CHAPTER 12

EFFECTS OF THE ACTION TO ESA-LISTED SPECIES

1,3-DICHLOROPROPENE AND METOLACHLOR

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12 EFFECTS OF THE ACTION ANALYSIS

12.1 Introduction

See Chapters 4 (Approach to the Assessment) and 11 (Effects Analysis Introduction) for descriptions of the methods and information used in this section. In this section we integrate the exposure and response information to evaluate the likelihood of adverse effects from stressors of the action at the population and species level. The information is organized by species. Within each species section the information is presented in the following order:

1. R- Plots figures: Demonstrate the relationship between geographically-specific potential exposure distributions and assessment measures (response distributions). These figures also convey the prevalence of registered use sites within the species range by providing potential acreage of allowed uses within the species range and what the percent overlap of that use relative to the size of the species range. See Table 1 below, the assessment framework (chapter 4), and the introduction to the effects analysis (Chapter 11) for more information on the interpretation of risk plots. Additional information on the effects information displayed in risk plots is provided in the beginning of each of the effects analysis sections.

Table 1. General risk plot components

Title Species name is given, with ESU or DPS abbreviated, for example: **Chinook salmon PS (Range)** "(Range)" indicates that the species range, rather than designated critical habitat, was used to calculate overlap percentages.
Effect Concentrations See Tables below for 1,3-D, chloropricrin, and metolachlor specific information.
Exposure Concentrations The overlap category is listed, followed by the acres within species range and percent of species range composed of those acres, for example: Vegetables and Mint (40807, 0.6 %) Some use categories such as "field crops" and "fruit and nuts" show multiple overlap percentages. This reflects that more than one crop is lumped into this use category. See chapter 11 for a crosswalk of authorized use sites to overlap category. Circles represent estimated exposure concentrations for three modeled scenarios: bin 0 (open circles); bin 2 (gray circles); bin 7 (black circles). Note that there are three rows of estimated exposure concentrations for

each overlap category; each row represents a different time-weighted average: 1-day (bottom row); 4-day (middle row); and 21-day (top row).

2. Likelihood of exposure tables: Tables summarizing assessment of likelihood of exposure to each pesticide use that can occur within the species range.

3. Risk Hypotheses Tables: tables for each risk hypothesis summarizing risk and confidence associated with each registered use that occurs within the species range.

4. Final effects analysis table and narrative summary: Each species sections concludes with a Table indicating which risk hypotheses were supported and associated narrative summary of overall risk of the action to the species. Where applicable, the effects analysis table includes Pacific salmon population model output. Population model output is also provided in appendix A: Pacific Salmon Population Modeling. Ranges of acute mortality indicated by the risk-plots were combined with percent overlap values from the use area and species range data to identify ranges of acute mortality salmon population model outputs and estimate impacts on population productivity. The models assessed impacts to population growth rates for ocean-type Chinook, stream-type Chinook, sockeye, and coho salmon.

12.2 Products Containing 1,3-Dichloropropene Effects Analysis

The response endpoints displayed in the 1,3-Dichloropropene and chloropicrin risk plots that follow are provided in Table 2 & Table 3. See the introduction to the effects analysis chapter for more information regarding the available relevant toxicological data for these compounds.

Table 2. Effects endpoints displayed in risk plots for 1,3-Dichloropropene

Endpoint: Behavior

Test species: Rainbow Trout
Duration: 96-hr
Toxicity value (ppb): NOAEC (N) = 1460; LOAEC (L) = 2130
Citation/MRID: 49382003

Endpoint: Growth

Test species: Fathead Minnow
Duration: Chronic (ELS)
Toxicity value (ppb): NOAEC (N) = 15; LOAEC (L) = 34
Citation/MRID: 49682401

Endpoint: Aquatic Plants

Test species: Freshwater diatom (nv); Duckweed (v); Green algae (a)
Duration: 5-day; 7-day; 96-hr
Toxicity value (ppb): EC25= 30; 1310; 7850
Citation/MRID: 44843909; 44843914; 44940314

Endpoint: Prey Abundance

Test species: Water flea; Water flea
Duration: 48-hr
Toxicity value (ppb): EC50 (50) = 90; 6200; geometric mean* (gm) = 747; slope = 4.5 (assumed)
Citation/MRID: 40098001; 00117044

Endpoint: Direct Mortality

Test species: Rainbow Trout
Duration: 96-hr

Toxicity value (ppb): LC50 (50) = 2780; slope = 4.5 (assumed); None Expected (NE) = 244 Citation/MRID: 49382003
**The calculation and reference to the geometric mean of the two different LC50s was determined appropriate as the studies were otherwise comparable in regards to species tested, exposure duration, and overall data quality.*

Table 3. Effects endpoints displayed in risk plots for chloropicrin

Endpoint: Aquatic Plants   Test species: Duckweed (v); Green Algae (a) Duration: not specified Toxicity value (ppb): EC25 = 4.6; 85 Citation/MRID: 48442801; 49559701
Endpoint: Prey Abundance   Test species: Water flea Duration: Acute Toxicity value (ppb): EC50 (50) = 120; slope = 4.5 (assumed) Citation/MRID: 48442401
Endpoint: Direct Mortality   Test species: Rainbow Trout Duration: Acute Toxicity value (ppb): LC50 (50) = 11; slope = 4.5 (assumed); None Expected (NE) = 1 Citation/MRID: 48442405

Characterizing the "effect of exposure" for chloropicrin.

The effects analysis for 1,3-Dichloropropene, like metolachlor, is an assessment of the effects of the action which includes (1) approved product labels containing the primary active ingredient, (2) degradates and metabolites of that active ingredient, (3) formulations, including other ingredients within formulations, (4) adjuvants, and (5) tank mixtures. Some aspects of the effects of the action are considered quantitatively (e.g. direct mortality response to the primary active ingredient), whereas others are considered more qualitatively (e.g. recommended tank mixtures). Here we present a semi-quantitative analysis of chloropicrin, a common co-active ingredient in 1,3-Dichloropropene formulated products. A semi-quantitative assessment was determined to be

appropriate for chloropicrin given the frequency at which it is co-formulated with 1,3-Dichloropropene as well as its relatively greater toxicity to freshwater fish.

The effect of chloropicrin was considered in evaluating the direct mortality and prey availability risk hypotheses for each of the species considered. Data was not available to evaluate the effect of chloropicrin in the context of the other risk hypotheses. For direct mortality to fish, the effect of exposure associated with chloropicrin was characterized as medium. This follows from the criteria described in the assessment framework chapter i.e. relevant EECs falls between the one percent and the median effect level. Note in Figure 1 that bin 2 estimates (gray circles) fall between the 10 percent and 50 percent effect threshold for direct mortality. For invertebrate prey abundance, the effect of exposure was “none expected”, this is due to the lack of overlap between EECs and effects endpoints. Our confidence associated with the direct mortality and prey abundance risk characterizations was decreased with the added consideration of chloropicrin. This was primarily due to uncertainties in the exposure estimates and response data. Note also that not all 1,3-D/chloropicrin formulated products contain chloropicrin at levels indicating the potential for adverse effects. For example, Figure 2 shows EECs associated with the maximum label rates of all formulated products authorized for use on vegetables and mint. In this example, about half of the label’s maximum rates do not result in bin 2 estimates which exceed the 1% effects level for direct mortality.

The species-specific assessments that follow include effect of exposure characterizations for chloropicrin within the risk hypothesis tables. Chloropicrin risk plots are not provided for each ESU or DPS.

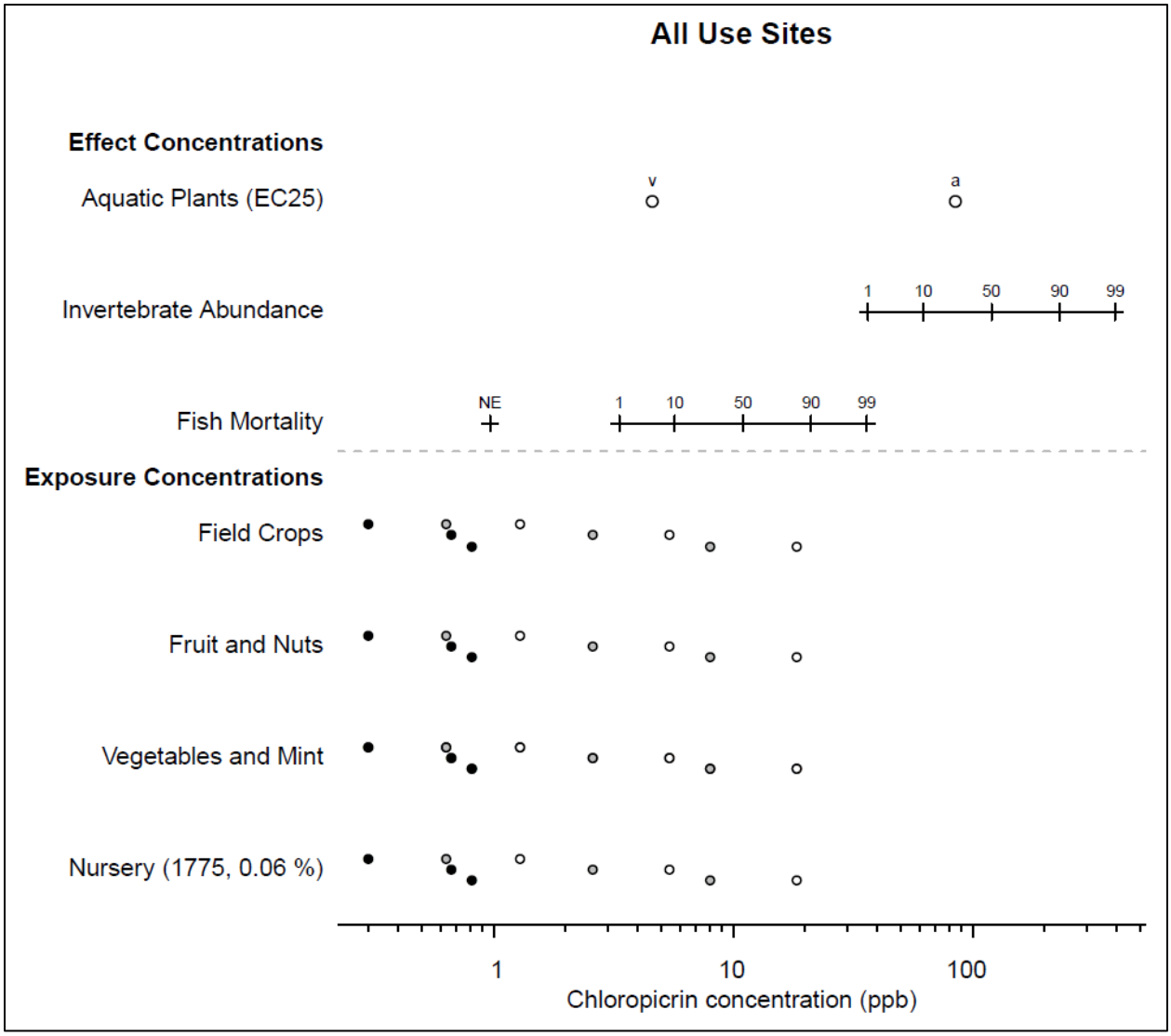


Figure 1. Chloropicrin estimated concentrations associated with the maximum label rates within each of the FIFRA section 3 uses authorized for 1,3-D/chloropicrin formulated products.

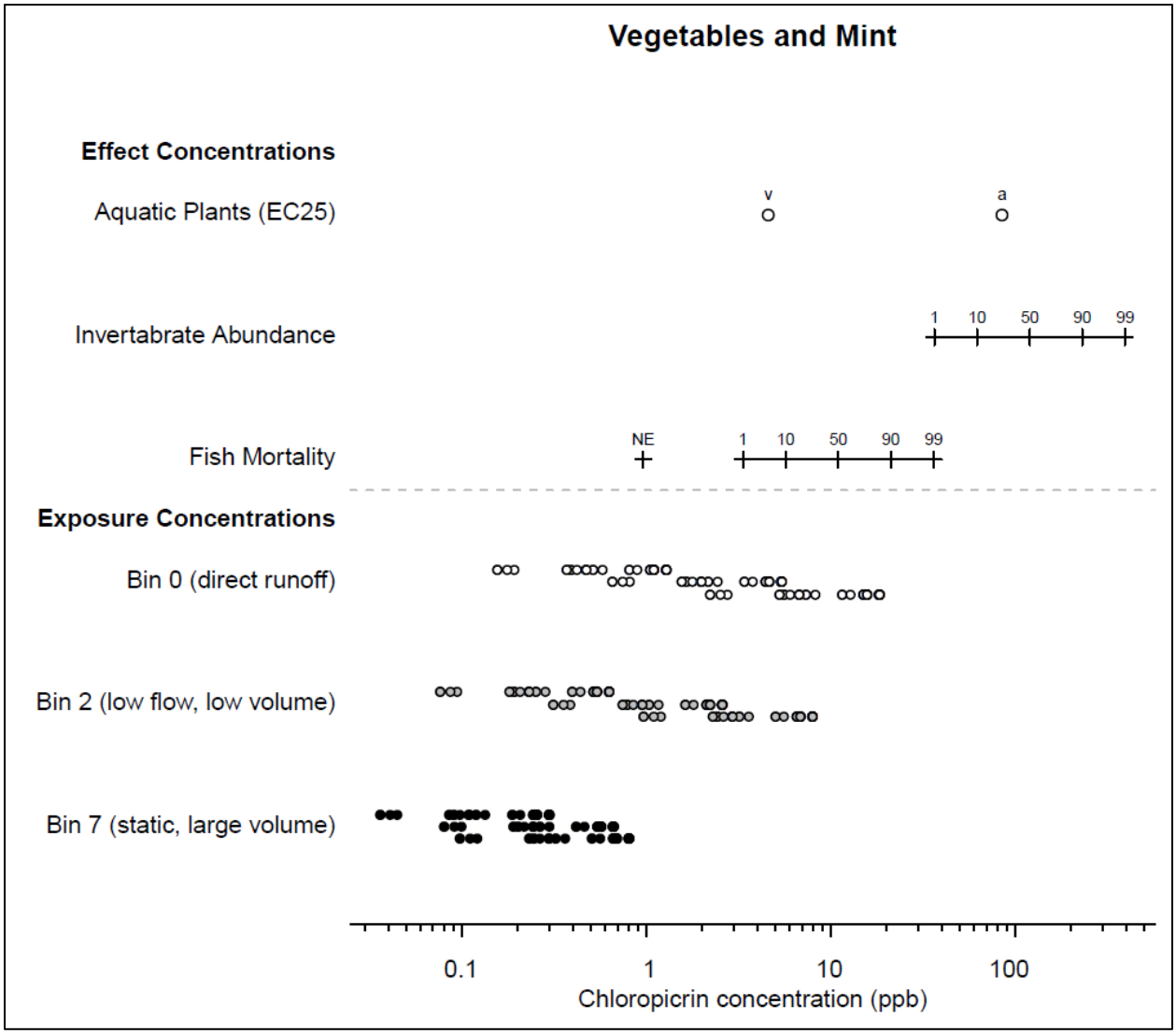


Figure 2. Chloropicrin estimated concentrations associated with the maximum rates in labels authorized for use on vegetables and mint.

