Appendix C – Wildlife

Exposure Groups

Tables 5 – 9 Herbicides

Summary of Herbicide Effects to Wildlife – Shawna Bautista

This document was printed for the DEIS and removed for the FEIS printing. Information from this document can be found at http://fsweb.r6.fs.fed.us/nr/native-plants/project-planning/

Exposure Groups for Forest Service Sensitive Wildlife

Table C-1 displays the species group and the exposure scenario used in the SERA risk assessments (2001, 2003, and 2004). The individual species evaluated in this analysis (TES, MIS, SOLI) were placed into these exposure groups based on body size and food habits. Grouping various wildlife species facilitates calculation of estimated exposures to herbicides.

Table C- 1 - Exposure groups, exposure scenarios, and species included in each group.

Exposure Group	Exposure Scenarios	Species [1]
Large herbivorous mammal	Consumption of 100% contaminated grass	Rocky Mountain bighorn sheep, Rocky Mountain elk.
Carnivorous mammals	Consumption of an entire days diet of prey that has been directly sprayed on 50% of body surface	gray wolf, California wolverine, Pacific fisher, pine marten, Canada lynx.
Small Insectivorous mammals	Consumption of an entire day's diet of contaminated insects	spotted bat
Herbivorous birds	Consumption of 100% contaminated grass	Greater sage grouse (adults), sharp-tailed grouse (adults).
Insectivorous birds	Consumption of an entire days diet of contaminated small insects using empirical relationships for residues in vegetation (no data available on concentrations of pesticides in insects)	Greater sage grouse (chicks), sharp-tailed grouse (chicks), gray flycatcher, upland sandpiper, greater yellow-legs, tricolored blackbird, bobolink, pileated woodpecker, primary cavity excavators, landbirds and focal species,
Predatory birds[2]	Consumption of an entire day's diet of small mammal prey that has been directly sprayed	American peregrine falcon, Northern goshawk
Piscivorous birds	Consumption of fish contaminated by an accidental spill	bald eagle, horned grebe, bufflehead, greater yellowlegs
Reptiles	None available. Information from literature is used.	Painted turtle
Amphibians	For sulfometuron methyl, used water concentrations from runoff and percolation estimates. For other herbicides, information from literature is used	Northern leopard frog, Columbia spotted frog.

1 - Most animals will eat more than one type of food. Species were placed in groups that represented the majority of their diet, or the type of diet that would pose the most risk.
2 - No scenario is yet available for animals that feed primarily on birds, so exposures from mammal prey are used.

The general effects to wildlife from invasive plant treatments, and treatment standards are displayed in Table C-4. For sensitive species, dose estimates for each exposure group were obtained from Forest Service/ SERA risk assessments or calculated in project file worksheets using the Forest Service/SERA exposure scenarios. The exposure estimates were then compared to wildlife toxicity indices. Results of exposure scenarios for birds and mammals are found below in Table C-2 and Table C-3.

When data is insufficient to estimate doses, information from literature is used to evaluate toxic effects. These doses and information from the literature are subsequently used to evaluate effects to the members of each exposure group in conjunction with diet, plausibility of exposure scenario, behavior, etc.

Scientific uncertainty exists in extrapolating laboratory data to specific species and wild conditions. Laboratory species, and soil/air conditions may not accurately reflect in situation scenarios. Herbicides considered in this EIS have had comparatively little testing and analysis for amphibians and virtually no data exists for reptiles found in the Region. Also, data is insufficient to evaluate effects to predatory birds that eat primarily birds (i.e. American peregrine falcon), and ducks feeding primarily on aquatic insects (i.e. Harlequin ducks and bufflehead which are not present on the Forest). All these species need to be evaluated at the site-specific scale to determine the likelihood of exposure.

Effects of the Alternatives on Sensitive Wildlife

The invasive plant treatments projects were designed to reduce or eliminate adverse effects to sensitive species, as required in Treatment and Restoration Standard 22 for all alternatives; however, short-term, minor adverse effects (See individual species discussions) could occur under any alternative from the herbicide treatment methods. There may be some instances where it is most prudent to conduct a project that has a short-term adverse effect in order to provide a long-term beneficial effect to the habitat

Table C-2 and Table C-3 display the different herbicides that may be used, with restrictions, in the action alternatives. The No Action Alternative, which continues treatment under the existing 1994 EA, is limited to Glyphosate or Picloram. Dicamba was originally included in the list of approved herbicides for the 1994 EA, but was removed from use by the R6 2005 ROD. The exposure scenarios were compiled from the FS and SERA risk assessment found in the R6 2005 FEIS.

