APPENDIX B

Human Health and Safety and Ecological Risk Evaluation for Borax Stump Treatment

Alder Creek Project

Truckee Ranger District

Proposal

The Alder Creek Project proposes thinning on approximately 778 acres of National Forest Land in the eastside pine type to improve forest health. Borax treatment of freshly cut stumps of all conifer species is prescribed on approximately 515 acres to reduce the spread of annosus root disease in the project area. Borax will be applied by hand (sprinkled “salt-shaker style”) to only the surface of cut stumps greater than or equal to 14 inches in diameter. Application rates will average 1 pound per 50 square feet of stump area, which equates to approximately 1 pound/acre, though up to 2 pounds per acre may occur, depending on stand density.

Background Information

The Donner Ridge Fire in 1960 burned much of the Alder Creek project area. Vegetation in the project area is classified as the eastside pine type, and consists primarily of dense stands of relatively young pine and fir that did not burn, interspersed with brushfields and a scattered overstory of trees that survived the fire. Subsequent fire suppression has allowed much of the area to become overstocked with pine and fir. Overstocking and periodic years of drought have impacted conifer growth and vigor, leaving conifers susceptible to insect attack and disease. Bark beetle infestations in the project area have caused extensive mortality. The USFS Pest Management Program identifies the Alder Creek project area as a high priority within Region 5 for preventive treatment and funding. Annosus root disease, which is caused by the fungus *Heterobasidion annosum* is present in the project area. This disease affects all western conifers and is a serious problem in the eastside pine type of northern California. The disease weakens trees leading to increased susceptibility to bark beetle attack, or even death.

The majority of the project area lies within the Alder Creek Watershed. Alder Creek a perennial stream and two perennial tributaries flow through the project area. The area receives approximately 35 to 45 inches of annual precipitation, mostly in the form of snow.

General Information on Borax

Product Name: Sporax® (Mfr. Wilbur Ellis), ingredients: 100% borax

Pesticide Classification: Fungicide, EPA Reg. No. 2935-501, EPA Est. No. 66196-CA-01

Common Name: Borax (hydrated salt of boric acid)

Chemical Name: Sodium tetraborate decahydrate

Inert Ingredients: The Sporax® formulation contains 100% borax and no inert ingredients (USDA, 1994, p. 5).

Impurities: No contaminants have been identified (USDA, 1994, p. 5).

Metabolites: The main break-down product of borax in the soil is boron (USDA, 1994). Borax is not broken down by soil organisms (Dost et al, 1996). Lab studies indicate that borax is rapidly excreted without formation of potentially reactive metabolites (Dost et al, 1996 p. 54).

Borax Use

Sporax® is registered for forestry use as a conifer stump treatment to control annosus root disease. The target species is the fungus Heterobasidion annosum. Borax is a contact fungicide that inhibits the growth of fungi by preventing spore production (USDA, 1994). Several studies have demonstrated the efficacy of using borax as a stump treatment in California. Graham (1971) demonstrated the efficacy of borax on Jeffrey and ponderosa pine. Smith (1970) demonstrated that borax prevented infection of white fir stumps. Kliejunas (1989) provides a summary of the existing literature on borax effectiveness in the eastside pine type.

Borax as used in forestry is identical to the material sold throughout North America as a household cleaning agent and also used for control of household insects (Dost et al, 1996, p. 1). Borax has even been recommended as a "safe alternative to common household products" (Mother Earth News 1990; Wilmington College 2003; AEHA 2005). These "environmentally friendly" household cleaning solutions are in much closer proximity to humans and probably in higher concentrations than tree stump applications.

Human Health and Safety and Ecological Risk Analysis

Hazard Analysis

Dost et al (1996) report that most research on boron-related compounds focus on the biological effects of boric acid. References to boric acid are relevant in this analysis, as borax and boric acid are generally accepted as biologically equivalent, i.e. have similar biological effects (Dost et al, p.5).

