

United States  
Department of  
Agriculture

Forest Service

Fire and Aviation Management  
Washington, DC



# Nationwide Aerial Application of Fire Retardant on National Forest System Land

## Record of Decision

December 2011



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**Record of Decision,  
Nationwide Aerial Application of Fire Retardant**

**Lead Agency: U.S. Department of Agriculture (USDA), Forest Service**

**Cooperating Agency: U.S. Department of the Interior (USDI),  
Bureau of Land Management**

**Responsible Official: Thomas Tidwell, Chief, USDA Forest Service**



# Table of Contents

Decision and Reason for the Decision .....	1
Background.....	1
Decision.....	2
Aircraft Operational Guidance.....	2
Avoidance Area Mapping Requirements.....	3
Reporting and Monitoring Requirements .....	4
Modifications Resulting from ESA Section 7 Consultation .....	5
Decision Rationale.....	5
Decision Authority .....	7
Other Alternatives Considered .....	7
Alternative 1 – No Action.....	7
Alternative 2 – Proposed Action.....	8
Issues Considered .....	9
Alternative Comparison Table.....	10
Alternatives Considered but Not Developed for Detailed Study.....	11
Major Conclusions from the FEIS about the Selected Alternative.....	12
Fire Retardant Use in Wildland Fire Management .....	12
Soils .....	13
Hydrology .....	13
Aquatic Vertebrates and Invertebrates.....	13
Plant Species and Habitats .....	14
Wildlife Species and Habitats.....	14
Social and Economic Considerations.....	15
Public Health and Safety.....	15
Scenery Management.....	15
Wilderness .....	16
Air Quality .....	16
Heritage, Cultural and Tribal Resources.....	16
Environmentally Preferred Alternative .....	16
Interagency Coordination .....	17
ESA Section 7 Consultation.....	17
Consultation with American Indian Tribes.....	18
Cooperating Agency – Bureau of Land Management .....	20
Public Involvement.....	20
Findings Required by Laws and Regulations .....	21
National Environmental Policy Act .....	21
National Forest Management Act .....	21
Endangered Species Act .....	21

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Clean Air Act .....	21
Clean Water Act .....	22
National Historic and Preservation Act .....	22
Civil Rights and Environmental Justice.....	23
Tribal Treaty Rights and Trust Resources .....	23
Valid Existing Rights .....	23
Implementation .....	23
Contact Person.....	23
Literature Cited.....	24
APPENDICES .....	27
Appendix A. Species Specific Conservation Measures included in the Federal Action .....	28
Appendix B. Incidental Take Statements from the USDI Fish and Wildlife Service and NOAA Fisheries (National Marine Fisheries Service).....	33
Appendix C. Species Determination Changes among FWS Biological Opinion, NOAA Fisheries Biological Opinion, and USFS Biological Assessment .....	63

## Table of Tables

Table 1. Comparison of Alternatives: Effects Indicators for Significant Issues.....	10
Table 2. Final ESA Determinations for Threatened and Endangered Species and Designated Critical Habitats as a Result of ESA Consultation.....	18
Table C-1. Species Determination Changes between FWS Biological Opinion, NOAA Fisheries Biological Opinion and USFS Biological Assessment. ....	63

## Decision and Reason for the Decision

I have decided to authorize the continued use of aerially applied fire retardant on National Forest System lands in the United States of America in a manner consistent with the Forest Service's policy on fighting wildfires.

### Background

Aerial application of fire retardant is part of an integrated firefighting strategy applied in a range of situations depending on the access, topography, fuel condition, available resources, time of year, expected weather, and other factors. High fire intensity and rate of spread inhibit the ability to fight wildland fires safely with ground-based forces alone. In addition, remote locations and rugged topography make access difficult and often delay the deployment of ground forces for fire suppression efforts. Fire retardant is intended to slow the rate of fire spread by cooling and coating fuels, depleting the fire of oxygen, and slowing the rate of fuel combustion as the retardant's inorganic salts change how fuels burn.

Most aerial fire retardant is applied to ridgetops and adjacent to existing fire breaks such as roads, meadows, old fire scars, and rock outcrops to increase the size of the firebreak. Fire retardant is used to address specific firefighting objectives and can be used in any situation, especially when firefighters, public safety, or structures are threatened.

Decisionmaking on wildland fires occurs at various levels and requires strategic planning involving the evaluation of risk to responders and the public, natural/cultural values at risk, jurisdictional/property boundaries, and objectives/constraints defined by land and resource management plans.

Because of the wide variety of potential circumstances on the ground, the Forest Service has taken a nationwide, programmatic approach to NEPA analysis for retardant use to address the range of situations in which aerially applied retardant may be needed.

The Forest Service has been using fire-retardant chemicals since the 1950s. In recent decades, the focus has been on improving formulations to minimize their potential adverse impacts while maintaining or improving their firefighting effectiveness.

In 2003, Forest Service Employees for Environmental Ethics filed a lawsuit against the Forest Service maintaining that NEPA required the Forest Service to analyze the effects from the aerial application of fire retardant and the Endangered Species Act (ESA) required the Forest Service to consult with the U.S. Fish and Wildlife Service (FWS) on the same issue. On September 30, 2005, the United States District Court for the District of Montana held that the Forest Service violated NEPA and the ESA by not doing so.

The Forest Service issued an Environmental Assessment in October 2007 and a Decision Notice/Finding of No Significant Impact (DN/FONSI) for the aerial application of retardant use in February 2008. The Forest Service integrated the reasonable and prudent alternatives that the FWS and National Marine Fisheries Service (NMFS) had proposed into that DN/FONSI as a result of the ESA Section 7 consultation process. On April 2, 2008, Forest Service Employees for Environmental Ethics filed another lawsuit. This time, the group sued not only the Forest Service, but also the FWS and the NMFS.<sup>1</sup> Forest Service Employees for Environmental Ethics challenged both (1) the Environmental Assessment and (2)

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<sup>1</sup> This Record of Decision (ROD) and other related documents often refer to this agency as National Oceanic and Atmospheric Administration (NOAA) Fisheries.

the consultation the Forest Service had completed with the FWS and the NMFS. On July 27, 2010, the United States District Court for the District of Montana held that the Forest Service's decision violated NEPA (Forest Service Employees for Environmental Ethics vs. Forest Service, 726 F.Supp.2d 1195 (D. Mont. 2010)). The court also held that the FWS and NMFS Section 7 consultation with the Forest Service violated the ESA. The court vacated the previous decision and ordered the Forest Service, the FWS, and NMFS to cure the NEPA and ESA violations. It directed the Forest Service to issue a new decision no later than December 31, 2011.

Since the July 2010 court order, the Forest Service has (1) held several public meetings and other public involvement opportunities; (2) prepared a draft Environmental Impact Statement (EIS); (3) circulated the draft EIS for public comment; and (4) responded to the public comment in a final EIS. The Forest Service also initiated and completed ESA Section 7 consultation with the FWS and NMFS, which issued Biological Opinions for this action on November 2, 2011, and November 7, 2011, respectively.

## Decision

Based upon my review of all alternatives, I have decided to implement the preferred Alternative 3, with modifications resulting from ESA Section 7 consultation. The Selected Alternative approves the use of aerially applied fire retardant and implements an adaptive management approach that protects resources and continues to improve the documentation of retardant effects through reporting, monitoring, and application coordination. Aerial retardant drops are not allowed in mapped avoidance areas for threatened, endangered, proposed, candidate or sensitive (TEPCS) species or in waterways. This national direction is mandatory and would be implemented except in cases where human life or public safety is threatened and retardant use within avoidance areas could be reasonably expected to alleviate that threat. When an application occurs inside avoidance areas for any reason (which this document refers to as a "misapplication"), it will be reported, assessed for impacts, monitored, and remediated as necessary. In addition, I am providing direction that will help better protect important heritage, cultural, and tribal resources and sacred sites, based on site-specific recommendations.

Nothing in this decision changes the way aerially applied fire retardant is used outside of the mapped avoidance areas. All other fire suppression tactics are still available with avoidance areas. I want to emphasize that Firefighter and public safety continues to be our number one priority.

I am approving the following components of the Selected Alternative: Aircraft Operational Guidance; Avoidance Area Mapping Requirements; annual coordination and Reporting and Monitoring Requirements; and Modifications Resulting from ESA Section 7 Consultation.

### *Aircraft Operational Guidance*

Whenever practical, as determined by the fire incident commander, the Forest Service will use water or other wildland fire chemical suppressants for direct attack or less toxic approved fire retardants in areas occupied by TEPCS species or their designated critical habitats. Some species and habitats require that only water be used to protect their habitat and populations; these habitats and populations have been mapped as avoidance areas. Incident commanders and pilots are required to avoid aerial application of fire retardant in avoidance areas for TEPCS species or within the 300-foot (or larger) buffers on either side of waterways.

When approaching an avoidance area mapped for TEPCS species, waterway, or riparian vegetation visible to the pilot, the pilot will terminate the application of retardant approximately 300 feet before reaching the mapped avoidance area or waterway.

When flying over a mapped avoidance area, waterway, or riparian vegetation, the pilot will wait one second before applying retardant. Pilots will make adjustments for airspeed and ambient conditions such as wind to avoid the application of retardant within the 300-foot or larger buffer or avoidance area.

Cultural resources, including historic properties, traditional cultural resources, and sacred sites will be given case-by-case consideration when ordering the aerial application of fire retardant. As necessary, incident commanders will consider the effects of aerial applications on known or suspected historic properties, any identified traditional cultural resources, and sacred sites. The Forest Service means to use cultural resources specialists, archaeologists, and tribal liaisons to assist in the Forest Service's consideration of effects and alternatives for protection.

These guidelines do not require helicopter or air tanker pilots to fly in a manner that endangers their aircraft or other aircraft or structures or that compromises the safety of ground personnel or the public.

### *Avoidance Area Mapping Requirements*

The Forest Service will annually coordinate with FWS and NOAA Fisheries local offices to ensure that the mapped avoidance areas on National Forest System (NFS) lands incorporate the most up-to-date information. The Forest Service will coordinate with aviation managers and pilots on avoidance area mapping and aircraft operational direction and will provide reporting direction to all firefighting fire personnel with suppression responsibilities in the event they discover a misapplication in an avoidance area.

- Each Forest Supervisor will be responsible for maintaining and updating the avoidance area maps for the applicable National Forest System land area.
- Avoidance maps can be updated or adjusted for TEPCS species or designated critical habitats by Forest Supervisors in consultation with FWS or NOAA Fisheries as necessary. Mapping changes are allowed if they do not create additional adverse effects than what was analyzed in the Biological Assessments or change the analysis conducted or determinations made in the Biological Opinions.
- Terrestrial and waterway avoidance areas are mapped using the best current information and can be updated as better data becomes available. As this information changes or is updated, the maps can be adjusted.
- When there is a discrepancy between the maps and the language in this decision, the language in this decision controls.
- Avoidance maps can be updated by Forest Supervisors for candidate and Forest Service listed sensitive species based on the best current information.

### **Aquatic Avoidance Areas**

Waterways will be avoided and are given a minimum of a 300-foot buffer, including perennial streams, intermittent streams, lakes, ponds, identified springs, reservoirs, and vernal pools. Buffer areas may be increased based on local conditions in coordination with the FWS and NOAA Fisheries local offices.

### **Terrestrial Avoidance Areas**

Terrestrial Avoidance Areas may be used to avoid impacts on a) one or more federally listed threatened, endangered, or proposed plant or animal species or critical habitat where aerial application of fire

retardant may affect habitat and/or populations; or b) any Forest Service terrestrial sensitive or candidate species where aerial application of fire retardant may result in a trend toward federal listing under ESA or a loss of viability on the planning unit. The Forest Service used the following protocols to generate a standardized, national map template of avoidance areas for TEPCS species and will revise that template as appropriate. At this time all national forests and grasslands that have affected TEPCS species have completed this mapping. These protocols will be used for annual updates.

- Use FWS and NOAA Fisheries-designated critical habitat layers when available.
- Use the National Hydrography Dataset for mapping water bodies to create aquatic avoidance areas.
- Use FWS, NOAA Fisheries, and Forest Service species population and designated critical habitat information for occupied sites.
- Update maps annually in cooperation with FWS and NOAA Fisheries to reflect changes during the year on additional species or changes made for designated critical habitat.
- Annual revisions to the maps will be coordinated with and maintained by the Forest Service.

### *Reporting and Monitoring Requirements*

The Forest Service will report to FWS and NOAA fisheries (as appropriate) all misapplications of aerially applied fire retardant. The report and assessment of impacts will determine necessary mitigation measures, remediation action, monitoring needs, and whether there is a need for reinitiation of formal consultation. Depending on the severity of the adverse effect, an appropriate restriction on future aerial application of retardant may be necessary for the reported area.

To help in determining whether under-reporting of fire retardant misapplication is occurring, the Forest Service will annually assess 5 percent of all fires that are less than 300 acres in size and during which aerially delivered fire retardant had been used and aquatic or terrestrial avoidance areas exist.

Reporting and monitoring of misapplications of fire retardant will be outlined within an *Implementation Handbook for the Final Environmental Impact Statement for the Nationwide Aerial Application of Fire Retardant on National Forest System Land*. The monitoring components that are reported annually through national forests and national TES species staff for coordination with other agencies will:

- Be conducted in coordination with local Forest Service/FWS/NOAA/US Geological Survey (USGS) offices and appropriate State agencies.
- Determine the necessary recovery, restoration, or remediation actions for the species or habitats.
- Determine the appropriate contingency measures for protection of TEPCS species from aerially applied fire retardant.
- Determine the amount of follow-up monitoring necessary as dictated by the extent of the impacts to species or habitats identified during assessment of the misapplication.
- Determine if an assessment of cumulative effects for certain species is necessary and is conducted and coordinated with appropriate agencies.

If a retardant drop occurs on a cultural resource, traditional cultural property, or sacred site, the site condition will be assessed by a qualified archaeologist and reported to the respective State Historic Preservation Officer and, if appropriate, tribal representatives that may include a Tribal Historic Preservation Officer. Tribal notification and consultation is required if the affected resource is a sacred site or traditional cultural property. If the effect is found to be adverse, the agency will consult with the tribe to determine an appropriate course of action to mitigate or resolve the adverse effect. Existing monitoring and reporting forms will be updated, as needed, for use in the reporting and monitoring process.

### *Modifications Resulting from ESA Section 7 Consultation*

The FWS and NOAA Fisheries have issued terms and conditions, reasonable and prudent measures, and conservation measures that provide additional measures to minimize impacts to specific species. I have reviewed the Biological Opinions and relied on the analysis in those Biological Opinions in making my decision as described in this Record of Decision. I have agreed to accept these terms and conditions as part of the action as described in Appendix A. Conservation recommendations provided in the Biological Opinions will be implemented when possible to assist in recovery actions.

The Forest Service, the FWS, and NOAA Fisheries analyzed the environmental effects of the alternatives on a nationwide, programmatic scale. At that scale, it is impossible to predict accurately where the Forest Service will use the aerial application of fire retardant as a firefighting tool, when the Forest Service will drop fire retardant, or how much fire retardant the Forest Service will use. Alternative 3 uses enhanced ESA consultation to mitigate that uncertainty (FEIS pages 22-23). Local Forest Service and FWS offices mapped terrestrial avoidance areas at the local level for known locations based on the analysis used for the potential effects on TEPCS and their known habitats, but, of course, the Forest Service and NOAA Fisheries already know the location of the waterways.

Completing surveys for all the effected TEPCS on all 193 million acres in the National Forest System would allow the Forest Service to develop a more robust set of avoidance areas, but that survey would cost an exorbitant amount of money. Without the surveys, it is possible that the Forest Service would drop retardant from the air onto TEPCS species or their habitats. Nevertheless, because the FWS and NOAA Fisheries analyses in their biological opinions concluded that Alternative 3 would not jeopardize any threatened or endangered species, any drops in unknown areas with TEPCS species or their habitats is unlikely to jeopardize those species. Finally, as project-level surveys or other methods make new data available, the Forest Service, FWS, and NOAA Fisheries, as appropriate, will consider that new information during the annual review and will consider adding an avoidance area or increasing the size of an existing avoidance area.

## Decision Rationale

I have selected Alternative 3 because it advances these goals:

- Provides for firefighter and public safety;
- Provides additional protection for ESA listed species sufficient to ensure that no species will be jeopardized based on local-level consultations between the Forest Service and FWS and NMFS;
- Provides for protection of aquatic and terrestrial environments and other special habitats;
- Includes measures for the protection of important heritage, cultural, and tribal resources;

- Provides a monitoring structure that assures the Forest Service is identifying and reporting misapplications; and
- Allows the Forest Service to continue using aerially delivered fire retardant as one tool for reducing the spread and intensity of fires while still meeting the above criteria.

This alternative will likely reduce the spread and intensity of fires, which increases firefighter and public safety. It also likely reduces the exposure of firefighters and the public to risky and dangerous situations during fires and provides an exception to allow use of aerially delivered fire retardant into avoidance areas to protect human life and public safety.

This alternative allows the Forest Service to continue using aerially delivered fire retardant while reducing impacts to federally listed species sufficiently to ensure that no species will be jeopardized by such use. It establishes national avoidance area mapping standards and annual coordination with FWS and NOAA Fisheries to ensure that avoidance areas are mapped using the most up-to-date information. It clarifies requirements for reinitiation of consultation and potential for further mitigation measures and remediation actions that may be needed and develops a clear monitoring structure in cooperation with FWS and NMFS.

This alternative is more protective of aquatic and terrestrial environments and other special habitats, including Forest Service-listed sensitive species, than past practices.

This alternative established national requirements for protection of heritage, cultural, and tribal resources.

This alternative requires misapplication reporting and notification to FWS and NMFS to determine if any necessary future mitigation measures or reinitiation of consultation is needed. It also requires a review of 5 percent of all fires less than 300 acres in size during which aerially delivered retardant was used and are proximate to avoidance areas to determine if any misapplications occurred that were not reported. Additionally, it requires that the Forest Service train and inform firefighters concerning reporting of misapplication as well as the location of avoidance areas.

This alternative ensures that the Forest Service will work at the local level with cooperators in establishing fire strategies and tactics in areas of wildland–urban interface at risk of fire activity within or near avoidance areas.

I recognize that some firefighting strategies will be adjusted due to this decision. To assist in minimizing the potential impacts from not utilizing aerially delivered fire retardant and the potential for increased damage to private and public property and infrastructure investments, local agency administrators will have to establish clear direction and expectations for suppressing fires near the avoidance areas through delegation-of-authority letters issued to incident commanders. Discussion of alternative tactical strategies should take place on the units in advance of fire season as well as coordination with their cooperators to determine the best strategies for areas of potential high risk, such as the wildland–urban interface.

My decision increases the avoidance areas for excluding retardant use across approximately 0.8 percent of NFS lands in addition to the current direction.

The Forest Service needs an effective tool for wildland firefighting. I believe Alternative 3 best meets the stated Purpose and Need.

