willow flycatchers, from reduction in the threat of catastrophic fire, and the return of fire to its role in maintenance of willow habitat. Actions taken to manage fires in habitat occupied by willow flycatchers, should take into account the possible adverse effects associated with fuel accumulation; steps would be taken to mitigate these effects.

Prescribed Fire

Effects would be similar to those in Alternative A. The impact of Alternative C would be beneficial, long-term, and minor, 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)

As in Alternative A, the actions taken to manage wildland and prescribed fires would have a minor, adverse, short-term effect on willow flycatchers. This would mainly be due to potential impacts from conducting helicopter operations out of Wawona meadow.

Fuel Reduction by Hand or Machine

Passive Reduction and Lower Profile Techniques.
Low-Impact Skidding Would not be used in willow flycatcher habitat.

Hand Cutting. Same as Alternative A, hand cutting would have 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. Would not occur in willow flycatcher habitat.

Cumulative Impacts

Past, present, and reasonable 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 C 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 C, the cumulative impacts would be beneficial, long-term, and minor to moderate.

Conclusion

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

Summary Conclusion, Special-Status Species – Animals

In almost all cases, the greatest threat to special-status species would be through catastrophic fire. This alternative would reduce the potential of catastrophic fire, compared to Alternative A. Mitigations and special measures, as identified, would be applied to limit impacts. There would be no impairment from the effects of this alternative. See Appendix 9 for mitigation developed in consultation with USFWS.

Physical Environment

Watersheds, Soils, and Water Quality

Among the action alternatives, Alternative C proposes the least amount of prescribed fire and wildland/urban interface treatment, meaning it will take longer to accomplish ecosystem restoration and fuel reduction objectives. Because of the limited amount of work proposed fewer actions would directly impact watersheds, soils, and water quality, however, threats from unwanted fire to watersheds would be greater. The treatment acreage would be greater than under Alternative A, but the least among the action alternatives.

Potential for Impacts from Catastrophic Fire

In all action alternatives, 76,664 acres of the Merced River watershed and 51,379 acres of the Tuolumne River watershed would be within the Suppression Unit. Prescribed fire units in the Suppression Unit would include approximately 55,892 acres in the Merced River watershed and 51,444 acres in the Tuolumne River watershed. Approximately 25% of the Merced River watershed and 19% of the Tuolumne River watershed show moderate to high departures, when using the median FRID analysis; these are the areas with the greatest potential for catastrophic fire. However, because this alternative (of all the action alternatives) would use the longest period to restore ecosystems (25 years) and wildland/urban interface (10 years), it would retain the highest potential for large, high severity fire during the life of the plan (assumed 15-year time frame).

Areas of hydrophobic soils would exist, but because fire would be less likely to burn throughout the vertical gradient, the increase in water yield and peak flows would be less, compared to Alternative A, but the most among the action alternatives. The increase in sediment and nutrient yields would also be less than in Alternative A, because of the smaller amounts of intrusion by fire into the lower slopes of watersheds. Catastrophic fire could make banks and channel margins less stable, but the effects would be localized, and lessen as more of each watershed were restored. The

size of the areas adversely affected would be less than under Alternative A ; in particular, stream channel response would be less while recovery of riparian vegetation and stabilization of stream systems would be faster. However, benefits would be mainly realized toward the end of the restoration period. The potential for having large, high-severity fires with adverse, potentially long-term, and moderate effects on soils and watersheds would be less than under Alternative A, but would remain high until near the end of the 25-year restoration period. The effects of Alternative C on water quality and watershed conditions in regards to catastrophic fire would be beneficial, long-term, and minor to moderate.

Fire Management Treatments

Managed Wildland Fire

Same as Alternative B—beneficial, moderate, and short-term.

Re-ignition clause. Same as Alternative B—beneficial, moderate, and short-term.

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

Prescribed Fire

Prescribed fire would typically be used in 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 as in Alternative B, but this alternative proposes the least aggressive prescribed fire program (1,260 to 6,436 acres burned per year). Due to the controlled nature of prescribed fire, in terms of fuel moisture, weather conditions, time of day, spatial pattern of ignition, and other factors, the small scale effects of actions under this alternative would be similar to that of Alternative A. On a watershed scale, compared to Alternative A, because of the greater number of acres being treated through prescribed fire, this alternative would reduce the potential for large, high-severity fires. Carefully placed prescribed burns would reduce the continuity of fuels on the vertical gradient in more areas throughout the watershed, compared to that of Alternative A, but benefits would not be fully realized until the end of the restoration period (25 years). Fire in the duff layers would spread under variable conditions, but not with enough severity to cause extensive areas of hydrophobic soil. Post-fire water yield, peak flows, sediment yield, and nutrient yield would gradually return to more natural conditions (decrease) through the life of the plan. The effects of prescribed burning on soil and watershed conditions would be beneficial, long-term, and major, but until the restoration work is completed, the potential would remain high for large, high-intensity wildland fires.

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

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

Fuel Reduction by Hand or Machine

Aggressive Reduction Techniques. Would not occur under Alternative C.

Passive Reduction and Lower Profile Techniques.