Toxicity

Because of its low oral and dermal toxicity, Sporax® is a Class III (CAUTION) pesticide. However, because the active ingredient is an eye irritant, the label carries a DANGER signal word (USDA, 1994). Acute and chronic toxicity are summarized below (USDA,1994):

Acute toxicity

- **Acute oral toxicity:** The acute oral LD50 for borax was 5,400 mg/kg in male rats and 5,000 in female rats (Toxicity Category IV, Table I, Oral). Symptoms of acute poisoning include nausea, vomiting, diarrhea, and abdominal pain. In children, swallowing 5 to 10 grams can cause shock and death.
- **Acute dermal toxicity:** The acute dermal (skin) LD50 for borax was >2,000 mg/kg in rabbits. (Toxicity Category III, Table I, Dermal)
- **Primary irritation score:** In rabbits, 0.5 grams of borax did not cause skin irritation. (Toxicity Category IV, Table I, Skin irritation)
- **Primary eye irritation:** Borax was a severe eye irritant in rabbits (Toxicity Category I, Table I, Eye irritation)
- **Acute inhalation:** The EPA has not required inhalation studies for borax.

Chronic toxicity:

Mutagnicity and Carcinogenicity: Laboratory studies of mutagenicity with borax have been negative (USDA, 1994, p. 4). In a 2 year feeding study in rats, borax was not found to be carcinogenic. EPA classifies the related compound boric acid as a Group E carcinogen (evidence of non-carcinogenicity for humans).

Reproduction: Feeding studies in rats have indicated that chronic exposure to borax may cause reproductive damage and infertility (USDA FS, 1994, p. 4). **Developmental:** In other feeding studies, boric acid was given to rats and mice during pregnancy and had no effect on development (USDA,1994, p. 4).

Environmental Fate

Soil

Dost et al (1996, p. 6 and 7) report that boron is almost ubiquitous in the earth's crust, and is present in soil at low concentrations as a borate or related compound. Concentrations in soil are generally less than 10 ppm, but in some cases as high as 200 ppm (Eisler, 1990).

Persistence/Mobility: Borax is adsorbed by the mineral portion of the soil, and remains unchanged in the soil for varying lengths of time, depending on soil acidity and rainfall. The average persistence is 1 year or more. Borax is less persistent in acid soils and in areas with high rainfall conditions, where borax may leach rapidly, but has a greater rate of adsorption and immobilization in soils with less organic content. (USDA,1994).

Dost et al conducted a study to determine the distribution of boron in the environment before and after application of borax to freshly cut stumps. They found no increases in the boron content of adjacent foliage, litter and soil at various times after application, at up to 5 meters from the center of the stumps (Dost et al, 1996, p. 10 and 11, and Appendix A).

At high rates, borax can act as a soil sterilant (USDA, 1994, p. 4). Should a spill occur, the protocol for cleanup that is outlined in the Alder Creek project spill plan will be followed.

Water

Surface waters naturally contain low levels of boron at an average concentration from 0.001 mg/L to 0.1 mg/L (USDA, 1994). Although borax is highly soluble in water (Eisler, 1990), it has a low potential for surface water contamination (USDA, 1994). Although no data has been obtained on movement of borax to water after stump treatment, movement into surface or groundwater is unlikely, since borax is adsorbed to mineral particles in the soil, and plant uptake would probably scavenge any boron moving through soil (Dost et al, 1996). Dost et al report that although borates do not adsorb tightly to soils, attachment is such that only large amounts of rain or other water moving through the soil would be required to produce the leaching necessary to move boron to a water body (Burns and Collier,1980). Dost et al suggest that the absence of detectable boron taken up by adjacent plant after stump treatment, supports his conclusion that the migration of boron away from the site into water sources and aquatic flora and fauna at some distance from the site unlikely (Dost et al, 1996, p. 11).