12.2.1 Chum salmon, Columbia River ESU (*Oncorhynchus keta*)

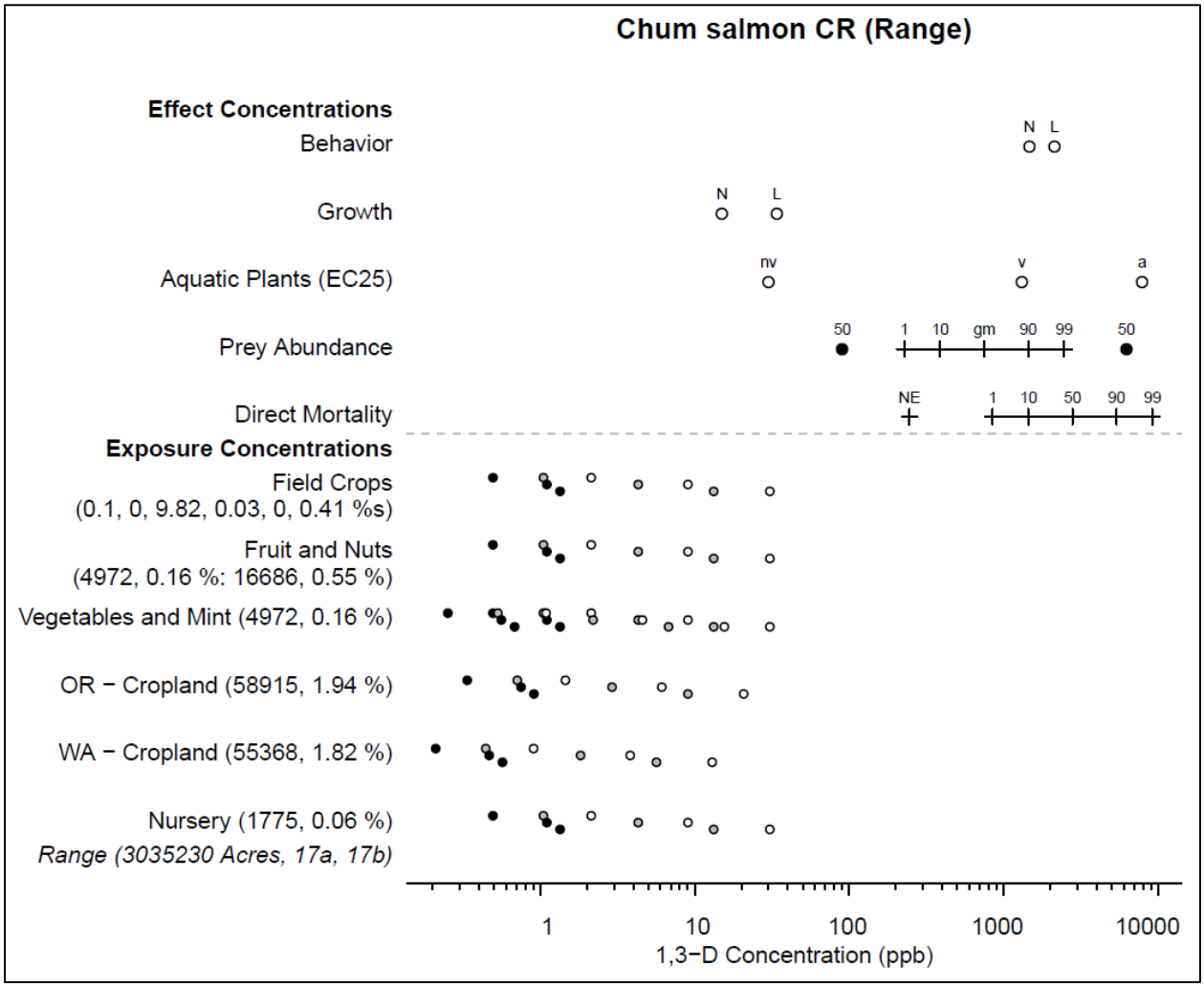
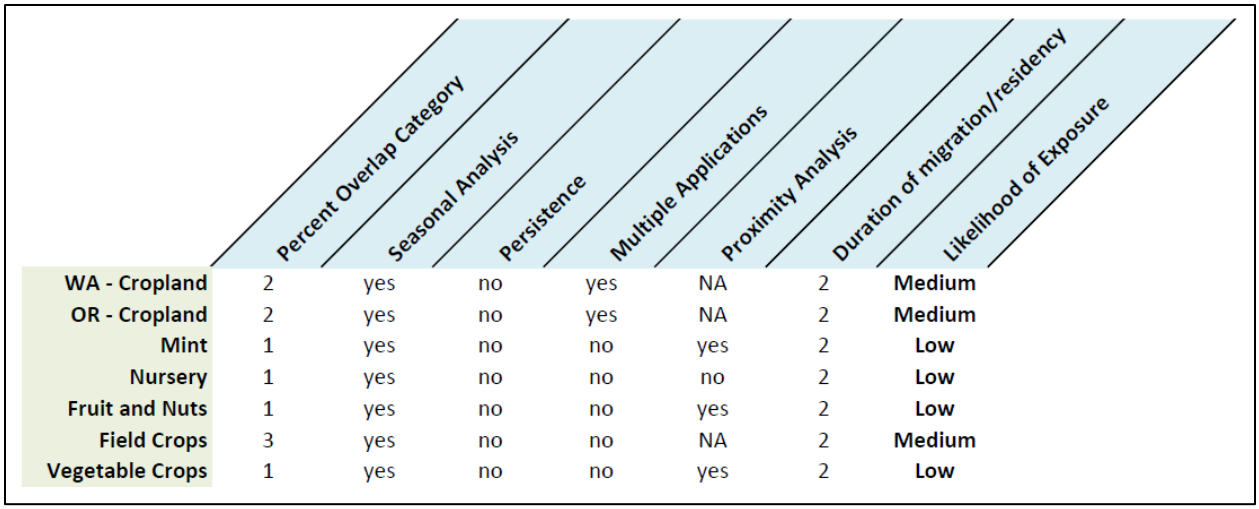


Figure 3. Effects analysis Risk-plot for Chum salmon, Columbia River ESU and products containing 1,3-Dichloropropene

Table 4. Likelihood of exposure determination for Chum salmon, Columbia River ESU and products containing 1,3-Dichloropropene



	Percent Overlap Category	Seasonal Analysis	Persistence	Multiple Applications	Proximity Analysis	Duration of migration/residency	Likelihood of Exposure
WA - Cropland	2	yes	no	yes	NA	2	Medium
OR - Cropland	2	yes	no	yes	NA	2	Medium
Mint	1	yes	no	no	yes	2	Low
Nursery	1	yes	no	no	no	2	Low
Fruit and Nuts	1	yes	no	no	yes	2	Low
Field Crops	3	yes	no	no	NA	2	Medium
Vegetable Crops	1	yes	no	no	yes	2	Low

Table 5. Direct mortality risk hypothesis; Chum salmon, Columbia River ESU and products containing 1,3-Dichloropropene

Endpoint: Mortality				
Use Category	**% Overlap**	**Effect of Exposure**		**Likelihood of Exposure**
		1,3-D	**Chloropicrin**	
WA - Cropland	1.94	None Expected	Medium	Medium
OR – Cropland	1.82	None Expected	Medium	Medium
Mint	0.16	None Expected	Medium	Low
Nursery	0.06	None Expected	Medium	Low
Fruit and Nuts	0.16, 0.55	None Expected	Medium	Low
Field Crops	0.1, 0, 9.82, 0.03, 0, 0.41	None Expected	Medium	Medium
Vegetable Crops	0.16	None Expected	Medium	Low
Risk Hypothesis: Exposure to products containing products containing 1,3-Dichloropropene is sufficient to reduce abundance via acute lethality.				
Risk	**Confidence**			
Medium	**Low**			

Table 6. Prey risk hypothesis; Chum salmon, Columbia River ESU and products containing 1,3-Dichloropropene

Endpoint: Prey

Use Category	% Overlap	Effect of Exposure		Likelihood of Exposure
		1,3-D	Chloropicrin	
WA - Cropland	1.94	None Expected	None Expected	Medium
OR – Cropland	1.82	None Expected	None Expected	Medium
Mint	0.16	None Expected	None Expected	Low
Nursery	0.06	None Expected	None Expected	Low
Fruit and Nuts	0.16, 0.55	None Expected	None Expected	Low
Field Crops	0.1, 0, 9.82, 0.03, 0, 0.41	None Expected	None Expected	Medium
Vegetable Crops	0.16	None Expected	None Expected	Low
Risk Hypothesis: Exposure to products containing products containing 1,3-Dichloropropene is sufficient to reduce abundance via reduction in prey availability.				
Risk	**Confidence**			
Low	**Medium**			

Table 7. Growth risk hypothesis; Chum salmon, Columbia River ESU and products containing 1,3-Dichloropropene

Endpoint: Growth			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
WA - Cropland	1.94	None Expected	Medium
OR – Cropland	1.82	None Expected	Medium
Mint	0.16	None Expected	Low
Nursery	0.06	None Expected	Low
Fruit and Nuts	0.16, 0.55	None Expected	Low
Field Crops	0.1, 0, 9.82, 0.03, 0, 0.41	None Expected	Medium
Vegetable Crops	0.16	None Expected	Low
Risk Hypothesis: Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via impacts to growth (direct toxicity).			
Risk	**Confidence**		
Low	**High**		

Table 8. Behavior risk hypothesis; Chum salmon, Columbia River ESU and products containing 1,3-Dichloropropene

Endpoint: Behavior

Use Category	% Overlap	Effect of Exposure	Likelihood of Exposure
WA - Cropland	1.94	None Expected	Medium
OR – Cropland	1.82	None Expected	Medium
Mint	0.16	None Expected	Low
Nursery	0.06	None Expected	Low
Fruit and Nuts	0.16, 0.55	None Expected	Low
Field Crops	0.1, 0, 9.82, 0.03, 0, 0.41	None Expected	Medium
Vegetable Crops	0.16	None Expected	Low
Risk Hypothesis: Exposure to products containing 1,3-Dichloropropene is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.			
Risk	**Confidence**		
Low	**High**		

Table 9. Effects analysis summary table: Chum salmon, Columbia River ESU and products containing 1,3-Dichloropropene

Risk Hypothesis	Risk-plot Derived		Population Model Results	Risk Hypothesis Supported? Yes/No
	Risk 1,3-D Chloropicrin	Confidence 1,3-D Chloropicrin		
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via acute lethality.	Medium	Low	Not Applicable	No
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via reduction in prey availability.	Low	Medium		No
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via impacts to growth (direct toxicity).	Low	High		No
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce adult and juvenile abundance and adult productivity via impairments	Low	High		No

to ecologically significant behaviors.				

Effects analysis summary: Chum salmon, Columbia River ESU are not anticipated to experience reductions in abundance through any of the risk hypotheses assessed from exposure to products containing 1,3-D or associated degradates. Some take is anticipated when formulated products containing chloropicrin are used in proximity to low flow, low volume species habitats. We did not find support for the risk hypotheses for prey abundance, growth, or behavior. Although risk associated with acute mortality is medium, we have low confidence in this determination because only a subset of product labels containing chloropicrin produced EECs which exceeded this determination threshold. Additionally, the likelihood of exposure characterizations for products containing 1,3-D indicate a greater likelihood than is anticipated because labeled use sites are broadly categorized (e.g. field crops). Exposure to multiple ingredients from formulated products and tank mixtures containing 1,3-Dichloropropene may result in increased toxicity. NMFS has determined the overall risk to the species from the effects of the action is medium and the confidence associated with that risk is low.

12.2.2 Chum Salmon, Hood Canal summer-run ESU (*Oncorhynchus keta*)

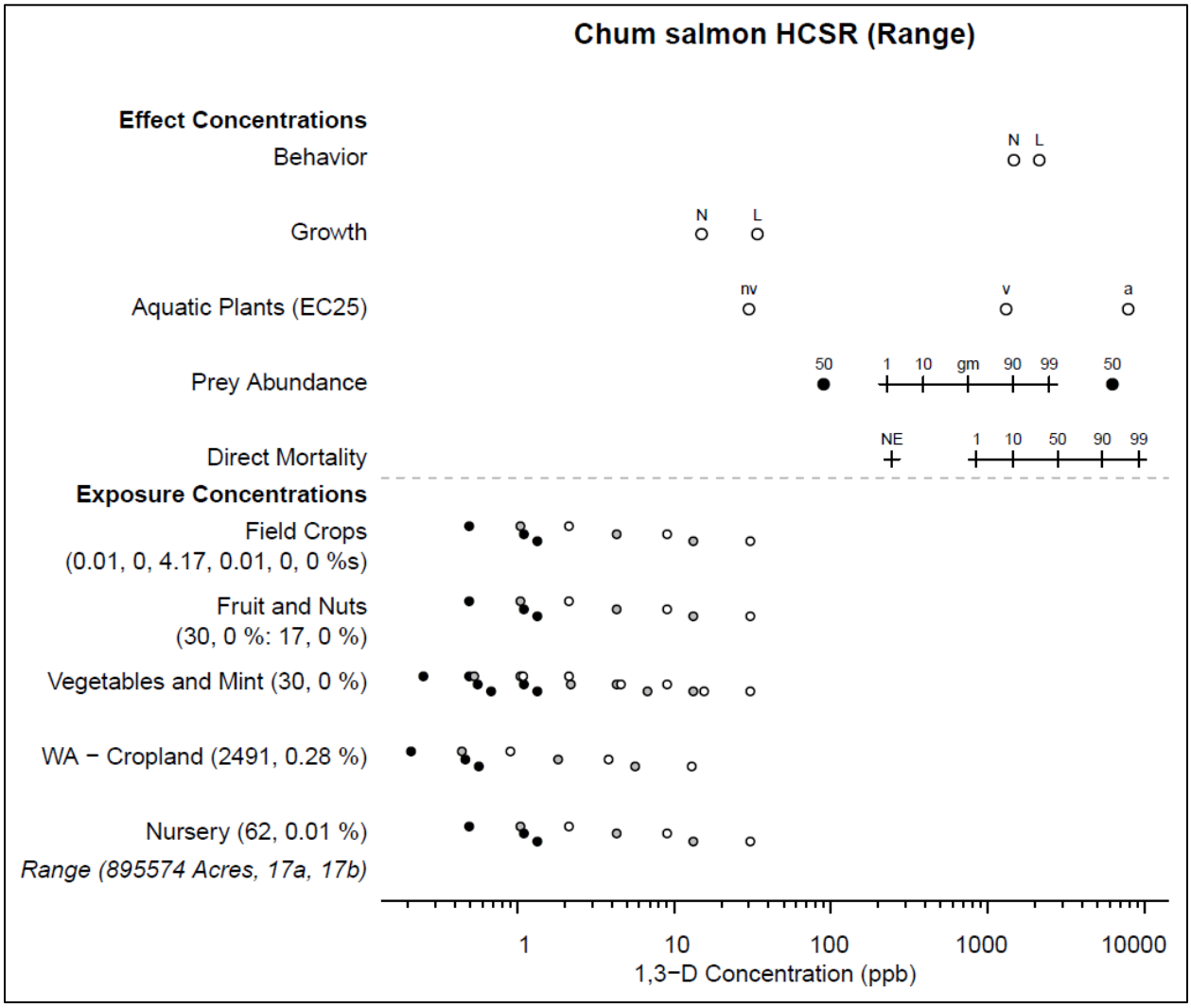


Figure 4. Effects analysis Risk-plot for Chum salmon, Hood Canal summer-run ESU and products containing 1,3-Dichloropropene

Table 10. Likelihood of exposure determination for Chum salmon, Hood Canal summer-run ESU and products containing 1,3-Dichloropropene

	Percent Overlap Category	Seasonal Analysis	Persistence	Multiple Applications	Proximity Analysis	Duration of migration/residency	Likelihood of Exposure
WA - Cropland	1	yes	no	yes	NA	2	**Low**
Mint	1	yes	no	no	no	2	**Low**
Nursery	1	yes	no	no	no	2	**Low**
Fruit and Nuts	1	yes	no	no	no	2	**Low**
Field Crops	2	yes	no	no	NA	2	**Medium**
Vegetable Crops	1	yes	no	no	no	2	**Low**

Table 11. Direct mortality risk hypothesis; Chum salmon, Hood Canal summer-run ESU and products containing 1,3-Dichloropropene

Endpoint: Mortality				
Use Category	**% Overlap**	**Effect of Exposure**		**Likelihood of Exposure**
		1,3-D	**Chloropicrin**	
WA - Cropland	0.28	None Expected	Medium	Low
Mint	0	None Expected	Medium	Low
Nursery	0.01	None Expected	Medium	Low
Fruit and Nuts	0,0	None Expected	Medium	Low
Field Crops	0.01, 0, 4.17, 0.01, 0, 0	None Expected	Medium	Medium
Vegetable Crops	0	None Expected	Medium	Low
Risk Hypothesis: Exposure to products containing products containing 1,3-Dichloropropene is sufficient to reduce abundance via acute lethality.				
Risk	**Confidence**			
Medium	**Low**			

Table 12. Prey risk hypothesis; Chum salmon, Hood Canal summer-run ESU and products containing 1,3-Dichloropropene

Endpoint: Prey				
Use Category	**% Overlap**	**Effect of Exposure**		**Likelihood of Exposure**
		1,3-D	**Chloropicrin**	
WA - Cropland	0.28	None Expected	None Expected	Low
Mint	0	None Expected	None Expected	Low
Nursery	0.01	None Expected	None Expected	Low
Fruit and Nuts	0,0	None Expected	None Expected	Low
Field Crops	0.01, 0, 4.17, 0.01, 0, 0	None Expected	None Expected	Medium
Vegetable Crops	0	None Expected	None Expected	Low
Risk Hypothesis: Exposure to products containing products containing 1,3-Dichloropropene is sufficient to reduce abundance via reduction in prey availability.				
Risk	**Confidence**			
Low	**Medium**			

Table 13. Growth risk hypothesis; Chum salmon, Hood Canal summer-run ESU and products containing 1,3-Dichloropropene

Endpoint: Growth			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
WA - Cropland	0.28	None Expected	Low
Mint	0	None Expected	Low
Nursery	0.01	None Expected	Low
Fruit and Nuts	0,0	None Expected	Low
Field Crops	0.01, 0, 4.17, 0.01, 0, 0	None Expected	Medium
Vegetable Crops	0	None Expected	Low
Risk Hypothesis: Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via impacts to growth (direct toxicity).			
Risk	**Confidence**		
Low	**High**		

Table 14. Behavior risk hypothesis; Chum salmon, Hood Canal summer-run ESU and products containing 1,3-Dichloropropene

Endpoint: Behavior			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
WA - Cropland	0.28	None Expected	Low
Mint	0	None Expected	Low
Nursery	0.01	None Expected	Low
Fruit and Nuts	0,0	None Expected	Low
Field Crops	0.01, 0, 4.17, 0.01, 0, 0	None Expected	Medium
Vegetable Crops	0	None Expected	Low
Risk Hypothesis: Exposure to products containing 1,3-Dichloropropene is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.			
Risk	**Confidence**		
Low	**High**		

Table 15. Effects analysis summary table: Chum salmon, Hood Canal summer-run ESU and products containing 1,3-Dichloropropene

Risk Hypothesis	**Risk-plot Derived**		**Population Model Results**	**Risk Hypothesis Supported? Yes/No**
	Risk 1,3-D Chloropicrin	**Confidence 1,3-D Chloropicrin**		
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via acute lethality.	Medium	Low	Not Applicable	No
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via reduction in prey availability.	Low	Medium		No
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via impacts to growth (direct toxicity).	Low	High		No
Exposure to products containing 1,3-Dichloropropene is sufficient	Low	High		No

to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.				