Low-Impact Skidding. This would include the use of draft animals and four wheel, all-terrain vehicles (ATVs), in combination with fetching arches, to skid trees approximately 10 to 20 inches in diameter. This technique would be used in the wildland/urban interface and along road and utility corridors and would be relied upon as the principle means of skidding. It would not be feasible to move trees larger than approximately 20" dbh and because only 766 acres are proposed for fuel reduction treatment annually, impacts would be less than under Alternatives B or D. Where logs were skidded, these techniques would cause compaction and scarification of the upper duff and topsoil layers. No tracked vehicles would be used and the knobby tires of ATVs and the feet of draft animals would have only negligible effects on topsoil and duff layers. The most significant effect would be from dragging one end of the tree which could cause a skid trench less than a foot wide and a few inches deep in most locations, although it could be deeper in paths used repeatedly. The use of fetching arches would mitigate this impact. In most locations, scarification could be raked out with hand tools, which would retard soil erosion and thus limit the effect upon sediment and nutrient yield in the watershed. Waterbars might be needed along paths that get repeated use. Other mitigation, when needed, could include the use of 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 mitigation are effectively utilized. Projects could be extensive enough that effects could be greater than localized, nevertheless they would not typically occur on ridge, mid-slope, and bottom-slope combinations, thus effects would be adverse, short-term, and minor for watersheds and soils.

Hand Cutting. Local effects would be similar to those in Alternative A, but because this class of treatments would be used to perform most of the 766 acres of plant reduction work, its effects would be greater than under other alternatives. However, the labor intensive nature of the work would limit the amount of annual accomplishment. Effects would be beneficial and potentially long-term, and moderate.

Pile burning. Same as Alternative B—beneficial, short-term, and minor to moderate.

Chipping. Same as Alternative B—adverse, short-term, and negligible to minor.

Girdling. Same as Alternative B—adverse, short-term, and negligible to minor effect.

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 impacts on soil would be adverse, long-term, and minor. 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 other lands in the upper watersheds, the cumulative impacts of Alternative C would be beneficial, long-term, and moderate.

Conclusion

In aggregate, the actions of this alternative would have beneficial, long-term, and moderate effects to watersheds, soils, and water quality. This is based upon a combination of beneficial, long-term, moderate to major effects in Fire Use Units, as in Alternative A, and the potential for areas of beneficial, long-term, and moderate effects in Suppression Units, due to the timeframe required for restoration compared to Alternative A. Large, high-severity fires would likely occur during the life of the plan, but the treatments proposed would reduce their 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 intent of the alternative is to reduce the risk of catastrophic fire, 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 C were estimated using the FOFEM model. The results are summarized and compared to Alternative A in table IV-13. 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 IV-13 provides an example of the magnitude of this type of emission reduction.

Prescribed Fire Summary

To compare the estimated emissions from the various alternatives, the emissions from prescribed burns were averaged for the 7-year period that was modeled, and these data are provided in table IV-14.

Table IV-13
Projected Air Emissions Associated with Various Fire Types in Yosemite National Park Under Alternative C (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	917	719	12,945	370	58,557
Managed Wildland Fire [b]	2,152	1,564	1,321	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 (methane), CO = Carbon Monoxide, NOx = Nitrogen Oxides, CO_2 = Carbon Dioxide

b Based on composite emission factor for prescribed burning

Alternative C – 2003							
Fire Type	Acres	Fire Emissions (tons/yr) [a]					
		PM_{10}	$PM_{2.5}$	VOC	CO	NO_X	CO_2
Prescribed Burns [b]	2,547	2,088	1,769	1,070	23,383	668	107,259
Managed Wildland Fire [b]	9,583	6,967	5,883	4,607	83,002	2,371	375,457
Wildfire	5,759	6,920	5,864	3,529	76,930	2,198	387,446
Total	**17,889**	**15,975**	**13,516**	**9,206**	**183,315**	**5,237**	**870,162**

Alternative C – 2004							
Fire Type	Acres	Fire Emissions (tons/yr) [a]					
		PM_{10}	$PM_{2.5}$	VOC	CO	NO_X	CO_2
Prescribed Burns [b]	2,106	1,877	1,591	961	21,005	600	107,259
Managed Wildland Fire [b]	9,583	6,967	5,883	4,607	83,002	2,371	375,457
Wildfire	5,759	6,920	5,864	3,529	76,930	2,198	387,446
Total	**17,448**	**15,764**	**13,338**	**9,097**	**180,937**	**5,169**	**870,162**

Alternative C – 2005							
Fire Type	Acres	Fire Emissions (tons/yr) [a]					
		PM_{10}	$PM_{2.5}$	VOC	CO	NO_X	CO_2
Prescribed Burns [b]	3,712	4,267	3,618	2,190	47,610	1,360	222,126
Managed Wildland Fire [b]	9,583	6,967	5,883	4,607	83,002	2,371	375,457
Wildfire	5,759	6,920	5,864	3,529	76,930	2,198	387,446
Total	**19,054**	**18,154**	**15,365**	**10,326**	**207,542**	**5,929**	**985,029**

Alternative C – 2006							
Fire Type	Acres	Fire Emissions (tons/yr) [a]					
		PM_{10}	$PM_{2.5}$	VOC [b]	CO	NO_X	CO_2
Prescribed Burns [c]	2,132	1,435	1,218	741	15,958	456	72,843
Managed Wildland Fire [c]	9,583	6,967	5,883	4,607	83,002	2,371	375,457
Wildfire	5,759	6,920	5,864	3,529	76,930	2,198	387,446
Total	**17,474**	**15,322**	**12,965**	**8,877**	**175,890**	**5,025**	**835,746**