The Alder Creek Project area receives precipitation primarily in the form of snow. Though intense thundershowers can occur in the summer, generally thundershowers are not of an intensity that would move borax off of cut stumps and into a water body. According to the Sporax® label, moisture in the exposed wood from freshly cut stumps, dew or rain, will dissolve the product and leach it into the wood (Wilbur-Ellis).

Project design features have been incorporated into the project design that would further minimize the potential for borax to enter stream courses, violate Lahontan Regional Water Quality Control Standards or affect soil productivity. Of particular importance are 25 foot no treatment buffers along live streams, hand application methods and spill contingency planning (Proposed Action, p. 6 and 7, #15 BMPs, no treatment buffers). Dost et al state that even if a significant spill were to occur, it is unlikely that measured amounts in water would be above background, natural levels of boron in water (Dost et al, 1996).

Exposure of and Risk to Human Health and Safety

Routes of Exposure for forest workers and forest users to boron

There are few potential routes of exposure for humans that might result from application of borax to cut stumps (Dost et al, 1996 p. 54-56). These are described below:

Dermal Contact:-The most likely exposure of humans should be during handling. Exposure of skin should result in virtually no absorption, unless borax contacts broken skin. Human exposure from handling borax or contact with treated stumps is not likely to result in acute or chronic toxicological effects (Dost et al, 1996).

Ingestion: Contact through the digestive tract can only arise from extreme carelessness, or intent. Human exposure from contact with treated stumps is not likely to result in acute or chronic toxicological effects (Dost et al, 1996).

Inhalation: In an industrial setting, workers have reported bronchial irritation after chronic exposure to borax dust (USDA, 1994, p. 5). However, Dost et al conclude that inhalation of significant amounts during typical forestry application is highly unlikely (Dost et al, 1996).

Estimated risk to workers and forest users

Evidence indicates that workers who apply borax to cut stumps are not at risk of adverse effects due to boron exposure (Dost et al, 1996 p. 61). Boron is excreted very rapidly without change by humans and other species, regardless of the route of intake (Dost et al, 1996 p. 57). Dost et al conclude that due to the limited routes of borax exposure to forestry workers and forest users, coupled very little absorption through the skin any doses incurred are expected to be inconsequential to human health and safety (Dost et al, 1996 p.59). USEPA (1993) states that "Applicators and others in treatment areas may be exposed to boric acid and its sodium salts during or after application. However there is no reasonable expectation that these pesticide uses may constitute a hazard or risk to people involved in, or near to, handling or application activities. Proper care and adhering to label directions and precautions should reduce exposure and any associated risk". The proposed action requires strict adherence to applicable state, federal laws regarding safe use of pesticides and to the Sporax label requirements, i.e., proper worker training, use of required personal protective equipment, washing hands after handling and before eating, spill contingency planning, etc. These measures provide additional assurance that workers or forest users would not be exposed to hazardous levels of borax through dermal contact, ingestion or inhalation. Because a heavily used recreational trail bisects the project area, a forest closure would be in effect during harvest activities to ensure public safety. Although the closure is not specifically prescribed to protect forest users during borax application, the closure would help reduce potential exposures. The Sporax® formulation is exempt from the Worker Protection Standard because application to stumps is not considered treatment of an agricultural crop, i.e. used for food feed, or fiber.

Exposure of and Risk to Wildlife

Routes of Exposure to Wildlife

Mammals

Two general routes of exposure are possible for mammals. Animals may ingest borax directly from the stump surface after application. However, Dost et al report that deer and cattle do not seem to be unduly attracted to free borax, based on study results and observation (Dost et al 1996, p. 59-60).The second route of exposure by animals is consumption of vegetation into which boron has moved over time, or consumption of surface litter, which is largely fallen vegetation that serves as a food source for small animals and invertebrates (Dost et al,1996, p. 60). As discussed previously, Dost et al (1996, p. 11) found no treatment-related increases in borax in adjacent soil, litter and vegetation before and after application to freshly cut stumps. If mammals were to consume vegetation or surface litter in the vicinity of treated stumps, exposure to borax is unlikely. As displayed in Table 1, acute oral toxicity in rats was approximately 5,000 mg/kg, which indicates that borax is practically non-toxic to mammals (USDA FS, 1994). **Bioaccumulation -** Based on mammalian feeding studies, borax is rapidly excreted from the body and does not concentrate in tissue (Dost et al, 1996)

Birds

USDA (1994,page 3) reports that borax is practically nontoxic to birds (Table 1 below). In a feeding study, only boron at high concentrations affected hatching success and survival, but did not affect fertility (Dost et al, 1996 p. 51).