## Decision Authority

As Chief of the Forest Service, I am the Responsible Official and sole decisionmaker for this project. Local, forest-level, and regional land managers may refine these measures, as necessary, in the future.

## Other Alternatives Considered

In addition to the Selected Alternative, I considered two other alternatives discussed in the following sections. Considering the same decision criteria, the following is my rationale for not selecting either of the other alternatives.

### *Alternative 1 – No Action*

Under the No Action Alternative, aerially delivered wildland fire retardant would not be used on National Forest System lands in the United States. Currently, the Forest Service has been using fire retardant following guidelines established in 2000 and updated in 2008. Under Alternative 1, all aerially delivered fire retardant use would be suspended. Aerial resources would deliver only water to assist with the tactics for managing a fire.

### Why Alternative 1 - No Action Was Not Selected

Under this alternative, a necessary firefighting tool (the aerial delivery of fire retardant) in the Forest Service would be eliminated. Alternative 1 would promote significantly reduced effectiveness of aerial resources (primarily air tankers) in fighting wildfires, which can result in more acres burned. Therein lies potential for increased loss of structures and increased exposure of incident responders to fireline hazards as well as inconsistent use of fire retardant among partners and cooperators with the potential for increased loss of critical infrastructure, failure to meet public expectations, and degradation of air quality.

I did not select Alternative 1 because eliminating the fire retardant tool would impact efficiency and timeliness in containing fires and result in a greater loss to natural resources, watersheds, and public and private property. The final environmental impact statement (Final EIS) (section 3.1.3, page 64) found that:

“Fire retardant has been shown to be up to 50 percent more effective than plain water as a suppressant in reducing fire spread and intensity (USDA Forest Service n.d.). Water does not have the ‘staying power’ of fire retardant on the vegetation as it evaporates very quickly and has little or no effect in slowing the rate of fire spread or fire spotting potential under conditions of low relative humidity and high temperature. The reduced effectiveness of aerial resources may place firefighters in more hazardous situations, requiring the assistance of aerial resources. With reduced effectiveness, firefighters may not be able to tactically engage the fire on the ground through perimeter control or direct attack as in the past. Firefighters would be required to back away from known effective fire control barriers and anchor points otherwise defensible with the use of fire retardant and choose a more ground-defensible barrier (natural or man-made). The loss of both natural resources and private property would increase under Alternative 1. Because of the difference in the effectiveness of water on fire behavior compared to fire retardant, there would be:

- Greater risk of small fires becoming large fires and fires moving into populated areas;
- Potential increase in loss of public infrastructure, including utilities corridors, communication sites, and transportation systems;
- Increase in the cost of fighting fires; and

- Inconsistencies between agency fire policies if the Forest Service is the only agency that does not use aerially applied fire retardant to fight fires, which puts both firefighters and the public at greater risk.”

Thus, use of ground-based firefighting tactics would be increased, which would result in increased competition and cost for these resources during critical shortage periods during the season. If the Forest Service unable to aerially delivered fire retardant and a fire spreads to lands under State jurisdiction, cooperative relationships could be compromised, resulting in increased potential for additional losses to critical infrastructure for communities as well as private property (Final EIS, section 3.1.3, page 66).

This alternative would have required that Master Cooperative Agreements and Annual Operating Plans be modified collaboratively with cooperators to clearly articulate policies, guidelines, and standard operating procedures with regard to aerial resources and the use of fire retardant. Confusion as to boundaries and authorities could have led to a loss of firefighting effectiveness both on and off national forests. In addition, the loss of both natural resources and private property could have increased due to the difference in the effectiveness of water as compared to fire retardant on fire behavior. Because of the potential for increased fire size, fire intensity, and ground suppression activities, variable effects on plants and animals could occur (Final EIS, section 3.5.2, pages 114-115). The extent of an effect would depend on site-specific conditions of the fire and the location. These impacts from Alternative 1 are not acceptable to me. Over the past 50 years, aerially delivered fire retardant has become an important tactical tool for wildland firefighters and has set the stage for public expectations regarding fire response. Input from professional wildland firefighters identified how effective the use of fire retardant is in slowing the growth of fire and impacting the combustibility of fuel (See Appendix O of the Final EIS). My own experience as a District Ranger, Forest Supervisor, and Regional Forester has shown me that fire retardant is an effective tool for fire suppression. In fire-prone areas, utilizing all fire suppression tools and tactics available—including aerially delivered fire retardant—contributes to overall fire management.

### *Alternative 2 – Proposed Action*

Alternative 2 is the Forest Service Proposed Action: to continue the current program. Under Alternative 2, the Forest Service would continue to follow the guidelines published in 2000 in Aerial Delivery of Retardant or Foam Near Waterways (see Appendix A of the Final EIS) to 1) avoid known waterways and 2) maintain communication with resource advisors, scouts, and others through the incident commander on a fire. The Forest Service would also have adopted the 2008 Reasonable and Prudent Alternatives (RPAs) that resulted from previous ESA Section 7 consultation. The adoption of the RPAs incorporated additional protection measures that avoided aerial application to terrestrial species found to be jeopardized from the application of aerially applied retardant. Assessments of site conditions following wildfires where aerially applied fire retardant entered waterways were also required as part of an RPA. (see the Final EIS, Appendix B).

Like the Selected Alternative, the Proposed Action prescribed a 300-foot buffer area between retardant application and surface waters on national forests, excluding about 30 percent of NFS lands from aerially delivered retardant use. In contrast to the Selected Alternative, which has one exception to the buffer rule; the Proposed Action would have allowed three exceptions: 1) for protection of life and property; 2) when alternative line construction tactics were unavailable; and 3) when damage to natural resources outweighed loss of aquatic life.

### *Why Alternative 2 – Proposed Action Was Not Selected*

I did not select the Proposed Action because it was not sufficiently protective of federally listed species and Forest Service-listed sensitive species. Far less area would have been excluded from retardant use

(0.0025 percent of all National Forest system lands, compared to 0.80 percent under Alternative 3). Alternative 2 would have allowed for more exceptions (three compared to one under the proposed action). Under Alternative 2, there would have been greater potential for misapplication of aerially delivered fire retardant into waterways, within the 300-foot buffer, and to the habitat of some TEPCS species. Measures for the protection of important heritage, cultural, and tribal resources and sacred sites are not included within this alternative.

I acknowledge that Alternative 2 would have expanded firefighting options available for use in some situations, especially in comparison to the additional exclusion areas associated with Alternative 3, which comprise about 0.8 percent of NFS lands. In both Alternatives 2 and 3, advance planning is the key to appropriately implementing the guidelines for aerially delivered fire retardant use and minimizing loss of suppression effectiveness during fire situations. I find the additional planning that must occur is reasonable and its cost is outweighed by the need for increased protection of TEPCS species.

## Issues Considered

The analysis represented in the Final EIS was focused on the following significant issues:

1. **Human Health and Safety:** Because fire retardant contains numerous chemicals, there is concern by some as to their safety to humans. In addition, firefighting is an inherently risky activity and it is important to manage that risk and keep firefighter and public safety as the highest priority.
2. **Water Quality:** In certain rare situations, when fire retardant comes in contact with water, the fire retardant chemicals can temporarily alter the water quality and may be toxic to aquatic organisms. Fire retardant could reach water through misapplication or through leaching and erosion, although studies show no measurable increase in soluble nitrogen forms and phosphorus levels (Final EIS, section 3.3.3, page 83).
3. **Impacts on Threatened and Endangered Species:** The previous Biological Opinions and environmental analysis conducted for the aerial delivery of fire retardant included reasonable and prudent alternatives. However, the District Court determined that the measures did not adequately address the possible effects on these species and that the effects to some ESA-listed terrestrial wildlife and plant species were not adequately addressed.
4. **Impacts on Cultural Resources:** Petroglyphs, historic structures, traditional Native American gathering areas, and sacred sites may be affected by the aerial application of fire retardant.

In addition to the decision criteria listed earlier, I also considered how well each alternative responded to these issues. Based on the analysis in the Final EIS and summarized in Table 1, below, I find that the Selected Alternative responds best to these issues. Water quality will be maintained through observation of aquatic avoidance areas and monitoring. It is estimated that less than one-half of 1 percent of fire retardant drops may reach the 300-foot or larger buffer (Final EIS, section 3.4.2, page 102). Impacts due to the exceptions, or from misapplication of fire retardant into water, would be rare. The human health effects of retardant use are likely to be minimal (Final EIS, section 3.8.2, page 154). The Selected Alternative best responds to the issue of impacts to threatened and endangered species by mapping avoidance areas, providing for additional monitoring and consultation, and tightening the exceptions that allow the application of aerially delivered fire retardant into avoidance areas. The Selected Alternative best responds to the issue of impacts on cultural resources by providing national direction for the protection of important heritage, cultural, and tribal resources and sacred sites.

### Alternative Comparison Table

The following two tables compare the different components for each alternative and how each alternative responds to public issues.

**Table 1. Comparison of Alternatives: Effects Indicators for Significant Issues**

<b>Effect</b>	<b>Indicator</b>	<b>Alternative 1 – No Retardant</b>	<b>Alternative 2 – Current Use</b>	<b>Alternative 3 – New Direction, Preferred Alternative</b>
Human health	Known health issues	None from retardant; may be some increase in smoke in the air, which may cause respiratory problems.	Some minor skin irritation may occur when retardant comes in direct contact with skin.	Same as under Alternative 2.
Human life and public safety	Protection of human life and public safety	N/A	Includes an exception allowing for use of aerially delivered fire retardant to protect life and property.	Includes an exception allowing for use of aerially delivered fire retardant to protect human life or safety.
Impact on all federally listed species	Number of species and critical habitat affected	No species or critical habitat directly affected by the use of aerially delivered fire retardant as no fire retardant used.	More potential for risk of impacts from aerially applied retardant than under Alternative 3 due to 3 exceptions under Alternative 3.	Less potential for impacts from aerially applied retardant than Alternative 2 due to only one exception for human safety but more than Alternative 1.
	Toxicity	No toxicity to wildlife and aquatic species, no changes in plant or wildlife habitat.	More risk than under Alternative 1.	More species protected by additional avoidance area mapping and additional monitoring requirements.
		Could have positive or negative effects on species or habitats due to the increased potential for smaller fires to become larger fires or increases in ground suppression actions. More use of water suppression activities that may impact federally listed aquatic species or habitats.	For ESA plant species: 64 no effect, 105 likely to be adversely affected. For designated critical habitats for plants: 9 likely to be adversely affected, 14 not likely to be adversely affected, 1 no effect.	For ESA plant species: 64 no effect, 49 likely to be adversely affected, 56 not likely to be adversely affected. For designated critical plant habitats: 23 not likely to be adversely affected, 1 no effect.
		Potential for more disturbances to occur to wildlife species under this alternative than under Alternatives 2 and 3 due to potential for	For ESA wildlife species: 43 no effect, 63 likely to be adversely affected, including 28 critical	For ESA wildlife species: 43 no effect, 13 likely to be adversely affected, 50 not likely to be

Effect	Indicator	Alternative 1 – No Retardant	Alternative 2 – Current Use	Alternative 3 – New Direction, Preferred Alternative
		more aerial use of water.	habitats.	adversely affected. For wildlife designated critical habitats: 22 no effect and 6 likely to be adversely affected.
			For ESA aquatic species: 21 no effect, 18 not likely to be adversely affected, 118 likely to be adversely affected. For designated critical habitat aquatic species: 10 no effect, 15 not likely to be adversely affected, 72 likely to be adversely affected.	For ESA aquatic species: 21 no effect, 18 not likely to be adversely affected, 118 likely to be adversely affected. For designated critical habitat aquatic species: 10 no effect, 15 not likely to be adversely affected, 72 likely to be adversely affected.
Cultural resources	Potential for effects	No impact from fire retardant; may be some impact from larger fires.	Some potential for effects such as deterioration, staining, or deterioration of protein residues.	Some potential; however, less than under Alternative 2 due to additional requirements for the protection of cultural resources.

## Alternatives Considered but Not Developed for Detailed Study

Federal agencies are required by NEPA to rigorously explore and objectively evaluate reasonable alternatives and to briefly discuss the reasons for eliminating alternatives that were not developed in detail (40 C.F.R. § 1502.14). People who commented during scoping and on the draft EIS suggested a number of alternatives that reflect their values and preferred management options.

The alternatives suggested ranged from unrestricted use of retardant to greatly restricted use of retardant. I considered these alternatives during the course of the process and they contribute to the range of reasonable alternatives and a reasoned choice, even though they were eliminated from detailed study. Most of the suggested alternatives that were not developed for detailed study were eliminated for one or more of these reasons:

- The suggested alternative would not meet the purpose and need – either because it would severely undermine firefighting effectiveness or because it would jeopardize TEPCS species;
- The suggested alternative was not within the authority of the Forest Service;
- The suggested alternative was not supported by scientific evidence and was based solely on opinion or conjecture;
- The suggested alternative was similar to an existing alternative that was studied in detail; and

- The suggested alternative was not within the scope of this decision; i.e. did not pertain to aerial retardant use.

Chapter 2 of the Final EIS (pages 38-40) describes the alternatives that were suggested. The following summarizes the reasons for eliminating them from further study.

In one instance, an alternative was suggested that would have restricted retardant use within one-quarter mile of waterways, in wilderness and wilderness study areas, and in other withdrawn land allocation areas. A GIS analysis of this alternative using two sample national forests (the Boise and San Bernardino National Forests) (see Appendix K of the Final EIS), showed that restricting retardant use, as described, would have removed more than 90 percent of the national forest from fire retardant use. This alternative would be so similar to Alternative 1 that it did not warrant further consideration as a stand-alone alternative.

Some people suggested alternatives that they believed would reduce potential environmental damage by introducing a national standard that would allow retardant use only when some level of effectiveness is guaranteed or when the benefits outweighed the risks. These alternatives were not chosen for detailed study because the conditions facing fire managers vary too widely to articulate a prescriptive standard, and Alternative 3 is intended to facilitate safe, effective retardant use with minimal adverse impact. Alternatives 2 and 3 were already designed to facilitate efficient decisions about the aerial application of fire retardant by: 1) placing restrictions on fire retardant use to minimize risks to aquatic, terrestrial, and plant life, in addition to cultural resources and sites; and 2) still allowing for the use of fire retardant as one of a number of tools to help maximize the effectiveness of fire suppression efforts. As such, the existing alternatives already authorize retardant use where the benefits (helping to achieve suppression objectives and goals) outweigh the potential risks (avoidance areas) and thus be considered “safe and effective.”

An alternative that would have increased protection to waterways to 600 feet on each side and protection to some specially designated areas, such as designated wilderness and inventoried roadless areas (IRAs) was also suggested but eliminated from detailed study. Based on the chemistry of the retardant formulations and its fate in the environment, retardant application outside the 300-foot buffer was found unlikely to have a measurable impact on stream water quality (Crouch et al. 2006). In addition, the environmental values in IRAs are already protected under the alternatives considered in detail.

## Major Conclusions from the FEIS about the Selected Alternative

The following sections summarize the key impacts expected for the physical, biological, and social environment as a result of the Selected Alternative.

### *Fire Retardant Use in Wildland Fire Management*

Aerially applied fire retardant would use continue, and, depending on the extent of mapping and the identification of additional avoidance areas, there could be increased limitations and restrictions as to where wildland fire retardant could be aerially applied, with the potential subsequent loss of critical public infrastructure. More restrictions in the use of fire retardant could lead to the reduced effectiveness of fire operations and increased risk and hazard to firefighters and the public than the current situation (Final EIS, section 3.1.3, pages 68–69).

## *Soils*

Effects on forest soils from the aerial application of fire retardant resemble a fertilizing response. For nutrient-poor soils (sandy, with low organic matter content), the addition of nitrogen and phosphorus could improve soil productivity in the short term. For already productive soils (clay, with high organic matter content), the additional nutrients could have an acidifying effect and reduce soil pH, making some nutrients unavailable. An indirect effect of fire retardant application is an increase in vegetative growth and potential change in vegetative community structure and composition. Leaching of nitrogen from fire retardant into streams and water bodies could occur in areas of coarse-textured soils. The persistence of effects will depend on vegetation type and post-application weather patterns (Adams and Simmons 1999) (Final EIS, section 3.2.2, page 75).

## *Hydrology*

Fire retardant in water can have adverse impacts on water quality and can have an impact on defined beneficial uses of water. Generally, impacts are short term, as dilution occurs when the affected water moves downstream. Eutrophication can occur where fire retardant affects small bodies of water that do not have the ability to quickly dilute the impacted water. Alternative 3 rarely would have impacts, either due to the exceptions or from misapplication of fire retardant into water. It is estimated that less than one-quarter of one percent of fire retardant drops may reach the 300-foot buffer under this alternative. (Final EIS, Summary, page 12).

Even if fire retardant misapplications lead to drops within the 300-foot buffer, effects could be minimal if the retardant falls more than approximately 9 feet from the waterway (Final EIS, section 3.3.3., page 89). Studies of fire retardant impacts on water quality (Norris et al. 1978) showed that direct application of retardant to the stream surface initiated the primary impact to water quality. At a site in Oregon, an untreated buffer as narrow as 3 meters largely eliminated the movement of retardant to the stream even when heavy precipitation occurred. Nevertheless, areas that are steep and rocky with coarse-textured soils and little vegetation have comparatively greater potential for movement of fire retardant into water.

Post-fire water quality monitoring for streams near four wildfires showed that aerial application of fire retardant near but not into the streams had minimal affect on surface water quality (Crouch et al. 2006). Ammonia and phosphorus from the burning of wood and other organics in burn area streams where fire retardant was not used were found in at concentrations similar to those found in areas where fire retardant was aerially applied.

## *Aquatic Vertebrates and Invertebrates*

There are 86 threatened, endangered, and proposed fish species and 67 threatened, endangered, and proposed crustaceans and mollusks in the United States. At the Forest Service sensitive-species level, there are 166 sensitive fish species and 90 sensitive crustaceans and mollusks. Macroinvertebrates are a key food source for fish; mollusk, and crustacean species, and the loss of numbers and populations will affect the viability of the food web.

If an exception is implemented or a misapplication occurs and fire retardant enters a waterway, direct effects include lethal and sublethal effects on aquatic species. These could include mortality of organisms, change in abundance and composition of aquatic communities, or adverse impacts to habitat. Increased monitoring of retardant drops under the Selected Alternative will help address missing information on the frequency of misapplications.

Indirectly, there is the chance of increased nutrients in waterways if an exception is implemented or a misapplication occurs. There is the risk of eutrophication to waterways (as discussed in the Final EIS, Hydrology section). There may be a change in macroinvertebrate abundance and species composition, affecting the food resources for aquatic vertebrates. Additionally, the influx of nutrients may favor the increase in existing populations of nonnative aquatic invasive species, and many of these species are strong competitors, opportunistic, and adversely affect the native aquatic communities.