Effects analysis summary: Chum salmon, Hood Canal summer-run ESU are not anticipated to experience reductions in abundance through any of the risk hypotheses assessed from exposure to products containing 1,3-D or associated degradates. Some take is anticipated when formulated products containing chloropicrin are used in proximity to low flow, low volume species habitats. We did not find support for the risk hypotheses for prey abundance, growth, or behavior. Although risk associated with acute mortality is medium, we have low confidence in this determination because only a subset of product labels containing chloropicrin produced EECs which exceeded this determination threshold. Additionally, the likelihood of exposure characterizations for products containing 1,3-D indicate a greater likelihood than is anticipated because labeled use sites are broadly categorized (e.g. field crops). Exposure to multiple ingredients from formulated products and tank mixtures containing 1,3-Dichloropropene may result in increased toxicity. NMFS has determined the overall risk to the species from the effects of the action is medium and the confidence associated with that risk is low.

12.2.3 Chinook, California Coastal (*Oncorhynchus tshawytscha*)

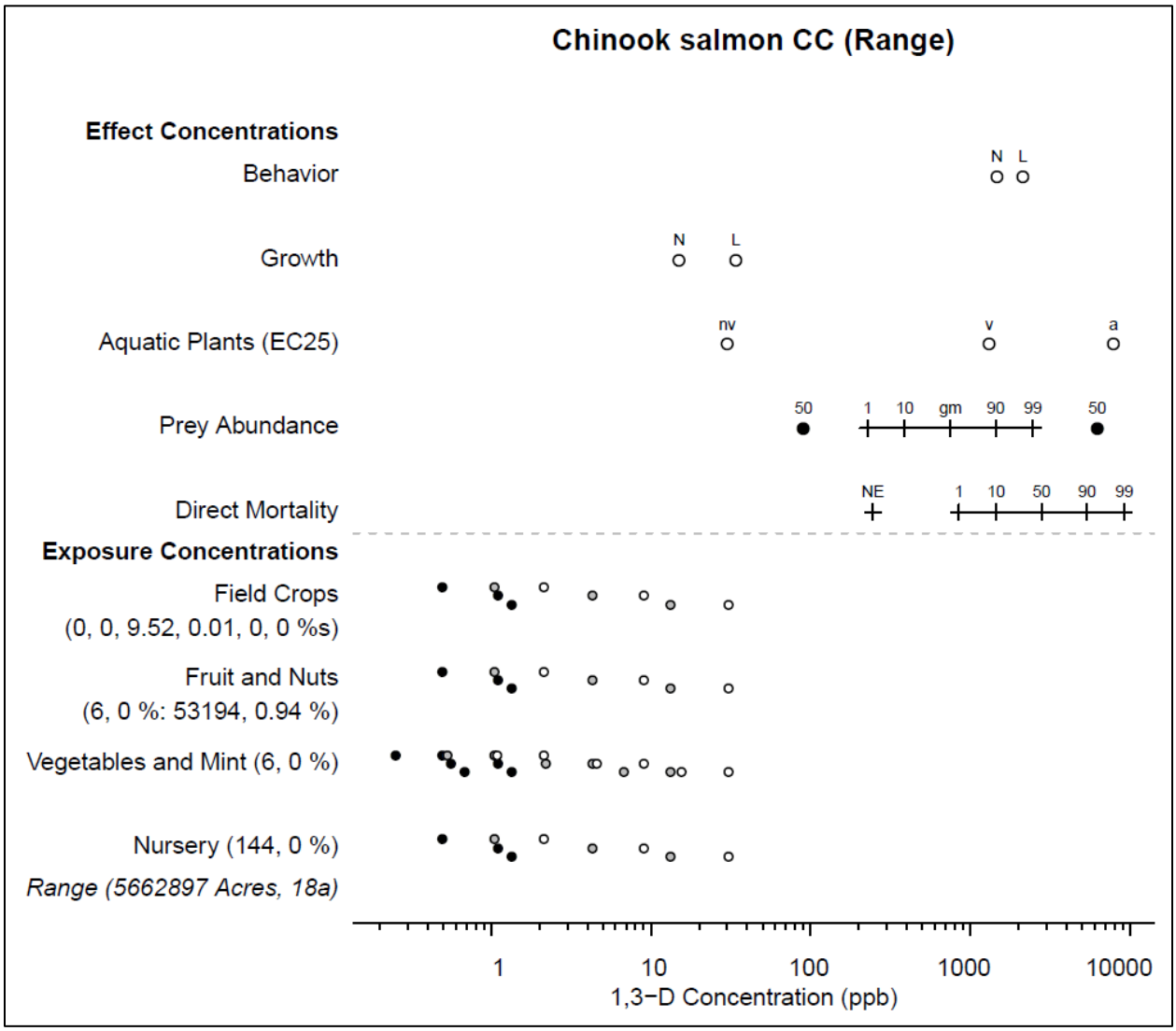
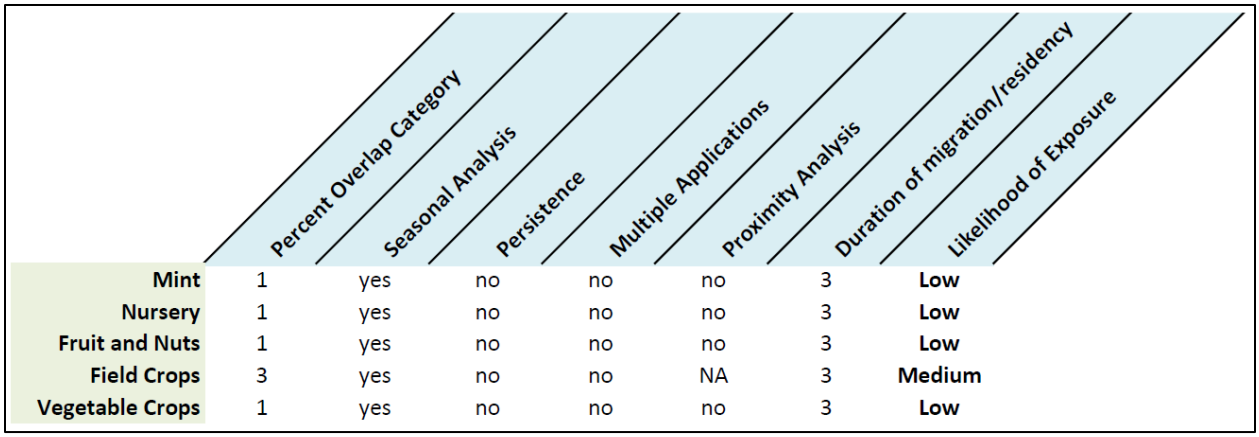


Figure 5. Effects analysis Risk-plot for Chinook salmon, California Coastal ESU and products containing 1,3-Dichloropropene

Table 16. Likelihood of exposure determination for Chinook salmon, California Coastal ESU and products containing 1,3-Dichloropropene



	Percent Overlap Category	Seasonal Analysis	Persistence	Multiple Applications	Proximity Analysis	Duration of migration/residency	Likelihood of Exposure
Mint	1	yes	no	no	no	3	**Low**
Nursery	1	yes	no	no	no	3	**Low**
Fruit and Nuts	1	yes	no	no	no	3	**Low**
Field Crops	3	yes	no	no	NA	3	**Medium**
Vegetable Crops	1	yes	no	no	no	3	**Low**

Table 17. Direct mortality risk hypothesis; Chinook salmon, California Coastal ESU and products containing 1,3-Dichloropropene

Endpoint: Mortality				
Use Category	**% Overlap**	**Effect of Exposure**		**Likelihood of Exposure**
		1,3-D	**Chloropicrin**	
Mint	0	None Expected	Medium	Low
Nursery	0	None Expected	Medium	Low
Fruit and Nuts	0,0.94	None Expected	Medium	Low
Field Crops	0, 0, 9.52, 0.01, 0, 0	None Expected	Medium	Medium
Vegetable Crops	0	None Expected	Medium	Low
Risk Hypothesis: Exposure to products containing products containing 1,3-Dichloropropene is sufficient to reduce abundance via acute lethality.				
Risk	**Confidence**			
Low	**High**			

Table 18. Prey risk hypothesis; Chinook salmon, California Coastal ESU and products containing 1,3-Dichloropropene

Endpoint: Prey				
Use Category	**% Overlap**	**Effect of Exposure**		**Likelihood of Exposure**
		1,3-D	**Chloropicrin**	
Mint	0	None Expected	None Expected	Low
Nursery	0	None Expected	None Expected	Low

Fruit and Nuts	0,0.94	None Expected	None Expected	Low
Field Crops	0, 0, 9.52, 0.01, 0, 0	None Expected	None Expected	Medium
Vegetable Crops	0	None Expected	None Expected	Low
Risk Hypothesis: Exposure to products containing products containing 1,3-Dichloropropene is sufficient to reduce abundance via reduction in prey availability.				
Risk	**Confidence**			
Low	**Medium**			

Table 19. Growth risk hypothesis; Chinook salmon, California Coastal ESU and products containing 1,3-Dichloropropene

Endpoint: Growth			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Mint	0	None Expected	Low
Nursery	0	None Expected	Low
Fruit and Nuts	0,0.94	None Expected	Low
Field Crops	0, 0, 9.52, 0.01, 0, 0	None Expected	Medium
Vegetable Crops	0	None Expected	Low
Risk Hypothesis: Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via impacts to growth (direct toxicity).			
Risk	**Confidence**		
Low	**High**		

Table 20. Behavior risk hypothesis; Chinook salmon, California Coastal ESU and products containing 1,3-Dichloropropene

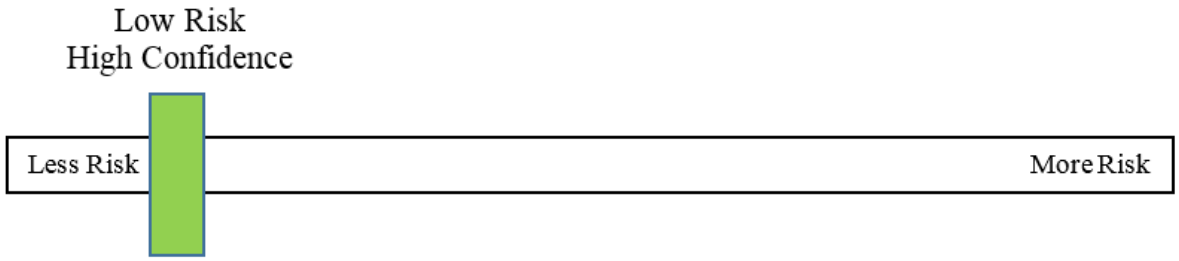
Endpoint: Behavior			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Mint	0	None Expected	Low
Nursery	0	None Expected	Low
Fruit and Nuts	0,0.94	None Expected	Low
Field Crops	0, 0, 9.52, 0.01, 0, 0	None Expected	Medium
Vegetable Crops	0	None Expected	Low
Risk Hypothesis: Exposure to products containing 1,3-Dichloropropene is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.			
Risk	**Confidence**		
Low	**High**		

Table 21. Effects analysis summary table: Chinook salmon, California Coastal ESU and products containing 1,3-Dichloropropene

Risk Hypothesis	Risk-plot Derived		Population Model Results	Risk Hypothesis Supported? Yes/No
	Risk 1,3-D Chloropicrin	Confidence 1,3-D Chloropicrin		
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via acute lethality.	Low	High	No impact for 1,3-D; some associated with chloropicrin (See chapter 11.5).	No
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via reduction in prey availability.	Low	Medium	Not modelled	No
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via impacts to growth (direct toxicity).	Low	High	Not modelled	No
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.	Low	High	Not modelled	No

Effects analysis summary: Chinook salmon, California Coastal ESU are not anticipated to experience reductions in abundance through any of the risk hypotheses assessed from exposure to 1,3-D or associated degradates. No changes in population growth rate occurred at the one percent mortality level for any model runs. This suggests that no changes in population growth would occur at the percent mortalities anticipated (less than one percent) with exposures to 1,3-D. Slight shifts in population growth rate occurred at the mortality levels anticipated for some formulated products containing chloropicrin, and increased with the percentage of the population exposed. Where formulated products and tank mixtures containing 1,3-D occur in aquatic habitats, individuals may experience increased toxicity. NMFS has determined the overall risk to

the species from the effects of the action is low and the confidence associated with that risk is high given the low risk associated with all risk hypotheses evaluated.



12.2.4 Chinook Salmon, Central Valley spring-run ESU (*Oncorhynchus tshawytscha*)

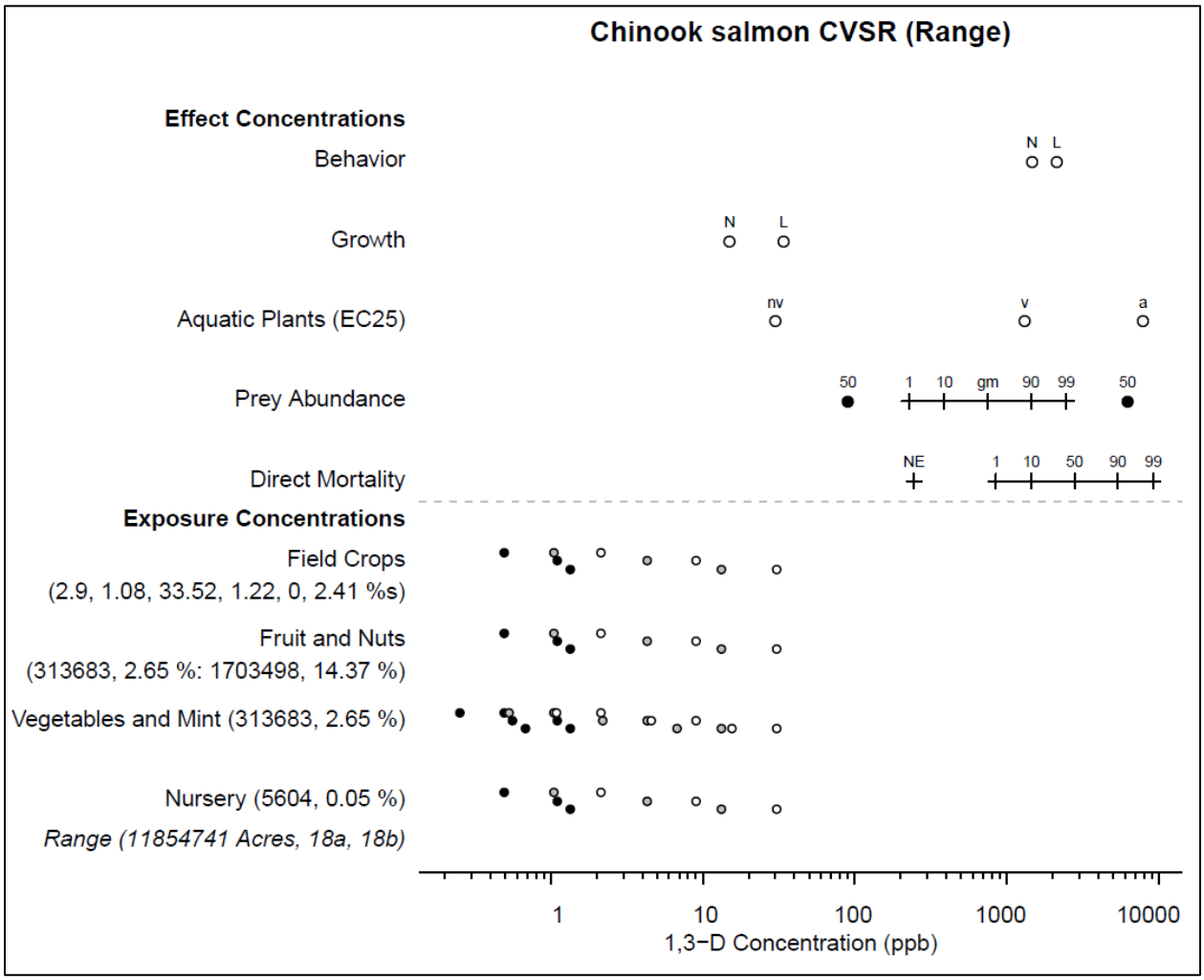


Figure 6. Effects analysis Risk-plot for Chinook salmon, Central Valley Spring-run ESU and products containing 1,3-Dichloropropene