Bioaccumulation-Large quantities of boric acid are used in some poultry facilities to control flies. Sander et al (1991) reported that application of as much as 7.2 kg boric acid per 9.9 M^2 (approximately 700g/M^2)of floor space resulted in no increase of boron residues in tissues of chicks. For comparison, distribution of borax over a forest site at the rate of one pound borax per 50 square feet of stump area would be 0.012 g/m^2 (Dost et al, 1996, p. 60). Feeding studies showed only non-significant increases in tissue residues at dietary concentrations up to 1250 ppm. (Dost et al, 1996, p.30).

Table 1. Acute toxic level to terrestrial animals (USDA, 1996, p. 4 and 9):

Species	LC50	Toxicological Category
rats	5,000-5400 mg/kg	Practically non-toxic (>2000 mg/kg)
quail	>2510 mg/kg	Practically non-toxic (>2000 mg/kg)
bee	>362 ppm	---

Estimated Risk to Wildlife

Based on existing data Dost et al conclude that adverse effects on wildlife from stump treatment with borax are improbable (Dost et al, 1996 p.61). Proposed use of borax in the Alder Creek Project is not expected to adversely impact wildlife for the following reasons:

- Relatively low rates of use
- Low probable risk of exposure, particularly since wildlife is not attracted to borax
- Low rate of bioaccumulation
- Relative non-toxicity to wildlife.

Though adverse impacts to individuals could occur, under an unlikely exposure e.g. a spill, populations would not be affected. Project design features including spill contingency planning; borax application by hand to cut stumps only (not vegetation, soil, or litter); relatively low use rates (minimum stump diameter of ≥ 14 inches), treatment staggered over approximately 5 years etc. are expected to minimize the risk to wildlife.

Exposure of and Risk to Plants

Boron is an essential nutrient for plants, and boron compounds, including borax occur widely in nature. Boron is taken up from soil by plants in proportion to the amount of boron in the soil. Borax is used in fertilizer formulations to supply boron. However, borax at high levels may kill plants, and may be used as a nonselective herbicide (USDA, 1994). Apparently the difference in doses between boron's effectiveness as a nutrient and its effect as an herbicide are not very distinct, and vary from species to species. Agricultural use of boron as a foliar fertilizer or fungicide generally occurs in the range of 0.9 to 9 lbs/acre (borax equivalent) while as a soil fertilizer, borax would be applied at a rate of 9 to 18 lbs/acre (Travis et al 2003, US Borax 2005). Above an application rate of 20 pounds borax per acre, there are indications that borax would act as an herbicide (27 pounds per acre is recommended as a control of creeping Charlie (Glechoma hederacea) in turf grass in the Midwest (Lunsford 1998)). Applied at very high rates (670 to 1,770 pounds borax per acre) it will act as a soil sterilant (WSSA 2002, US EPA 1993, Kimball et al 1956). US EPA (1993) states that borax can be applied to treat Klamath weed at a rate of 3-4 pounds/100 square feet (equivalent to 1,300 to 1,700 pounds/acre).