Alternative C – 2007							
Fire Type	Acres	Fire Emissions (tons/yr) [a]					
		PM_{10}	$PM_{2.5}$	VOC [b]	CO	NO_X	CO_2
Prescribed Burns[c]	1,576	779	660	399	8,729	249	40,043
Managed Wildland Fire[c]	9,583	6,967	5,883	4,607	83,002	2,371	375,457
Wildfire	5,759	6,920	5,864	3,529	76,930	2,198	387,446
Total	**16,918**	**14,666**	**12,407**	**8,535**	**168,661**	**4,818**	**802,946**

Alternative C – 2008							
Fire Type	Acres	Fire Emissions (tons/yr) [a]					
		PM_{10}	$PM_{2.5}$	VOC[b]	CO	NO_X	CO_2
Prescribed Burns[c]	1,958	1,195	1,013	612	13,398	383	60,652
Managed Wildland Fire[c]	9,583	6,967	5,883	4,607	83,002	2,371	375,457
Wildfire	5,759	6,920	5,864	3,529	76,930	2,198	387,446
Total	**17,300**	**15,082**	**12,760**	**8,748**	**173,330**	**4,952**	**823,555**

Alternative C – 2009							
Fire Type	Acres	Fire Emissions (tons/yr) [a]					
		PM_{10}	$PM_{2.5}$	VOC [b]	CO	NO_X	CO_2
Prescribed Burns[c]	1,534	829	703	423	9,245	264	45,001
Managed Wildland Fire[c]	9,583	6,967	5,883	4,607	83,002	2,371	375,457
Wildfire	5,759	6,920	5,864	3,529	76,930	2,198	387,446
Total	**16,876**	**14,716**	**12,450**	**8,559**	**169,177**	**4,833**	**807,904**

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

c Based on composite emission factor for prescribed burning

Table IV-14
Average Prescribed Burn Estimated Emissions for Alternative C for the years 2003 – 2009

Alternative C						
	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 C Average	2,224	1,782	1,510	914	19,904	92,211
Potential Increase in Alt. C	**729**	**695**	**593**	**195**	**6,959**	**33,654**

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 chainsaws, chippers, skidders, ATVs, and haul trucks used in site preparation and fuel reduction activities. Emissions from the operation of these machines have been figured by estimating the hours of this equipment needed to clear an average of 766 acres per year, which would be more than seven times the number of acres cut historically. Estimated air emissions are summarized in table IV-15. 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. Emissions from machinery would be minor compared to fire emissions.

Table IV-15
Alternative C Projected Air Emissions Associated with Mechanical Thinning

Alternative C							
		Motorized Equipment Emissions (tons/yr) [a]					
Equipment	Operating Hours	PM_{10}	$PM_{2.5}$	VOC	CO	NO_x	CO_2 [b]
Chainsaws	7,910	0.20	0.20	4.18	13.55	0.05	ND
Chippers	1,507	0.32	0.32	0.14	20.14	0.01	ND
Haul Trucks	543	0.16	0.16	0.26	1.19	0.80	ND
ATV Skidders	225	0.0	0.0	0.04	3.44	0.03	ND
Total		**0.68**	**0.68**	**4.62**	**38.12**	**0.89**	**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 Measures

Under Alternative C, mitigation measures, including the use of the *Smoke Communications Strategy*, would be the same as those for Alternative B.

Agency Coordination

Agency coordination for Alternative C would be the same as for Alternative B.

Cumulative Impacts

Past, present, and reasonably foreseeable projects in the region that might have a cumulative impact under Alternative C would be the same as those for Alternative A. The cumulative impact of Alternative C, 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

Alternative C would generate a smaller quantity of emissions among all the alternatives, except for Alternative A. The intensity of the impact of Alternative C relative to Alternative A would be

adverse, short-term, and major since the increases would be slightly above 50% of Alternative A for all emissions except VOC. The impact on VOC emissions would be moderate.

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, No Action, this alternative would reduce slightly the potential for catastrophic fire and its impacts. This would probably result in beneficial, short- and long-term minor 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 this figure, 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). Acres burned and effects would be similar to that of Alternative B. 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 reduced to the degree possible through mitigating measures (described under Methodology).

Re-ignition clause. The potential for impacts occurring 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). The potential for impacts occurring from holding and monitoring actions would be identical to those described under Alternative A, potentially minor to moderate, adverse, and long-term.

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. Of the action alternatives, this alternative would treat the smallest annual average acreage, from 1,260 to 6,436 acres per year. Actions would focus on areas of greater than three missed fire return intervals (using the median FRID analysis). Impacts resulting from prescribed fire under this alternative would be similar to those described under Alternative A, minor to moderate, long-term, and beneficial, as a result of maintaining more natural fuel loading on archeological sites. However, the potential for adverse impacts is somewhat greater due to the increased acreage targeted for treatment. These impacts would be reduced to the degree possible through mitigating measures (described under Methodology).

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

The potential for impacts associated with site preparation is identical to that described for Alternative A, minor to moderate, adverse and long-term. These impacts would be avoided or reduced as much as possible through mitigating measures.

Fuel Reduction by Hand or Machine

Aggressive Reduction Techniques. Would not occur under Alternative C.

Passive Reduction and Lower Profile Techniques.