Table 22. Likelihood of exposure determination for Chinook salmon, Central Valley Spring-run ESU and products containing 1,3-Dichloropropene

	Percent Overlap Category	Seasonal Analysis	Persistence	Multiple Applications	Proximity Analysis	Duration of migration/residency	Likelihood of Exposure
Mint	2	yes	no	no	NA	3	**Medium**
Nursery	1	yes	no	no	no	3	**Low**
Fruit and Nuts	3	yes	no	no	NA	3	**Medium**
Field Crops	3	yes	no	no	NA	3	**Medium**
Vegetable Crops	2	yes	no	no	NA	3	**Medium**

Table 23. Direct mortality risk hypothesis; Chinook salmon, Central Valley Spring-run ESU and products containing 1,3-Dichloropropene

Endpoint: Mortality				
Use Category	**% Overlap**	**Effect of Exposure**		**Likelihood of Exposure**
		1,3-D	**Chloropicrin**	
Mint	2.65	None Expected	Medium	Medium
Nursery	0.05	None Expected	Medium	Low
Fruit and Nuts	2.65, 14.37	None Expected	Medium	Medium
Field Crops	2.9, 1.08, 33.52, 1.22, 0, 2.41	None Expected	Medium	Medium
Vegetable Crops	2.65	None Expected	Medium	Medium
Risk Hypothesis: Exposure to products containing products containing 1,3-Dichloropropene is sufficient to reduce abundance via acute lethality.				
Risk	**Confidence**			
Medium	**Low**			

Table 24. Prey risk hypothesis; Chinook salmon, Central Valley Spring-run ESU and products containing 1,3-Dichloropropene

Endpoint: Prey				
Use Category	**% Overlap**	**Effect of Exposure**		**Likelihood of Exposure**
		1,3-D	**Chloropicrin**	
Mint	2.65	None Expected	Medium	Medium
Nursery	0.05	None Expected	Medium	Low

Fruit and Nuts	2.65, 14.37	None Expected	Medium	Medium
Field Crops	2.9, 1.08, 33.52, 1.22, 0, 2.41	None Expected	Medium	Medium
Vegetable Crops	2.65	None Expected	Medium	Medium
Risk Hypothesis: Exposure to products containing products containing 1,3-Dichloropropene is sufficient to reduce abundance via reduction in prey availability.				
Risk	**Confidence**			
Low	**Medium**			

Table 25. Growth risk hypothesis; Chinook salmon, Central Valley Spring-run ESU and products containing 1,3-Dichloropropene

Endpoint: Growth			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Mint	2.65	None Expected	Medium
Nursery	0.05	None Expected	Low
Fruit and Nuts	2.65, 14.37	None Expected	Medium
Field Crops	2.9, 1.08, 33.52, 1.22, 0, 2.41	None Expected	Medium
Vegetable Crops	2.65	None Expected	Medium
Risk Hypothesis: Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via impacts to growth (direct toxicity).			
Risk	**Confidence**		
Low	**High**		

Table 26. Behavior risk hypothesis; Chinook salmon, Central Valley Spring-run ESU and products containing 1,3-Dichloropropene

Endpoint: Behavior			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Mint	2.65	None Expected	Medium
Nursery	0.05	None Expected	Low
Fruit and Nuts	2.65, 14.37	None Expected	Medium
Field Crops	2.9, 1.08, 33.52, 1.22, 0, 2.41	None Expected	Medium
Vegetable Crops	2.65	None Expected	Medium
Risk Hypothesis: Exposure to products containing 1,3-Dichloropropene is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.			
Risk	**Confidence**		

Low	**High**	

Table 27. Effects analysis summary table: Chinook salmon, Central Valley Spring-run ESU and products containing 1,3-Dichloropropene

Risk Hypothesis	**Risk-plot Derived**		**Population Model Results**	**Risk Hypothesis Supported? Yes/No**
	Risk 1,3-D Chloropicrin	**Confidence 1,3-D Chloropicrin**		
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via acute lethality.	Medium	Low	No impact for 1,3-D; some associated with chloropicrin (See chapter 11.5).	No
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via reduction in prey availability.	Low	Medium	Not modelled	No
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via impacts to growth (direct toxicity).	Low	High	Not modelled	No
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.	Low	High	Not modelled	No

Effects analysis summary: Chinook salmon, California Central-Valley spring-run ESU are not anticipated to experience reductions in abundance through any of the risk hypotheses assessed from exposure to products containing 1,3-D or associated degradates. Some take is anticipated when formulated products containing chloropicrin are used in proximity to low flow, low volume species habitats. We did not find support for the risk hypotheses for prey abundance, growth, or behavior. Although risk associated with acute mortality is medium, we have low confidence in this determination because only a subset of product labels containing chloropicrin produced EECs which exceeded this determination threshold. Additionally, the likelihood of exposure characterizations for products containing 1,3-D indicate a greater likelihood than is anticipated because labeled use sites are broadly categorized (e.g. field crops). No changes in population growth rate occurred at the one percent mortality level for any model runs. This suggests that no changes in population growth would occur at the percent mortalities anticipated (less than one percent) with exposures to 1,3-D. Slight shifts in population growth rate occurred at the mortality levels anticipated for some formulated products containing chloropicrin, and increased with the percentage of the population exposed. Exposure to multiple ingredients from formulated products and tank mixtures containing 1,3-D may result in increased toxicity. NMFS has determined the overall risk to the species from the effects of the action is medium and the confidence associated with that risk is low.

12.2.5 Chinook Salmon, Lower Columbia River ESU (*Oncorhynchus tshawytscha*)

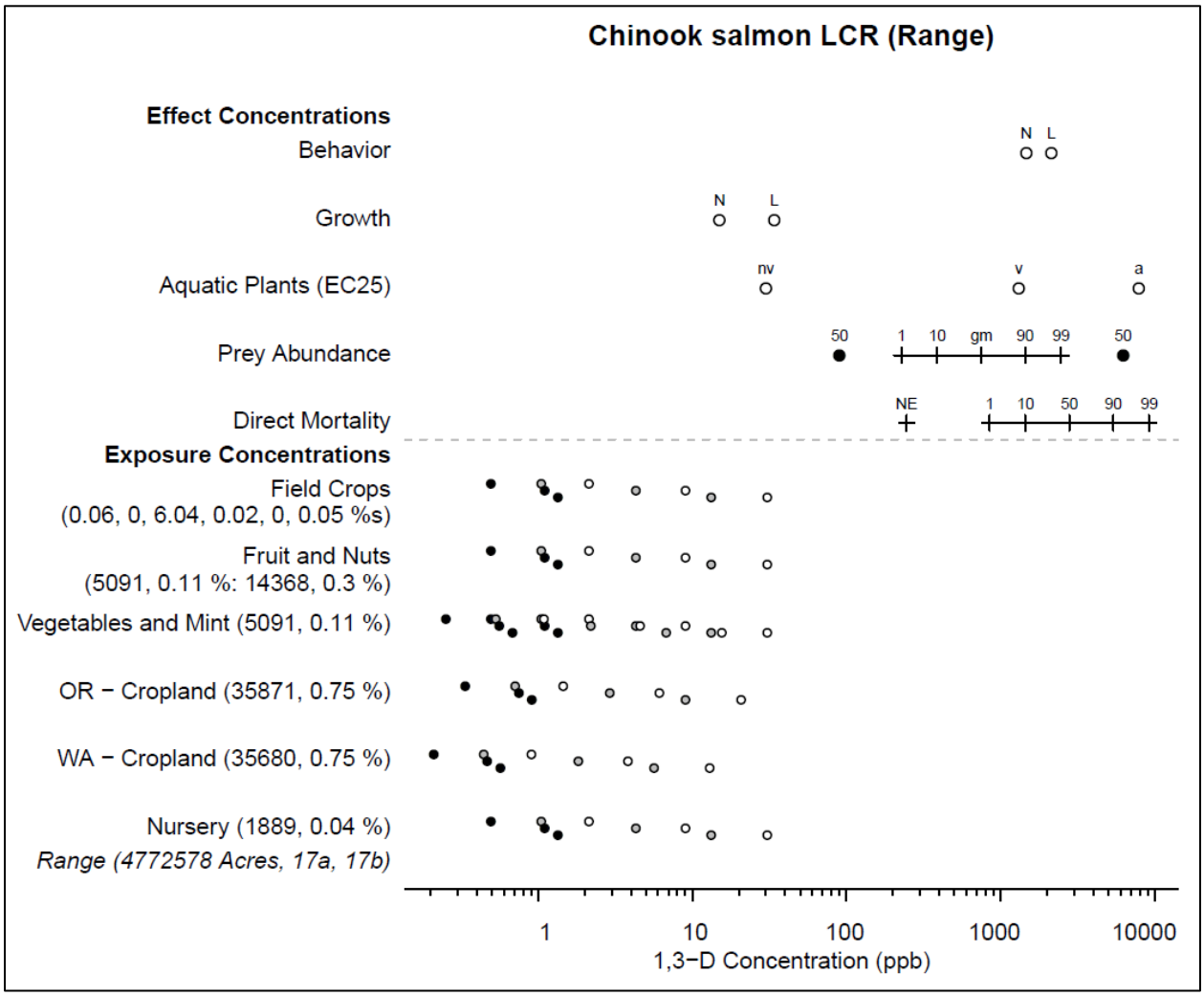


Figure 7. Effects analysis Risk-plot for Chinook salmon, Lower Columbia River ESU and products containing 1,3-Dichloropropene

Table 28. Likelihood of exposure determination for Chinook salmon, Lower Columbia River ESU and products containing 1,3-Dichloropropene

	Percent Overlap Category	Seasonal Analysis	Persistence	Multiple Applications	Proximity Analysis	Duration of migration/residency	Likelihood of Exposure
OR - Cropland	1	yes	no	yes	yes	3	High
WA - Cropland	1	yes	no	yes	yes	3	High
Mint	1	yes	no	no	yes	3	Medium
Nursery	1	yes	no	no	no	3	Low
Fruit and Nuts	1	yes	no	no	yes	3	Medium
Field Crops	3	yes	no	no	NA	3	Medium
Vegetable Crops	1	yes	no	no	yes	3	Medium

Table 29. Direct mortality risk hypothesis; Chinook salmon, Lower Columbia River ESU and products containing 1,3-Dichloropropene

Endpoint: Mortality				
Use Category	**% Overlap**	**Effect of Exposure**		**Likelihood of Exposure**
		1,3-D	**Chloropicrin**	
OR Cropland	0.75	None Expected	Medium	High
WA Cropland	0.75	None Expected	Medium	High
Mint	0.11	None Expected	Medium	Medium
Nursery	0.04	None Expected	Medium	Low
Fruit and Nuts	0.11, 0.3	None Expected	Medium	Medium
Field Crops	0.06, 0, 6.04, 0.02, 0, 0.05	None Expected	Medium	Medium
Vegetable Crops	0.11	None Expected	None Expected	Medium
Risk Hypothesis: Exposure to products containing products containing 1,3-Dichloropropene is sufficient to reduce abundance via acute lethality.				
Risk	**Confidence**			
Medium	**Low**			

Table 30. Prey risk hypothesis; Chinook salmon, Lower Columbia River ESU and products containing 1,3-Dichloropropene

Endpoint: Prey

Use Category	% Overlap	Effect of Exposure		Likelihood of Exposure
		1,3-D	Chloropicrin	
OR Cropland	0.75	None Expected	None Expected	High
WA Cropland	0.75	None Expected	None Expected	High
Mint	0.11	None Expected	None Expected	Medium
Nursery	0.04	None Expected	None Expected	Low
Fruit and Nuts	0.11, 0.3	None Expected	None Expected	Medium
Field Crops	0.06, 0, 6.04, 0.02, 0, 0.05	None Expected	None Expected	Medium
Vegetable Crops	0.11	None Expected	None Expected	Medium
Risk Hypothesis: Exposure to products containing products containing 1,3-Dichloropropene is sufficient to reduce abundance via reduction in prey availability.				
Risk	**Confidence**			
Low	**Medium**			

Table 31. Growth risk hypothesis; Chinook salmon, Lower Columbia River ESU and products containing 1,3-Dichloropropene

Endpoint: Growth			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
OR Cropland	0.75	None Expected	High
WA Cropland	0.75	None Expected	High
Mint	0.11	None Expected	Medium
Nursery	0.04	None Expected	Low
Fruit and Nuts	0.11, 0.3	None Expected	Medium
Field Crops	0.06, 0, 6.04, 0.02, 0, 0.05	None Expected	Medium
Vegetable Crops	0.11	None Expected	Medium
Risk Hypothesis: Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via impacts to growth (direct toxicity).			
Risk	**Confidence**		
Low	**High**		

Table 32. Behavior risk hypothesis; Chinook salmon, Lower Columbia River ESU and products containing 1,3-Dichloropropene

Endpoint: Behavior

Use Category	% Overlap	Effect of Exposure	Likelihood of Exposure
OR Cropland	0.75	None Expected	High
WA Cropland	0.75	None Expected	High
Mint	0.11	None Expected	Medium
Nursery	0.04	None Expected	Low
Fruit and Nuts	0.11, 0.3	None Expected	Medium
Field Crops	0.06, 0, 6.04, 0.02, 0, 0.05	None Expected	Medium
Vegetable Crops	0.11	None Expected	Medium
Risk Hypothesis: Exposure to products containing 1,3-Dichloropropene is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.			
Risk	**Confidence**		
Low	**High**		

Table 33. Effects analysis summary table: Chinook salmon, Lower Columbia River ESU and products containing 1,3-Dichloropropene

Risk Hypothesis	Risk-plot Derived		Population Model Results	Risk Hypothesis Supported? Yes/No
	Risk 1,3-D Chloropicrin	Confidence 1,3-D Chloropicrin		
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via acute lethality.	Medium	Low	No impact for 1,3-D; some associated with chloropicrin (See chapter 11.5).	No
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via reduction in prey availability.	Low	Medium	Not modelled	No
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via impacts to growth (direct toxicity).	Low	High	Not modelled	No
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce adult	Low	High	Not modelled	No

and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.				

Effects analysis summary: Chinook salmon, Lower Columbia River ESU are not anticipated to experience reductions in abundance through any of the risk hypotheses assessed from exposure to products containing 1,3-D or associated degradates. Some take is anticipated when formulated products containing chloropicrin are used in proximity to low flow, low volume species habitats. We did not find support for the risk hypotheses for prey abundance, growth, or behavior. Although risk associated with acute mortality is medium, we have low confidence in this determination because only a subset of product labels containing chloropicrin produced EECs which exceeded this determination threshold. Additionally, the likelihood of exposure characterizations for products containing 1,3-D indicate a greater likelihood than is anticipated because labeled use sites are broadly categorized (e.g. field crops). No changes in population growth rate occurred at the one percent mortality level for any model runs. This suggests that no changes in population growth would occur at the percent mortalities anticipated (less than one percent) with exposures to 1,3-D. Slight shifts in population growth rate occurred at the mortality levels anticipated for some formulated products containing chloropicrin, and increased with the percentage of the population exposed. Exposure to multiple ingredients from formulated products and tank mixtures containing 1,3-D may result in increased toxicity. NMFS has determined the overall risk to the species from the effects of the action is medium and the confidence associated with that risk is low.