Symbol meanings are as follows for Tables C-2 and C-3:

- **--** Exposure scenario results in a dose below the toxicity index
- × •Exposure scenario results in a dose that exceeds the toxicity index

Table C- 2 - Exposure scenario results from FS/SERA risk assessments for mammals, birds, and honeybees using the typical application rate and upper residue rates

Animal/Scenario	Chlorsulfuron	Clopyralid	Glyphosate	Imazapic	Imazapyr	Metsulfuron methyl	Picloram	Sethoxydim	Sulfometuron methyl	Triclopyr	NPE Surfactant
ACUTE EXPOSURES											
Direct spray, bee	--	--	--	--	--	--	--	--	--	--	
Direct spray, sm. mammal	--	--	--	--	--	--	--	--	--	--	×
Consume Contaminated Vegetation											
small mammal	--	--	--	--	--	--	--	--	--	--	--
large mammal	--	--	--	--	--	--	--	--	--	--	×
large bird	--	--	--	--	--	--	--	--	--	×	×
Consume Contaminated Water											
Spill, sm. mammal	--	--	--	--	--	--	--	--	--	--	--
Consume Contaminated Insects											
small mammal	--	--	--	--	--	--	--	--	--	--	×
small bird	--	--	--	--	--	--	--	--	--	×	×
Consume Contaminated Prey											
carnivore (sm. mammal)	--	--	--	--	--	--	--	--	--	--	--
predatory bird (sm. mammal)	--	--	--	--	--	--	--	--	--	--	--
predatory bird (fish)	--	--	--	--	--	--	--	--	--	--	--
CHRONIC EXPOSURES											
Consume Contaminated Vegetation											
small mammal, on site	--	--	--	--	--	--	--	--	--	--	--
lg. mammal, on site	--	--	--	--	--	--	--	--	--	×	--
lg. bird, on site	--	--	--	--	--	--	--	--	--	×	--
Consume Contaminated Water											
small mammal	--	--	--	--	--	--	--	--	--	--	--
Consume Contaminated Insects#											
small mammal	--	**unk**	**--**	**--**	**--**	**--**	**unk**	**unk**	**unk**	**unk**	**unk**
small bird	--	**unk**	**unk**	**--**	**--**	**--**	**unk**	**unk**	**unk**	**unk**	**unk**
Consume Contaminated Prey											
carnivore (sm. mammal)#	--	--	--	--	--	--	--	--	--	×	--
predatory bird (sm. mammal)#	--	--	--	--	--	--	--	--	--	--	--
predatory bird (fish)	--	--	--	--	--	--	--	--	--	--	--

*Includes scenario for direct spray of a rabbit-sized mammal.
Data is lacking regarding chronic exposures, so effects are assumed by comparing acute dose vs. chronic NOAEL, and will likely over-estimate actual risk.
unk – unknown; insufficient data to assess risk

Table C- 3 - Exposure scenario results from FS/SERA risk assessments for mammals, birds, and honeybees using the highest application rate and upper residue rates

Animal/Scenario	Chlorsulfuron	Clopyralid	Glyphosate	Imazapic	Imazapyr	Metsulfuron methyl	Picloram	Sethoxydim	Sulfometuron methyl	Triclopyr	NPE Surfactant
ACUTE EXPOSURES											
Direct spray, bee	--	--	¨	--	--	--	--	--	--	¨	
Direct spray, sm. mammal	--	--	--	--	--	--	--	--	--	--	¨
Consume Contaminated Vegetation											
small mammal	--	--	--	--	--	--	--	--	--	--	¨
large mammal	--	--	¨	--	--	--	--	--	--	¨	¨
large bird	--	--	--	--	--	--	--	--	--	¨	¨
Consume Contaminated Water											
Spill, sm. mammal	--	--	--	--	--	--	--	--	--	--	--
Consume Contaminated Insects											
small mammal	--	--	¨	--	--	--	¨	--	--	¨	¨
small bird	--	--	¨	--	--	--	--	--	--	¨	¨
Consume Contaminated Prey											
carnivore (sm. mammal)	--	--	--	--	--	--	--	--	--	--	--
predatory bird (sm. mammal)	--	--	--	--	--	--	--	--	--	--	¨
predatory bird (fish)	--	--	--	--	--	--	--	--	--	--	--
CHRONIC EXPOSURES											
Consume Contaminated Vegetation											
small mammal, on site	--	--	--	--	--	--	--	--	--	--	--
lg. mammal, on site	--	--	--	--	--	--	--	--	¨	¨	--
lg. bird, on site	--	¨	¨	--	--	--	--	¨	¨	¨	--
Consume Contaminated Water											
small mammal	--	--	--	--	--	--	--	--	--	--	--
Consume Contaminated Insects#											
small mammal	--	**unk**	**unk**	--	--	--	**unk**	**unk**	**unk**	**unk**	**unk**
small bird	--	**unk**	**unk**	--	--	--	**unk**	**unk**	**unk**	**unk**	**unk**
Consume Contaminated Prey											
carnivore (sm. mammal)#	--	--	--	--	--	--	--	--	--	¨	¨
predatory bird (sm. mammal)#	--	--	--	--	--	--	--	¨	--	¨	¨
predatory bird (fish)	--	--	--	--	--	--	--	--	--	--	--