Low-Impact Skidding Low-impact skidding and yarding could cause soil disruption and compaction, if trees and logs are dragged (rather than lifted) into natural openings or landing areas. However, the extent of soil disruption associated with these techniques would be much less than the disturbance associated with mechanized and conventional tree and shrub removal. 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 yarding, but archeological resources obscured by vegetation could be adversely impacted. Post treatment inventory would document and stabilize any sites inadvertently disrupted. The intensity of impact would depend upon the nature and significance of the archeological 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. 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.

Hand Cutting. The potential for impacts associated with hand thinning would be greatest in this alternative because of the degree to which it is relied upon. Approximately 766 acres per year would be treated. Effects would be similar to those under Alternative A, but the increased amount of treatment would result in moderate to major, long-term, beneficial impacts to archeological resources.

Pile burning. The potential for impacts associated with pile burning is identical to that described for Alternative A—potentially minor to moderate, adverse and long-term.

Chipping. Same as under Alternative A—negligible.

Girdling. Same as Alternative B—negligible.

Helibase Upgrades

Same as Alternative B

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 minimally reduce the potential for catastrophic fire and associated emergency response actions. The adverse impacts associated with

other past, present, and reasonably foreseeable future projects would be minor to moderate. Considered in combination with the impacts to archeological resources from Alternative C, cumulative impacts would be beneficial, long-term, and minor.

Therefore the cumulative impacts would be minor, beneficial and long-term.

Conclusion

Implementation of this alternative could result in adverse impacts to archeological resources mostly due to the increasing potential for high-intensity fires in areas of three or more missed fire return intervals and the use of equipment to reduce heavy fuel loads. These impacts would be reduced or avoided to the extent possible through standard mitigating measures. Compared with Alternative A, this alternative minimally reduces the potential for catastrophic fire and its impacts. Of all fire management situations and treatments, catastrophic fire and emergency response actions result in the most frequent and severe impacts to archeological resources. Overall, the effect of this alternative would be beneficial, minor to moderate, and long-term. The intent of the alternative is to reduce the risk of catastrophic fire, thus there would be no impairment from the effects of this alternative.

Ethnographic Resources

Potential for Impacts from Catastrophic Fire

Compared with Alternative A, No Action, this alternative would reduce the potential for catastrophic fire and its impacts. Compared to Alternatives B and D, this reduction would be minimal. The reduction in impacts from catastrophic fire would result in beneficial, short- and long-term, minor impacts to ethnographic resources.

Fire Management Treatments

Managed Wildland Fire

Effects would be the same as Alternative B. 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 reduced to the degree possible through the mitigations described under Methodology.

Re-ignition clause. The potential for impacts occurring as a result of re-igniting a controlled wildland fire would be identical to those described for managed wildland fire in Alternative B.

Holding Action and Monitoring Effects (water and retardant drops, helispots and spike camps). The impacts occurring as a result of holding and monitoring actions would be identical to those described under Alternative A. Impacts would be potentially minor to moderate, adverse and short- to long-term. These impacts would be avoided or reduced as much as possible through standard mitigations described under Methodology.

Prescribed Fire

Impacts resulting from prescribed fire under this alternative would be similar to those described under Alternative A. Impacts would be minor to moderate, long-term, and beneficial, as a result of maintaining more natural fuel loading on ethnographic resources. However, the potential for

adverse impacts is greater due to the increased acreage targeted for treatment. These impacts would be reduced to the degree possible through mitigating measures.

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

The impacts associated with site preparation are identical to those described for Alternative A. Impacts would be potentially minor to moderate, adverse, and short- to long-term. These impacts would be avoided or reduced as much as possible through mitigating measures and through ongoing consultation with park-associated tribal groups.

Fuel Reduction by Hand or Machine

Passive Reduction and Lower Profile Techniques.

Low-Impact Skidding. Low-impact skidding could cause soil disruption and compaction, and disruption of understory species. Areas proposed for treatment would be surveyed for cultural landscape 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 these treatments but activities have the potential to adversely impact cultural landscape 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 moderate, long-term, and adverse.

Hand Cutting. The potential for impacts associated with hand cutting would be similar to that described for Alternative A, but there would be much more reliance on these treatments than under any of the other alternatives. Effects upon ethnographically important plants would be potentially moderate to major, adverse and short-term, but these effects would be precluded through avoidance and other mitigation measures.

Pile burning. The potential for impacts associated with pile burning is identical to that described for Alternative A, negligible to moderate, adverse and short-term. These impacts would be mitigated by avoiding traditionally used plants, and pile burning could actually be beneficial for some plants if done to maintain important plant characteristics.

Chipping. The potential impacts associated with chipping would be identical to those described under Alternative A, negligible.

Girdling. Same as Alternative B, negligible.

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 minimally reduce the potential for catastrophic fire and associated emergency response actions. Considered in conjunction with the minor to moderate, adverse, and long-term effects of present, and reasonably foreseeable projects, and the effects of Alternative C, the cumulative effects upon ethnographic resources would be beneficial, long-term, and minor.

Conclusion

Implementation of this alternative would result in minor to moderate, beneficial and long-term effects upon ethnographic resources, but the potential for major, adverse and long-term 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 equipment to reduce heavy fuel loads. These impacts would be reduced or avoided to the extent possible through use of mitigating measures (described under Methodology). Compared with Alternative A, implementation of this alternative would reduce the potential for catastrophic fire and its impacts. Of all fire management situations and treatments, catastrophic fire and emergency response actions generally result in the most frequent and severe impacts to ethnographic resources. The intent of the alternative is to reduce the risk of catastrophic fire, 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 a minimal extent the potential for catastrophic fire and its impacts. This would result in beneficial, short- and long-term, minor impacts to cultural landscape resources.