12.2.6 Chinook Salmon, Puget Sound ESU (*Oncorhynchus tshawytscha*)

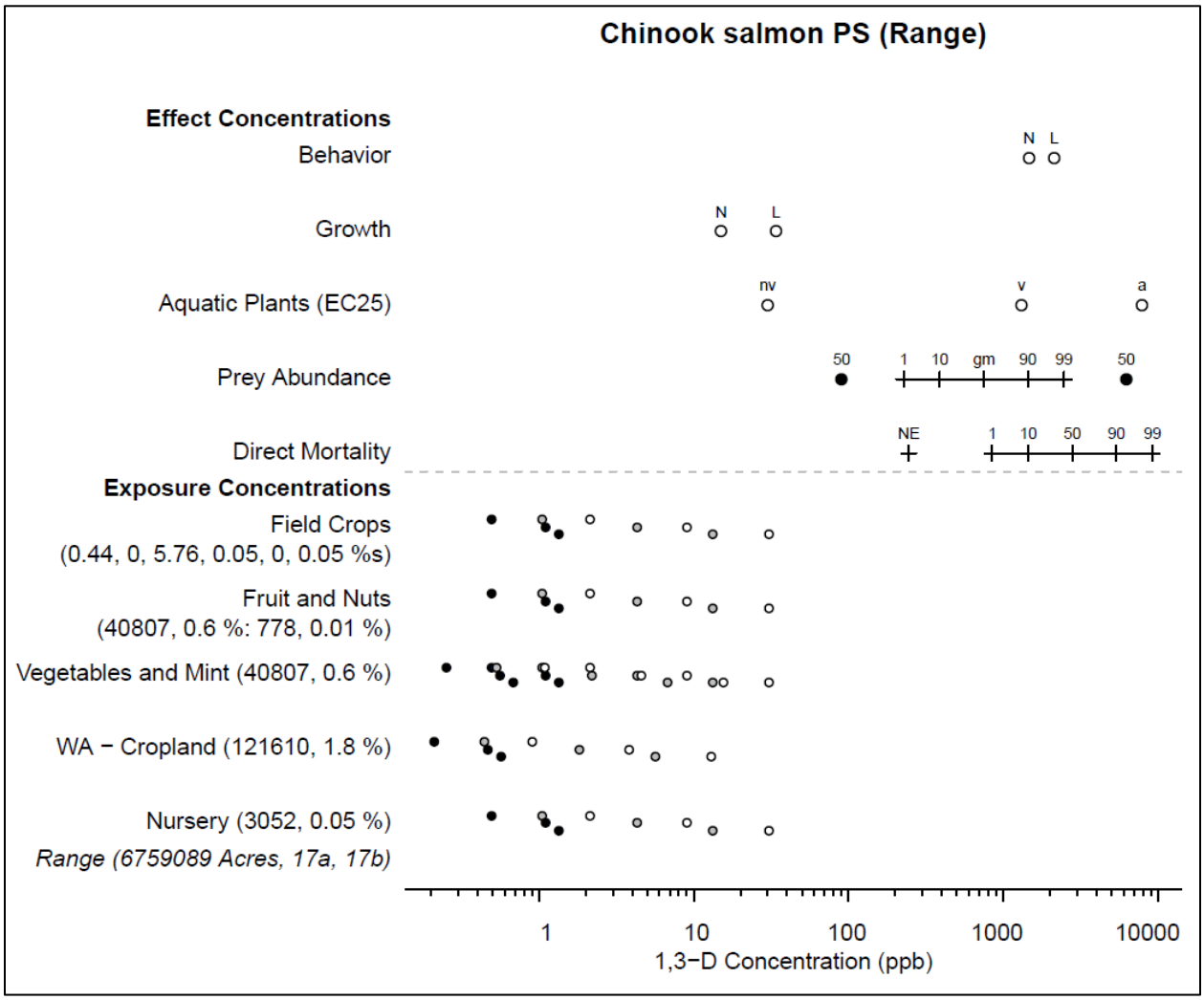
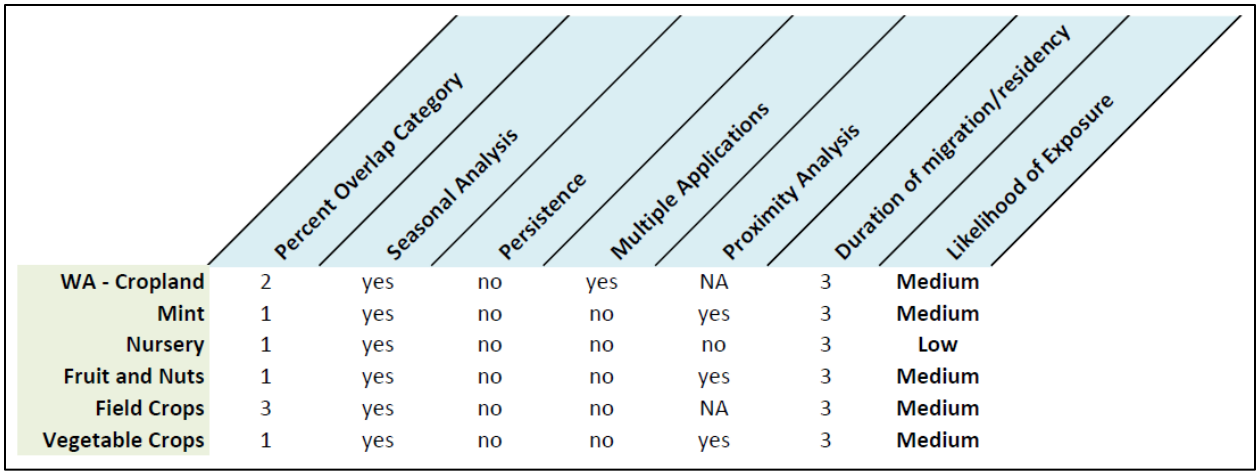


Figure 8. Effects analysis Risk-plot for Chinook salmon, Puget Sound ESU and products containing 1,3-Dichloropropene

Table 34. Likelihood of exposure determination for Chinook salmon, Puget Sound ESU and products containing 1,3-Dichloropropene



	Percent Overlap Category	Seasonal Analysis	Persistence	Multiple Applications	Proximity Analysis	Duration of migration/residency	Likelihood of Exposure
WA - Cropland	2	yes	no	yes	NA	3	Medium
Mint	1	yes	no	no	yes	3	Medium
Nursery	1	yes	no	no	no	3	Low
Fruit and Nuts	1	yes	no	no	yes	3	Medium
Field Crops	3	yes	no	no	NA	3	Medium
Vegetable Crops	1	yes	no	no	yes	3	Medium

Table 35. Direct mortality risk hypothesis; Chinook salmon, Puget Sound ESU and products containing 1,3-Dichloropropene

Endpoint: Mortality				
Use Category	**% Overlap**	**Effect of Exposure**		**Likelihood of Exposure**
		1,3-D	**Chloropicrin**	
WA Cropland	1.8	None Expected	Medium	Medium
Mint	0.6	None Expected	Medium	Medium
Nursery	0.05	None Expected	Medium	Low
Fruit and Nuts	0.6, 0.01	None Expected	Medium	Medium
Field Crops	0.44, 0, 5.76, 0.05, 0, 0.05	None Expected	Medium	Medium
Vegetable Crops	0.6	None Expected	Medium	Medium
Risk Hypothesis: Exposure to products containing products containing 1,3-Dichloropropene is sufficient to reduce abundance via acute lethality.				
Risk	**Confidence**			
Medium	**Low**			

Table 36. Prey risk hypothesis; Chinook salmon, Puget Sound ESU and products containing 1,3-Dichloropropene

Endpoint: Prey				
Use Category	**% Overlap**	**Effect of Exposure**		**Likelihood of Exposure**
		1,3-D	**Chloropicrin**	

WA Cropland	1.8	None Expected	None Expected	Medium
Mint	0.6	None Expected	None Expected	Medium
Nursery	0.05	None Expected	None Expected	Low
Fruit and Nuts	0.6, 0.01	None Expected	None Expected	Medium
Field Crops	0.44, 0, 5.76, 0.05, 0, 0.05	None Expected	None Expected	Medium
Vegetable Crops	0.6	None Expected	None Expected	Medium
Risk Hypothesis: Exposure to products containing products containing 1,3-Dichloropropene is sufficient to reduce abundance via reduction in prey availability.				
Risk	**Confidence**			
Low	**Medium**			

Table 37. Growth risk hypothesis; Chinook salmon, Puget Sound ESU and products containing 1,3-Dichloropropene

Endpoint: Growth			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
WA Cropland	1.8	None Expected	Medium
Mint	0.6	None Expected	Medium
Nursery	0.05	None Expected	Low
Fruit and Nuts	0.6, 0.01	None Expected	Medium
Field Crops	0.44, 0, 5.76, 0.05, 0, 0.05	None Expected	Medium
Vegetable Crops	0.6	None Expected	Medium
Risk Hypothesis: Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via impacts to growth (direct toxicity).			
Risk	**Confidence**		
Low	**High**		

Table 38. Behavior risk hypothesis; Chinook salmon, Puget Sound ESU and products containing 1,3-Dichloropropene

Endpoint: Behavior			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
WA Cropland	1.8	None Expected	Medium
Mint	0.6	None Expected	Medium
Nursery	0.05	None Expected	Low

Fruit and Nuts	0.6, 0.01	None Expected	Medium
Field Crops	0.44, 0, 5.76, 0.05, 0, 0.05	None Expected	Medium
Vegetable Crops	0.6	None Expected	Medium
Risk Hypothesis: Exposure to products containing 1,3-Dichloropropene is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.			
Risk	**Confidence**		
Low	**High**		

Table 39. Effects analysis summary table: Chinook salmon, Puget Sound ESU and products containing 1,3-Dichloropropene

Risk Hypothesis	**Risk-plot Derived**		**Population Model Results**	**Risk Hypothesis Supported? Yes/No**
	Risk 1,3-D Chloropicrin	**Confidence 1,3-D Chloropicrin**		
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via acute lethality.	Medium	Low	No impact for 1,3-D; some associated with chloropicrin (See chapter 11.5).	No
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via reduction in prey availability.	Low	Medium	Not modelled	No
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via impacts to growth (direct toxicity).	Low	High	Not modelled	No
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.	Low	High	Not modelled	No

Effects analysis summary: Chinook salmon, Puget Sound ESU are not anticipated to experience reductions in abundance through any of the risk hypotheses assessed from exposure to products containing 1,3-D or associated degradates. Some take is anticipated when formulated products containing chloropicrin are used in proximity to low flow, low volume species habitats. We did not find support for the risk hypotheses for prey abundance, growth, or behavior. Although risk associated with acute mortality is medium, we have low confidence in this determination because only a subset of product labels containing chloropicrin produced EECs which exceeded this determination threshold. Additionally, the likelihood of exposure characterizations for products containing 1,3-D indicate a greater likelihood than is anticipated because labeled use sites are broadly categorized (e.g. field crops). No changes in population growth rate occurred at the one percent mortality level for any model runs. This suggests that no changes in population growth would occur at the percent mortalities anticipated (less than one percent) with exposures to 1,3-D. Slight shifts in population growth rate occurred at the mortality levels anticipated for some formulated products containing chloropicrin, and increased with the percentage of the population exposed. Exposure to multiple ingredients from formulated products and tank mixtures containing 1,3-D may result in increased toxicity. NMFS has determined the overall risk to the species from the effects of the action is medium and the confidence associated with that risk is low.

12.2.7 Chinook Salmon, Sacramento River winter-run (*Oncorhynchus tshawytscha*)

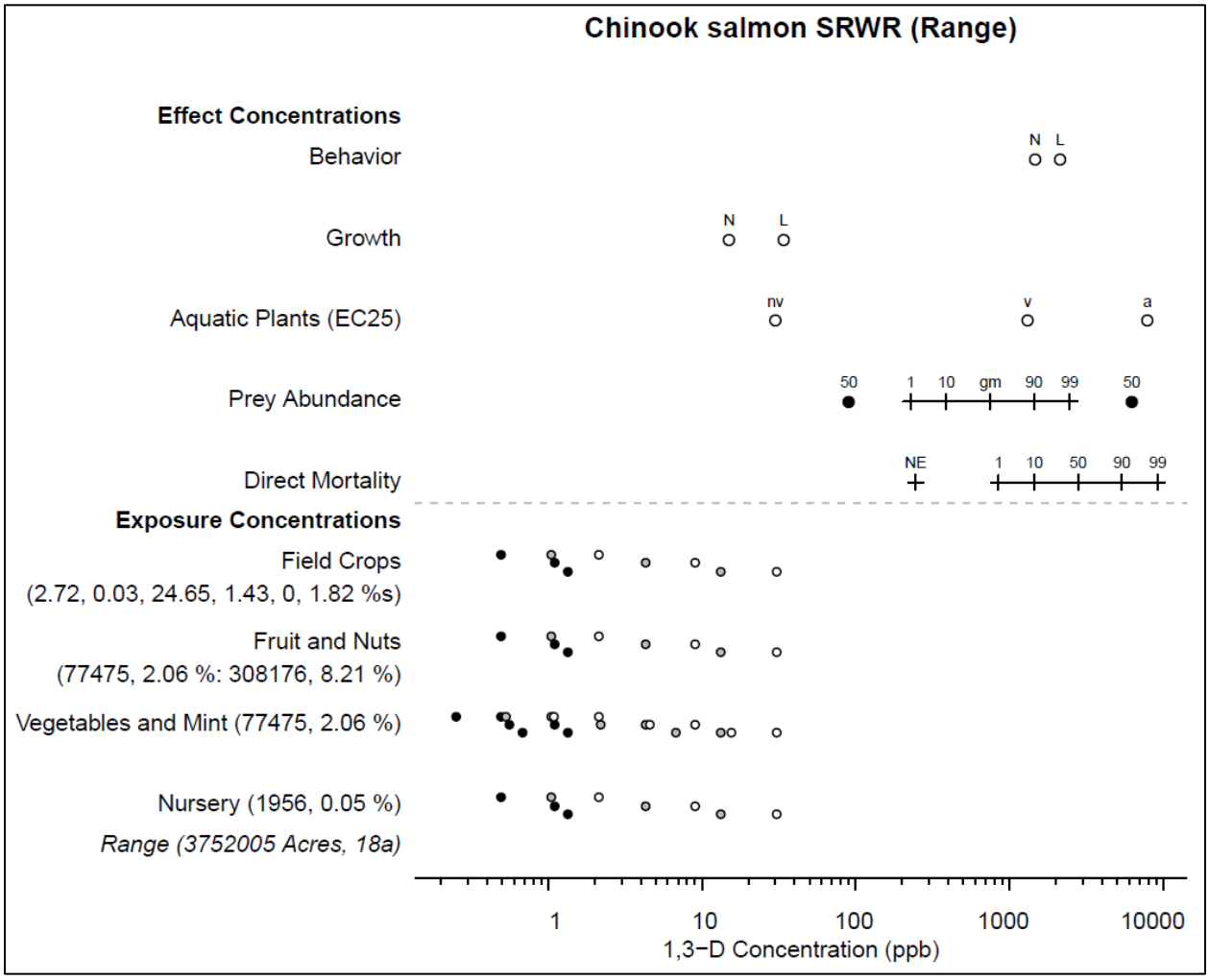
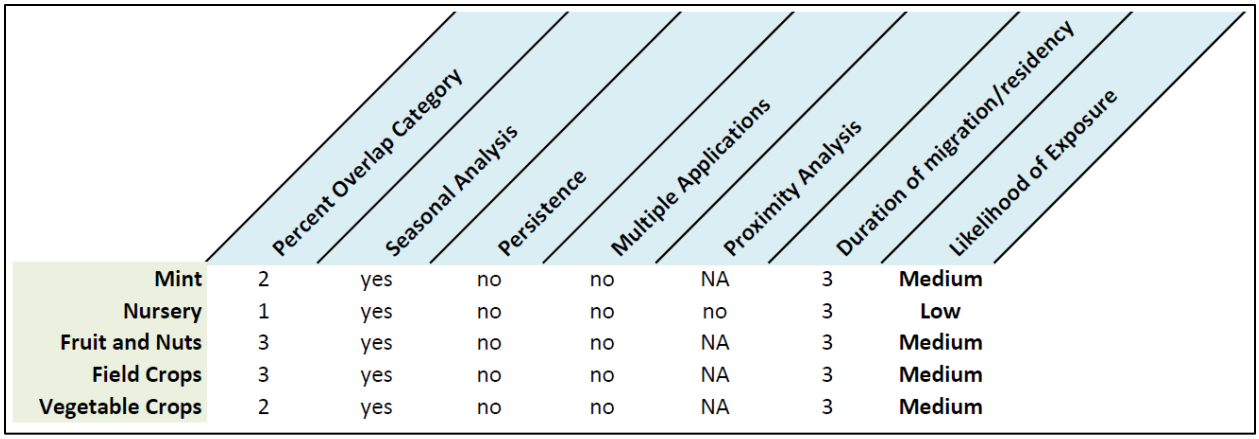