•Includes scenario for direct spray of a rabbit-sized mammal
Data is lacking regarding chronic exposures, so effects are assumed by comparing acute dose vs. chronic NOAEL, which will likely over-estimate actual risk.
unk – unknown; insufficient data to assess risk

In terms of effects to sensitive species, there are no substantial differences between the different standards and PDFs in the alternatives or the alternatives as a whole. Therefore, the following table, Table C- 4, summarizes the potential effects to each sensitive species group.

Table C- 4 - Potential effects from invasive plant treatment methods to groups of sensitive species

Sensitive Species Group	Potential Effects	Determination
Large herbivorous mammal	Worst-case exposure exceeds toxicity index from ingesting forage that has glyphosate, picloram, sulfometuron methyl, triclopyr, or NPE surfactants if broadcast sprayed. Worst-case herbicide exposure is highly unlikely for non-selective herbicides; more likely for selective herbicides.	MINL* Bighorns utilize cheatgrass. Worst-case exposure can be reduced by project design (Standard 22).
Small herbivorous mammals	Mechanical treatments may reduce cover and increase incidence of cheatgrass in certain habitat. Worst-case exposure exceeds toxicity index from ingesting forage that has been sprayed with triclopyr, or NPE surfactants if broadcast sprayed. Worst-case herbicide exposure is highly unlikely for non-selective herbicides; much more likely for selective herbicides.	MINL. Invasive plants threaten habitat. Short-term adverse effects provide long-term benefit. Worst-case exposure can be reduced by project design (Standard 22).
Carnivorous mammals	Infrequent and short-term disturbance from treatment projects could affect wolverines during breeding season. Worst-case exposure exceeds toxicity index from ingesting prey that has been sprayed with triclopyr. Worst-case herbicide exposure is highly unlikely.	MINL. Invasive plants may degrade habitat for some prey. Short-term adverse effects provide long-term benefit. Worst-case exposure highly unlikely.
Insectivorous mammals	Mechanical treatments may reduce foraging areas over the short-term. Worst-case exposure exceeds toxicity index from ingesting prey that has been sprayed with clopyralid, glyphosate, picloram, sethoxydim, sulfometuron methyl, and triclopyr if broadcast sprayed. Worst-case herbicide exposure is highly unlikely for bats, somewhat more likely for shrews.	MINL. Little overlap between invasive plants and shrew habitat. Bats may forage over large areas, reducing exposure. Worst-case exposure can be reduced by project design (Standard 22).
Herbivorous birds	Mechanical treatments may reduce cover and increase incidence of cheatgrass within grouse habitat. Worst-case exposure exceeds toxicity index from ingesting forage that has been sprayed with clopyralid, glyphosate, picloram, sethoxydim, sulfometuron methyl, and triclopyr if broadcast sprayed. Worst-case herbicide exposure is highly unlikely for non-selective herbicides; much more likely for selective herbicides.	MINL. Invasive plants threaten habitat. Short-term adverse effects provide long-term benefit. Worst-case exposure can be reduced by project design (Standard 22).
Insectivorous birds	Manual and mechanical treatments could trample or harm eggs or young of ground or low-nesting species during the breeding season. Worst-case exposure exceeds toxicity index from ingesting prey that has been sprayed with clopyralid, glyphosate, picloram, sethoxydim, sulfometuron methyl, and triclopyr if broadcast sprayed. Worst-case herbicide exposure is likely for grassland species on large projects.	MINL. Invasive plants threaten habitat for some species. Short-term adverse effects provide long-term benefit. Worst-case exposure can be reduced by project design (Standard 22).
Predatory birds	Manual and mechanical treatments could disturb species during the nesting season or affect their prey base. Worst-case exposure exceeds toxicity index from ingesting prey that has been sprayed with sethoxydim, and triclopyr if broadcast sprayed. Worst-case herbicide exposure is unlikely except aerial spray of grasslands.	MINL. Invasive plants may alter habitat for prey. Short-term adverse effects provide long-term benefit. Worst-case exposure can be reduced by project design (Standard 22).