Fire Management Treatments

Managed Wildland Fire

Same as Alternative B, 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 reduced to the degree possible through the mitigating measures described above.

Re-ignition clause. The potential for impacts occurring as a result of 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). The potential for impacts occurring as a result of holding and monitoring actions would be identical to those described under Alternative A, potentially minor to moderate, adverse and long-term. These impacts would be avoided or reduced as much as possible through mitigating measures (described under Methodology, Cultural Resources).

Prescribed Fire

Impacts resulting from prescribed fire under this alternative would be similar to those described under Alternative A, potentially negligible to minor, adverse, and long-term. However the potential for adverse impacts would be somewhat greater due to the increased acreage targeted for treatment. These impacts would be reduced to the degree possible through mitigating measures.

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

The potential for impacts associated with site preparation is identical to that described for Alternative A, negligible, adverse and short-term, and would be avoided or reduced as much as possible through mitigating measures.

Fuel Reduction by Hand or Machine

Passive Reduction and Lower Profile Techniques.

Low-Impact Skidding Low-impact skidding could cause soil disruption and compaction, and disruption of understory species. Areas proposed for treatment would be surveyed for cultural landscape 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 these treatments but activities have the potential to adversely impact cultural landscape 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 moderate, adverse, and long-term.

Limb Removal. Limb removal involves cutting lower limbs from six to 16 feet above the ground to remove ladder fuels. This action has the potential to change the visual setting in cultural landscape or historic structures settings. Areas proposed for treatment would be surveyed for cultural landscape resources. Target conditions would be developed in consultation with cultural resources specialists, thus avoiding any potential adverse impacts.

Skidding/Grappling. Effects would be the same as Alternative B—potentially adverse, long-term, and moderate to major. These potential impacts would be reduced through avoidance, and, to the extent possible, through mitigating measures.

Hand Cutting. The potential for impacts associated with hand cutting would be identical to that described for Alternative A—potentially moderate, adverse, and long-term. Impacts would be avoided by prescribing a target condition for these areas that would protect and enhance the cultural resource.

Pile burning. The potential for impacts associated with pile burning would be identical to that described for Alternative A. Little or no potential to impact cultural landscape resources. Any potential impacts would be avoided by implementing mitigating measures.

Chipping. The potential impacts associated with chipping would be identical to those described under Alternative A—negligible.

Girdling. Same as Alternative B.

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 minimally 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 C, cumulative effects would be beneficial, long-term, and minor.

Conclusion

Implementation of this alternative would result in minor, beneficial and long-term effects upon 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 equipment to reduce heavy fuel loads. These adverse effects of equipment use would be reduced or avoided to the extent possible through mitigating measures described under Methodology. Compared with Alternative A, implementation of this alternative would minimally reduce the potential for catastrophic fire and its impacts. Of all fire management situations and treatments, catastrophic fire and emergency response actions result in the most frequent and severe impacts to cultural landscape resources. The intent of the alternative is to reduce the risk of catastrophic fire, 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 lands. These impacts would be mitigated to the extent possible by some pre-burn inventory for resources of concern, avoiding known resources when feasible, reducing hazardous fuels at significant resources, documentation and protection of significant resources, post-burn inventory and stabilization, and fire-effects research.

Social Environment

Recreation

Potential for Impacts from Catastrophic Fire

Large catastrophic fires are most likely to occur in the Suppression Unit, where fire has been excluded, causing unnatural fuel buildup and changes in plant community structure. The moderate 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 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

Among the action alternatives, this alternative would have the least amount of prescribed fire and wildland/urban interface treatment. However, the treatment acreages would still be greater than under Alternative A, resulting in effects upon recreation that would be similar to that of Alternative B, except in the case of the following treatment:

Fuel Reduction by Hand or Machine

Aggressive Reduction Techniques. Would not occur under Alternative C.

Passive Reduction and Lower Profile Techniques.

Low-Impact Skidding. Use of draft animals and four-wheel, all terrain vehicles, in combination with fetching arches would be used to skid trees approximately 10 to 20 inches in diameter. Low-impact skidding would infrequently affect visitors through small, contained, safety closures and equipment noise while work was going on. These techniques would be used only in the wildland/urban interface and along road corridors (Suppression Unit and non-Wilderness portions of the Fire Use Unit), which might include trailhead areas. Visitors would generally be able to partake in their chosen activity, including hiking, nature study, and scenic touring, in a nearby area. Some visitors would have concerns about equipment noise and use in the park; other people would understand the rationale for its use and would be supportive. Overall, the effects of low-impact skidding upon recreation, due to the limited amount of use, would be adverse, short-term, and negligible.

Cumulative Impacts

As in Alternative B, the impacts of other projects in the region, in combination with the adverse, short-term, and minor impacts of this alternative, would result in beneficial, long-term, and major cumulative impacts upon recreation.

Conclusion

The effects of this alternative upon recreation would be adverse, short-term and minor. The potential for large, catastrophic fire events and its likely effect upon recreation would be similar to but less than under Alternative A. There would be no impairment from the effects of this alternative.