### *Plant Species and Habitats*

There are currently 169 federally listed plant species, 24 designated critical habitats, 2,537 Forest Service-listed sensitive plant species, and 10 candidate species on NFS lands. Little is known related to the impacts of retardant to plant species. Studies that do exist indicate the potential for some species to be adversely impacted while others are beneficially impacted as a consequence of the chemical components (nitrogen and phosphorus) of fire retardants. Implementation of this alternative provides additional avoidance areas for federally listed species, their designated critical habitats, and Forest Service-listed plant species to prevent potential adverse impacts, such as potential phytotoxic effects or threats from nearby invasive plant communities that may encroach on critical habitats if added nutrients are available. Reporting and monitoring of effects in the event of misapplication associated with this alternative will provide additional information related to present knowledge gaps associated with impacts and allow for flexibility in mapping of areas to ensure species are adequately protected.

Effects from aerially applied fire retardant on native plant communities on NFS lands are expected to be variable and based on site-specific conditions. An increase in vegetative growth as a result of nutrients derived from fire retardant chemicals may elicit a beneficial impact in some native plant communities. Fire retardant use may also result in changes to plant community structure or composition, depending on the species that respond favorably to nutrient additions. The magnitude and direction of potential change is highly site-specific and influenced by numerous factors other than fire retardant application. Non-native invasive species may increase in some areas where fire retardant is applied. Based on records of past fire retardant use, we estimate that future aerial fire retardant application would impact only a small proportion of NFS lands annually (0.002 percent; Final EIS, Chapter 3, page 50).

### *Wildlife Species and Habitats*

There are currently 106 federally listed species, 28 designated critical habitats, and 515 Forest Service sensitive wildlife species, and 35 candidate species. There is a potential direct effect on animals resulting from disturbance associated with low-flying aircraft and the breaking off of tree tops and vegetation.

Implementation of Alternative 3 would designate more fire retardant avoidance areas than are currently in place and thus the potential for fewer species that are likely to be adversely affected.

There are 27 sensitive species and 9 candidate species identified for fire retardant avoidance mapping to ensure that fire retardant would not affect individuals, resulting in a loss of viability in the planning area or a trending toward federal listing. These avoidance areas would be protected from adverse effects except in the event of a misapplication. As a result, there are potentially 437 sensitive or candidate species that, if fire retardant were to be applied, may experience some adverse impacts; however, this would not result in a loss of viability in the planning unit or cause a trend towards federal listing. No impacts are expected on 74 sensitive or candidate species because they either occur on forests or grasslands that do not use fire retardant or occur in habitats where fire retardant would not be used.

Under Alternative 3, terrestrial species with limited mobility could be directly affected from the aerial application of fire retardant. The indirect effects of the use of the aerial application of fire retardant may

include the coating or covering of vegetation and food sources consumed by terrestrial species. The level of ingestion of retardant on vegetation or insects depends on the amount of fire retardant used (coverage by vegetation/eco-region type), timing of ingestion after application, and the ability of an animal to avoid feeding on food sources bearing the chemicals. The use of proposed avoidance area mapping may help to minimize direct and indirect impacts caused from the aerial delivery of fire retardant in the vicinity of the TEPCS species populations that may be affected during a critical period of their life cycle, such as nesting, if the predominate fire season coincides with this life-cycle period.

Direct and indirect impacts from the implementation of Alternative 3 are not expected to impede the long-term recovery of a species or the conservation value of its critical habitat. Implementation of the proposed action would allow essential features of critical habitat to remain functional because long-term retardants are not likely to have lasting effects on terrestrial ecosystems. Additionally, Alternative 3 will prevent wildfires from becoming potentially much larger and consuming most or the entire critical habitat of a species. Lastly, mitigation measures in avoidance mapping for habitat and populations, the establishment of trigger points for restricting the use of retardants within watersheds where fire retardant previously has caused adverse effects to a species or population, and yearly operations planning should all help to reduce impacts on species and habitats (Final EIS, section 3.6.2, pages 128–139).

### *Social and Economic Considerations*

Annual agency-wide compliance costs associated with avoidance area mapping, assessments, consultations, and monitoring are estimated to be \$1.4 million under Alternative 3. Compliance costs are relatively small compared to estimated costs for applying retardant (\$24 to \$36 million per year). Combined annual costs for compliance and retardant use are small percentages of total average annual suppression costs for 2000 to 2010 (\$917 million per year; Final EIS, section 3.7.1, page 139).

### *Public Health and Safety*

The human health effects of Alternative 3 are likely to be minimal: primarily temporary skin irritations. The use of fire retardant has the potential to reduce smoke concentrations in some areas more than the use of water only; however, the greater influence on smoke concentrations is likely to be the presence of wind sufficient to disperse the smoke. There is some potential for fire retardant to drop on private property or gardens and for pets to make contact with fire retardant if the lands are surrounded by or adjacent to NFS lands. People are unlikely to suffer health effects if their property or pets come into contact with fire retardant, but the Forest Service does not advise consuming garden produce coated with fire retardant even after removing the fire retardant from the produce. (Final EIS, section 3.8.1, pages 152–153).

### *Scenery Management*

The application of aerial fire retardant may have a temporary impact on scenic resources on National Forest System lands. Colored fire retardant can temporarily stain surfaces a reddish color. The duration of this impact varies and depends on the site conditions (soils, vegetation, and other physical characteristics) and on weather events (rain and snowfall) following the application. The visibility of the residual fire retardant will last longest in rocky areas and where little precipitation occurs. Areas composed of more porous surfaces and receiving more frequent precipitation will have shorter-duration impacts. Most commonly, the effect on scenic resources is short-lived and of minimal consequence. Further, the Forest Service is shifting to using fire retardant with fugitive colorant, which fades quickly. As it makes progress in this area, the effects on scenic resources from colored fire retardant should diminish. (Final EIS, section 3.10.2, page 160).

## *Wilderness*

Fire retardant introduces chemicals into the environment that locally will affect nutrient loads, nutrient cycling, growth rates, and potentially raise some toxicity issues. The presence of fire retardant dye creates an unnatural appearance, which is another indicator of the effects of man and civilization. While fire retardant is not a structure or installation, the presence of the dye trace can result in visible presence of the fire retardant in wilderness. Fire suppression activities, including the application of retardant, are unlikely to adversely affect human use and visitation because most active fire suppression areas are closed to human use. Fire retardant drops may adversely affect cultural resources, historic structures, and other features in wilderness. Effects include coloration, application damage, and small changes in nutrient loading. The number and degree of current and projected fire retardant drops are not sufficient to have long-lasting effect on wilderness character. (Final EIS, section 3.11.2, page 162–163).

## *Air Quality*

There would be no measurable direct, indirect, or cumulative effects from the aerial delivery of fire retardant on air quality because the retardant remains in the air less than a minute and is typically in the path of the fire, which is well removed from areas accessible to the public. (Final EIS, section 3.12.2, page 165).

## *Heritage, Cultural and Tribal Resources*

Some heritage resources will be identified for avoidance from aerial retardant application. Incident commanders will consult on the effects of a misapplication on cultural resources. It is expected that consultation would likely result in recommendations for actions to resolve or mitigate any adverse effects. In the event that a misapplication occurs or that other resource considerations require an application that affects cultural resources, the effects must be the subject of consultation with State historic preservation offices (SHPOs) and/or tribes depending on the nature of the affected site. The Selected Alternative provides direction for the development of a plan for long-term monitoring in the event that it is determined to be necessary during consultation. Monitoring will allow for data collection and better understanding of effects on a variety of resources. (Final EIS, section 3.9.2, page 158).

## **Environmentally Preferred Alternative**

Council on Environmental Quality (CEQ) regulations require that the Record of Decision specify “the alternative or alternatives which were considered to be environmentally preferable” (40 CFR 1505.2(b)). CEQ’s “Forty Questions” document (46 Federal Register, 18026, March 23, 1981) clarifies that, “[t]he environmentally preferable alternative is the alternative that will promote the national environmental policy as expressed in NEPA’s Section 101.” Ordinarily, this means the alternative that causes the least damage to the biological and physical environment; it also means the alternative that “best protects preserves and enhances historic, cultural and natural resources.”

I have concluded that Alternative 3 is the environmentally preferred alternative. The environmental analysis shows that using the aerial application of fire retardant as a tool for firefighting allows firefighters to contain some wildfires earlier than otherwise possible and therefore can reduce the size of those fires and the total acreage burned. Those likely smaller wildfires would reduce threats to human health and safety, loss of human improvements to wildfire, damaging effects of uncontrolled fire on the environment, smoke emissions (Final EIS, section 3.5.4, page 120), and spread of unwanted invasive species. With the protections under Alternative 3 for all listed ESA species, water quality, and cultural and tribal resources and the improvements in the chemical composition of the retardant formulae, I expect the adverse effects from the aerial application of retardant to be negligible due to the designated and mapped

avoidance areas. The environmental analysis demonstrates that the nominal adverse effects of judicious aerial application of fire retardant are offset by the opportunities to reduce the size of fires and the risk of uncontrolled wildfires that often burn in ecologically unnatural ignition and fuel conditions and can result in significant damage to the natural environment and threaten human improvements, health, and safety.

On the other hand, some public comments have expressed the truth that fire can be a beneficial and a natural component of some ecosystems and that Alternative 1 would lead to larger fires. Other comments have stated that, consistent with Alternative 1, we should never drop chemicals on National Forest System lands. I have considered these benefits of Alternative 1, and I have concluded that the balance of environmental benefits tips in favor of allowing the aerial use of fire retardant as described in Alternative 3. While fire retardant drops may cause nominal adverse effects, the drops could diminish the size of some wildfires and allow firefighters to contain otherwise uncontrollable wildfires. As the environmental impact statement states, any tendency to reduce the size of wildfires or to contain them diminishes other potential adverse effects on air quality, watersheds, wildlife habitat, ecosystems, and invasive species spread.

Finally, Alternative 3 provides more protection than Alternative 2 for TEPCS terrestrial plants and wildlife because it maps sensitive areas for the pilots to avoid. Alternative 3 also provides more protection for aquatic species by reducing the number of exceptions that would allow aerially applied fire retardant use near waterways. The Selected Alternative also provides national direction for the protection of important heritage, cultural, and tribal resources and sacred sites.

## Interagency Coordination

The Forest Service consulted with FWS and NOAA Fisheries on effects from aerially applied retardant for species occurring on all NFS lands using a broad scale screening process with additional local regional and forest-level consultations to validate effects.

### *ESA Section 7 Consultation*

The FWS and NOAA issued their final Biological Opinions (BOs) on November 2, 2011, and November 9, 2011, respectively, with the conclusion that the proposed action is not likely to jeopardize the continued existence of any analyzed listed species and it is not likely to result in the destruction or adverse modification of designated critical habitat for any analyzed species.

The FWS completed formal consultation on 74 species, and effects determinations for species and designated critical habitats were modified from the Forest Service determination of effects to reflect local knowledge and assumptions (Table 2). Rationale for those changes is reflected in the Biological Opinions, and I am incorporating that analysis here. The FWS has issued conservation measures, terms, and conditions for site- and species-specific concerns and has authorized incidental take for 13 wildlife species and 28 aquatic species (Appendix A and Appendix B). This ROD incorporates those changes into Alternative 3. The NOAA Fisheries Biological Opinion did not require any changes to Alternative 3.

Incidental Take Statements, and the associated terms and conditions, were issued for wildlife and aquatic species that resulted in determinations of likely to adversely affect (Appendix B).

The NOAA Fisheries Biological Opinion concluded formal consultation for 22 species and 27 designated critical habitats. Terms and Conditions and conservation measures are identified for those species in the Incidental Take Statements (Appendix B). NOAA Fisheries did not require any changes to Alternative 3.

**Table 2. Final ESA Determinations for Threatened and Endangered Species and Designated Critical Habitats as a Result of ESA Consultation.**

<b>ESA Determinations</b>	<b>May Affect - Likely to Adversely Affect Prior to Completion of ESA Consultation</b>	<b>May Affect - Likely to Adversely Affect After Completion of ESA Consultation</b>	<b>May Affect - Not Likely to Adversely Affect Prior to Completion of ESA Consultation</b>	<b>May Affect - Not Likely to Adversely Affect After Completion of ESA Consultation</b>	<b>No Effect prior to Completion of ESA Consultation</b>	<b>No Effect After Completion of ESA Consultation</b>
Number of Listed Aquatic Species	118	56	18	75	21	26
Number of Aquatic Designated Critical Habitats	72	43	15	41	10	14
Number of Listed Botanical Species	49	32	56	50	64	87
Number of Botanical Designated Critical Habitats	0	0	23	23	1	1
Number of Listed Terrestrial Wildlife Species*	13	13	50	50	43	43
Number of Terrestrial Designated Critical Habitats	6	8	12	16	22	16

\*Numbers for listed terrestrial wildlife species are the same but have different species listed in BA for LAA or NLAA than in BO for LAA/NLAA.

### *Consultation with American Indian Tribes*

On August 27, 2010, the Forest Service published a Notice of Intent (NOI) in the *Federal Register* to prepare an EIS and initiated a 45-day scoping period. After scoping yielded 27 public comments, the Forest Service engaged the U.S. Institute for Environmental Conflict Resolution (the Institute) to assist the agency in further identifying meaningful methods for engagement with a variety of stakeholders and also with American Indian tribes. With the help of a third-party, a neutral contractor (Enviroissues), the Institute convened a small design group to design a stakeholder assessment. Jerry Pardilla, executive director for the National Tribal Environmental Council, participated with the design group. The design

group recommended methods for engaging tribes both formally (government-to-government) and informally (technical).

On February 8 and 9, 2011, Aerial Fire Retardant Team, and the Forest Service Office of Tribal Relations, provided briefings on the project to the Intertribal Timber Council (ITC) at meetings in Phoenix, Arizona. Briefings were provided to the Fire and Operations subcommittees as well as the General Board. Tribes from all over the country were represented at the meeting. ITC suggested that a more formal and detailed technical working session focused on tribal and cultural resources would be warranted for the project.

On April 8, 2011, Jim Hubbard, Deputy Chief for State and Private Forestry, and Joel Holtrop, Deputy Chief for National Forest System, provided direction through correspondence to all Regional Foresters:

The Agency is committed to government-to-government consultation on agency policies that may affect federally recognized Indian Tribes. Tribal consultation must be initiated by the appropriate district, forest, or region for the national Aerial Application of Fire Retardant EIS by April 25, 2011. It is also important to provide these documents and the invitation to consult to any federally recognized Indian Tribes who have expressed an historical connection to NFS lands in your region, even if they no longer reside there.

As a result of this national direction, every tribe in the country was offered the opportunity in writing to engage in government-to-government consultation on this project.

On April 12, 2011, the Forest Service conducted a Technical Listening Session at the Intertribal Timber Council meetings in Albuquerque. Tribes from all over the country attended the session and provided feedback on tribal and cultural resources. The meeting was convened by the Institute and facilitated by Enviroissues. A meeting summary was posted to the project website to help inform other tribal interests of what was discussed at the technical session. ITC leadership also agreed to share the meeting summary with a large mailing list of tribal technical stakeholders. This was completed following the meeting.

On May 10, 2011, the Forest Service sent a letter to all tribal governments announcing the availability of the draft EIS and reiterating the agency's offer of consultation.

To complement the government-to-government consultations, the Institute and Enviroissues designed and agency leadership participated in three listening sessions for tribal interests and stakeholders. Tribal listening sessions were held (using webinar and conference-call) on April 21, June 27, and October 12 (this session was combined with other stakeholders at the suggestion of tribal participants on the June 27 call). These sessions were all summarized and posted to the project website. In order to promote more widespread involvement in the project from tribes, the Institute and Enviroissues issued written invitations to all tribes (listed in the Final EIS, section 4.2, pages 170-177) for all of the listening sessions.

On May 17, 2011, an interdisciplinary science panel was convened by the Institute in Boise, Idaho. The event was streamed live over the Internet for those who chose to participate remotely. Gary Morishima, natural resources advisor to the Quinault Indian Nation, participated on the science panel and presented a "native science" perspective.

While a variety of tribal perspectives were shared with the agency throughout this project, tribal input from government-to-government consultations, the tribal technical session, the science panel, and tribal listening sessions was carefully considered by agency leadership in making a decision. More specifically, input helped to further refine the cultural resources section of the final EIS and to polish and refine cultural aspects of Alternative Three (the agency Selected Alternative).

On October 19, 2011, the Forest Service sent a letter to all tribal governments announcing the availability of the Final EIS. A similar letter is being posted regarding the Record Of Decision.

### *Cooperating Agency – Bureau of Land Management*

Several liaisons from the Bureau of Land Management worked with the Forest Service in development of Alternative 3, ESA Section 7 consultation work products, and the analysis in the final EIS.

## Public Involvement

On August 27, 2010, a notice of intent was published in the Federal Register announcing the intention of the Forest Service to prepare an EIS and initiate a 45-day scoping period. Scoping is defined in the NEPA regulations at 40 C.F.R. § 1501.7 as, “an early and open process for determining the scope of issues to be addressed...” As a result of this notice, 27 comment letters were received by October 12, 2010. Letters were received from individuals, representatives of businesses, special interest groups, tribal governments, and Federal and State agencies. The letters were reviewed for issues and comments on the proposed action. Comments received during the scoping comment period are part of the project record located at the National Interagency Fire Center in Boise, Idaho.

A notice of availability was posted in the Federal Register on May 13, 2011, for the draft EIS titled “Aerial Application of Fire Retardant, Draft Environmental Impact Statement.” This began the 45-day comment period, which ended on June 27, 2011. The Forest Service received 53 comment letters from individuals, representatives of businesses, special interest groups, tribal governments, and Federal and State agencies; these comments were received by email and via the U.S. Postal Service.

To supplement the comments received during scoping and the draft EIS commenting periods and to determine if greater public outreach was warranted, the Forest Service entered into an interagency agreement with the U.S. Institute for Environmental Conflict Resolution (the Institute) to conduct a stakeholder assessment. The Institute contracted with EnviroIssues, a facilitation and public outreach company based in Seattle.

An Assessment Design Team was convened, consisting of representatives of the Forest Service, NOAA Fisheries, Forest Service Employees for Environmental Ethics (plaintiffs in the 2010 lawsuit), National Tribal Environmental Council, and the Institute. The FWS were invited, but did not participate. The Assessment Design Team was asked to review and comment on the interview methodology, interview questions, and the initial list of potential interviewees. A total of 24 stakeholder interviews were conducted in November and December 2010 that reflected a wide spectrum of stakeholder expertise and interests.

The Assessment Design Team prepared a summary of the assessment findings that included its process recommendations. A draft of this report was presented to the Institute, the Forest Service, and other members of the Assessment Design Team in Tucson, Arizona, on January 7, 2011. The only Assessment Design Team member who was not an employee of either the Institute or the Forest Service who participated in the January 7 meeting was Andy Stahl, from Forest Service Employees for Environmental Ethics. Mr. Stahl participated via conference call. After incorporating the feedback from this meeting, the report, “Assessment: USDA Forest Service Aerial Fire Retardant Application”( January 2011) (the Assessment), was finalized and delivered. The Assessment identified and recommended six objectives for tribal and stakeholder engagement, along with recommendations on mechanisms for giving and receiving information.