Sensitive Species Group	Potential Effects	Determination
Piscivorous birds	Manual and mechanical treatments could disturb species during the nesting season. Worst-case exposure does not exceed toxicity index for any herbicide.	MINL. Invasive plants can reduce or eliminate preferred nesting habitat. Short-term adverse effects provide long-term benefit.
Reptiles	Mechanical treatments could trample or harm individuals. Insufficient data to determine potential effects from herbicides.	MINL. Species have extensive distributions. Most adverse effects can be reduced by project design (Standard 22).
Amphibians	Applications or accidental spills of glyphosate or triclopyr, could harm or kill amphibians.	MINL. Little overlap between invasive plants and amphibian habitat, except for riparian weeds. Herbicide exposure can be reduced by project design (Standard 22).

* May Impact, Not likely to adversely impact

Tables C-5 – C-9 Herbicides

Table C- 5 – Herbicides Analyzed in the Region 6 Invasive Plants EIS

Chemical Name	Selectivity	Sample Trade Name
Chlorsulfuron	broad-leaf	Telar, Glean, Corsair
Clopyralid	broad-leaf	Transline, Stinger
Dicamba*	broad-leaf & woody	Vanquish, Banvel
Glyphosate	No	RoundUp, Rodeo, Accord, Aquamaster
Imazapic	some broad-leaf & some grasses	Plateau
Imazapyr	No	Arsenal, Chopper, Stalker, Habitat
Metsulfuron methyl	broad-leaf & woody	Escort
Picloram	broad-leaf & woody	Tordon
Sethoxydim	grasses	Poast
Sulfometuron methyl	No	Oust
Triclopyr	broad-leaf & woody	Garlon, Pathfinder, Remedy
* Not selected in the 2005 Record of Decision. Not currently available for use on forests in R6.		

Table C- 6 - Herbicide and nonylphenol polyethoxylate application rates to be used to treat invasive plants, including the incidental rates of application of the impurity hexachlorobenzene

Herbicide	Highest Application Rate Lbs. a.i./acre	Typical Application Rate Lbs. a.i./acre*	Lowest Application Rate Lbs. a.i./acre
Chlorsulfuron	0.25	0.056	0.0059
Clopyralid	0.50	0.35	0.10
Glyphosate	7.00	2.00	0.50
Imazapic	0.19	0.130	0.031
Imazapyr	1.25	0.45	0.03
Metsulfuron Methyl	0.15	0.03	0.013

Picloram	1.00	0.35	0.10
Sethoxydim	0.38	0.30	0.094
Sulfometuron Methyl	0.38	0.045	0.03
Triclopyr	6.00	1.00	0.10
Nonylphenol Polyethoxylate	6.68	1.67	0.167
Hexachlorobenzene#	0.000012	0.000004	0.0000024

* pounds of active ingredient per acre
#These application rates reflect the incidental rates of application of the impurity hexachlorobenzene.
Source: USDA Forest Service 2003, SERA 1998, 2001, 2003

An exposure scenario was developed when enough data was available for a particular type of animal, and a quantitative estimate of dose received by the animal type in the scenario was calculated (SERA 2007). The quantitative estimates of dose were compared to available toxicity data to determine potential adverse impacts. The most sensitive response (i.e. a sub-lethal effect that occurred at the lowest dose) from the most sensitive species was used to determine the “toxicity indices” (described below) for each herbicide. The following analysis relies on these types of effects and effects of possible herbicide toxicity to wildlife discussed throughout this analysis are based on this following terminology (USDA-FS 2005 appendix P).