Scenic Resources

The effects of this alternative on scenic resources would be similar to that of Alternative B, except in the following areas:

Potential for Impacts from Catastrophic Fire

The potential for catastrophic fire would remain similar to that of Alternative A for most of the life of the plan. If a fire the size of the A-Rock Fire were to occur, the effect on scenic quality would be adverse, long-term, and major. Under this alternative, the potential for more fires of this size and intensity would remain high until near the end of the planning period (25 years). Along major road corridors, near major scenic vistas, or on the margins of or in Special Management Areas, the effects of this alternative, regarding catastrophic fire would be beneficial, minor, and long-term.

Fire Management Treatments

Prescribed Fire

Prescribed fire operations would typically occur within a defined project area. Between 1,260 and 6,436 acres would be treated in an average year, compared to 1,442 acres per year under Alternative A. Effects of prescribed burning on scenic resources would be generally beneficial, long-term, and moderate to major, based on the amount of annual accomplishment.

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

Passive Reduction and Lower Profile Techniques

Low-Impact Skidding. Under Alternative C, this technique would be used in the wildland/urban interface and along road corridors to remove some cut trees up to 20" dbh. 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 lessened by the use of fetching arches or by skidding over snow, frozen ground, or crushed vegetation. Most areas would be prescribed burned after fuel reduction was finished, lessening the visual impact of skidding. Considering the use of mitigation, especially burning, at the end of each project, most of these effects would be short-term, minor to moderate, and adverse.

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—potentially within major scenic views. Second, piles once burned would leave a patch of burned area that would not appear natural. As in Alternative A, both effects would be adverse, short-term, and minor.

Chipping. Chipping would result in small areas with evidence of activity, through concentrations of wood chips left behind. Chipping would not be a major feature on the scale of a landscape or scenic view. 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

Past, present, and reasonable foreseeable projects affecting scenic resources would be the same as under Alternative A. The effects of present and reasonably foreseeable projects would be adverse to beneficial, long-term, and minor. Considered in combination with the beneficial, long-term and moderate impact of Alternative C on scenic resources, cumulative impacts would be beneficial, long-term, and moderate.

Conclusion

Fire management activities would affect scenic resources in generally beneficial ways, through actions that would contribute to restoring and maintaining open vistas and natural forest structure.

The beneficial effects within the Suppression Unit would be greater in this alternative than under Alternative A, because there would be more annual accomplishment in prescribed fire and plant growth removal. Overall, these effects would be beneficial, long-term and moderate. However, the potential for large, high intensity, catastrophic fires with effects as major as the A-Rock Fire would be only slightly less than under Alternative A. The intent of the alternative is to reduce the risk of catastrophic fire, thus there would be no impairment from the effects of this alternative.

Noise

The noise effects of this alternative would be similar to that of Alternative B, except in the following areas:

Potential for Impacts from Catastrophic Fire

The potential for catastrophic fire would remain similar to that of Alternative A, for most of the life of the plan. Thus, the dependence upon large fire organizations and their equipment would be similar but would go down over 25 years as the threat of catastrophic fire were reduced. Because of a reduction in the threat of catastrophic fire, effects would be beneficial, long-term, and negligible.

Fire Management Treatments

Prescribed Fire

Prescribed fire operations would typically occur within a defined project area. Between 1,260 to 6,436 acres per year would be treated in an average year. This amount of acreage would take approximately 40 to 50 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.

Fuel Reduction by Hand or Machine

Passive Reduction and Lower Profile Techniques.

Low-Impact Skidding. The use of draft animals would have negligible effect in terms of noise, but ATVs, which have motorcycle-type engines, and would potentially be very loud, with noise levels of approximately 90 dB at 25 feet—32 times as loud as reference noise levels [although ATVs are operated at lower RPMs than motorcycles and may have engine sizes and mufflers that could reduce this noise output considerably, motorcycle noise levels (see table III-12, in Chapter III) are considered as the basis for comparison]. Low-impact skidding could be used for several weeks at a time, over entire project areas. Distance from the noise source, in heavily wooded areas, would lessen the noise considerably, but nearby the effects would be clearly audible. The impacts of low-impact skidding, using ATVs would be adverse, short-term, and 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

Past, present and reasonable foreseeable projects affecting scenic resources would be the same as under Alternative A. Considered in combination with the adverse, short-term, and major impact of Alternative C on noise, cumulative effect 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 but more than would occur under Alternative A. Large fire organization events, as needed for catastrophic fire would be similar to those 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

This alternative would have the least amount of prescribed fire and wildland/urban interface treatment, per year, among the action alternatives. The treatment acreage would be greater than under Alternative A, resulting in adverse effects and risk levels for local communities that would be less than under Alternative A, No Action. However, the level of risk from the effects of catastrophic fire would remain high and would be the greatest among the action alternatives. The amount of annual accomplishment for wildland/urban interface work would meet objectives for protecting these areas within approximately 10 years, but the ecosystem restoration work would require much longer, approximately 25 years, meaning the potential for large, high intensity catastrophic fire would remain high for much of the implementation period. Even with the wildland/urban interface work completed, large fires could potentially run through the area and put wildland/urban interface areas at risk, despite efforts to hold the fires and protect communities.

Potential for Impacts from Catastrophic Fire

These effects would be similar to Alternative B, except that risks for local communities would be more slowly abated by the schedule for wildland/urban interface treatment, which would reduce fuels in forests around communities and developed areas within 10 years. Thus, effects of Alternative C on the potential impacts from catastrophic fire would be beneficial, long-term, and negligible to minor.