Throughout the comment period for the Draft EIS and based on the objectives identified in the Assessment, the Forest Service provided a variety of opportunities for tribal, public, science/technical, and agency interests to participate in the process. A description of these activities and outcomes are posted to the Forest Service fire retardant website at <http://www.fs.fed.us/fire/retardant/index.html>. Comments received during the comment period and concerns collected during the tribal and stakeholder meetings, webinars, and conference calls were analyzed and synthesized. The Forest Service response to comments can be found in Appendix Q of the Final EIS.

## Findings Required by Laws and Regulations

My decision is consistent with national laws and regulations: specifically, the National Environmental Policy Act (NEPA), National Forest Management Act (NFMA), Endangered Species Act, Clean Air Act, Clean Water Act, and the National Historic and Preservation Act (NHPA). It would not affect civil rights, environmental justice, or valid existing rights.

### *National Environmental Policy Act*

Implementing regulations for NEPA (40 C.F.R. § 1909.15) were followed in preparing the EIS. The range of alternatives was adequate to understand and analyze significant public issues. The Selected Alternative adopts all practical means to avoid and/or minimize adverse effects to the environment that are relevant to this planning scale.

### *National Forest Management Act*

This decision does not directly affect existing forest land management plans and does not affect projections of goods and services; rather, it will help maintain the ability of the Forest Service to manage land for existing desired conditions and outputs.

### *Endangered Species Act*

Consultation with regulatory agencies has been conducted and completed. The National Marine Fisheries Service (NMFS) issued its Biological Opinion on November 7, 2011. The FWS issued its Biological Opinion (BO) on November 2, 2011. Both agencies concurred that no species listed under the Federal Endangered Species Act are likely to be jeopardized by the Selected Alternative (see modifications required by the BOs). Incidental take is described in Appendix B.

### *Clean Air Act*

This decision is consistent with the Clean Air Act. The Forest Service is tasked through the Federal Clean Air Act of 1970 to provide particular protection to Air Quality Related Values, including visibility. Air quality on and surrounding a national forest is periodically impacted by smoke from unplanned wildfire. Smoke from fires consists primarily of fine particulate matter, which is one of the regulated criteria pollutants. Fine particulate matter is unhealthy to humans and can cause visibility impairment. Fires can also cause elevated ozone in some cases, especially some distance downwind of the fire, where it is more likely to impact urban areas. Wildfire is highly variable in time and space, and smoke impacts range from mild and very short lived to severe and long-duration. Residents of the wildland–urban interface are likely affected most often from wildland fire smoke, although urban areas many miles downwind may also be affected.

Thus, any reduction in smoke that occurs as a result of retardant use would improve air quality. Retardant itself has no measurable direct, indirect, or cumulative effects on air quality. The retardant remains in the

air less than a minute, and is typically in the path of the fire, which is well-removed from areas accessible to the public (Final EIS, section 3.12.2, page 165).

An emergency event, such as a response to a wildfire, is given a six-month exemption from General Conformity requirements of the Clean Air Act (40 C.F.R. Parts 51 and 93, Federal Register Vol. 75, No 64 Monday, April 5, 2010). If States measure an NAAQS exceedance that they believe was caused by wildfire, they can document the event and apply to the Environmental Protection Agency (EPA) to have affected data points excluded from their official record of air quality standard attainment as guided by the “Treatment of Data Influenced by Exceptional Events” rule (40 CFR 50.1.14.51.930).

### *Clean Water Act*

The Federal Water Pollution Control Act of 1948, expanded and reorganized in 1972 (Federal Water Pollution Control Amendments of 1972) is commonly known as the Clean Water Act (CWA). Major amendments occurred in 1977 and 1987. The objective of the CWA is to restore and maintain the chemical, physical and biological integrity of the Nation’s waters. CWA Section 303(d) directed the States to list water quality-limited waterways (303(d) listed streams) and develop total maximum daily loads (TMDL) to control the non-point source pollutant causing loss of beneficial uses.

The Forest Service has a determination from the EPA that a National Pollutant Discharge Elimination System (NPDES) permit is not necessary for aerial delivery of fire retardant. The 300-foot buffer zone on either side of any surface water for fire retardant application would ensure fire retardant would not be discharged into waters of the United States. Therefore, an NPDES permit would not be required (EPA letter from Susan Bromm, project record). The potential for measurable effects from leaching of fire retardant from outside the 300-foot buffer on surface water is low (Final EIS, section 3.3.3, page 88).

Application outside the buffer is unlikely to have a measurable impact on stream water quality (Crouch et al. 2006). Intrusions into the buffer but at least 9.75 feet (3 meters) from water are unlikely to have a high impact on water because of uptake by vegetation and adherence of phosphorus to soils (Norris et al. 1978). Areas with steep slopes, coarse-textured soils, and little vegetation cover will have greater potential for movement of fire retardant to water and associated negative impacts (Napper 2011).

### *National Historic and Preservation Act*

The Selected Alternative is consistent with the NHPA. It requires assistance from cultural resource specialists prior to aerial application of fire retardant. The assistance and consideration of effects would likely create a management context and actions that will not adversely affect the integrity or data potential of any cultural resources.

The Selected Alternative addresses the potential for misapplication and directs incident commanders to ensure misapplications are reported. The agency administrator is responsible to ensure consultation on the effects of a misapplication on cultural resources occurs. Consultation with state historic preservation offices (SHPOs) is required should a misapplication occur, depending on the nature of the affected site. SHPO consultation would result in recommendations for actions to resolve or mitigate any adverse effects. The Selected Alternative provides direction for the development of a plan for long-term monitoring in the event that it is determined to be necessary during consultation. Monitoring will allow for data collection and better understanding of effects on a variety of resources.

### *Civil Rights and Environmental Justice*

Aerial retardant use would not have any impacts on civil rights or environmental justice. It would not have a disproportionately high and adverse human health or environmental effect on minority populations or low-income populations (Final EIS, section 3.7.2, page 149).

### *Tribal Treaty Rights and Trust Resources*

This decision does not change, restrict or abrogate treaty reserved rights, trust resources, or Executive Orders. Use of retardant may affect natural resources on which the tribes depend and impacts on sacred sites may not be resolvable (Final EIS, section 3.9.2, page 158).

In the event of a misapplication that impacts tribal resources, the Forest Service will consult with the tribe to determine an appropriate course of action to mitigate or resolve the adverse effect. The selected alternative provides direction for the development of a plan for long-term monitoring in the event that it is determined to be necessary during consultation. Monitoring will allow for data collection and better understanding of effects on a variety of resources.

### *Valid Existing Rights*

This decision does not affect valid existing rights on public lands. Valid existing rights may be held by other Federal, State or local government agencies or by private individuals or companies. Valid existing rights may pertain to mining claims, mineral or energy easements, rights-of-way, reciprocal rights-of-way, leases, agreements, permits, and water rights.

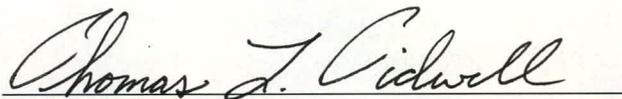
### *Implementation*

My decision will be implemented immediately; pre-incident planning and retardant use will continue as outlined within the Aerial Fire Retardant Direction Guidance (Final EIS, Appendix R).

This project is not subject to appeal; it constitutes final agency action on authorization of nationwide aerial application of retardant. No further administrative remedies are available.

### **Contact Person**

For additional information concerning this decision, contact Glen Stein, Fire and Aviation Management, USDA Forest Service, [gstein@fs.fed.us](mailto:gstein@fs.fed.us), 202-205-1588 or 801-625-5281.



THOMAS TIDWELL  
Chief of the Forest Service

12/13/11  
Date

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**USDI Fish and Wildlife Service.** 2011. Biological Opinion - Effects to Listed Species from US Forest Service Aerial Application of Fire Retardants on National Forest Systems Lands, 711 p.

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# APPENDICES

## Appendix A. Species Specific Conservation Measures included in the Federal Action

### USFS Region 3

#### Three Forks springsnail

- Establish a 1,200-foot (366 m) buffer/avoidance area (600 feet or 183 m from either side of the waterway) around Boneyard Creek from Boneyard Bog Springs downstream to Three Forks Springs.
- Assist the Forest Service and Arizona Game and Fish Department (AGFD) in the continued development and adoption of a Three Forks springsnail salvage protocol whereby springsnails may be removed and placed into facilities for repatriation stock. This salvage plan shall be in place prior to the onset of the 2012 fire season.
- Assist the Service and AGFD in the continued development and maintenance of a Three Forks springsnail captive rearing program in order to provide stock for repatriation. Assistance shall include locating suitable rearing sites, funding where appropriate, technical input, and policy guidance. This captive rearing program shall be in place prior to the 2014 fire season

#### Holy Ghost ipomopsis (*Ipomopsis sancti-spiritus*)

- Wherever practical, the Forest Service shall prioritize fuels reduction projects within Holy Ghost Canyon and areas that the Forest Service determines will reduce the risk of fire and the need to use aerially applied fire retardants within habitat occupied by Holy Ghost ipomopsis.
- Whenever practical, the Forest Service will use water or other less toxic fire retardants than those described in the proposed action within a 0.5-mile (.85 km) avoidance zone around the habitat occupied by Holy Ghost ipomopsis.
- USFS will coordinate with the New Mexico Ecological Services Field Office each year prior to the onset of the fire season to ensure that: 1) up-to-date information is incorporated in local fire planning and distributed to appropriate resources by the local Fire Management Officer; 2) maps and information are made available to incident commanders and fire teams for the purposes of avoiding application of retardants to Holy Ghost Canyon, whenever possible, including use of best available technologies to avoid areas occupied by the species, and 3) any other appropriate conservation measures are included to avoid the likelihood of jeopardizing the species. Such measures may include enhancement of populations or other appropriate contingency measures.

### USFS Region 4

#### Kendall Warm Springs Dace

- Mapped avoidance areas will be 0.5 mile (.85 km).

Heliotrope milkvetch (*Astragalus montii*)

- Mapped avoidance areas will be 500 feet (152 m).

**USFS Region 5**

Arroyo toad (*Anaxyrus californicus* (*Bufo microscaphus californicus*))

- Each forest will have retardant avoidance mapping (600 feet land base) for all known arroyo toads locations as described in the Biological Assessment (BA).

California red-legged frog (*Rana draytonii*)

- Because the level of toxicity depends on many variables, including retardant concentrations, stream flow volume, gradient, riparian vegetation, slope, soils, wind direction, ultraviolet exposure, etc., and in order to be conservative for the species, we will assume that California red-legged frogs 6.2 miles (10 km) downstream of a misapplication have the potential to be adversely affected by retardant (see the BA, pages 119 and 123).
- As per the BA, critical habitat for the California red-legged frog will not be mapped for avoidance.

Little Kern golden trout (*Oncorhynchus mykiss whitei*)

- In order to reduce the potential for adverse effect to the species, the Forest Service is proposing to implement retardant use avoidance areas within specific subwatersheds for the Little Kern golden trout.
- Because the level of toxicity depends on many variables, including retardant concentrations, stream flow volume, gradient, riparian vegetation, slope, soils, wind direction, ultraviolet exposure, etc., and in order to be conservative in assessments for the species, we will assume that Little Kern golden trout 6.2 miles (10 km) downstream of a misapplication have the potential to be adversely affected by retardant (see the BA, pages 119 and 123).

Mariposa pussypaws (*Calyptridium pulchellum*)

In the event of the aerial application of fire retardant to areas occupied by *C. pulchellum*, the Forest Service has agreed to implement the following conservation actions.

- The area affected by retardant will be monitored monthly for a period of 3 years, including locating and identifying all *Calyptridium pulchellum* plants. Yearly reports will be submitted to the Forest Service for review. If population numbers appears to be declining, the appropriate office of the Forest Service will be contacted for guidance.
- During monitoring, all non-native plant species will be removed from areas known to contain *Calyptridium pulchellum*
- All non-compatible plant species will be removed within and adjacent to known *Calyptridium pulchellum* plants.
- All weed control will be conducted by hand.

Owens tui chub (*Siphateles bicolor snyderi*)

- Inyo National Forest will have retardant avoidance mapping (600 feet land base) for Owens tui chub occupied habitat to reduce the likelihood of effects from surface runoff into habitat.
- Because the level of toxicity depends on many variables, including retardant concentrations, stream flow volume, gradient, riparian vegetation, slope, soils, wind direction, ultraviolet exposure, etc. and in order to be conservative in assessments for the species, we assume fish 6.2 miles (10 km) downstream of a misapplication have the potential to be adversely affected by retardant (see the BA, pages 119 and 123).

Paiute cutthroat trout (*Oncorhynchus clarkii seleniris*)

- Each national forest will have retardant avoidance mapping (600 feet land base) for all flowing water occupied by Paiute cutthroat trout as described in the BA.
- Because of the variance of population densities and because we cannot determine which populations of Paiute cutthroat trout are most likely to be affected given the extent of the action area, in order to determine the extent of take, we will use habitat as a surrogate. Because the level of toxicity depends on many variables, including retardant concentrations, stream flow volume, gradient, riparian vegetation, slope, soils, wind direction, ultraviolet exposure, etc. and in order to be conservative in assessment for the species, we will assume fish may be adversely affected by retardant up to 6.2 miles (10 km) downstream from a misapplication (see the BA, pages 119 and 123).

Railroad Valley springfish (*Crenichthys nevadae*)

- Because of the variance of population densities and because we cannot determine which populations of Railroad Valley springfish are most likely to be affected given the extent of the action area, in order to determine the extent of take, we will use habitat as a surrogate. Because the level of toxicity depends on many variables, including retardant concentrations, stream flow volume, gradient, riparian vegetation, slope, soils, wind direction, ultraviolet exposure, etc., and in order to be conservative in assessment for the species, we will assume fish 6.2 miles (10 km) downstream of a misapplication has the potential to be adversely affected by retardant (see the BA, pages 119 and 123).

Shasta crayfish

- In order to reduce the potential effects of the proposed action on Shasta Crayfish, the Forest Service proposes to avoid fire retardant application in areas that are hydrologically connected to Shasta crayfish occupied habitat with a 1,000-foot buffer for a distance of 6.2 miles (10 km) upstream of Shasta crayfish occurrences by providing maps and guidance to aerial fire-fighting personnel so that the potential for a misapplication to occur in hydrologically connected waterways is minimized (P. Krueger pers. comm. 2011a). However, the extenuating circumstances of human health and safety or

misapplications are assumed to be likely to occur over the timeframe of the proposed action.

In the event of the aerial application of fire retardant within the 1,000-foot buffer, the Forest Service has agreed to implement the following conservation actions:

1. No later than June 30, 2012, the local offices of the Forest Service (Lassen National Forest) and FWS shall develop and implement a plan to monitor water quality for Shasta crayfish-occupied waterways and/or adjacent waterways in the event of a misapplication of aerial fire retardant. A minimum downstream distance of 6.2 miles (10 km) should be monitored if aerial applied fire retardant is misapplied in these waterways on NFS lands by the Forest Service. Monitoring of water quality will start within 24 hours of notification of a misapplication of fire retardant or when safe to enter the area. Results will be provided to the Service 48 hours from completion of lab analysis.
2. If it is determined that water quality has been affected by a misapplication of aerial applied fire retardant, the Forest Service shall ensure that surveys are conducted for Shasta crayfish for 3 consecutive years by a 10(a)(1)(A) permitted biologist. Yearly reports will be submitted to the Forest Service for review. Annual/semi-annual meetings with the Forest Service will occur to determine if a population decline has occurred or if any modification needs to be done to the monitoring protocol. During surveys, all non-native crayfish will be removed and destroyed.

Tidewater goby (*Eucyclogobius newberryi*)

- Because of the variance of population densities, and because we cannot determine which populations are most likely to be affected given the extent of the action area, to determine the extent of take, we will use habitat as a surrogate. Because the level of toxicity depends on many variables, including retardant concentrations, stream flow volume, gradient, riparian vegetation, slope, soils, wind direction, ultraviolet exposure, etc., and in order to be conservative for the species, we will assume fish 6.2 miles (10 km) downstream of a misapplication could be adversely affected by retardant (see the BA, pages 119 and 123).

Unarmored threespine stickleback (*Gasterosteus aculeatus williamsoni*)

- The Angeles and San Bernardino National Forests will have retardant avoidance mapping (600 feet land base) available for unarmored threespine stickleback-occupied habitat to reduce the likelihood of effects of surface runoff into habitat.
- Because the level of toxicity depends on many variables, including retardant concentrations, stream flow volume, gradient, riparian vegetation, slope, soils, wind direction, ultraviolet exposure, etc., and in order to be conservative for the species, we assume fish 6.2 miles (10 km) downstream of a misapplication have the potential to be adversely affected by retardant (see the FWS BA, pages 119 and 123).

## **USFS Region 6**

Wenatchee Mountains checker-mallow (*Sidalcea oregana* var. *calva*)

- In the action area, Wenatchee Mountains checker-mallow avoidance areas are expanded to a distance of 0.5 miles (.85 km) for the species and its designated critical habitat.

## Appendix B. Incidental Take Statements from the USDI Fish and Wildlife Service and NOAA Fisheries (National Marine Fisheries Service)

The Forest Service had committed to a process for identifying, reporting, remediating misapplications of aerially applied fire retardant. This is central to *all species* to minimize “take” of species or habitat.

1. Determine the amount of follow-up monitoring necessary as dictated by the extent of the impacts to species or habitat identified during assessment of the misapplication.
2. Conduct in coordination with local unit(s) of the Forest Service/USFWS/NOAA Fisheries/USGS offices and appropriate state agencies.
3. Determine the type of recovery, remediation or restoration of species or habitats:
  - a. May include salvage of species during BAER activities
  - b. May supplement established captive breeding programs until specie can be re-introduced back into impacted area.
4. Determine the appropriate contingency measures for protection of TEP species from aerially applied fire retardant.
  - a. If soil or vegetation and surrounding habitat within the waterway buffers are impacted, implement erosion control measures to reduce retardant delivery during rain events from entering habitat. Follow revegetation and erosion control guidance as outlined within BAER guidance.
  - b. May include restrictions of retardant use for an agreed upon timeframe to allow the species or habitat to recover.
5. Determine if additional assessment of cumulative effects for some species is needed and coordinate with other agencies as needed.
6. Report annually through forest and national TES species staff for coordination with other agencies.