Figure 9. Effects analysis Risk-plot for Chinook salmon, Sacramento River Winter-run ESU and products containing 1,3-Dichloropropene

Table 40. Likelihood of exposure determination for Chinook salmon, Sacramento River Winter-run ESU and products containing 1,3-Dichloropropene



	Percent Overlap Category	Seasonal Analysis	Persistence	Multiple Applications	Proximity Analysis	Duration of migration/residency	Likelihood of Exposure
Mint	2	yes	no	no	NA	3	**Medium**
Nursery	1	yes	no	no	no	3	**Low**
Fruit and Nuts	3	yes	no	no	NA	3	**Medium**
Field Crops	3	yes	no	no	NA	3	**Medium**
Vegetable Crops	2	yes	no	no	NA	3	**Medium**

Table 41. Direct mortality risk hypothesis; Chinook salmon, Sacramento River Winter-run ESU and products containing 1,3-Dichloropropene

Endpoint: Mortality				
Use Category	**% Overlap**	**Effect of Exposure**		**Likelihood of Exposure**
		1,3-D	**Chloropicrin**	
Mint	2.06	None Expected	Medium	Medium
Nursery	0.05	None Expected	Medium	Low
Fruit and Nuts	2.06, 8.21	None Expected	Medium	Medium
Field Crops	2.72, 0.03, 24.65, 1.43, 0, 1.82	None Expected	Medium	Medium
Vegetable Crops	2.06	None Expected	Medium	Medium
Risk Hypothesis: Exposure to products containing products containing 1,3-Dichloropropene is sufficient to reduce abundance via acute lethality.				
Risk	**Confidence**			
Medium	**Low**			

Table 42. Prey risk hypothesis; Chinook salmon, Sacramento River Winter-run ESU and products containing 1,3-Dichloropropene

Endpoint: Prey				
Use Category	**% Overlap**	**Effect of Exposure**		**Likelihood of Exposure**
		1,3-D	**Chloropicrin**	
Mint	2.06	None Expected	Medium	Medium

Nursery	0.05	None Expected	Medium	Low
Fruit and Nuts	2.06, 8.21	None Expected	Medium	Medium
Field Crops	2.72, 0.03, 24.65, 1.43, 0, 1.82	None Expected	Medium	Medium
Vegetable Crops	2.06	None Expected	Medium	Medium
Risk Hypothesis: Exposure to products containing products containing 1,3-Dichloropropene is sufficient to reduce abundance via reduction in prey availability.				
Risk	**Confidence**			
Low	**Medium**			

Table 43. Growth risk hypothesis; Chinook salmon, Sacramento River Winter-run ESU and products containing 1,3-Dichloropropene

Endpoint: Growth			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Mint	2.06	None Expected	Medium
Nursery	0.05	None Expected	Low
Fruit and Nuts	2.06, 8.21	None Expected	Medium
Field Crops	2.72, 0.03, 24.65, 1.43, 0, 1.82	None Expected	Medium
Vegetable Crops	2.06	None Expected	Medium
Risk Hypothesis: Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via impacts to growth (direct toxicity).			
Risk	**Confidence**		
Low	**High**		

Table 44. Behavior risk hypothesis; Chinook salmon, Sacramento River Winter-run ESU and products containing 1,3-Dichloropropene

Endpoint: Behavior			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Mint	2.06	None Expected	Medium
Nursery	0.05	None Expected	Low
Fruit and Nuts	2.06, 8.21	None Expected	Medium
Field Crops	2.72, 0.03, 24.65, 1.43, 0, 1.82	None Expected	Medium
Vegetable Crops	2.06	None Expected	Medium

Risk Hypothesis: Exposure to products containing 1,3-Dichloropropene is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.		
Risk	**Confidence**	
Low	**High**	

Table 45. Effects analysis summary table: Chinook salmon, Sacramento River Winter-run ESU and products containing 1,3-Dichloropropene

Risk Hypothesis	**Risk-plot Derived**		**Population Model Results**	**Risk Hypothesis Supported? Yes/No**
	Risk 1,3-D Chloropicrin	**Confidence 1,3-D Chloropicrin**		
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via acute lethality.	Medium	Low	No impact for 1,3-D; some associated with chloropicrin (See chapter 11.5).	No
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via reduction in prey availability.	Low	Medium	Not modelled	No
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via impacts to growth (direct toxicity).	Low	High	Not modelled	No
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.	Low	High	Not modelled	No

Effects analysis summary: Chinook salmon, Sacramento River Winter-run ESU are not anticipated to experience reductions in abundance through any of the risk hypotheses assessed from exposure to products containing 1,3-D or associated degradates. Some take is anticipated when formulated products containing chloropicrin are used in proximity to low flow, low volume

species habitats. We did not find support for the risk hypotheses for prey abundance, growth, or behavior. Although risk associated with acute mortality is medium, we have low confidence in this determination because only a subset of product labels containing chloropicrin produced EECs which exceeded this determination threshold. Additionally, the likelihood of exposure characterizations for products containing 1,3-D indicate a greater likelihood than is anticipated because labeled use sites are broadly categorized (e.g. field crops). No changes in population growth rate occurred at the one percent mortality level for any model runs. This suggests that no changes in population growth would occur at the percent mortalities anticipated (less than one percent) with exposures to 1,3-D. Slight shifts in population growth rate occurred at the mortality levels anticipated for some formulated products containing chloropicrin, and increased with the percentage of the population exposed. Exposure to multiple ingredients from formulated products and tank mixtures containing 1,3-D may result in increased toxicity. NMFS has determined the overall risk to the species from the effects of the action is medium and the confidence associated with that risk is low.

12.2.8 Chinook Salmon, Snake River fall-run ESU (*Oncorhynchus tshawytscha*)

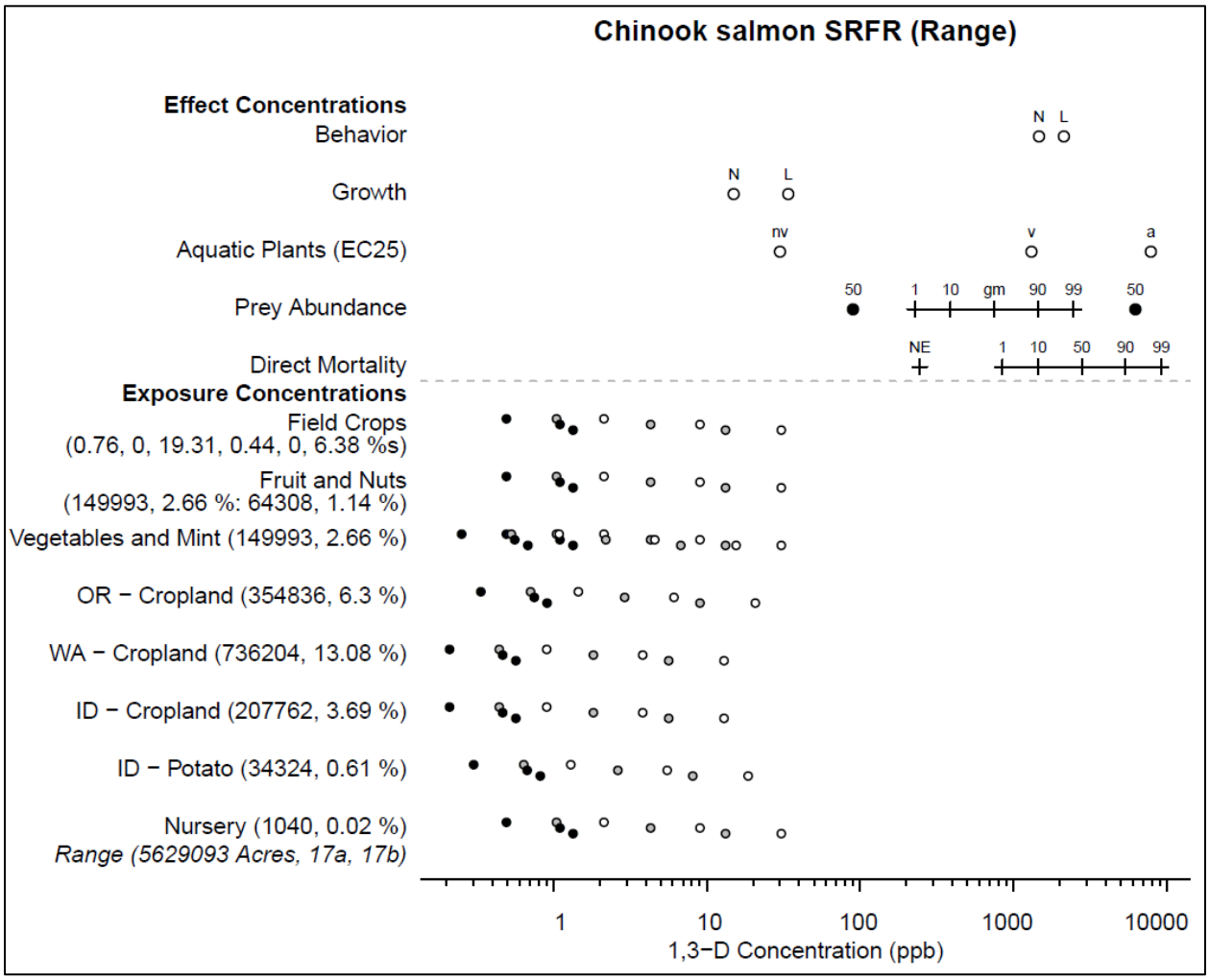
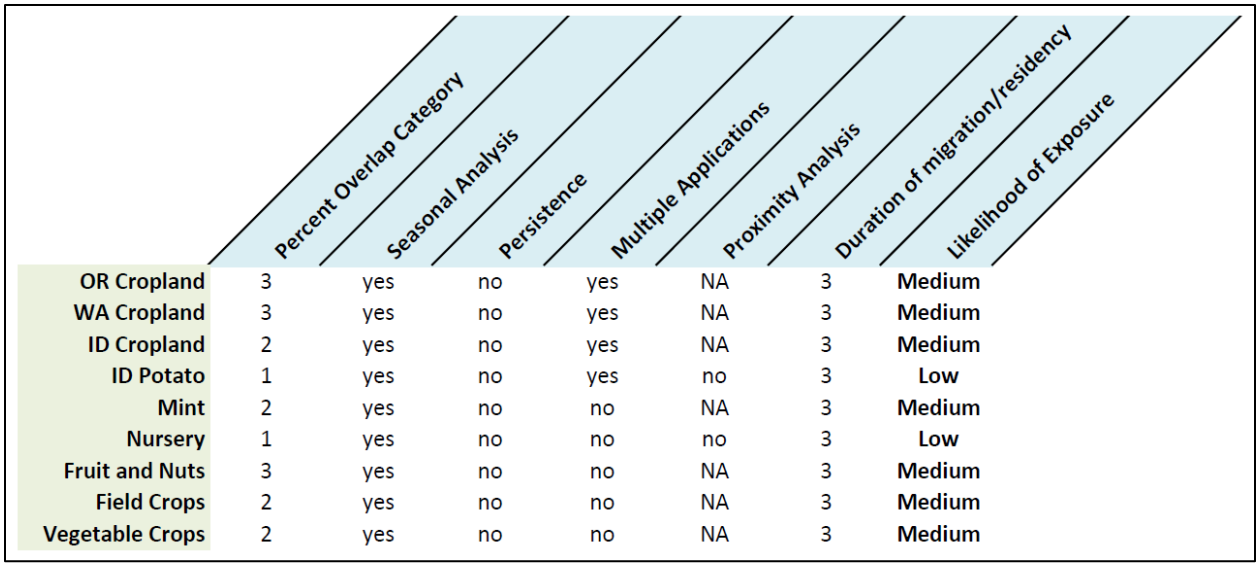


Figure 10. Effects analysis Risk-plot for Chinook salmon, Snake River Fall-run ESU and products containing 1,3-Dichloropropene

Table 46. Likelihood of exposure determination for Chinook salmon, Snake River Fall-run ESU and products containing 1,3-Dichloropropene



	Percent Overlap Category	Seasonal Analysis	Persistence	Multiple Applications	Proximity Analysis	Duration of migration/residency	Likelihood of Exposure
OR Cropland	3	yes	no	yes	NA	3	Medium
WA Cropland	3	yes	no	yes	NA	3	Medium
ID Cropland	2	yes	no	yes	NA	3	Medium
ID Potato	1	yes	no	yes	no	3	Low
Mint	2	yes	no	no	NA	3	Medium
Nursery	1	yes	no	no	no	3	Low
Fruit and Nuts	3	yes	no	no	NA	3	Medium
Field Crops	2	yes	no	no	NA	3	Medium
Vegetable Crops	2	yes	no	no	NA	3	Medium

Table 47. Direct mortality risk hypothesis; Chinook salmon, Snake River Fall-run ESU and products containing 1,3-Dichloropropene

Endpoint: Mortality				
Use Category	**% Overlap**	**Effect of Exposure**		**Likelihood of Exposure**
		1,3-D	**Chloropicrin**	
OR Cropland	6.3	None Expected	Medium	Medium
WA Cropland	13.08	None Expected	Medium	Medium
ID Cropland	3.69	None Expected	Medium	Medium
ID Potato	0.61	None Expected	Medium	Low
Mint	2.66	None Expected	Medium	Medium
Nursery	0.02	None Expected	Medium	Low
Fruit and Nuts	2.66, 1.14	None Expected	Medium	Medium
Field Crops	0.76, 0, 19.31, 0.44, 0, 6.38	None Expected	Medium	Medium
Vegetable Crops	2.66	None Expected	Medium	Medium
Risk Hypothesis: Exposure to products containing products containing 1,3-Dichloropropene is sufficient to reduce abundance via acute lethality.				
Risk	**Confidence**			
Medium	**Low**			

Table 48. Prey risk hypothesis; Chinook salmon, Snake River Fall-run ESU and products containing 1,3-Dichloropropene

Endpoint: Prey				
Use Category	**% Overlap**	**Effect of Exposure**		**Likelihood of Exposure**
		1,3-D	**Chloropicrin**	
OR Cropland	6.3	None Expected	None Expected	Medium
WA Cropland	13.08	None Expected	None Expected	Medium
ID Cropland	3.69	None Expected	None Expected	Medium
ID Potato	0.61	None Expected	None Expected	Low
Mint	2.66	None Expected	None Expected	Medium
Nursery	0.02	None Expected	None Expected	Low
Fruit and Nuts	2.66, 1.14	None Expected	None Expected	Medium
Field Crops	0.76, 0, 19.31, 0.44, 0, 6.38	None Expected	None Expected	Medium
Vegetable Crops	2.66	None Expected	None Expected	Medium
Risk Hypothesis: Exposure to products containing products containing 1,3-Dichloropropene is sufficient to reduce abundance via reduction in prey availability.				
Risk	**Confidence**			
Low	**Medium**			

Table 49. Growth risk hypothesis; Chinook salmon, Snake River Fall-run ESU and products containing 1,3-Dichloropropene

Endpoint: Growth			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
OR Cropland	6.3	None Expected	Medium
WA Cropland	13.08	None Expected	Medium
ID Cropland	3.69	None Expected	Medium
ID Potato	0.61	None Expected	Low
Mint	2.66	None Expected	Medium
Nursery	0.02	None Expected	Low
Fruit and Nuts	2.66, 1.14	None Expected	Medium

Field Crops	0.76, 0, 19.31, 0.44, 0, 6.38	None Expected	Medium
Vegetable Crops	2.66	None Expected	Medium
Risk Hypothesis: Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via impacts to growth (direct toxicity).			
Risk	**Confidence**		
Low	**High**		

Table 50. Behavior risk hypothesis; Chinook salmon, Snake River Fall-run ESU and products containing 1,3-Dichloropropene

Endpoint: Behavior			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
OR Cropland	6.3	None Expected	Medium
WA Cropland	13.08	None Expected	Medium
ID Cropland	3.69	None Expected	Medium
ID Potato	0.61	None Expected	Low
Mint	2.66	None Expected	Medium
Nursery	0.02	None Expected	Low
Fruit and Nuts	2.66, 1.14	None Expected	Medium
Field Crops	0.76, 0, 19.31, 0.44, 0, 6.38	None Expected	Medium
Vegetable Crops	2.66	None Expected	Medium
Risk Hypothesis: Exposure to products containing 1,3-Dichloropropene is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.			
Risk	**Confidence**		
Low	**High**		

Table 51. Effects analysis summary table: Chinook salmon, Snake River Fall-run ESU and products containing 1,3-Dichloropropene

Risk Hypothesis	**Risk-plot Derived**		**Population Model Results**	**Risk Hypothesis Supported? Yes/No**
	Risk 1,3-D Chloropicrin	**Confidence 1,3-D Chloropicrin**		
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via acute lethality.	Medium	Low	No impact for 1,3-D; some associated with chloropicrin (See chapter 11.5).	No

Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via reduction in prey availability.	Low	Medium	Not modelled	No
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via impacts to growth (direct toxicity).	Low	High	Not modelled	No
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.	Low	High	Not modelled	No

Effects analysis summary: Chinook salmon, Snake River Fall-run ESU are not anticipated to experience reductions in abundance through any of the risk hypotheses assessed from exposure to products containing 1,3-D or associated degradates. Some take is anticipated when formulated products containing chloropicrin are used in proximity to low flow, low volume species habitats. We did not find support for the risk hypotheses for prey abundance, growth, or behavior. Although risk associated with acute mortality is medium, we have low confidence in this determination because only a subset of product labels containing chloropicrin produced EECs which exceeded this determination threshold. Additionally, the likelihood of exposure characterizations for products containing 1,3-D indicate a greater likelihood than is anticipated because labeled use sites are broadly categorized (e.g. field crops). No changes in population growth rate occurred at the one percent mortality level for any model runs. This suggests that no changes in population growth would occur at the percent mortalities anticipated (less than one percent) with exposures to 1,3-D. Slight shifts in population growth rate occurred at the mortality levels anticipated for some formulated products containing chloropicrin, and increased with the percentage of the population exposed. Exposure to multiple ingredients from formulated products and tank mixtures containing 1,3-D may result in increased toxicity. NMFS has determined the overall risk to the species from the effects of the action is medium and the confidence associated with that risk is low.