Fire Management Treatments

Managed Wildland Fire

The effects under this alternative would be similar to Alternative B—adverse, short-term, and negligible.

Re-ignition clause. The effects of this alternative would be the same as under managed wildland fire—adverse, short-term, and negligible.

Holding Action and Monitoring Effects (water and retardant drops, helispots and spike camps). ***The effects under this alternative would be similar to Alternative B.***

Prescribed Fire

Prescribed fire operations typically occur within a defined project area. Between 1,260 and 6,436 acres would be restored in an average year, compared to 1,285 acres per year under Alternative A, thus reducing the risks associated with catastrophic fire, compared to Alternative A. However, with this amount of annual work, it would still require up to 25 years to accomplish ecosystem restoration objectives, meaning that the risks associated with catastrophic fire would remain through much of this period. Effects of prescribed burning on local communities would be beneficial and long-term, but moderate. Other effects would be similar to under Alternative B.

Other effects of prescribed fire would be similar to those under Alternatives A and B.

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

The effects under this alternative would be similar to Alternatives A.

Fuel Reduction by Hand or Machine

Passive Reduction and Lower Profile Techniques.

Low-Impact Skidding. Low-impact skidding would affect local communities through its relationship to the duration required to complete fuel reduction in communities and ecological restoration work around community perimeters. Under this alternative, low-impact skidding would be the major tool for skidding trees to quickly reduce fuels near homes, businesses, and other buildings. This alternative requires the longest period for completing these projects (10 years for wildland/urban interface work), in part because of the time required to do this work, considering the range of tools and equipment available. Skidding using these techniques would be beneficial, but more time-consuming, thus risks to communities would remain high for a longer time. Effects of low-impact skidding on local communities would be beneficial, long-term, and moderate to major.

Hand Cutting. There would be approximately 766 acres of plant and fuel reduction work competed in wildland/urban interface areas per year. This would accomplish wildland/urban interface objectives for protection and ecosystem restoration in approximately 10 years, reducing risks near communities compared to Alternative A. Although catastrophic fire potential would remain great, the opportunity to protect these communities would be improved compared to Alternative A. The effects of biomass removal would be beneficial, long-term and moderate to major.

Pile burning. The effects under this alternative would be similar to Alternatives B— adverse, short-term and minor.

Chipping. The effects of this alternative would be similar to Alternative B—minor, short-term and beneficial.

Girdling. The effects under this alternative would be similar to Alternatives B—negligible.

Cumulative Impacts

As in Alternative A, there would be a diversity of 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 matters.

The long-term, beneficial, and moderate effects of these actions, considered with the impacts of Alternative C, would result in cumulative effects in Yosemite's wildland/urban interface areas that would potentially be beneficial, long-term, and moderate.

Conclusion

The risks associated with large, catastrophic fires would be reduced in this alternative, compared to Alternative A. The risk in Alternative C for direct effects (loss of property during fires) and indirect effects (loss of business during fire-related closures) would be reduced compared to Alternative A, but would remain the highest among the action alternatives. This is because of a smaller amount of annual prescribed fire and mechanical thinning accomplishment to restore plant communities in wildland/urban interface areas and elsewhere in the Suppression Unit. The potential for fire-related closures and other effects would also be only slightly lower than under Alternative A. As a result, the overall affect of this alternative on local communities would be beneficial, long-term and moderate.

Environmental Justice

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

Because of the greater amount of prescribed burning and fuel treatment, compared to Alternative A, the benefits for each community would be greater. The amount of prescribed fire and fuel treatment would be less than under other action alternatives. Nevertheless, the risks in each of the wildland/urban interface areas would be less than under Alternative A. 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, 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.

Conclusion

Prescribed fire and fuel treatment would be focused upon the 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.

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 V 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.

The effects of Alternative C on Wilderness values would be similar to Alternative B, except in the following areas:

Potential for Impacts from Catastrophic Fire

Potential for impacts from catastrophic fire would be remain similar to under Alternative A, No Action, during the life of the plan. Although there would be more fuel treatment than under Alternative A, the amount of annual accomplishment toward restoration goals would likely result in effects that would be similar until toward the end of the planning period when the threat of catastrophic fire would be reduced.

Fire Management Treatments

Prescribed Fire

Prescribed fire would be used as a tool to restore and maintain park ecosystems, especially in areas altered from years of fire exclusion. Some of this area includes Wilderness. Alternative C proposes to burn from 1,260 to 6,436 acres per year with prescribed fire. Much of this would be to accomplish objectives related to wildland/urban interface and Special Management Areas. Where prescribed burning is needed to achieve restoration targets, the effect would be beneficial, long-term and moderate to major. However, the greatest effect upon Wilderness values would be in reducing the potential for large, high-intensity fires spreading under extreme fire conditions into large areas, including Wilderness.

Fuel Reduction by Hand or Machine

Passive Reduction and Lower Profile Techniques.

Low-Impact Skidding. If trees needed to be removed from Wilderness, draft animals would be used to skid trees. 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 in Wilderness. Many areas would be burned after skidding activities took place. Considering the limited application of this technique in Wilderness, and the use of mitigation at the end of the project, effects would be adverse, negligible, and short-term.

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 national 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 beneficial, long-term and minor to moderate effects of Alternative C, would result in the cumulative effects on Wilderness would remain beneficial, long-term, and minor to moderate.