- NOAEL (No observed adverse effect level): An exposure level at which there is no statistically or biologically significant increases in the frequency or severity of adverse effects between the exposed population and its appropriate control. Some effects may be produced at this level, but they are not considered as adverse, or as precursors to adverse effects. In an experiment with several NOAELs, the regulatory focus is primarily on the highest one, leading to the common usage of the term NOAEL as the highest exposure without adverse effects.
- LOAEL (Lowest Observed Adverse Effect Level): The lowest dose associated with an adverse effect.
- Toxicity index: The benchmark dose used in analysis to determine a potential adverse effect when it is exceeded. Usually a NOAEL, but when data are lacking other values may be used.
- Acute Exposure: A single exposure or multiple brief exposures occurring within a short time (24 hours for most species).
- Chronic Exposure: Exposures that extend over the average lifetime or for a significant fraction of the lifetime of the species (exposure for 30 days for most species). Chronic exposure studies are used to evaluate the carcinogenic potential of chemicals and other long-term health effects.

Whenever sufficient data was available to determine the dose that resulted in no observable adverse effects (NOAEL), the NOAEL was used as the toxicity index. If data were not sufficient to determine a NOAEL, other endpoints of toxicity were used, such as the lowest-adverse-effect level (LOAEL), or the dose that was lethal to 50 percent of the test population (LD50). When a LOAEL or LD50 was used as the toxicity index, standard EPA methods for applying an uncertainty factor to the toxicity index to determine a level of concern were used. The standard EPA method for listed terrestrial species is to take 0.1 of the LD50 (EPA/OPP 2004), which is the protocol used in this analysis when a NOAEL is not available.

Table C- 7 - Toxicity indices for mammals used in the effects analysis. Indices represent the most sensitive endpoint from the most sensitive species for which adequate data are available

Herbicide	Duration	Endpoint	Dose	Species	Effect Noted at LOAEL
Chlorsulfuron	Acute	NOAEL	75 mg/kg	Rabbit	Decreased weight gain at 200 mg/kg
	Chronic	NOAEL	5 mg/kg/day	Rat	Weight changes at 25 mg/kg/day
Clopyralid	Acute	NOAEL	75 mg/kg	Rat	Decreased weight gain at 250 mg/kg
	Chronic	NOAEL	15 mg/kg/day	Rat	Thickening of gastric epithelium at 150 mg/kg/day
Dicamba	Acute	NOAEL	45 mg/kg1	Rat	Decreased pup growth at 120 mg/kg
	Chronic	NOAEL	45 mg/kg/day	Rat	Decreased pup growth at 120 mg/kg
Glyphosate	Acute	NOAEL	175 mg/kg	Rabbit	Diarrhea at 350 mg/kg
	Chronic	NOAEL	175 mg/kg/day	Rabbit	Diarrhea at 350 mg/kg
Imazapic	Acute	NOAEL	350 mg/kg	Rabbit	Decreased body weight at 500 mg/kg
	Chronic	NOAEL2	45 mg/kg	Dog	Microscopic muscle effects at 137 mg/kg
Imazapyr	Acute	NOAEL	250 mg/kg	Dog	No effects at highest doses tested
	Chronic	NOAEL	250 mg/kg/day	Dog	No effects at highest doses tested
Metsulfuron methyl	Acute	NOAEL3	25 mg/kg	Rat	Decreased weight gain at 500 mg/kg
	Chronic	NOAEL	25 mg/kg/day	Rat	Decreased weight gain at 125 mg/kg
Picloram	Acute	NOAEL	34 mg/kg	Rabbit	Decreased weight gain at 172 mg/kg
	Chronic	NOAEL	7 mg/kg	Dog	Increased liver weight at 35 mg/kg4
Sethoxydim	Acute	NOAEL	160 mg/kg5	Rabbit	Reduced number of viable fetuses, some dam mortality at 480 mg/kg
	Chronic	NOAEL	9 mg/kg/day	Dog	Mild anemia at 18 mg/kg/day
Sulfometuron methyl	Acute	NOAEL	87 mg/kg	Rat	Decreased body weight at 433 mg/kg
	Chronic	NOAEL	2 mg/kg/day	Rat	Effects on blood and bile ducts at 20 mg/kg/day
Triclopyr6	Acute	NOAEL	100 mg/kg	Rat	Malformed fetuses at 300 mg/kg
	Chronic7	NOAEL	0.5 mg/kg/day	Dog	Effect on kidney at 2.5 mg/kg/day
NPE Surfactants	Acute	NOAEL	10 mg/kg	Rat	Slight reduction of polysaccharides in liver at 50 mg/kg/day
	Chronic	NOAEL	10 mg/kg/day	Rat	Increased weights of liver, kidneys, ovaries, and decreased live pups at 50 mg/kg/day