Medium Risk
Low Confidence
Less Risk
More Risk

12.2.9 Chinook Salmon, Snake River spring/summer-run ESU (*Oncorhynchus tshawytscha*)

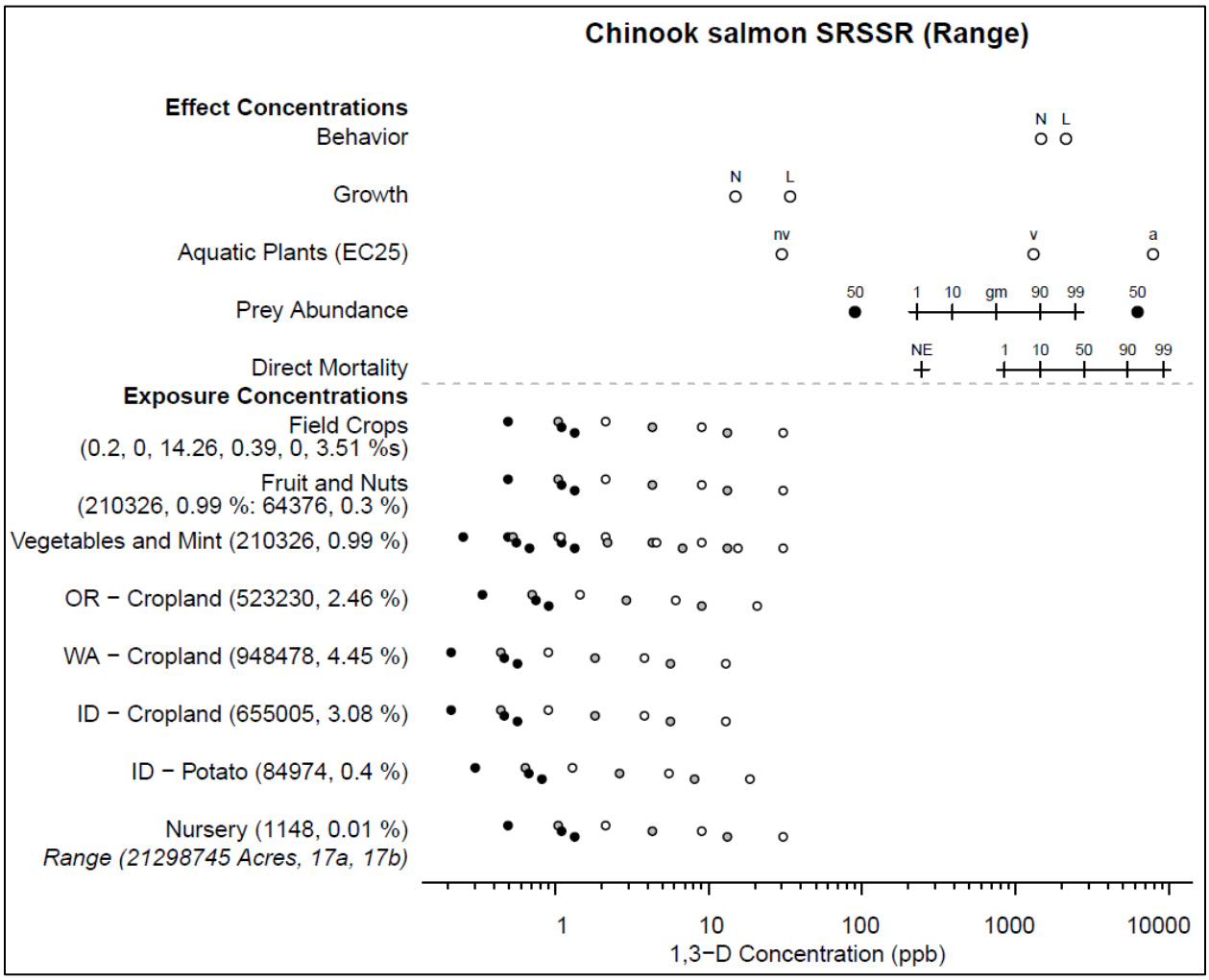


Figure 11. Effects analysis Risk-plot for Chinook salmon, Snake River Spring/Summer-run ESU and products containing 1,3-Dichloropropene

Table 52. Likelihood of exposure determination for Chinook salmon, Snake River Spring/Summer-run ESU and products containing 1,3-Dichloropropene

	Percent Overlap Category	Seasonal Analysis	Persistence	Multiple Applications	Proximity Analysis	Duration of migration/residency	Likelihood of Exposure
OR Cropland	2	yes	no	yes	NA	3	Medium
WA Cropland	2	yes	no	yes	NA	3	Medium
ID Cropland	2	yes	no	yes	NA	3	Medium
ID Potato	1	yes	no	yes	no	3	Low
Mint	1	yes	no	no	yes	3	Medium
Nursery	1	yes	no	no	no	3	Low
Fruit and Nuts	1	yes	no	no	yes	3	Medium
Field Crops	3	yes	no	no	NA	3	Medium
Vegetable Crops	1	yes	no	no	yes	3	Medium

Table 53. Direct mortality risk hypothesis; Chinook salmon, Snake River Spring/Summer-run ESU and products containing 1,3-Dichloropropene

Endpoint: Mortality				
Use Category	**% Overlap**	**Effect of Exposure**		**Likelihood of Exposure**
		1,3-D	**Chloropicrin**	
OR Cropland	2.46	None Expected	Medium	Medium
WA Cropland	4.45	None Expected	Medium	Medium
ID Cropland	3.08	None Expected	Medium	Medium
ID Potato	0.4	None Expected	Medium	Low
Mint	0.99	None Expected	Medium	Medium
Nursery	0.01	None Expected	Medium	Low
Fruit and Nuts	0.99, 0.3	None Expected	Medium	Medium
Field Crops	0.2, 0, 14.26, 0.39, 0, 3.51	None Expected	Medium	Medium
Vegetable Crops	0.99	None Expected	Medium	Medium
Risk Hypothesis: Exposure to products containing products containing 1,3-Dichloropropene is sufficient to reduce abundance via acute lethality.				
Risk	**Confidence**			
Medium	**Low**			

Table 54. Prey risk hypothesis; Chinook salmon, Snake River Spring/Summer-run ESU and products containing 1,3-Dichloropropene

Endpoint: Prey				
Use Category	**% Overlap**	**Effect of Exposure**		**Likelihood of Exposure**
		1,3-D	**Chloropicrin**	
OR Cropland	2.46	None Expected	None Expected	Medium
WA Cropland	4.45	None Expected	None Expected	Medium
ID Cropland	3.08	None Expected	None Expected	Medium
ID Potato	0.4	None Expected	None Expected	Low
Mint	0.99	None Expected	None Expected	Medium
Nursery	0.01	None Expected	None Expected	Low
Fruit and Nuts	0.99, 0.3	None Expected	None Expected	Medium
Field Crops	0.2, 0, 14.26, 0.39, 0, 3.51	None Expected	None Expected	Medium
Vegetable Crops	0.99	None Expected	None Expected	Medium
Risk Hypothesis: Exposure to products containing products containing 1,3-Dichloropropene is sufficient to reduce abundance via reduction in prey availability.				
Risk	**Confidence**			
Low	**Medium**			

Table 55. Growth risk hypothesis; Chinook salmon, Snake River Spring/Summer-run ESU and products containing 1,3-Dichloropropene

Endpoint: Growth			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
OR Cropland	2.46	None Expected	Medium
WA Cropland	4.45	None Expected	Medium
ID Cropland	3.08	None Expected	Medium
ID Potato	0.4	None Expected	Low
Mint	0.99	None Expected	Medium
Nursery	0.01	None Expected	Low
Fruit and Nuts	0.99, 0.3	None Expected	Medium

Field Crops	0.2, 0, 14.26, 0.39, 0, 3.51	None Expected	Medium
Vegetable Crops	0.99	None Expected	Medium
Risk Hypothesis: Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via impacts to growth (direct toxicity).			
Risk	**Confidence**		
Low	**High**		

Table 56. Behavior risk hypothesis; Chinook salmon, Snake River Spring/Summer-run ESU and products containing 1,3-Dichloropropene

Endpoint: Behavior			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
OR Cropland	2.46	None Expected	Medium
WA Cropland	4.45	None Expected	Medium
ID Cropland	3.08	None Expected	Medium
ID Potato	0.4	None Expected	Low
Mint	0.99	None Expected	Medium
Nursery	0.01	None Expected	Low
Fruit and Nuts	0.99, 0.3	None Expected	Medium
Field Crops	0.2, 0, 14.26, 0.39, 0, 3.51	None Expected	Medium
Vegetable Crops	0.99	None Expected	Medium
Risk Hypothesis: Exposure to products containing 1,3-Dichloropropene is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.			
Risk	**Confidence**		
Low	**High**		

Table 57. Effects analysis summary table: Chinook salmon, Snake River Spring/Summer-run ESU and products containing 1,3-Dichloropropene

Risk Hypothesis	**Risk-plot Derived**		**Population Model Results**	**Risk Hypothesis Supported? Yes/No**
	Risk 1,3-D Chloropicrin	**Confidence 1,3-D Chloropicrin**		
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via acute lethality.	Medium	Low	No impact for 1,3-D; some associated with chloropicrin (See chapter 11.5).	No

Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via reduction in prey availability.	Low	Medium	Not modelled	No
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via impacts to growth (direct toxicity).	Low	High	Not modelled	No
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.	Low	High	Not modelled	No

Effects analysis summary: Chinook salmon, Snake River Spring/Summer-run ESU are not anticipated to experience reductions in abundance through any of the risk hypotheses assessed from exposure to products containing 1,3-D or associated degradates. Some take is anticipated when formulated products containing chloropicrin are used in proximity to low flow, low volume species habitats. We did not find support for the risk hypotheses for prey abundance, growth, or behavior. Although risk associated with acute mortality is medium, we have low confidence in this determination because only a subset of product labels containing chloropicrin produced EECs which exceeded this determination threshold. Additionally, the likelihood of exposure characterizations for products containing 1,3-D indicate a greater likelihood than is anticipated because labeled use sites are broadly categorized (e.g. field crops). No changes in population growth rate occurred at the one percent mortality level for any model runs. This suggests that no changes in population growth would occur at the percent mortalities anticipated (less than one percent) with exposures to 1,3-D. Slight shifts in population growth rate occurred at the mortality levels anticipated for some formulated products containing chloropicrin, and increased with the percentage of the population exposed. Exposure to multiple ingredients from formulated products and tank mixtures containing 1,3-D may result in increased toxicity. NMFS has determined the overall risk to the species from the effects of the action is medium and the confidence associated with that risk is low.

Medium Risk
Low Confidence
Less Risk
More Risk

12.2.10 Chinook salmon, Upper Columbia River spring-run ESU (*Oncorhynchus tshawytscha*)

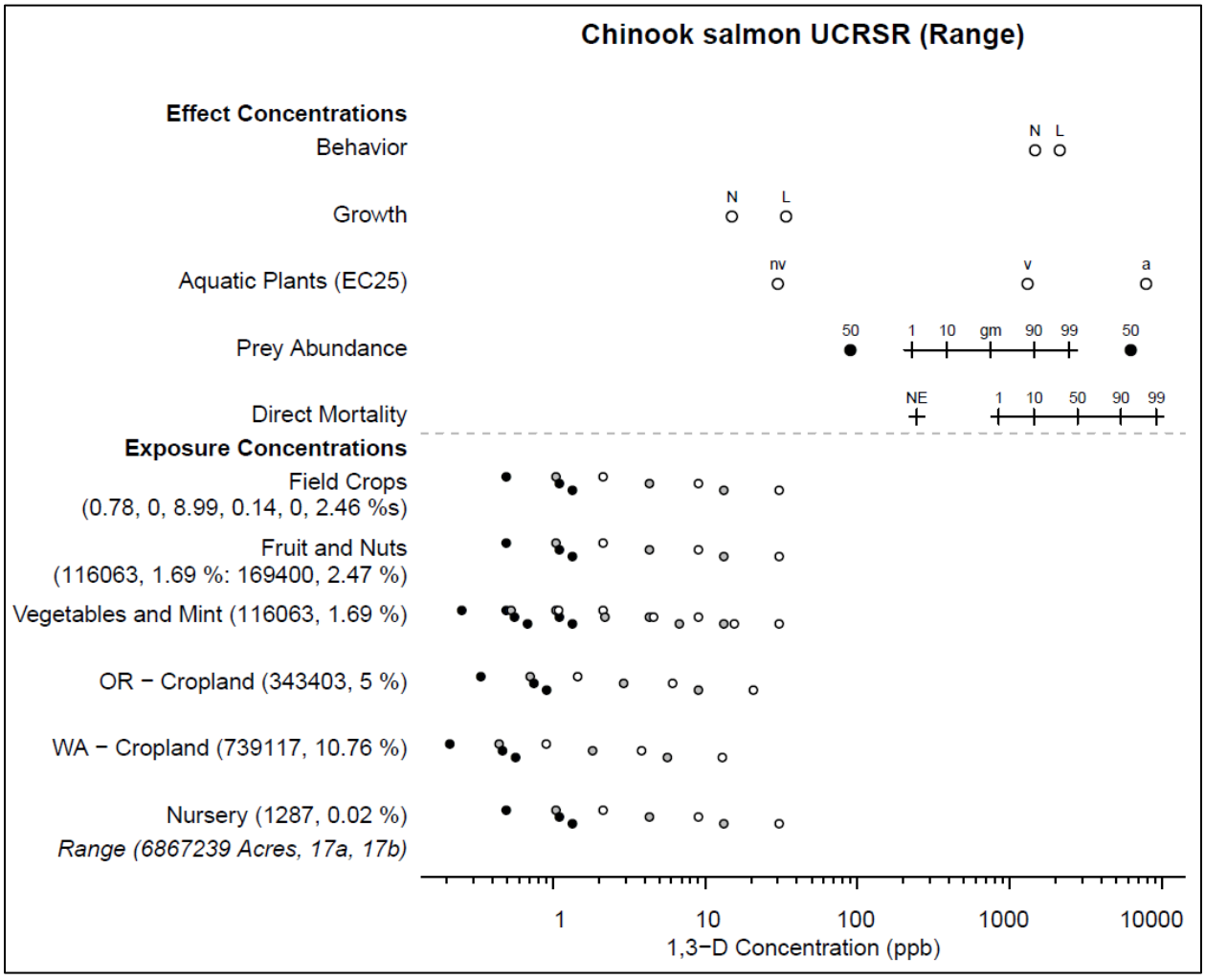


Figure 12. Effects analysis Risk-plot for Chinook salmon, Upper Columbia River Spring-run ESU and products containing 1,3-Dichloropropene

Table 58. Likelihood of exposure determination for Chinook salmon, Upper Columbia River Spring-run ESU and products containing 1,3-Dichloropropene