## US Fish and Wildlife Species Incidental Take Statements

### Forest Service Regions 1, 4, and 6

#### Bull Trout

Forest name	Miles of perennial stream on Forest	Miles of occupied streams or BT critical habitat on Forest	% of total perennial streams which are occupied or CH	Number of drops expected to hit stream	Total stream miles affected by retardant (6.2 miles per drop to water)	% BT occupied streams or CH affected by retardant (miles)	Extent of take (miles)
Beaverhead Deerlodge	4,501	163	3.6	2	12.4	.04x12.4=0.5	10
Bitterroot	2,865	476	16	1	1x6.2=6.2	.16x16.2=1.1	3
Boise	4,985	1,244	25	3	18.6	5	5
Clearwater	4,192	666	16	0.3	0.3x6.2=1.86	.16x1.86=.3	1.0
Colville	2,246	131	5.8	1	6.2	6.2/131=5%	6.2
Deschutes	621	115	18.4	3	3x6.2=18.6	.184x18.6	3.4
Flathead	3,758	936	25	3	3x6.2=18.6	.17x18.6=4.6	5
Fremont-Winema	1,315	30	2.3	5	5*6.2=31.0	.023*31.0=0.7	1.0
Gifford Pinchot	2,881	24.7	0.87	1	6.2	1.0	1.0
Helena	1,181	35	3	2	2x6.2=12.4	.03x12.4=.4	.4
Humboldt-Toiyabe	4,364	118	2.7	2	2*6.2=12.4	(.027*12.4=0.3 mi)/118 =0.3%	0.3
Idaho Panhandle	4,692	645	13.7	2.	2x6.2=12.4	.137x12.4=1.7	1.7
Kootenai	2,343	399	17	.3	6.2	.17x2=.34	.06
Lolo	2,693	703	26	1	6.2	.26x6.2=1.6	1.6
Malheur National Forest	2,355	232	9.9	1	6.2	0.099x6.2=0.61	0.61 2 adults
Mt Baker-Snoqualmie	7,134	418	5.86	1	6.2	0.36	0.36
Mt. Hood	2,555	39	1.5	1	1x6.2=6.2	1.5% x6.2=0.1	0.1
Nez Perce	4,643	766	16	0.8	0.8x6.2=4.34	0.16x4.34=0.7	0.7
Ochoco	999	18	1.8	0.3	0.3x6.2=1.9	.018x1.9=0.03	.03
Okanogan-Wenatchee	5,251	807	15	7	43.4	15.4%	6.7

Forest name	Miles of perennial stream on Forest	Miles of occupied streams or BT critical habitat on Forest	% of total perennial streams which are occupied or CH	Number of drops expected to hit stream	Total stream miles affected by retardant (6.2 miles per drop to water)	% BT occupied streams or CH affected by retardant (miles)	Extent of take (miles)
Olympic	2,280	82	3.60	1	6.2	0.22	0.22
Payette	4,316	1,221	28	3.9	$3.9 \times 6.2 = 24$	$0.28 \times 24 = 1.36$	6.78
Salmon-Challis	6,143	1,856	30	2	12.4	0.6	12.4
Sawtooth	3,497	590	16.9	1.3	$1.3 \times 6.2 = 8.06$	$0.169 \times 8.06 = 1.36$	1.36
Umatilla	2,401	365	15.2	2	$2 \times 6.2 = 12.4$	$.152 \times 12.4 = 1.9$	1.9
Wallowa-Whitman	4,398	700	15.9	3	$3 \times 6.2 = 18.6$	$.159 \times 18.6 = 3.0$	3.0
Willamette	4,150	78	1.9	2	$2 \times 6.2 = 12.4$	$1.9\% \times 12.4 = 0.24$	0.24 1 adults

#### Reasonable and Prudent Measures

The Service concludes that the following reasonable and prudent measures are necessary and appropriate to minimize the take of bull trout.

1. Monitor the effects of the action to ensure the actual levels of effects do not exceed the effects or incidental take levels anticipated by this assessment and its associated biological opinion.

#### Terms and Conditions

1. The analysis in the Biological Opinion assumed fire retardant impacts are likely to extend up to 6.2 miles downstream. To validate this assumption and ensure that the extent of effects of the proposed action is within the scope of what was analyzed, the Forest Service shall, for each misapplication:
  - a. No later than June 30, 2012, the local offices of the Forest Service and Fish and Wildlife Service shall develop and implement a plan to monitor water quality for bull trout-occupied waterways and/or adjacent waterways in the event of a misapplication of aerial fire retardant. A minimum downstream distance of 6.2 miles should be monitored if aerial applied fire retardant is misapplied in these waterways on NFS lands by the USFS. Monitoring of water quality will start within 24 hours of notification of a misapplication of fire retardant or when safe to enter the area. [Results will be provided to the Service one to five business days from completion of lab analysis.](#)

- b. If it is determined that water quality has been affected by a misapplication of aerial applied fire retardant the Forest Service shall ensure that surveys are conducted for bull trout for 3 consecutive years. Yearly reports will be submitted to the Service for review. Annual/semi-annual meetings with the Service will occur to determine if a population decline has occurred or if any modification needs to be done to the monitoring protocol.
- c. A sample of dead fish will be collected to help identify the cause of death.

### Marbled Murrelet

We expect murrelets associated with up to 26,725 acres of nesting habitat distributed across four National Forests in Oregon and California will be exposed to disturbance harassment over a period of 10 years.

<b>Administrative Unit</b>	<b>Total 10-year average number of retardant drops on National Forest</b>	<b>No. of retardant drops expected to result in Incidental Take of Murrelets</b>	<b>Incidental Take in the Form of Harassment (Habitat Acres)</b>
Olympic National Forest	4	-	-
Mt. Baker-Snoqualmie National Forest	3	-	-
Okanogan-Wenatchee National Forest	1,325	-	-
Gifford Pinchot National Forest	59	-	-
Siuslaw National Forest	123	123	9,919
Rogue River- Siskiyou National Forest	258	145	7,452
Klamath National Forest	246	32	2,223
Six Rivers National Forest	213	119	7,131
<b>Totals</b>	<b>2,231</b>	<b>419</b>	<b>26,725</b>

#### Reasonable and Prudent Measures

1. To ensure that activities are completed as described in the BA and in this Opinion, and that the protective measures are effective, complete a post-incident report of any misapplications to species habitat to ensure the terms and conditions in this incidental take statement are effective to avoid and minimize the likelihood of take from proposed activities.

#### Terms and Conditions

1. At the end of each calendar year, the Forest Service shall compile, by Forest, information on the number and approximate locations of retardant drops that occurred within or adjacent to occupied murrelet nesting habitat. The independent measure for knowing whether take is exceeded is based on the total number of predicted retardant drops within occupied habitat within the murrelet range for each National Forest, and the estimated acres of occupied habitat exposed directly to retardant and aircraft noise. Information compiled by each Forest should be submitted to the U.S. Fish and Wildlife Service Regional Office in Portland, Oregon by March 15 of each year.

*Northern Spotted Owl*

Excessive aircraft noise at low altitude is likely to harass spotted owl pairs at 96 spotted owl nest sites. This will create the likelihood of injury to 70 young spotted owls during the 10-year term of the proposed action. Number of sites harassed and number of juveniles harmed are allocated

<b>National Forest</b>	<b>Number of Nest Sites Subject to Excessive Noise Levels Likely to Harass Northern Spotted Owls</b>	<b>Number of Disturbed Nest Sites that are Expected to be Occupied by Spotted Owls<sup>1</sup></b>	<b>Loss of reproduction (number of young harmed) from Disturbed and Occupied Sites<sup>1</sup></b>
Deschutes	3	1	1
Fremont-Winema	12	5	3
Gifford Pinchot	3	1	1
Klamath	12	6	3
Lassen	0	0	0
Mendocino	19	9	5
Modoc	0	0	0
Mt. Baker-Snoqualmie	0	0	0
Mt Hood	11	5	3
Okanogan-Wenatchee	24	7	12
Olympic	0	0	0
Rogue River Siskiyou	16	8	10
Shasta-Trinity	54	23	13
Siuslaw	11	3	5
Six Rivers	19	9	5
Umpqua	12	6	4
Willamette	27	13	7
<b>Total</b>	<b>223</b>	<b>96<sup>2</sup></b>	<b>72<sup>2</sup></b>

Reasonable and Prudent Measures

1. To ensure that activities are completed as described in the BA and in this Opinion, and that the protective measures are effective, complete a post-incident report of any misapplications to species habitat to ensure the terms and conditions in this incidental take statement are effective to avoid and minimize the likelihood of take from proposed activities

Terms and Conditions

1. At the end of each calendar year, the Forest Service shall compile, by Forest, information on the number and approximate locations of retardant drops that occurred within or adjacent to occupied northern spotted owl nesting habitat. The independent measure for knowing whether take is exceeded is based on the total number of predicted retardant drops in occupied habitat within the

northern spotted owl range for each National Forest, and the estimated acres of occupied habitat exposed directly to retardant and aircraft noise. Information compiled by each Forest should be submitted to the U.S. Fish and Wildlife Service Regional Office in Portland, Oregon by March 15 of each year.

*Warner Sucker*

Amount of take to habitat in stream miles	Honey Creek	Deep Creek	Twentymile Creek	Twelvemile Creek
Occupied Warner sucker habitat	1.2 miles	0 miles	0 miles	0 miles

Reasonable and Prudent Measures

The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize take of the Warner sucker on the Freemont-Winema National Forest:

1. To ensure that activities are completed as described in the BA and in this Opinion, and that the protective measures are effective, complete a post-incident report of any misapplications to species habitat to ensure the terms and conditions in this incidental take statement are effective to avoid and minimize the likelihood of take from proposed activities

Terms and Conditions

In order to be exempt from the prohibitions of Section 9 of the Act, the Forest Service must comply with the following terms and conditions, which implement the reasonable and prudent measures described above. These terms and conditions are nondiscretionary.

1. To implement reasonable and prudent measure number one, the following term and condition shall be implemented:
  - a. No later than June 30, 2012, the local offices of the Forest Service (Lassen National Forest) and Fish and Wildlife Service shall develop and implement a plan to monitor water quality for warner sucker-occupied waterways and/or adjacent waterways in the event of a misapplication of aerial fire retardant. A minimum downstream distance of 6.2 miles should be monitored if aerial applied fire retardant is misapplied in these waterways on NFS lands by the USFS. Monitoring of water quality will start within 24 hours of notification of a misapplication of fire retardant or when safe to enter the area. **Results will be provided to the Service one to five business days from completion of lab analysis.**
  - b. If it is determined that water quality has been affected by a misapplication of aerial applied fire retardant the Forest Service shall ensure that surveys are conducted for warner sucker for 3 consecutive years by a 10(a)(1)(A) permitted biologist. Yearly reports will be submitted to the Service for review. Annual/semi-annual meetings with the Service will occur to determine if a population decline has occurred or if any modification needs to be done to the monitoring protocol. During surveys, all non-native crayfish will be removed and destroyed.
  - c. A sample of dead fish will be collected to help identify the cause of death.

## Region 2 Forest Service

### *Greenback cutthroat trout*

We estimated that a combined total of 0.42 miles of GBCT habitat could be affected from misapplication.

Forest	Amount of Take	Form of Take
<b>Colorado</b>		
Arapaho-Roosevelt NF	0.1 mile	Harm, harassment
GMUG NF <sup>1</sup>	0.02 mile	Harm, harassment
Medicine Bow-Routt	0.02 mile	Harm, harassment
Pike and San Isabel NF	0.19 mile	Harm, harassment
San Juan NF	0.04 mile	Harm, harassment
White River NF	0.02 mile	Harm, harassment
<b>Utah</b>		
Manti-Lasal NF	0.03 mile	Harm, harassment

<sup>1</sup>Grand Mesa, Uncompahgre, and Gunnison National Forests

### Reasonable and Prudent Measures

The Service believes the following Reasonable and Prudent Measures are necessary and appropriate to minimize impacts of incidental take of GBCT:

1. Protect stream, lake, and riparian habitat in occupied GBCT habitat from long-term fire retardant effects.

### Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the ESA, the Forest Service must comply with the following terms and conditions, which implement the Reasonable and Prudent Measures, described above and outline required monitoring/reporting requirements. These Terms and Conditions are non-discretionary.

To implement Reasonable and Prudent Measure Number 1, the Forest Service shall fully implement the following Terms and Conditions:

1. The Forest Service shall notify the Colorado Field Office – Lakewood immediately (once feasible given fire and staffing conditions) when there is any wildfire, regardless of size, in any occupied GBCT watershed or that could advance towards occupied habitat.
2. In the event of a fire retardant drop within 183 m (600 ft) of occupied GBCT habitat, the Forest Service shall report the incident to the Colorado Field Office – Lakewood at 303-236-4773.

### *Pawnee montane skipper*

Our estimate of anticipated take was based on the acres of skipper habitat on Forest System land within the Pike and San Isabel National Forest (17,380 acres). Based on these values, we estimated that 0.59 acres of skipper habitat receives a rate of 4 gpc and 0.30 acres of skipper habitat at 8 gpc annually, for a combined annual total of 0.89 acres. Given the 10-year period for this project, we estimated that the

project could result in the application of fire retardant on 8.9 acres of skipper habitat for the life of this project. Based on an average density of 2 adult skippers per acre, the proposed project could result in the take of 18 adult skippers in the form of harm and harass. We recognize that incidental take will also result to skipper larvae, pupae, and eggs but are not able to quantify this amount due to difficulty in detecting these life stages.

#### Reasonable and Prudent Measures

The Service believes the following Reasonable and Prudent Measures are necessary and appropriate to minimize impacts of incidental take of the Pawnee montane skipper:

1. The Forest Service should minimize impacts of aerial fire retardant on the skipper.

#### Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the ESA, the Forest Service must comply with the following terms and conditions, which implement the Reasonable and Prudent Measures, described above and outline required monitoring/reporting requirements. These Terms and Conditions are non-discretionary.

To implement Reasonable and Prudent Measure Number 1, the Forest Service shall fully implement the following Terms and Conditions:

1. If it is deemed necessary to use fire retardant in skipper habitat, the Forest Service shall minimize the use of fire retardant to the extent possible and shall minimize areas of overlapping fire retardant application.
2. In the event of a fire retardant drop occurs within skipper habitat, the Forest Service shall report the incident to the Colorado Field Office – Lakewood at 303-236-4773.

### *Region 3 Forest Service*

#### *Apache Trout*

We anticipate that take will occur from 3 fire retardant misapplications on Forest Service lands in Arizona. Over the next 10 years we anticipate impacts, as described above, to occur from following number of drops in each Forest described below:

1. Two drops affecting 12.4 stream miles in Apache-Sitgreaves National Forest.
2. One drop affecting 6.2 stream miles in Kaibab National Forest

#### Reasonable and Prudent Measures

The Forest Service has included a number of conservation measures and monitoring, remediation and reporting requirements described in the federal action that serve to minimize the effects of incidental take. No additional reasonable and prudent measures are included in this incidental take statement.

#### *Chihuahua Chub*

We anticipate that take will occur from two fire retardant misapplications on the Gila National Forest. Over the next 10 years we anticipate impacts, as described above, to occur from the following number of drops:

- Two drops in occupied Chihuahua habitat affecting 12.4 stream miles in the Gila National Forest

Reasonable and Prudent Measures

The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize impacts of incidental take of Chihuahua chub:

To ensure that activities are completed as described in the BA and in this Opinion, and that the protective measures are effective, complete a post-incident report of any misapplications to species habitat to ensure the terms and conditions in this incidental take statement are effective to avoid and minimize the likelihood of take from proposed activities.

Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the ESA, the U.S. Forest Service must comply with the following terms and conditions, which implement the reasonable and prudent measures described above. These terms and conditions are nondiscretionary.

The following terms and conditions will implement reasonable and prudent measure 1:

1. If a retardant drop occurs that affects the species, incorporate appropriate components of the Chihuahua chub Recovery Plan.
  - a. Participate the annual Gila Trout and Chihuahua Chub Recovery Team meeting, and implement recommendations to alleviate the effects the retardant drop as coordinated with the Recovery Team.
  - b. Provide Chihuahua chub status updates as they relate to a retardant misapplication that affected the species on Gila National Forest lands at the Gila Trout and Chihuahua Chub Recovery Team meetings.

Chiricahua Leopard Frog

We anticipate that take will occur from 17 fire retardant misapplications on Forest Service lands in Arizona and New Mexico. Over the next 10 years we anticipate impacts, as described above, to occur from the following number of drops in each Forest described below:

1. Two drops in occupied frog habitat on the Apache-Sitgreaves National Forest affecting 12.4 stream miles or 0.5 acres of non-fluvial, standing water and one drop on the Coconino National Forest affecting 6.2 stream miles or 0.25 acres of non-fluvial, standing water (18.6 miles or 15 acres total).
2. Four drops in occupied frog habitat affecting 24.8 stream miles or 1 acre of non-fluvial, standing water on the Tonto National Forest.
3. Five drops in occupied frog habitat on the Gila National Forest in New Mexico affecting 31.0 miles or 2.5 acres of non-fluvial, standing water.
4. Six drops in occupied frog habitat on the Coronado National Forest affecting 32.7 miles or 3 acres of non-fluvial, standing water.

Take will be considered to have been exceeded if any Forest surpasses the amount of drops described above.

Reasonable and Prudent Measures

The Forest Service has included a number of conservation measures and monitoring, remediation and reporting requirements described in the federal action that serve to minimize the effects of incidental take. No additional reasonable and prudent measures are included in this incidental take statement.

*Desert pupfish*

We anticipate that take will occur from three fire retardant misapplications on Forest Service lands in Arizona. Over the next 10 years we anticipate impacts, as described above, to occur from the following number of drops in each Forest described below:

- Three drops affecting 18.6 stream miles in Tonto National Forest

Reasonable and Prudent Measures

The Forest Service has included a number of conservation measures and monitoring, remediation and reporting requirements described in the federal action that serve to minimize the effects of incidental take. No additional reasonable and prudent measures are included in this incidental take statement.

*Gila chub*

We anticipate that take will occur from 21 fire retardant misapplications on Forest Service lands in Arizona and New Mexico. Over the next 10 years we anticipate impacts, as described above, to occur from following number of drops in each Forest described below:

1. Two drops affecting 12.4 stream miles in Apache-Sitgreaves National Forest.
2. One drop affecting 6.2 stream miles in Coconino National Forest
3. Six drops affecting 37.2 stream miles in Coronado National Forest
4. Three drops affecting 18.6 stream miles in Prescott National Forest
5. Four drops affecting 24.8 stream miles in Tonto National Forest
6. Five drops affecting 31 stream miles in Gila National Forest

Reasonable and Prudent Measures

The Forest Service has included a number of conservation measures and monitoring, remediation and reporting requirements described in the federal action that serve to minimize the effects of incidental take. No additional reasonable and prudent measures are included in this incidental take statement.