The average application of borax in Region 5 is 1 pound per acre while the heaviest application reported over the last five years was at 6 pounds per acre; 90% of the applications are at or below 2.5 pounds per acre. Admittedly there is little information on the levels of borax that result in negative plant effects, however, these rates of application are within the range used and recommended as foliar fertilizer applications on various agricultural crops and a factor of 10 times lower than recommended as a selective herbicide on turf grass. If Sporax was applied to foliage or the soil at the same rates as it is applied on the cut stump (1 pound/50 square feet), it would be applied in the range that would act as a soil sterilant (870 pounds per acre). The careful application onto the stump surface and the prompt cleanup of spillage is necessary to avoid effects to vegetation in close proximity to stumps. Again, Dost et al found through limited monitoring data that no treatment-related increases in boron content of adjacent foliage, litter, or soil resulted from stump treatment. Because of the proposed application method and use rates, spill contingency planning, etc. plants are not expected to be routinely exposed to Sporax or at risk.

Noxious Weeds

Application of Sporax is highly unlikely to cause disturbance which could encourage the spread of noxious weeds. An accidental spill may create potential habitat disturbance for noxious weeds by killing native vegetation, or could have a beneficial fertilizing effect depending on the amount spilled. However, the careful application onto the stump surface and the prompt cleanup of spillage, as directed in the project spill plan would likely avoid effects to vegetation in close proximity to stumps.

Sensitive Plants

The sensitive species *Meesia uliginosa* is known to occur in the Alder Creek Project area. Although highly unlikely, it is possible that Sporax may be spilled on or in close proximity to occurrences of *Meesia uliginosa.* This possibility would be mitigated by the protection of sensitive plant occurrences through designated flag and avoid control areas, in accordance with the Interim Management Prescriptions for Sensitive Plant Species, and spill contingency planning. However, outside flag and avoid control areas, there is a very small chance that direct effects to *M. uliginosa* could occur to any outlier plants. The 25 foot no borax treatment buffer along live streams would protect the riparian habitat in which *M. uliginosa is found* occurs, and would likely offer protection to outlier plants (Proposed Action, p. 7, #23). In such cases, application of Sporax may affect individuals but is unlikely to lead to a trend toward federal listing or loss of viability for sensitive plant species.

Exposure of and Risk to Aquatic Species

Exposure

Aquatic Species- The project area contains a known occurrence of the Mountain yellow-legged frog, a FS sensitive species and provides potential habitat for several other sensitive aquatic species. Dost et al report that low level effects of boron aquatic toxicity, such as no-observed effect concentrations (NOEC) or the concentrations affecting one percent of the study population (LC_{01}), have been difficult to specify because large changes in concentration produce relatively little change in effect (Dost et al, 1996 p. 31). The change in effect between concentrations of 0.001 and 10 ppm boron was almost not discernable (Dost et al, 1996 p. 32) which is quite different from that observed with most other chemicals, where the dose or concentration–response slope is usually steep enough to estimate a clear no-effect level (Dost et al, 1996 p.32-33)

It is generally recognized that rainbow trout are the fish species most sensitive to common boron compounds (Dost et al, 1996, p. 32). In a toxicity experiment with rainbow trout, Black et al (1993) found highly variable results. The lowest effective concentration was judged to be 0.1 ppm boron (Dost et al, 1996, p. 33-34). However, in a longer term study, Black et al (1993) found a no effect concentration at an exposure of 2.1 ppm. A survey of 76 trout bearing streams found many containing in excess of 0.1 ppm boron, including one stream containing 13 ppm, while all sustained viable populations (Dost et al, 1996, p. 35). Researchers conclude that some factor of natural waters may be protective. It seems likely that dissolved organic compounds may play some role in mitigating boron effects. It is likely that soluble organic molecules in water will reduce the availability of boron to aquatic animals (Loomis and Durst, 1992).

Bioaccumulation-The bioconcentration factor for boron for salmonids is less than one (Dost et al, 1996, p. 35), i.e. borax does not build up (bioaccumulate) in fish (USDA, 1994).

Dost et al report that amphibians are considerably less sensitive than trout, and that the post-hatch NOEC for the leopard frog exposed to boric acid was 13 ppm in soft water and 22 ppm in hard water. Corresponding values for exposures to borax were 5 ppm and 3ppm (Dost et al, 1996, p. 32).