Conclusion

Fire management activities would affect Wilderness resources in generally beneficial ways, through actions that would maintain plant communities within their natural range of variability, and thus maintain Wilderness values, and especially in the Fire Use Unit. Effects in the Suppression Unit

would be greater than under Alternative A, due to the greater amount of annual accomplishment in fuels treatment and prescribed fire. However, the potential of having large, high intensity, catastrophic fires that could spread their effects into Wilderness would remain fairly high during the life of the plan. That would mean the possibility of having fires of the magnitude of the A-Rock Fire. In Wilderness, helicopter and chainsaw noises would continue to introduce short-term intrusions, with adverse and major effects, the same as under Alternative A.

Overall, the effect of Alternative C would be beneficial, long-term and minor to moderate. 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; emergency fire suppression and administrative activities are not.

The same fire management activities considered under Alternative A are used in this alternative. In addition, passive reduction techniques such as skidding with ATVs and chipping would be included into the treatment mix. The number of acres that would be treated, and related energy that would be consumed is estimated in table IV-16 below.

Cumulative Impacts

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, about 22,088 gallons of fuel per year, would be adverse, long-term, and minor, 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 22,000 gallons of various fuels per year would be consumed, compared to over 9,000 gallons under Alternative A. The effects of the fire management program's energy demand would be adverse, long-term, and minor, compared to Alternative A, No Action.

Table IV-16
Projected Energy Consumption Under Alternative C

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]	3,848 (1,260 - 6,436)	a) Drip Torches	Approx. 1 acre per hour per torch, 8 acres per day in an 8 hour shift. [OR in aerial ignition, 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]	7,696 gallons of drip torch fuel [OR 25,600 ignition balls, with approx. 3,072 gallons of aviation fuel; plus approx. 500 gallons drip torch fuel for ground crews]
		b) Engines	2 to 4 engines/ plus 1 to 2 water tenders per day (4 on average), for an average of 40 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	1,000 gallons
		c) Chainsaws for site prep.	Crew with 5 saws can treat 5 acres per day, for approx. 230 acres	2 gallons per day per saw; 10 gallons per crew per day	460 gallons
Hand Cutting	766	Chainsaws	Crew with 5 saws can treat 5 acres per day	2 gallons per day per saw; 10 gallons per crew per day	1,532 gallons
ATV Skidders		All Terrain Vehicles	225 hours per year	28 days, at 10 gallows of fuel consumption per day	280 gallons
Chipping	300	Chipper	5 acres per day	10 gallons per day	600 gallons
Total: 22,368 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 C 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 be suppressed, mostly in the Suppression Unit and to a smaller extent in the Fire Use Unit. This would allow forest structure to continue to change and fuel loads to increase throughout most of the planning period. This would be particularly true in upper and lower montane vegetation groups, in the Suppression Unit, and in the wildland/urban interface. Conditions would not likely be reversed in this alternative until the end of the planning period. Those areas that are burned would be restored to target conditions. The effects on vegetation are described under Vegetation for this alternative. Over the long-term, there would be the potential for high-intensity fires burning extensive areas and changing vegetation into early seral stages such as happened in the A-Rock Fire. This would be a long-term and adverse effect.

Irreversible or Irretrievable Commitments of Resources

Implementation of Alternative C would be similar to Alternative A in terms of the potential of large, catastrophic fires. The trend has shown that in Yosemite National Park large, high-intensity fires are becoming more frequent than in the past. The fire history of the park indicates that in past decades Yosemite did not have fires of the size of the A-Rock. In the 1990's, the park had three large fires: A-Rock, Steamboat, and Ackerson.

The effects of the A-Rock Fire were long-term, adverse, and major, and represent, in a relative sense, an irretrievable commitment of resources. Future fires of this size and intensity also would have irretrievable effects. Because of the limited amount of fuel reduction and prescribed fire, under Alternative C the situation would remain much the same until near the end of the planning period, 25 years.

The three giant sequoia groves in Yosemite National Park have been the focus of past fuel treatments and prescribed fire in Yosemite's fire management program. These actions have helped to protect them, yet they continue to be at risk. The gradual amount of fuel reduction and prescribed fire in Alternative C would allow surrounding areas to continue to degrade for much of the planning period. Thus, implementation of Alternative C would increase this level of risk over time. The loss of the Mariposa Grove of Giant Sequoias would be considered an irretrievable loss of resources, and impairment, under the definition in National Park Service Management Policies 1.4.5

The risk to historic resources in Yosemite Valley, Wawona, and in other wildland/urban interface areas would be slightly less than under Alternative A, No Action, because of biomass removal in the wildland/urban interface. If burned during catastrophic fire, historic resources would be irreversibly and irretrievably lost since one cannot be reconstructed, only replaced by a similar structure which would lack the significance and integrity of the original.

Effects of managed wildland fire upon wildlife and other park values would generally not be considered irreversible or irretrievable, in that their effects would typically be within the natural range of variability for park ecosystems and wildlife habitat, and 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

As in Alternative A, it is likely that the effects of large, catastrophic fires could not be avoided, considering the limited amount of prescribed fire and fuel reduction that would occur under this alternative. The effects would include vegetation type conversion and return of large areas to earlier seral stages following catastrophic fire. The potential for this would be greatest in upper and lower montane forests.

Plant and fuel reduction 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.