*Gila topminnow*

We anticipate that take will occur from 11 fire retardant misapplications on Forest Service lands in Arizona. Over the next 10 years we anticipate impacts, as described above, to occur from the following number of drops in each Forest described below:

1. One drop affecting 6.2 stream miles in Coconino National Forest
2. Six drops affecting 37.2 stream miles in Coronado National Forest
3. Four drops affecting 24.8 stream miles in Tonto National Forest

Reasonable and Prudent Measures

We believe the following reasonable and prudent measures are necessary and appropriate to minimize take of Gila trout:

1. Minimize take of Gila trout on National Forest lands through implementation of proposed conservation measures and monitoring, remediation and reporting requirements.

Terms and Conditions

The following terms and conditions will implement reasonable and prudent measure 1:

- 1.1 Minimize or eliminate adverse effects to Gila trout populations and habitat within the Fire Management Program by:
  - a. identifying potential threats to Gila trout and develop mitigation actions to eliminate threats during development and implementation of fire management plans.
  - b. developing contingency plans in cooperation with the Service, other Federal agencies, state agencies, universities, and others to preserve, rescue, and secure a population in imminent danger of localized extirpation.
- 1.2 If a misapplication occurs in an occupied habitat incorporate appropriate components of the Gila Trout Recovery Plan.
  - a. Participate in the annual Gila Trout and Chihuahua Chub Recovery Team meeting and implement recommendations as they relate to a misapplication that affected a population.
  - b. Provide Gila trout status updates on National Forest lands at the Gila Trout and Chihuahua Chub Recovery Team meetings as they relate to the effects of a misapplication that affected a population.

*Gila trout*

We anticipate that take will occur from 27 fire retardant misapplications on Forest Service lands in Arizona and New Mexico. Over the next 10 years we anticipate impacts, as described above, to occur from following number of drops in each Forest described below:

1. Six drops in occupied habitat affecting 37.2 stream miles in Coronado National Forest
2. Three drops in occupied habitat affecting 18.6 stream miles in Prescott National Forest
3. Six drops in occupied habitat affecting 37.2 stream miles in the Apache Sitgreaves National Forest
4. Eight drops in occupied habitat affecting 49.6 stream miles in the Gila National Forest.

Take will be considered to have been exceeded if any Forest surpasses the amount of drops described above.

Reasonable and Prudent Measures

We believe the following reasonable and prudent measures are necessary and appropriate to minimize take of Gila trout:

1. Minimize take of Gila trout on National Forest lands through implementation of proposed conservation measures and monitoring, remediation and reporting requirements.

### *Spinedace*

Due to the factors discussed above, we are describing take in terms of stream miles potentially affected, rather than number of fish:

One drop in occupied habitat affecting 7.32 miles of occupied habitat on the Coconino National Forest.

One drop in occupied habitat affecting 9.11 miles on Apache-Sitgraves National Forest.

### Reasonable and Prudent Measures

The Forest Service has included a number of conservation measures and monitoring, remediation and reporting requirements described in the federal action that serve to minimize the effects of incidental take. No additional reasonable and prudent measures are included in this incidental take statement.

### *Mexican Spotted Owl*

We anticipate the majority of incidental take from the proposed action will be in the form of harassment on an annual basis, with most of it occurring during the breeding season (March 1 through August 31). We anticipate the following incidental take, annually, for MSO:

#### Cibola National Forest

One MSO PAC taken by harassment (permitted take is one pair of MSO and/or associated juveniles in the form of single disturbance events (disturbance that occurs within/over one breeding season)); and

One MSO PAC taken by harm (permitted take is one pair MSO and/or associated eggs/juveniles in the form of direct mortality through the life of the project).

#### Gila National Forest

Two MSO PACs taken by harassment (permitted take is two pairs of MSO and/or associated juveniles in the form of single disturbance events (disturbance that occurs within/over one breeding season)); and

One MSO PAC taken by harm (permitted take is one pair MSO and/or associated eggs/juveniles in the form of direct mortality through the life of the project).

#### Lincoln National Forest

Three MSO PAC taken by harassment (permitted take is one pair of MSO and/or associated juveniles in the form of single disturbance events (disturbance that occurs within/over one breeding season)); and

One MSO PAC taken by harm (permitted take is one pair MSO and/or associated eggs/juveniles in the form of direct mortality through the life of the project).

Santa Fe National Forest

One MSO PAC taken by harassment (permitted take is one pair of MSO and/or associated juveniles in the form of single disturbance events (disturbance that occurs within/over one breeding season)); and

One MSO PAC taken by harm (permitted take is one pair MSO and/or associated eggs/juveniles in the form of direct mortality through the life of the project).

Apache-Sitgreaves National Forest

Four MSO PACs taken by harassment (permitted take is four pairs of MSO and/or associated juveniles in the form of single disturbance events (disturbance that occurs within/over one breeding season)); and

One MSO PAC taken by harm (permitted take is one pair MSO and/or associated eggs/juveniles in the form of direct mortality through the life of the project).

Coconino National Forest

Three MSO PACs taken by harassment (permitted take is two pairs of MSO and/or associated juveniles in the form of single disturbance events (disturbance that occurs within/over one breeding season)); and

One MSO PAC taken by harm (permitted take is one pair MSO and/or associated eggs/juveniles in the form of direct mortality through the life of the project).

Coronado National Forest

Two MSO PACs taken by harassment (permitted take is two pairs of MSO and/or associated juveniles in the form of single disturbance events (disturbance that occurs within/over one breeding season)); and

One MSO PAC taken by harm (permitted take is one pair MSO and/or associated eggs/juveniles in the form of direct mortality through the life of the project).

Kaibab National Forest

One MSO PACs taken by harassment (permitted take is four pair of MSO and/or associated juveniles in the form of single disturbance events (disturbance that occurs within/over one breeding season)); and

One MSO PAC taken by harm (permitted take is one pair MSO and/or associated eggs/juveniles in the form of direct mortality through the life of the project).

Tonto National Forest

We anticipate the following incidental take for MSO in Colorado for the life of the project:

Two MSO PACs taken by harassment (permitted take is two pairs of MSO and/or associated juveniles in the form of single disturbance events (disturbance that occurs within/over one breeding season)); and

One MSO PAC taken by harm (permitted take is one pair MSO and/or associated eggs/juveniles in the form of direct mortality through the life of the project).

#### Pike and San Isabel National Forest

One pair of MSO and/or associated juveniles in the form of short-term harassment or harm from air tanker overflights or the application of fire retardant during the breeding season.

#### Carson National Forest

No take is anticipated on the Carson National Forest or on any lands in PACs.

#### Reasonable and Prudent Measures

The Service believes the following reasonable and prudent measure is necessary and appropriate to minimize take of the Mexican spotted owl:

1. Minimize take on National Forest lands through implementation of proposed conservation measures and monitoring, remediation and reporting requirements.

#### Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the ESA, the Forest Service must comply with the following terms and conditions, which implement the reasonable and prudent measure described above and outline required reporting/monitoring requirements. These terms and conditions are non-discretionary.

The following terms and conditions will implement reasonable and prudent measure 1:

1. To the extent feasible without compromising human health and safety, incorporate conservation measures during suppression of wildfire in occupied Mexican spotted owl and its habitat to limit the amount of retardant dropped, with the overall goal of containing the wildfire to limit all of the associated impacts to the species and its habitat.

#### *New Mexico ridge-nosed rattlesnake*

We anticipate the following incidental take for the New Mexico ridge-nosed rattlesnake:

1. One New Mexico ridge-nosed rattlesnake will be killed (harm) or injured (harassed) on Coronado National Forest.

#### Reasonable and Prudent Measures

The USFWS believes the following reasonable and prudent measure is necessary and appropriate to minimize take of the New Mexico ridge-nosed rattlesnake:

1. Minimize take on National Forest lands through implementation of proposed conservation measures and monitoring, remediation and reporting requirements.

#### Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the ESA, the Forest Service must comply with the following terms and conditions, which implement the reasonable and prudent measure described

above and outline required reporting/monitoring requirements. These terms and conditions are non-discretionary.

The following terms and conditions will implement reasonable and prudent measure 1:

1. To the extent feasible without compromising human health and safety, incorporate conservation measures during suppression of wildfire in occupied New Mexico ridge-nosed rattlesnake and its habitat to limit the amount of retardant dropped, with the overall goal of containing the wildfire to limit all of the associated impacts to the species and its habitat.

### *Sonora chub*

We anticipate that take will occur from up to 6 fire retardant misapplications on up to 37.2 stream miles on the Coronado NF over the next 10 years.

#### Reasonable and Prudent Measures

The Forest Service has included a number of conservation measures and monitoring, remediation and reporting requirements described in the federal action that serve to minimize the effects of incidental take. No additional reasonable and prudent measures are included in this incidental take statement.

#### Disposition of Dead or Injured Sonora Chub

Upon locating a dead, injured, or sick listed species initial notification must be made to the USFWS's Law Enforcement Office, 2450 W. Broadway Rd, Suite 113, Mesa, Arizona, 85202, telephone: 480/967-7900) within three working days of its finding. Written notification must be made within five calendar days and include the date, time, and location of the animal, a photograph if possible, and any other pertinent information. The notification shall be sent to the Law Enforcement Office with a copy to this office. Care must be taken in handling sick or injured animals to ensure effective treatment and care, and in handling dead specimens to preserve the biological material in the best possible state.

### *Sonoran tiger salamander*

We anticipate that take will occur from 3 fire retardant misapplications on Forest Service lands in Arizona. Over the next 10 years we anticipate six drops in species occupied habitat on the Coronado National Forest. Take will be considered to have been exceeded if misapplications on the Coronado National Forest and within the range of the Sonoran tiger salamander surpass the amount of drops described above.

#### Reasonable and Prudent Measures

We believe the following reasonable and prudent measures are necessary and appropriate to avoid jeopardy of the Sonoran tiger salamander:

1. Ensure protection of the livestock tanks where Sonoran tiger salamanders occur.

#### Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the ESA, the U.S. Forest Service must comply with the following terms and conditions, which implement the reasonable and prudent measures described above. These terms and conditions are nondiscretionary.

To implement reasonable and prudent measure # 1, the Forest Service shall:

1. Map all known extant populations of Sonoran tiger salamanders (regardless of the size/type of occupied habitat), in close coordination with the Service and Arizona Game

and Fish Department, and where safety factors allow, include them as avoidance areas subject to the 300 foot buffer policy during retardant applications.

*Spikedace and loachminnow*

For the Coconino and Prescott National Forests, we are unable to develop a level of incidental take that we believe is reasonably certain to occur on the Verde River over the time period covered by this consultation. The low numbers of events (misapplications, drift, runoff, and spills) likely to occur within proximity to occupied habitats, combined with the low numbers of fish in Verde River does not provide us with a level of certainty that take will occur.

For these reasons, we are providing a surrogate measure to estimate the extent of take and when authorized incidental take will be considered to have been exceeded. For the proposed action under this consultation, incidental take is anticipated as follows:

National Forest	Incidental Take, in Miles of Stream
Apache-Sitgreaves	0 to 12
Gila National Forest	0 to 31

Reasonable and Prudent Measures

The Forest Service has included a number of conservation measures, monitoring, remediation and reporting requirements that serve to minimize the effects of incidental take. No additional reasonable and prudent measures are included in this incidental take statement. The proposed action is the application of fire retardant under emergency conditions to stop the spread of catastrophic wildfire. As such, any additional measures imposed at this time could result in increased damage to human life or property, as well as result in the spread of wildfire, which ultimately damages watersheds that can in turn lead to further habitat damage for spikedace and loach minnow.

*Three Forks springsnail*

We are providing for the entire four miles streams of Boneyard Creek (on the Apache-Sitgraves National Forest) to be affected by retardant drift or runoff.

Reasonable and Prudent Measures

These RPMs and accompanying T&Cs will become effective on the date that a final rule listing the species under ESA is published.

1. If a misapplication occurs in species occupied habitat or within the avoidance area surrounding habitat within the Boneyard Creek watershed, establish post-incident monitoring and remediation to avoid and minimize adverse effects species and aquatic habitat.

Terms and Conditions:

To implement reasonable and prudent measure # 1:

1. If a misapplication occurs in an occupied habitat, conduct follow up springsnail surveys and salvage in accordance with protocols established by USFS, AGFD, and Service.

*Yaqui catfish*

We anticipate that take will occur from six fire retardant misapplications on Forest Service lands in Arizona. Over the next 10 years we anticipate impacts, as described above, to occur from following number of drops in each Forest described below:

- Six drops affecting 37.2 stream miles in the Coronado National Forest

Reasonable and Prudent Measures

The Forest Service has included a number of conservation measures and monitoring, remediation and reporting requirements described in the federal action that serve to minimize the effects of incidental take. No additional reasonable and prudent measures are included in this incidental take statement.

*Yaqui chub*

We anticipate that take will occur from six fire retardant misapplications on Forest Service lands in Arizona, but the actual occur. Over the next 10 years we anticipate impacts, as described above, to occur from following number of drops in each Forest described below:

- Six drops affecting 37.2 stream miles in Coronado National Forest

Reasonable and Prudent Measures

The Forest Service has included a number of conservation measures and monitoring, remediation and reporting requirements described in the federal action that serve to minimize the effects of incidental take. No additional reasonable and prudent measures are included in this incidental take statement.

*Region 4, 5 Forest Service**Arroyo toad*

We anticipate that incidental take of some arroyo toad tadpoles and newly metamorphosed toadlets would most likely result from direct exposure to retardant dropped in occupied habitat, from indirect exposure to diluted retardant chemicals dropped upstream of arroyo toad occupied habitat, and from eutrophication processes in occupied habitat. We assume that arroyo toad tadpoles and newly metamorphosed toadlets that are within 6.2 miles of a misapplication on a waterbody within the Los Padres, Angeles, Cleveland, and San Bernardino National Forests have the potential to be killed or injured by retardant. Based on our calculations in the Effects Analysis and despite the uncertainties of what the impacts, timing, and length of exposure to retardant chemicals would be for arroyo toad tadpoles and toadlets, the probability is that misapplications of retardant on the Los Padres, Angeles, Cleveland, and San Bernardino National Forests will result in incidental take of arroyo toads in the form of injury or mortality of individuals within approximately 6 percent of arroyo toad occupied habitat in the next 10 years.

Angeles National Forest	All arroyo toad tadpoles and toadlets within 6 percent (2.5 miles) of occupied habitat	Injury or mortality of individuals
Los Padres National Forest	All arroyo toad tadpoles and toadlets within 9 percent (10 miles) of occupied habitat	Injury or mortality of individuals
Cleveland National Forest	All arroyo toad tadpoles and toadlets within 4 percent (6 miles) of occupied habitat	Injury or mortality of individuals
San Bernardino National Forest	All arroyo toad tadpoles and toadlets within 6 percent (3 miles) of occupied habitat	Injury or mortality of individuals

Reasonable and Prudent Measures

The Forest Service has included a number of conservation measures and monitoring, remediation and reporting requirements described in the federal action that serve to minimize the effects of incidental take. No additional reasonable and prudent measures are included in this incidental take statement.

In the event of a fire retardant drop within 600 feet of occupied arroyo toad habitat, the Forest Service shall also report the incident to the Ventura Fish and Wildlife Office at 805-644-1766.

*California red-legged frog*

Given that California red-legged frogs utilize different habitats for breeding on the National Forests in the Sierra Nevada compared to Los Padres and Angeles National Forests, it is necessary to quantify take differently amongst the forests.

<b>Forest</b>	<b>Amount of Take</b>	<b>Form of Take</b>	<b>Lifestage</b>
Plumas National Forest	0.30 acres occupied pond habitat	Harm, harass, kill	Tadpole
Plumas National Forest	0.30 acres occupied pond habitat	Harm	Adult
Eldorado National Forest	0.5 acres occupied pond habitat	Harm, harass, kill	Tadpole
Eldorado National Forest	0.5 acres occupied pond habitat 6.2 miles occupied stream habitat	Harm	Adult
Los Padres National Forest	25 miles occupied stream habitat	Harm	Adult
Angeles National Forest	0.2 miles occupied stream habitat	Harm	Adult

Reasonable and Prudent Measures

The Forest Service has included a number of conservation measures and monitoring, remediation and reporting requirements described in the federal action that serve to minimize the effects of incidental take. No additional reasonable and prudent measures are included in this incidental take statement.

- In the event of a fire retardant drop within 300 feet of occupied California red-legged frog habitat, the Forest Service shall also report the incident to the Sacramento Fish and Wildlife Office at 916-414-6600.

### *Laguna Mountains Skipper*

Incidental take of Laguna Mountains skipper on the Cleveland National Forest is exempted for the Forest Service as follows:

Death or injury of adults, larvae, pupae, and eggs within up to 3 ac (1.2 ha) of skipper occupied habitat. The amount or extent of incidental take will be exceeded if more than 3 ac (1.2 ha) of skipper occupied habitat is impacted as a result of the proposed action.

### Reasonable and Prudent Measures

The Service believes the following Reasonable and Prudent Measure is necessary and appropriate to minimize impacts of incidental take of the Laguna Mountains skipper:

1. The Forest Service shall monitor and report the impact of project activities on skipper habitat.

### Terms and Conditions

To be exempt from the prohibitions of section 9 of the Act, the Forest Service must comply with the following terms and conditions, which implements the reasonable and prudent measure described above and outlines reporting and monitoring requirements. Terms and conditions are nondiscretionary.

- 1.1 The Forest Service shall conduct an on-the-ground assessment of a fire retardant application in skipper occupied habitat within 1 week of the application or once feasible given fire safety conditions and availability of qualified resource personnel.
- 1.2 The Forest Service shall provide the Service with a report within 30 days of a fire retardant application in skipper occupied habitat that includes the acreage and location of skipper occupied habitat affected.
- 1.3 The Forest Service shall conduct a follow-up assessment 1 year after a fire retardant application in skipper occupied habitat and report to the Service regarding the extent of any nonnative plant enhancement detected due to the fire retardant application and describe efforts to remove nonnative plants, as appropriate.

### *Lahontan cutthroat*

We estimated that a total of 1.1 km (0.7 mi) of habitat would be affected from misapplication.

<b>Forest</b>	<b>Amount of Take</b>	<b>Form of Take</b>
HTNF	0.8 km (0.5 mi)	Harm, harassment
Tahoe NF	0.05 km (0.03 mi)	Harm, harassment
LTBMU	0.2 km (0.1 mi)	Harm, harassment
Stanislaus	0.1 km (0.04)	Harm, harassment
Sierra NF	0.02 km (0.01 mi)	Harm, harassment
Inyo NF	0.0003 km (0.0002 mi)	Harm, harassment

Reasonable and Prudent Measures

The Service believes the following Reasonable and Prudent Measures are necessary and appropriate to minimize impacts of incidental take of LCT:

1. Protect occupied LCT habitat from long-term fire retardant effects.
2. Reintroduce LCT into existing stream habitat if they become extirpated from a misapplied fire retardant drop.

Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the ESA, the Forest Service must comply with the following terms and conditions, which implement the Reasonable and Prudent Measures, described above and outline required monitoring/reporting requirements. These Terms and Conditions are non-discretionary.