USDA FS (1995) concludes that borax is practically nontoxic to fish, and practically nontoxic to aquatic invertebrate animals (Table 2, below).

Table 2. Acute toxic levels to fish and invertebrates (USDA, 1994, p. 3 and 8)

Species	LC50	Toxicological Category
fish	>1,000 ppm	Practically non-toxic (>100ppm)
water flea	133-226 ppm	Practically non-toxic (>100ppm)

Aquatic Habitat: The use of Sporax would not be expected to cause pesticide concentration in bottom sediments, because boron does not adsorb tightly to soils, particularly in the presence of large quantities of water (Dost et al, 1996). Maier and Knight point out that certain aquatic plants are more sensitive to boron and are likely to be markers of boron contamination of ecosystems (Dost et al, 1996, p. 39).

Estimated Risk to Aquatic Species

Application of borax to cut stumps is not expected to result in adverse effects to aquatic species, due to the low toxicity of borax to aquatic animals, and the low potential for borax to leach or enter surface water (USDA, 1994, p. 3). As discussed under the risks to water quality, mitigation measures incorporated into the project design, provide additional assurance that the potential for adverse impacts to aquatic species would be very low. There is a possibility that an amphibian on land can be exposed to borax outside the 25 foot buffer, which could lead to adverse impacts. Though an individual may be affected, effects to populations would not be expected.

Exposure of and Risk to Microorganisms and Insects

Exposure

Microorganisms: At high levels, borax could be toxic to many soil microorganisms (USDA, 1994, p. 3). However, Dost et al reason that in the highly variable medium of forest soil and litter, with substantial organic matter in the upper layers, both binding to organic material and leaching would tend to make borax unavailable to fungi (Dost et al, 1996 p. 37).

Insects- Relatively high concentrations of boron compounds are toxic to insects, and in some cases, borax is used for insect control While borax and boric acid are effective insecticides, the target organisms must come into direct contact with the powder, which may be carried to members of colonies that are not initially exposed (Grace, 1991) Dost et al report the findings in a termite study, which suggest a no-effect concentration of between 500 and 1000 ppm. When flies were exposed to a solution of water, sucrose and boric acid, a no effect level was about 400 ppm. However, water solutions were more toxic, possibly because of sucrose storage in the crop of the insect and slower release (Dost et al, 1996 p.37-38). According to Table 1 (Acute toxicity to wildlife), the LD_{50} of bees is >362 ppm. Based on this value, USDA (1994) concludes that borax is relatively nontoxic to bees.

Estimated Risk to invertebrates or microorganisms

Based on available research data or examination of potential maximum distribution in the environment surrounding treated stumps, use of borax for stump treatment should be expected to have no effect on invertebrates or microorganisms in the Alder Creek Project Area. It is unlikely that application of Sporax® on stumps would result in increases in boron or borates in the soil above background levels (Dost et al, 1996). If spilled or misapplied, localized effects on microorganisms could occur, however any effects would be restricted to a relatively small portion of the environment. US EPA (1993) states that beneficial insects will not be at risk from the uses of boric acid compounds. Since Sporax® is only applied to stumps and is not broadcasted over a large area, it is unlikely that there would be widespread exposure to insects. Though individuals could be affected in the event of a spill, or if individuals are in contact with treated stumps, when considered on the basis of landscape and populations, no detectable effects would be expected (Dost et al, 1996 p. 61-62).

Cumulative Effects

The Alder Creek project will be implemented over approximately the next 5 years. Cumulative impacts from borax treatment of cut stumps is not expected within the project area or Alder Creek Watershed, as borax generally dissipates within one year or less of application. Currently the Truckee Ranger District is not proposing any other timber management projects that prescribe borax use in the Alder Creek watershed. Region 5 policy requires borax treatment of cut stumps in recreational sites such as campgrounds to prevent potential spread of annosus root disease to residual, highly valued trees. Two heavily used recreational sites exist within ¼ mile of the project area. If borax treatment is needed within these recreational sites, the cumulative effects would be low, as relatively few stumps are likely to be treated at one time in these recreation sites.