Table C-8 – Comparison Summary of Herbicides and NPE Surfactant

Table C-8 categorizes the 10 herbicides considered in this analysis and displays their relative risk to wildlife from chronic and acute exposures. The categories are based on various criteria and while this information is displayed here to show relative risks associated with herbicides considered, it should be noted that risk from herbicide exposure from proposed activities were determined using data and methods outlined in the SERA risk assessments (2001, 2003, and 2004). Also risks identified in Tables C-2 and C-3 do not take into account implementation of PDFs, species specific behavior or other factors that would reduce the likelihood that an animal would receive levels of herbicides used in the exposure scenarios.

Table C- 8 - Relative Comparison Summary of the 10 Herbicides and NPE Surfactant

Herbicide & NPE Surfactant	Wildlife Risk
Chlorsulfuron, clopyralid, imazapic, imazapyr, metsulfuron methyl, sulfometuron methyl, sethoxydim	LOWEST = Exposure scenarios result in doses below the toxicity indices for all acute exposures, even at highest application rates.
Glyphosate, picloram	MODERATE = Exposure scenarios result in doses that exceed the toxicity indices for some acute exposures, but only at highest application rates.
Triclopyr, NPE-based surfactants	HIGHER = Exposure scenarios result in doses that exceed the toxicity indices for some acute exposures at typical application rates. (Risk of chronic exposure is variable and depends on many factors, including life history of wildlife, and persistence and selectivity of herbicide. Most chronic exposure scenarios are highly unlikely.)

It should be noted that broadcast applications would never exceed typical label rates shown in Table 6. Additionally for the purpose of this analysis it is assumed that the number of plausible exposure scenarios that exceed the toxicity indices is the same for the surfactant as it is for the herbicides. No estimate of acres treated using NPE surfactants is made because surfactants may not be used, or other additives may be used instead, so there is no direct correlation between acres treated with herbicide and acres treated with NPE.

Table C-9 – Exposure Scenarios

For Table C-9 symbol meanings are as follows:

-- Exposure scenarios result in a dose below the toxicity index at both the typical and highest application rates.
× Exposure scenarios result in a dose that exceeds the toxicity index at the typical and highest application rates.
¨ Exposure scenarios result in a dose that exceeds the toxicity index at the highest application rate only.

Table C- 9 - Summary of exposure scenario results for listed species

SPECIES	Chlorsulfuron	Clopyralid	Glyphosate	Imazapic	Imazapyr	Metsulfuron methyl	Picloram	Sethoxydim	Sulfometuron methyl	Triclopyr	NPE Surfactant
Grizzly Bear	--	--	¨	--	--	--	--	--	¨	×	×
Gray Wolf	--	--	--	--	--	--	--	--	--	×1	¨
Canada Lynx	--	--	--	--	--	--	--	--	--	×1	¨
Woodland Caribou	--	--	¨	--	--	--	--	--	¨	×	×
American Brown Pelican	--	--	--	--	--	--	--	--	--	--	--
No. Spotted Owl	--	--	--	--	--	--	--	¨ 1	--	¨ 1	¨ 1
Marbled Murrelet	--	--	--	--	--	--	--	--	--	--	--
Snowy Plover	--	--	--	--	--	--	--	--	--	--	--
OSS butterfly2	--	--	¨	--	--	--	--	--	--	¨	?
Bliss R snail3	--	--	--	--	--	--	--	--	--	--	--

1 These scenarios exceed the toxicity index only for assumed chronic exposures, risks are actually unknown, but the chronic exposure scenarios are not plausible.

2 Based on exposure scenario calculations for honeybee

3 Based on water concentrations used to calculate exposure to fish, and information on toxicity to federally listed aquatic invertebrates from analysis used for the EIS.

Source: SERA 1998, 2001, 2003, 2004 and USDA FS 2003.Summary of Herbicide Effects to Wildlife – Shawna Bautista

Summary of Herbicide Effects to Wildlife

DRAFT

Prepared by: Shawna L. Bautista, Wildlife Biologist, Invasive Plant EIS

US Forest Service, Region 6 Regional Office, Portland, OR

February 2005

This document was printed in full for the DEIS and removed for the FEIS printing. Information from this document is available on http://fsweb.r6.fs.fed.us/nr/native-plants/project-planning/