To implement Reasonable and Prudent Measure Number 1, the Forest Service shall fully implement the following Terms and Conditions:

1. The Forest Service shall notify the Nevada Fish and Wildlife Office within 24 hours or as soon as possible when there is any wildfire, regardless of size, in any occupied LCT watershed or that could advance towards occupied habitat when possible with fire conditions and available personnel.
2. In the event of a fire retardant drop within 91 m (300 ft) of occupied LCT habitat, the Forest Service shall also report the incident to the Nevada Fish and Wildlife Office at 775-861-6300.

To implement Reasonable and Prudent Measure Number 2, the HTNF shall fully implement the following Term and Condition:

1. In the event that LCT are extirpated from a currently occupied stream as a result of a misapplication of fire retardant, the Forest Service shall coordinate with the Recovery Implementation Team to reintroduce LCT back into the stream once the fire retardant no longer exists as a threat in that stream.

*Little Kern golden trout*

We anticipate the incidental take, in the form of injury or death, of all Little Kern golden trout occupying 6.2 miles of occupied stream reaches on the Sequoia National Forest.

Reasonable and Prudent Measures

The Service believes the following Reasonable and Prudent Measures are necessary and appropriate to minimize impacts of incidental take of Little Kern golden trout:

1. Protect occupied Little Kern golden trout habitat from long-term fire retardant effects.

Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the ESA, the Forest Service must comply with the following terms and conditions, which implement the Reasonable and Prudent Measures, described above and outline required monitoring/reporting requirements. These Terms and Conditions are non-discretionary.

To implement Reasonable and Prudent Measure Number 1, the Forest Service shall implement the following Terms and Conditions:

1. The Forest Service shall notify the Sacramento Fish and Wildlife Office within 24 hours or as soon as possible when there is any wildfire, regardless of size, in any occupied Little Kern golden trout watershed or that could advance towards occupied habitat.
2. In the event of a fire retardant drop within 91 m (300 ft) of occupied Little Kern golden trout habitat, the Forest Service shall also report the incident to the Sacramento Fish and Wildlife Office at 916-414-6600.

#### *Modoc sucker*

We estimated that 0.7 miles of occupied habitat would be affected for the species from misapplication on the Fremont-Winema National Forests. On the Modoc National Forest, we estimated that 0.06 miles of occupied habitat would be affected for the species from misapplication. All adult and juvenile Modoc sucker found within these distances of stream potentially exposed to a misapplication of fire retardant would be harmed and would eventually result in death.

Using the simplistic density numbers the Service anticipates that 21 Modoc sucker on the Fremont-Winema National Forests and 4 Modoc sucker on the Modoc National Forest could be exposed to adverse effects from the misapplication of fire retardant. We conclude that the impacts to any Modoc sucker in the impacted area are likely to die due to exposure to toxic levels of ammonia. The take of Modoc sucker is estimated at the scale or extent approximated above, but best measured by potential impacts to 0.7 miles of occupied habitat on the Fremont-Winema National Forests and 0.06 miles of occupied habitat on the Modoc National Forest.

#### Reasonable and Prudent Measures

The Forest Service has included a number of conservation measures and monitoring, remediation and reporting requirements described in the federal action that serve to minimize the effects of incidental take. No additional reasonable and prudent measures are included in this incidental take statement.

#### *Owens tui chub*

We assume Owens tui chub that are within 6.2 miles downstream of a misapplication of retardant on the Inyo National Forest have the potential to be adversely affected by retardant. Based on our calculations in the Effects Analysis and despite the uncertainties of what the impacts, timing, and length of exposure to retardant chemicals would be for Owens tui chub, there is a probability that misapplications of retardant on the Inyo National Forest will result in incidental take of Owens tui chub in the form of harm to less than 1 percent of Owens tui chub occupied habitat over the next 10 years.

Inyo National Forest	0.08 percent (0.008 miles) of occupied habitat	Harm
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#### Reasonable and Prudent Measures

The Forest Service has included a number of conservation measures and monitoring, remediation and reporting requirements described in the federal action that serve to minimize the effects of incidental take. No additional reasonable and prudent measures are included in this incidental take statement.

- In the event of a fire retardant drop within 600 feet of occupied Owens tui chub habitat, the Forest Service shall also report the incident to the Ventura Fish and Wildlife Office.

*Paiute cutthroat trout*

We estimated that a total of 0.08 km (0.05 mi) of habitat would be affected from misapplication.

<b>Forest</b>	<b>Amount of Take</b>	<b>Form of Take</b>
HTNF	0.05 km (0.03 mi)	Harm, harassment
Sierra NF	0.02 km (0.01 mi)	Harm, harassment
Inyo NF	0.008 km (0.005 mi)	Harm, harassment

Reasonable and Prudent Measures

The Service believes the following Reasonable and Prudent Measures are necessary and appropriate to minimize impacts of incidental take of PCT:

1. Protect spring, stream, and riparian habitat in occupied PCT habitat from long-term fire retardant effects.

Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the ESA, the Forest Service must comply with the following terms and conditions, which implement the Reasonable and Prudent Measures, described above and outline required monitoring/reporting requirements. These Terms and Conditions are non-discretionary.

To implement Reasonable and Prudent Measure Number 1, the Forest Service shall fully implement the following Terms and Conditions:

1. The Forest Service shall notify the Nevada Fish and Wildlife Office within 24 hours or as soon as possible when there is any wildfire, regardless of size, in any occupied PCT watershed or that could advance towards occupied habitat.

In the event of a fire retardant drop (either a misapplication or an intentional application) within 183 m (600 ft) of occupied PCT habitat, the Forest Service shall report the incident to the Nevada Fish and Wildlife Office at 775-861-6300.

*Shortnose sucker & Lost River sucker*

Over the 10-year term of the proposed action, take of no more than 100 LRS and SNS (total of both species) in the form of kill and harm is likely to occur as a result of the proposed action on the Fremont-Winema National Forests.

The Service anticipates that take in form of kill of 100 juvenile Lost River and shortnose suckers on the Fremont-Winema National Forests will result from the misapplication of fire retardant. We conclude that the impacts to any Lost River or shortnose sucker in the impacted area are likely to die due to exposure to toxic levels of ammonia. The take of Lost River and shortnose sucker is estimated at the scale or extent approximated above, but best measured by potential for one accidental retardant drop into Upper Klamath Lake on the Fremont-Winema National Forest.

Reasonable and Prudent Measures

The Forest Service has included a number of conservation measures and monitoring, remediation and reporting requirements described in the federal action that serve to minimize the effects of incidental take. No additional reasonable and prudent measures are included in this incidental take statement.

- In the event of a fire retardant drop within 91 m (300 ft) of occupied Lost River or shortnose sucker habitat, the Forest Service shall also report the incident to the Klamath Falls Fish and Wildlife Office.

*Quino Checkerspot Butterfly*

Incidental take of Quino is exempted for the San Bernardino National Forest as follows:

Death or injury of adults, larvae, pupae, and eggs within up to 46 ac (19 ha) of Quino occupied habitat, defined as any suitable Quino habitat within 0.6 mi (1 km) of a Quino sighting. The amount or extent of incidental take will be exceeded if more than 46 ac (19 ha) of Quino occupied habitat is impacted as a result of the proposed action.

Incidental take of Quino is exempted for the Cleveland National Forest as follows:

Death or injury of adults, larvae, pupae, and eggs within up to 4 ac (1.6 ha) of Quino occupied habitat, defined as any suitable Quino habitat within 0.6 mi (1 km) of a Quino sighting. The amount or extent of incidental take will be exceeded if more than 4 ac (1.6 ha) of Quino occupied habitat is impacted as a result of the proposed action.

Reasonable and Prudent Measures

The following reasonable and prudent measure is necessary and appropriate to minimize incidental take.

1. If a misapplication occurs in species occupied habitat or within the avoidance area surrounding habitat, establish post-incident monitoring and remediation to avoid and minimize adverse effects species and aquatic habitat.

Terms and Conditions

To be exempt from the prohibitions of section 9 of the Act, the Forest Service must comply with the following terms and conditions, which implement the reasonable and prudent measure described above and outlines reporting and monitoring requirements. Terms and conditions are nondiscretionary.

- 1.1 The Forest Service shall conduct an on-the-ground assessment of a fire retardant application in Quino occupied habitat within 1 week of the application or once feasible given fire safety conditions and availability of qualified resource personnel.
- 1.2 The Forest Service shall provide the Service with a report within 30 days of a fire retardant application in Quino occupied habitat that identifies the acreage and location of Quino occupied habitat affected.
- 1.3 The Forest Service shall conduct a follow-up assessment 1 year later and report to the Service regarding the extent of any nonnative plant enhancement detected due to the fire retardant application and describe efforts to remove nonnative plants, as appropriate.

*Railroad Valley springfish (Crenichthys nevadae)*

We conclude that take of Railroad Valley springfish will occur directly if fire retardant is applied within the 300 foot buffer during wildfire suppression activities. This take will occur in the form of harm and harassment, through behavioral modification, injury, or death caused by the toxicity of long-term fire retardant to aquatic species described above.

The Service anticipates incidental take of Railroad Valley springfish will be difficult to detect for the following reasons: 1) due to the inherent biological characteristics of aquatic species, the likelihood of discovering an individual death or other taking is small; 2) the small body size, behavioral modification before death, presence of aquatic vegetation, spring outflow, and rapid rates of decomposition make finding an incidentally taken individual fish extremely unlikely; and 3) the best scientific and commercial data available are not sufficient to enable the Service to estimate a specific amount of incidental take of the species themselves.

The likelihood of a misapplication of fire retardant is low; however, if it does occur, the loss of an entire population is likely due to the small amount of occupied habitat and the inability of Railroad Valley springfish to avoid toxic effects of the fire retardant. Therefore, the amount of take authorized in the Hot Creek Canyon/Old Dugan Ranch area is one of the three populations on the Humboldt-Toiyabe National Forest.

#### Reasonable and Prudent Measures

The Service believes the following Reasonable and Prudent Measures are necessary and appropriate to minimize impacts of incidental take of Railroad Valley springfish:

1. Protect spring, spring outflow, riparian, and meadow habitat in the Hot Creek Canyon/Old Dugan Ranch area from long-term fire retardant effects.
2. Reintroduce Railroad Valley springfish into existing spring systems if they become extirpated from a misapplied fire retardant drop.

#### Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the ESA, the HTNF must comply with the following terms and conditions, which implement the Reasonable and Prudent Measures, described above and outline required monitoring/reporting requirements. These Terms and Conditions are non-discretionary.

To implement Reasonable and Prudent Measure Number 1, the HTNF shall fully implement the following Terms and Conditions:

1. If it is deemed necessary to use fire retardant in the Hot Creek Canyon/Old Dugan Ranch area, the HTNF shall avoid the application of retardant within 91 m (300 ft) of the occupied springs and spring outflows.
2. The HTNF shall notify the Nevada Fish and Wildlife Office within 24 hours or as soon as possible when there is any wildfire, regardless of size, in the Hot Creek Canyon/Old Dugan Ranch area or that could advance towards the Hot Creek Canyon/Old Dugan Ranch area.

To implement Reasonable and Prudent Measure Number 2, the HTNF shall fully implement the following Terms and Conditions:

1. In the event that Railroad Valley springfish are extirpated from a currently occupied spring system in the Hot Creek Canyon/Old Dugan Ranch area as a result of a retardant misapplication, the HTNF shall coordinate with the Recovery Implementation Team to reintroduce Railroad Valley springfish back into the extirpated spring once the effects of the fire retardant have dissipated.
2. In the event of a fire retardant drop within 91 m (300 ft) of occupied Railroad Valley springfish habitat, the HTNF shall report the incident to the Nevada Fish and Wildlife Office at 775-861-6300.

#### *Santa Ana Sucker*

We cannot reasonably identify or predict the number of sucker individuals likely to be taken, we have established a habitat-based anticipated level of incidental take that, if exceeded, will trigger reinitiation of formal consultation.

Incidental take of Santa Ana sucker on the Angeles National Forest is exempted for the Forest Service as follows:

Death or injury of adults, juveniles, fry and eggs within up to 1,968 to 7,218 ft (600 to 2,200 m) of sucker occupied habitat. The amount or extent of incidental take will be exceeded if more than 1,968 to 7,218 ft (600 to 2,200 m) of sucker occupied habitat is impacted as a result of the proposed action.

#### Reasonable and Prudent Measures

The following reasonable and prudent measure is necessary and appropriate to minimize incidental take.

1. The Forest Service shall monitor and report the impact of project activities on suckers and their habitat.

#### Terms and Conditions

To be exempt from the prohibitions of section 9 of the Act, the Forest Service must comply with the following terms and conditions, which implement the reasonable and prudent measure described above and outlines reporting and monitoring requirements. Terms and conditions are nondiscretionary.

- 1 After a fire retardant application in sucker occupied habitat, the Forest Service shall conduct an on-the-ground assessment of the potential impacts to sucker, within 1 day or once feasible given fire safety conditions and availability of qualified resource personnel. This assessment will attempt to identify the extent of sucker mortality associated with the fire retardant application.
- 2 No later than June 30, 2012, the local offices of the Forest Service (Lassen National Forest) and Fish and Wildlife Service shall develop and implement a plan to monitor water quality for Santa Anna Sucker-occupied waterways and/or adjacent waterways in the event of a misapplication of aerial fire retardant. A minimum downstream distance of 6.2 miles should be monitored if aerial applied fire retardant is misapplied in these waterways on NFS lands by the USFS. Monitoring of water quality will start within 24 hours of notification of a misapplication of fire retardant or when safe to enter the area. [Results will be provided to the Service one to five business days from completion of lab analysis.](#)
  - 2.1 If it is determined that water quality has been affected by a misapplication of aerial applied fire retardant the Forest Service shall ensure that surveys are conducted for Santa Anna Sucker for 3 consecutive years. Yearly reports will be submitted to the Service for review. Annual/semi-annual meetings with the Service will occur to determine if a population decline has occurred or if any modification needs to be done to the monitoring protocol.
  - 2.2 A sample of dead fish will be collected to help identify the cause of death.

#### *Shasta crayfish*

The Service is authorizing incidental take in the form of harm, harassment, capture, injury, and death for all Shasta crayfish within 6.2 miles of one aerial retardant misapplication over the 10-year project for the Lassen National Forest.

#### Reasonable and Prudent Measures

The Forest Service has included a number of conservation measures and monitoring, remediation and reporting requirements described in the federal action that serve to minimize the effects of incidental take. No additional reasonable and prudent measures are included in this incidental take statement.

In the event of a fire retardant drop within the 1000 foot buffer, the Forest Service shall also report the incident to the Sacramento Fish and Wildlife Office at 916-414-6600

*Smith's blue butterfly*

The incidental take of the Smith's blue butterfly on the Los Padres national Forest will be difficult to detect for the following reasons: (1) the Smith's blue butterfly is generally difficult to detect due to its small body size, as eggs, larvae, and pupae are generally not visible; (2) finding a dead or impaired individual is unlikely; and (3) because Smith's blue butterfly vary in abundance in a given location. The Service anticipates that a low but indeterminate number of Smith's blue butterflies may be killed or injured by a misapplication of retardant in occupied habitat.

Reasonable and Prudent Measures

We believe the following reasonable and prudent measure is necessary and appropriate to minimize take of Smith's blue butterflies from misapplication of retardant in occupied habitat:

1. If a misapplication occur in species occupied habitat or within the avoidance area surrounding habitat, establish post-incident monitoring, reporting and remediation to avoid and minimize adverse effects species and aquatic habitat

Terms and Conditions

To be exempt from the prohibitions of section 9 of the Act, the Forest Service must comply with the following terms and conditions, which implement the reasonable and prudent measure described above. These terms and conditions are non-discretionary.

1. The area affected by retardant will be monitored for a period of three years, including locating and identifying Smith's blue butterfly on Los Padres National Forest lands. If population numbers appear to be declining, the USFWS will be contacted for guidance.
2. The Forest Service must annually review the locations of occupied habitat, particularly if new stands of seacliff buckwheat have been mapped, to ensure that non-native plant impacts to Smith's blue butterfly habitat are minimized and to update the fire retardant avoidance map for this species.

*Tidewater goby*

We anticipate that misapplications of retardant on the Los Padres National Forest and Six Rivers National Forest will result in incidental take of tidewater gobies in the form of harm to all individuals occupying approximately 9 percent of tidewater goby occupied habitat in the Los Padres NF and approximately 3.3 percent of tidewater goby occupied habitat in the Six Rivers NF over the next 10 years.

Six Rivers National Forest	3.3 percent (0.2 miles) of occupied habitat	Harm
Los Padres National Forest	9 percent ( 10 miles) of occupied habitat	Harm

Reasonable and Prudent Measures

We believe the following reasonable and prudent measure is necessary and appropriate to minimize take of Smith's blue butterflies from misapplication of retardant in occupied habitat:

If a misapplication occurs in species occupied habitat or within the avoidance area surrounding habitat, establish post-incident monitoring, reporting and remediation to avoid and minimize adverse effects species and aquatic habitat.

Terms and Conditions

To be exempt from the prohibitions of section 9 of the Act, the Forest Service must comply with the following terms and conditions, which implement the reasonable and prudent measure described above. These terms and conditions are non-discretionary.

1. The area affected by retardant will be monitored for a period of three years, including locating and identifying Smith's blue butterfly on Los Padres National Forest lands. If population numbers appear to be declining, the USFWS will be contacted for guidance.
2. The Forest Service must annually review the locations of occupied habitat, particularly if new stands of seacliff buckwheat have been mapped, to ensure that non-native plant impacts to Smith's blue butterfly habitat are minimized and to update the fire retardant avoidance map for this species.

Unarmored Threespine Stickleback

There is a probability that misapplications of retardant on the Angeles National Forest and San Bernardino National Forest will result in incidental take of UTS in the form of harm to approximately 5 percent of UTS occupied habitat over the next 10 years.

Angeles National Forest	5 percent (0.3 miles) of occupied habitat	Harm
San Bernardino National Forest	5 percent ( 0.05 miles) of occupied habitat on Shay Creek	Harm

Reasonable and Prudent Measures

The Forest Service has included a number of conservation measures and monitoring, remediation and reporting requirements described in the federal action that serve to minimize the effects of incidental take. No additional reasonable and prudent measures are included in this incidental take statement.

- In the event of a fire retardant drop within 600 feet of unarmored threespine stickleback habitat, the Forest Service shall also report the incident to the Ventura Fish and Wildlife Office at 805-644-1766.

**NOAA Fisheries (National Marine Fisheries Service) Species Incidental Take Statements  
Region 1, 4, 5, 6, 9 Forest Service**

CC Chinook salmon and their critical habitat are likely to be exposed to one intrusion event during the life of this project. No more than 6.2 miles of direct lethal effects as well as temporary impairment of critical habitat would be expected.

CV Chinook salmon and their critical habitat are likely to be exposed to one intrusion event during the life of this project. No more than 6.2 miles of direct lethal effects as well as temporary impairment of critical habitat would be expected.