The Tahoe Donner Association (TDA), an adjacent landowner is actively managing conifer stands on association lands to protect the homes in the TDA subdivision from catastrophic fire. According to Bill Houdyschell, TDA forester, the TDA has thinned stands to reduced hazardous fuels and improve forest health over the past 10 years, but does not utilize borax in their management program. It is not known whether borax is used on any other private forest land in the vicinity of the Alder Creek Project area. According to the California Department of Pesticide Regulation (DPR), Nevada County pesticide use records indicate that approximately 134 pounds of borax were used on 108 acres for forestry (stump treatment) in 2002. It is expected that borax use rates within the county will continue as recorded in the past. Given the relatively low borax usage in the county, adverse cumulative effects from borax use in forestry applications on private land are not expected.

The Alder Creek project lies adjacent to or in close proximity to three residential subdivisions that total well over 5,400 homes. If residents use borax, such use is likely in the form of household cleaning agents or insecticides. It is difficult to speculate how much this use may be. Only formulated insecticides would be registered as pesticides and regulated by product label requirements. If label instructions are followed, it is unlikely that cumulative adverse impacts to the Alder Creek Watershed from residential use of borax would occur. Borax, when used as a cleaning agent by area residents would likely end up in the Truckee Sanitation District sewer system, and would thus not add cumulative impacts to water quality in the Alder Creek watershed.

Summary

Available studies on borax indicate that borax is relatively benign to humans and the environment. Reports of adverse impacts from borax and related borate compounds occur only when exposures are much greater than would be expected under the Alder Creek Project proposal. Proposed borax use rates and hand application to the surface of recently cut stumps are not expected to result in exposures that would cause adverse effects to humans or the environment. Project design features and management requirements provide additional assurance that proposed application of borax to cut stumps would have no adverse direct, indirect or cumulative impacts to human health and safety and the environment.

Resource Protection Measures and Standard Management Requirements

The following resource protection measures requirements are included in the proposed action to minimize potential impacts to human health and safety and the environment from borax application to cut stumps (Proposed Action)

1. Apply borax (tradename Sporax®) by hand to cut stumps of all conifer species greater than or equal to (≥)14 inches stump diameter to minimize the spread of annosus root disease caused by the fungus Heterobasidion annosum. Apply Sporax® within 4 hours of felling, at a rate of 1 pound per 50 square feet of stump surface (approximately 1 pound/acre on average, though up to 2 pounds/acre could occur).

2. Comply with all applicable state and federal regulations for the safe use of pesticides, including the Sporax® label requirements, e.g., applicators will be adequately trained, medical aid will be available, wash water and eye wash water will be on site or nearby, and personal protective equipment will be used (eye protection, gloves, long-sleeved shirt, and long pants).

3. Close portions of the project area during operations to provide for public safety. A temporary Forest Order would be in effect, and publicized in the local newspaper, describing the areas closed to public access. These areas would be reopened, as soon as operations are completed.

4. Minimize risks to water quality when using Sporax® as follows:
   a. Implement Best Management Practices (BMPs) for pesticide application, including a spill contingency plan.
   b. Do not apply Sporax® within 25 feet of live streams, or riparian vegetation, whichever distance is greater.
   c. Do not apply Sporax® under periods of sustained rain.

5. Flag and avoid the known occurrence of the sensitive plant Meesia uliginosa during project activities in Unit 6a. Sporax® would not be applied within habitat for this species (See streamside buffer described under #15b).

6. Apply standard management requirements and contract clauses to protect resources during project activities.

7. Include the C clause for borax use in service contracts to ensure that contractors adhere to silvicultural prescriptions and follow federal and state regulations and label requirements for safe use.

References

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ATTACHMENT A

SPORAX® LABEL AND MATERIAL SAFETY DATA SHEET