LCR Chinook salmon and their critical habitat are likely to be exposed to one intrusion event during the life of this project. No more than 6.2 miles of direct lethal effects as well as temporary impairment of critical habitat would be expected.

Snake River fall-run Chinook salmon and their critical habitat are likely to be exposed to one intrusion event during the life of this project. No more than 6.2 miles of sub-lethal effects as well as temporary impairment of critical habitat would be expected.

Snake River spring/summer-run Chinook salmon and their critical habitat are likely to be exposed to one intrusion event during the life of this project. No more than 6.2 miles of direct lethal effects as well as temporary impairment of critical habitat would be expected.

UCR Chinook salmon and their critical habitat are likely to be exposed to one intrusion event during the life of this project. No more than 6.2 miles of direct lethal effects as well as temporary impairment of critical habitat would be expected.

Upper Willamette River Chinook salmon and their critical habitat are likely to be exposed to one intrusion event during the life of this project. No more than 6.2 miles of direct lethal effects as well as temporary impairment of critical habitat would be expected.

Puget Sound Chinook salmon and their critical habitat are likely to be exposed to one intrusion event during the life of this project. Approximately 6.2 miles of direct lethal effects as well as temporary impairment of critical habitat would be expected.

Columbia River chum salmon critical habitat is likely to be exposed to one intrusion event during the life of this project. Approximately 6.2 miles of temporary impairment of critical habitat would be expected.

Hood Canal summer-run chum salmon and their critical habitat are likely to be exposed to one intrusion event during the life of this project. Approximately 6.2 miles of sub-lethal effects as well as minor, temporary impairment of critical habitat would be expected.

Lower Columbia River coho salmon are likely to be exposed to one intrusion event during the life of this project. Approximately 6.2 miles of direct lethal effects would be expected.

SONCC coho salmon and their critical habitat are likely to be exposed to one intrusion event during the life of this project. Approximately 6.2 miles of direct lethal effects as well as temporary impairment of critical habitat would be expected.

Oregon Coast coho salmon and their critical habitat are likely to be exposed to one intrusion event during the life of this project. Approximately 6.2 miles of direct lethal effects as well as temporary impairment of critical habitat would be expected.

Snake River sockeye salmon and their critical habitat are likely to be exposed to one intrusion event during the life of this project. No more than 6.2 miles of sub-lethal effects as well as temporary impairment of critical habitat would be expected.

CCV steelhead and their critical habitat are likely to be exposed to one intrusion event during the life of this project. Approximately 6.2 miles of direct lethal effects as well as temporary impairment of critical habitat would be expected.

LCR steelhead and their critical habitat are likely to be exposed to one intrusion event during the life of this project. Approximately 6.2 miles of direct lethal effects as well as temporary impairment of critical habitat would be expected.

MCR steelhead and their critical habitat are likely to be exposed to one intrusion event during the life of this project. Approximately 6.2 miles of direct lethal effects as well as temporary impairment of critical habitat would be expected.

Northern California steelhead and their critical habitat are likely to be exposed to one intrusion event during the life of this project. Approximately 6.2 miles of direct lethal effects as well as temporary impairment of critical habitat would be expected.

Snake River Basin steelhead and their critical habitat are likely to be exposed to one intrusion event during the life of this project. Approximately 6.2 miles of direct lethal effects as well as temporary impairment of critical habitat would be expected.

SCCC steelhead and their critical habitat are likely to be exposed to one intrusion event during the life of this project. Approximately 6.2 miles of direct lethal effects as well as temporary impairment of critical habitat would be expected.

Southern California steelhead and their critical habitat are likely to be exposed to one intrusion event during the life of this project. Approximately 6.2 miles of direct lethal effects as well as temporary impairment of critical habitat would be expected.

UCR steelhead and their critical habitat are likely to be exposed to one intrusion event during the life of this project. Approximately 6.2 miles of direct lethal effects as well as temporary impairment of critical habitat would be expected.

Upper Willamette River steelhead and their critical habitat are likely to be exposed to one intrusion event during the life of this project. Approximately 6.2 miles of direct lethal effects as well as temporary impairment of critical habitat would be expected.

Puget Sound steelhead are likely to be exposed to one intrusion event during the life of this project. Approximately 6.2 miles of direct lethal effects would be expected.

Pacific eulachon critical habitat is likely to be exposed to one intrusion event during the life of this project. Approximately 6.2 miles of temporary impairment of critical habitat would be expected.

Shortnose sturgeon are likely to be exposed to one intrusion event during the life of this project. Because they occupy large, mainstem habitats, approximately 6.2 miles of sub-lethal effects would be expected.

Atlantic sturgeon are likely to be exposed to one intrusion event during the life of this project. Because they occupy the mouths of large, mainstem habitats, approximately 6.2 miles of sub-lethal effects would be expected.

Green sturgeon are likely to be exposed to one intrusion event during the life of this project. Because they occupy large, mainstem habitats, approximately 6.2 miles of sub-lethal effects would be expected.

Reasonable and Prudent Measures

NMFS believes that the following RPMs are necessary and appropriate to minimize take of listed fish resulting from implementation of this action.

The USFS shall:

1. Monitor and report aerially applied long-term fire retardant application on each forest identified in this Opinion.
2. Contact NMFS in the event of an intrusion event on any of the National Forests identified in this Opinion.

Terms and Conditions

1. To implement RPM 1 (monitoring and reporting):
  - a. The Washington (DC) Office of the USFS must compile records of the annual number of fire retardant applications on each forest identified in this Opinion.
  - b. Each forest identified in this Opinion must record and report annually to NMFS HQ (address below) the number of long-term fire retardant applications and whether the application entered the buffer or intruded into water.
2. To implement RPM 2 (consultation):
  - a. The USFS must contact NMFS HQ in the event of an intrusion and initiate consultation with the local NMFS office in the area of the intrusion.
  - b. The USFS must coordinate with the local NMFS office to identify which species and critical habitat may have been present at the intrusion site and/or immediately downstream.
  - c. The USFS must notify all National Forests with that species or that species' critical habitat of the intrusion and the consultation that has resulted.
  - d. The USFS must reinitiate consultation with the appropriate local NMFS office and based on the new baseline following the intrusion, obtain a new Opinion analyzing the risk of future intrusions to the affected species and identifying any local mitigation measures that should be implemented.
  - e. The USFS must supply a copy of the final Opinion including appropriate local mitigation measures from the local NMFS office in an annual report to Office of Protected Resources, NMFS HQ, 1315 East West Highway, Silver Spring, Maryland, 20910.

## Appendix C. Species Determination Changes among FWS Biological Opinion, NOAA Fisheries Biological Opinion, and USFS Biological Assessment

**Table C-1. Species Determination Changes between FWS Biological Opinion, NOAA Fisheries Biological Opinion and USFS Biological Assessment.**

Scientific Name	Common Name	Status	USFS	FWS
<b>Aquatic Species from FWS BO</b>				
<i>Cambarus aculabrum</i>	A Cave Crayfish	E	LAA	NLAA
<i>Percina antesella</i>	Amber Darter	E CH	LAA LAA	NLAA NLAA
<i>Alasmidonta raveneliana</i>	Appalachian Elktoe	E CH	LAA LAA	NLAA
<i>Quadrula sparsa</i>	Appalachian Monkeyface	E	LAA	NLAA
<i>Lampsilis powellii</i>	Arkansas Fatmucket	T	LAA	NLAA
<i>Lemiox rimosus</i>	Birdwing Pearlymussel	E	LAA	NLAA
<i>Phoxinus cumberlandensis</i>	Blackside Dace	T	LAA	NLAA
<i>Cyprinella caerulea</i>	Blue Shiner	T CH	LAA, LAA	NLAA NLAA
<i>Gila elegans</i>	Bonytail Chub	E CH	LAA LAA	NLAA NE
<i>Salvelinus confluentus</i>	Bull Trout	T CH	LAA LAA	LAA NLAA
<i>Lasmigona decorata</i>	Carolina Heelsplitter	E CH	LAA LAA	NLAA NLAA
<i>Gila nigrescens</i>	Chihuahua Chub	T CH	LAA None	LAA NLAA
<i>Ptychocheilus lucius</i>	Colorado (=squawfish) Pikeminnow	E CH	LAA LAA	NLAA NE
<i>Percina jenkinsi</i>	Conasauga Logperch	E, CH	LAA LAA	NLAA NLAA
<i>Branchinecta conservatio</i>	Conservancy Fairy Shrimp	E CH	LAA LAA	NLAA NLAA
<i>Medionidus parvulus</i>	Coosa Moccasinshell	E	LAA	NLAA
<i>Hemistena lata</i>	Cracking Pearlymussel	E	LAA	NE
<i>Villosa trabalis</i>	Cumberland Bean Pearlymussel	E	LAA	NLAA
<i>Epioblasma brevidens</i>	Cumberland Combshell	E CH	LAA LAA	NLAA NLAA
<i>Etheostoma susanae</i>	Cumberland Darter	PE	NLAA	NE
<i>Alasmidonta atropurpurea</i>	Cumberland Elktoe	E CH	LAA LAA	NLAA NLAA
<i>Dromus dromas</i>	Dromedary Pearlymussel	E	LAA	NE
<i>Etheostoma percnum</i>	Duskytail Darter	E	LAA	NLAA
<i>Cyprogenia stegaria</i>	Fanshell	E	LAA	NLAA
<i>Potamilus capax</i>	Fat Pocketbook	E	LAA	NLAA
<i>Amblema neislerii</i>	Fat Three-Ridge Mussel	E CH	LAA LAA	NLAA NLAA
<i>Lampsilis altilis</i>	Finelined Pocketbook	T CH	LAA LAA	NLAA NLAA
<i>Fusconaia cuneolus</i>	Finerayed Pigtoe	E	LAA	NLAA
<i>Epioblasma torulosa gubernaculum</i>	Green Blossom (Pearlymussel)	E	LAA	NLAA

<b>Scientific Name</b>	<b>Common Name</b>	<b>Status</b>	<b>USFS</b>	<b>FWS</b>
<i>Cambarus zophonastes</i>	Hell Creek Cave Crayfish	E	LAA	NLAA
<i>Gila cypha</i>	Humpback chub	E CH	LAA LAA	NLAA NE
<i>Pleurobema collina</i>	James Spinymussel	E	LAA	NLAA
<i>Chasmistes liorus</i>	June Sucker	E CH	LAA LAA	NLAA NLAA
<i>Rhinichthys osculus thermalis</i>	Kendall Warm Springs Dace	E	LAA	NLAA
<i>Percina pantherina</i>	Leopard Darter	T CH	LAA LAA	NLAA NLAA
<i>Oncorhynchus aguabonita whitei</i>	Little Kern Golden Trout	T CH	LAA LAA	LAA NLAA
<i>Pegias fabula</i>	Littlewing Pearlymussel	E	LAA	NLAA
<i>Margaritifera hembeli</i>	Louisiana Pearlshell	T	LAA	NE
<i>Epioblasma torulosa rangiana</i>	Northern Riffleshell	E	LAA	NLAA
<i>Medionidus simpsonianus</i>	Ochlockonee Moccasinshell	E CH	LAA LAA	NLAA
<i>Oregonichthys crameri</i>	Oregon Chub	E CH	LAA LAA	NLAA NLAA
<i>Pleurobema pyriforme</i>	Oval Pigtoe	E CH	LAA LAA	NE NE
<i>Epioblasma capsaeformis</i>	Oyster Mussel	E CH	LAA LAA	NLAA NLAA
<i>Siphateles bicolor snyderi</i>	Owen's Tui Chub	E CH	LAA NE	LAA LAA
<i>Amblyopsis rosae</i>	Ozark cavefish	T	LAA	NLAA
<i>Notropis albizonatus</i>	Palezone Shiner	E	LAA	NLAA
<i>Scaphirhynchus albus</i>	Pallid Sturgeon	E	LAA	NLAA
<i>Lampsilis abrupta</i>	Pink Mucket	E	LAA	NLAA
<i>Elliptoideus sloatianus</i>	Purple Bankclimber Mussel	T CH	LAA LAA	NLAA NLAA
<i>Villosa perpurpurea</i>	Purple Bean Mussel	E CH	LAA LAA	NLAA NLAA
<i>Crenichthys nevadae</i>	Railroad Valley Springfish	T CH	LAA LAA	LAA NLAA
<i>Percina rex</i>	Roanoke Logperch	E	LAA	NLAA
<i>Pleurobema plenum</i>	Rough Pigtoe	E	LAA	NLAA
<i>Leptodea leptodon</i>	Scaleshell Mussel	E	LAA	NLAA
<i>Plethobasus cyphus</i>	Sheepnose	PE	LAA	NLAA
<i>Fusconaia cor</i>	Shiny Pigtoe	E	LAA	NLAA
<i>Lampsilis subangulata</i>	Shinyrayed Pocketook	E CH	LAA LAA	NE NE
<i>Erimystax cahni</i>	Slender Chub	T CH	LAA LAA	NLAA NLAA
<i>Noturus baileyi</i>	Smoky Madtom	E CH	LAA LAA	NLAA NLAA
<i>Percina tanasi</i>	Snail Darter	T CH	LAA LAA	NLAA NLAA
<i>Pleurobema georgianum</i>	Southern Pigtoe	E CH	LAA LAA	NLAA NLAA
<i>Erimonax monacha</i>	Spotfin Chub	T CH	LAA LAA	NLAA NLAA
<i>Epioblasma florentina walkeri</i>	Tan Riffleshell	E	LAA	NLAA
<i>Branchinecta lynchi</i>	Vernal Pool Fairy Shrimp	T	LAA	NLAA

Scientific Name	Common Name	Status	USFS	FWS
		CH	LAA	
<i>Lepidurus packardii</i>	Vernal Pool Tadpole Shrimp	E	NE	NLAA
<i>Acipenser transmontanus</i>	White Sturgeon (Kootenai R. Pop.)	E CH	LAA LAA	NLAA NLAA
<i>Quadrula fragrosa</i>	Winged Maplefoot	E	LAA	NLAA
<i>Noturus flavipinnis</i>	Yellowfin Madtom	T CH	LAA LAA	NLAA NLAA
<i>Antrobia culveri</i>	Tumble Creek Cavesnail	T	NE	NLAA
<b>Aquatic Species From NOAA Fisheries BO</b>				
<i>Thaleichthys pacificus</i>	Pacific Eulachon	T PT	NE NE	NLAA NLAA
<b>Wildlife Species From FWS BO</b>				
<i>Ambystoma californiense</i>	California tiger salamander, central population	T	LAA	NLAA
<i>Ambystoma tigrinum stebbinsi</i>	Sonoran Tiger Salamander	E	NLAA	LAA
<i>Brachyramphus marmoratus</i>	Marbled murrelet	T CH	NLAA NE	LAA LAA
<i>Bufo californicus</i>	Arroyo Toad	E CH	LAA NE	LAA NLAA
<i>Crotalus willardi obscurus</i>	New Mexico Ridgenose Rattlesnake	T CH	NLAA NE	LAA NE
<i>Dipodomys ingens</i>	Giant kangaroo rat	E	NE	NLAA
<i>Euphilotes enoptes smithi</i>	Smith's Blue Butterfly	E CH	LAA NE	LAA NLAA
<i>Euproserpinus euterpe</i>	Kern Primrose Sphinx Moth	T CH	LAA NLAA	NLAA NE
<i>Poliioptila californica californica</i>	Coastal California Gnatcatcher	T CH	LAA NLAA	NLAA NLAA
<i>Rana aurora draytonii</i>	California Red-legged Frog	T CH	LAA NE	LAA NLAA
<i>Rana chiricahuensis</i>	Chiricahua leopard frog	T CH	NLAA	LAA LAA
<i>Rana muscosa pop. 1</i>	Mt. Yellow-legged frog (So. CA DPS)	E CH	LAA NE	NLAA
<i>Somatochlora hineana</i>	Hine's emerald dragonfly	E CH	NLAA NE	NLAA NLAA
<i>Strix occidentalis caurina</i>	Northern Spotted Owl	T CH	NLAA NE	LAA NLAA
<i>Tryonia alamosae</i>	Alamosa Springsnail	E	LAA	NLAA
<b>Plant Species from FWS BO</b>				
<i>Arenaria cumberlandensis (Minuaritia cumberlandensis)</i>	Cumberland Sandwort	E	NLAA	NLAA
<i>Argemone pleiacantha spp. Pinnatisecta</i>	Sacramento prickly poppy	E	LAA	NLAA
<i>Asclepias meadii</i>	Mead's Milkweed	T	NLAA	NE
<i>Astragalus brauntonii</i>	Braunton's milkvetch	E CH	LAA NLAA	NE NLAA
<i>Astragalus limnocharis var. montii</i>	Heliotrope Milk-vetch	T CH	LAA NLAA	NLAA NLAA
<i>Astragalus osterhoutii</i>	Osterhout milkvetch	E	NLAA	NLAA
<i>Betula uber</i>	Virginia Round Leaf Birch	T	NLAA	NE
<i>Bonamia grandiflora</i>	Florida Bonamia	T	LAA	NLAA

<b>Scientific Name</b>	<b>Common Name</b>	<b>Status</b>	<b>USFS</b>	<b>FWS</b>
<i>Calystegia stebbinsii</i>	Stebbin's morning glory	E	NLAA	LAA
<i>Cirsium vinaceum</i>	Sacramento Mts. Thistle	T	LAA	NLAA
<i>Eriastrum densifolium</i> ssp. <i>sanctorum</i>	Santa Ana River woolystar*	E	LAA	NLAA
<i>Eriogonum longifolium</i> var. <i>gnaphalifolium</i>	Scrub Buckwheat	T	LAA	NLAA
<i>Harperocallis flava</i>	Harper's Beauty	E	LAA	NLAA
<i>Hedeoma todsenii</i>	Todsen's pennyroyal	E	LAA	NLAA
<i>Lupinus oreganus</i> var. <i>kincaidii</i>	Kincaid's Lupine	T CH	LAA NLAA	NLAA NLAA
<i>Macbridea alba</i>	White Bird-in-a-nest	T	LAA	NLAA
<i>Nolina brittonia</i>	Britton's Beargrass	E	LAA	NLAA
<i>Phlox hirsuta</i>	Yreka Phlox	E	LAA	NLAA
<i>Pinguicula ionantha</i>	Godfrey's Butterwort	T	LAA	NLAA
<i>Polygala lewtonii</i>	Lewton's Polygala	E	LAA	NLAA
<i>Scutellaria floridana</i>	Florida Skullcap	T	LAA	NLAA
<i>Sencio franciscanus</i>	San Fransisco peaks groundsel	T CH	NLAA NE	NE NE
<i>Sidalcea oregana</i> var. <i>calva</i>	Wenatchee Mountains Checker Mallow	E CH	LAA NLAA	NLAA NLAA
<i>Tuctoria greenei</i>	Greene's tuctoria	E CH	NLAA NLAA	LAA NLAA

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