	Percent Overlap Category	Seasonal Analysis	Persistence	Multiple Applications	Proximity Analysis	Duration of migration/residency	Likelihood of Exposure
OR Cropland	3	yes	no	yes	NA	3	Medium
WA Cropland	3	yes	no	yes	NA	3	Medium
Mint	2	yes	no	no	NA	3	Medium
Nursery	1	yes	no	no	no	3	Low
Fruit and Nuts	2	yes	no	no	NA	3	Medium
Field Crops	3	yes	no	no	NA	3	Medium
Vegetable Crops	2	yes	no	no	NA	3	Medium

Table 59. Direct mortality risk hypothesis; Chinook salmon, Upper Columbia River Spring-run ESU and products containing 1,3-Dichloropropene

Endpoint: Mortality				
Use Category	**% Overlap**	**Effect of Exposure**		**Likelihood of Exposure**
		1,3-D	**Chloropicrin**	
OR Cropland	5.0	None Expected	Medium	Medium
WA Cropland	10.76	None Expected	Medium	Medium
Mint	1.69	None Expected	Medium	Medium
Nursery	0.02	None Expected	Medium	Low
Fruit and Nuts	1.69, 2.47	None Expected	Medium	Medium
Field Crops	0.78, 0, 8.99, 0.14, 0, 2.46	None Expected	Medium	Medium
Vegetable Crops	1.69	None Expected	Medium	Medium
Risk Hypothesis: Exposure to products containing products containing 1,3-Dichloropropene is sufficient to reduce abundance via acute lethality.				
Risk	**Confidence**			
Medium	**Low**			

Table 60. Prey risk hypothesis; Chinook salmon, Upper Columbia River Spring-run ESU and products containing 1,3-Dichloropropene

Endpoint: Prey				
Use Category	**% Overlap**	**Effect of Exposure**		**Likelihood of Exposure**
		1,3-D	**Chloropicrin**	
OR Cropland	5.0	None Expected	None Expected	Medium
WA Cropland	10.76	None Expected	None Expected	Medium
Mint	1.69	None Expected	None Expected	Medium
Nursery	0.02	None Expected	None Expected	Low
Fruit and Nuts	1.69, 2.47	None Expected	None Expected	Medium
Field Crops	0.78, 0, 8.99, 0.14, 0, 2.46	None Expected	None Expected	Medium
Vegetable Crops	1.69	None Expected	None Expected	Medium
Risk Hypothesis: Exposure to products containing products containing 1,3-Dichloropropene is sufficient to reduce abundance via reduction in prey availability.				
Risk	**Confidence**			
Low	**Medium**			

Table 61. Growth risk hypothesis; Chinook salmon, Upper Columbia River Spring-run ESU and products containing 1,3-Dichloropropene

Endpoint: Growth			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
OR Cropland	5.0	None Expected	Medium
WA Cropland	10.76	None Expected	Medium
Mint	1.69	None Expected	Medium
Nursery	0.02	None Expected	Low
Fruit and Nuts	1.69, 2.47	None Expected	Medium
Field Crops	0.78, 0, 8.99, 0.14, 0, 2.46	None Expected	Medium
Vegetable Crops	1.69	None Expected	Medium
Risk Hypothesis: Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via impacts to growth (direct toxicity).			
Risk	**Confidence**		
Low	**High**		

Table 62. Behavior risk hypothesis; Chinook salmon, Upper Columbia River Spring-run ESU and products containing 1,3-Dichloropropene

Endpoint: Behavior			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
OR Cropland	5.0	None Expected	Medium
WA Cropland	10.76	None Expected	Medium
Mint	1.69	None Expected	Medium
Nursery	0.02	None Expected	Low
Fruit and Nuts	1.69, 2.47	None Expected	Medium
Field Crops	0.78, 0, 8.99, 0.14, 0, 2.46	None Expected	Medium
Vegetable Crops	1.69	None Expected	Medium
Risk Hypothesis: Exposure to products containing 1,3-Dichloropropene is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.			
Risk	**Confidence**		
Low	**High**		

Table 63. Effects analysis summary table: Chinook salmon, Upper Columbia River Spring-run ESU and products containing 1,3-Dichloropropene

Risk Hypothesis	**Risk-plot Derived**		**Population Model Results**	**Risk Hypothesis Supported? Yes/No**
	Risk 1,3-D Chloropicrin	**Confidence 1,3-D Chloropicrin**		
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via acute lethality.	Medium	Low	No impact for 1,3-D; some associated with chloropicrin (See chapter 11.5).	No
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via reduction in prey availability.	Low	Medium	Not modelled	No
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via impacts to growth (direct toxicity).	Low	High	Not modelled	No

Exposure to products containing 1,3-Dichloropropene is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.	Low	High	Not modelled	No

Effects analysis summary: Chinook salmon, Upper Columbia River Spring-run ESU are not anticipated to experience reductions in abundance through any of the risk hypotheses assessed from exposure to products containing 1,3-D or associated degradates. Some take is anticipated when formulated products containing chloropicrin are used in proximity to low flow, low volume species habitats. We did not find support for the risk hypotheses for prey abundance, growth, or behavior. Although risk associated with acute mortality is medium, we have low confidence in this determination because only a subset of product labels containing chloropicrin produced EECs which exceeded this determination threshold. Additionally, the likelihood of exposure characterizations for products containing 1,3-D indicate a greater likelihood than is anticipated because labeled use sites are broadly categorized (e.g. field crops). No changes in population growth rate occurred at the one percent mortality level for any model runs. This suggests that no changes in population growth would occur at the percent mortalities anticipated (less than one percent) with exposures to 1,3-D. Slight shifts in population growth rate occurred at the mortality levels anticipated for some formulated products containing chloropicrin, and increased with the percentage of the population exposed. Exposure to multiple ingredients from formulated products and tank mixtures containing 1,3-D may result in increased toxicity. NMFS has determined the overall risk to the species from the effects of the action is medium and the confidence associated with that risk is low.

12.2.11Chinook Salmon, Upper Willamette River ESU (*Oncorhynchus tshawytscha*)

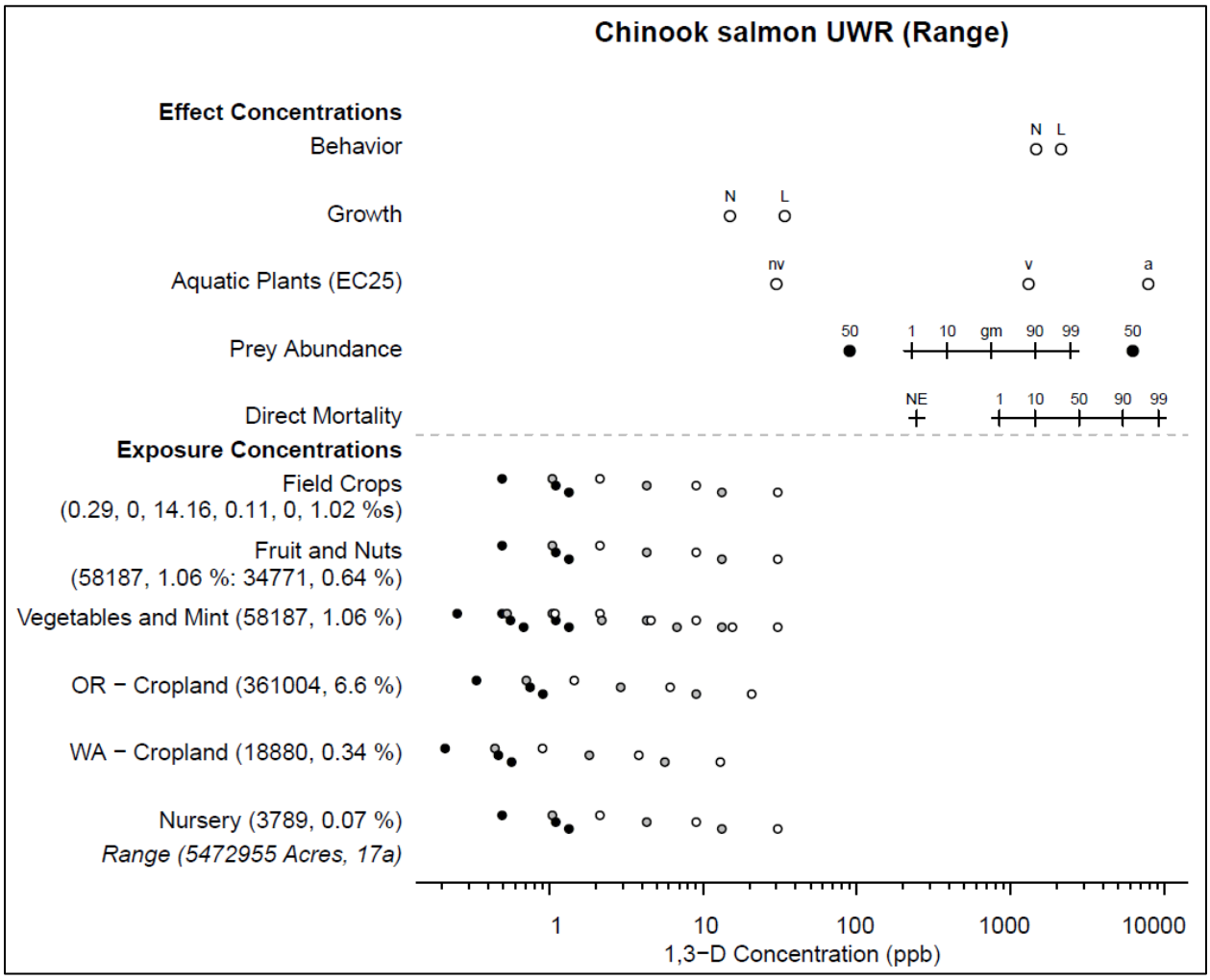
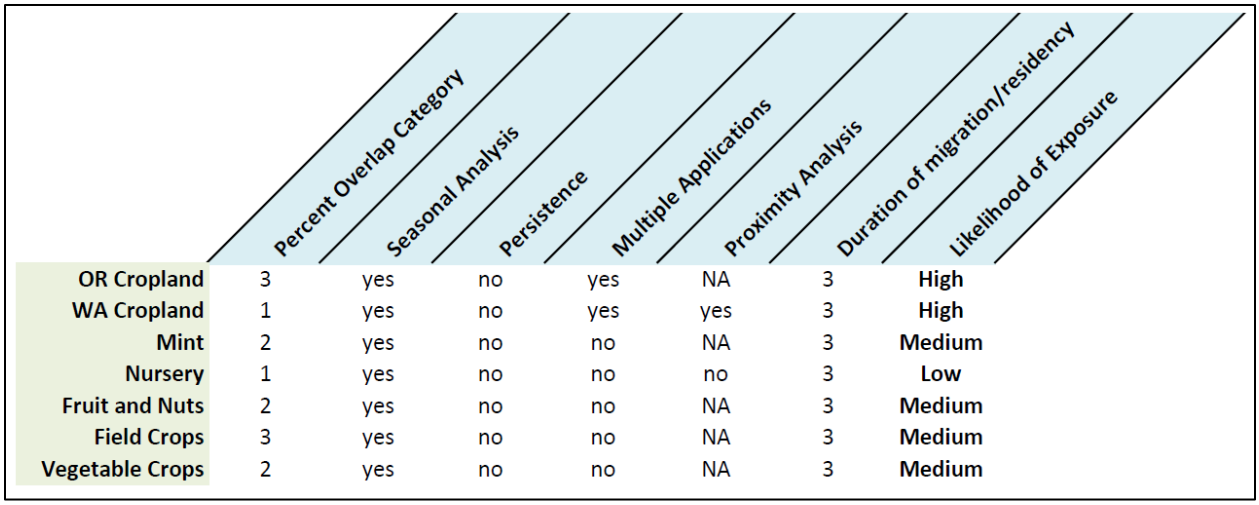


Figure 13. Effects analysis Risk-plot for Chinook salmon, Upper Willamette River ESU and products containing 1,3-Dichloropropene

Table 64. Likelihood of exposure determination for Chinook salmon, Upper Willamette River ESU and products containing 1,3-Dichloropropene



	Percent Overlap Category	Seasonal Analysis	Persistence	Multiple Applications	Proximity Analysis	Duration of migration/residency	Likelihood of Exposure
OR Cropland	3	yes	no	yes	NA	3	High
WA Cropland	1	yes	no	yes	yes	3	High
Mint	2	yes	no	no	NA	3	Medium
Nursery	1	yes	no	no	no	3	Low
Fruit and Nuts	2	yes	no	no	NA	3	Medium
Field Crops	3	yes	no	no	NA	3	Medium
Vegetable Crops	2	yes	no	no	NA	3	Medium

Table 65. Direct mortality risk hypothesis; Chinook salmon, Upper Willamette River ESU and products containing 1,3-Dichloropropene

Endpoint: Mortality				
Use Category	**% Overlap**	**Effect of Exposure**		**Likelihood of Exposure**
		1,3-D	**Chloropicrin**	
OR Cropland	6.6	None Expected	Medium	High
WA Cropland	0.34	None Expected	Medium	High
Mint	1.06	None Expected	Medium	Medium
Nursery	0.07	None Expected	Medium	Low
Fruit and Nuts	1.06, 0.64	None Expected	Medium	Medium
Field Crops	0.29, 0, 14.16, 0.11, 0, 1.02	None Expected	Medium	Medium
Vegetable Crops	1.06	None Expected	Medium	Medium
Risk Hypothesis: Exposure to products containing products containing 1,3-Dichloropropene is sufficient to reduce abundance via acute lethality.				
Risk	**Confidence**			
Medium	**Low**			

Table 66. Prey risk hypothesis; Chinook salmon, Upper Willamette River ESU and products containing 1,3-Dichloropropene

Endpoint: Prey

Use Category	% Overlap	Effect of Exposure		Likelihood of Exposure
		1,3-D	Chloropicrin	
OR Cropland	6.6	None Expected	None Expected	High
WA Cropland	0.34	None Expected	None Expected	High
Mint	1.06	None Expected	None Expected	Medium
Nursery	0.07	None Expected	None Expected	Low
Fruit and Nuts	1.06, 0.64	None Expected	None Expected	Medium
Field Crops	0.29, 0, 14.16, 0.11, 0, 1.02	None Expected	None Expected	Medium
Vegetable Crops	1.06	None Expected	None Expected	Medium
Risk Hypothesis: Exposure to products containing products containing 1,3-Dichloropropene is sufficient to reduce abundance via reduction in prey availability.				
Risk	**Confidence**			
Low	**Medium**			

Table 67. Growth risk hypothesis; Chinook salmon, Upper Willamette River ESU and products containing 1,3-Dichloropropene

Endpoint: Growth			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
OR Cropland	6.6	None Expected	High
WA Cropland	0.34		High
Mint	1.06	None Expected	Medium
Nursery	0.07	None Expected	Low
Fruit and Nuts	1.06, 0.64	None Expected	Medium
Field Crops	0.29, 0, 14.16, 0.11, 0, 1.02	None Expected	Medium
Vegetable Crops	1.06	None Expected	Medium
Risk Hypothesis: Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via impacts to growth (direct toxicity).			
Risk	**Confidence**		
Low	**High**		

Table 68. Behavior risk hypothesis; Chinook salmon, Upper Willamette River ESU and products containing 1,3-Dichloropropene

Endpoint: Behavior

Use Category	% Overlap	Effect of Exposure	Likelihood of Exposure
OR Cropland	6.6	None Expected	High
WA Cropland	0.34		High
Mint	1.06	None Expected	Medium
Nursery	0.07	None Expected	Low
Fruit and Nuts	1.06, 0.64	None Expected	Medium
Field Crops	0.29, 0, 14.16, 0.11, 0, 1.02	None Expected	Medium
Vegetable Crops	1.06	None Expected	Medium
Risk Hypothesis: Exposure to products containing 1,3-Dichloropropene is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.			
Risk	**Confidence**		
Low	**High**		

Table 69. Effects analysis summary table: Chinook salmon, Upper Willamette River ESU and products containing 1,3-Dichloropropene

Risk Hypothesis	Risk-plot Derived		Population Model Results	Risk Hypothesis Supported? Yes/No
	Risk 1,3-D Chloropicrin	Confidence 1,3-D Chloropicrin		
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via acute lethality.	Medium	Low	No impact for 1,3-D; some associated with chloropicrin (See chapter 11.5).	No
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via reduction in prey availability.	Low	Medium	Not modelled	No
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via impacts to growth (direct toxicity).	Low	High	Not modelled	No
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce adult	Low	High	Not modelled	No

and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.				

Effects analysis summary: Chinook salmon, Upper Willamette River ESU are not anticipated to experience reductions in abundance through any of the risk hypotheses assessed from exposure to products containing 1,3-D or associated degradates. Some take is anticipated when formulated products containing chloropicrin are used in proximity to low flow, low volume species habitats. We did not find support for the risk hypotheses for prey abundance, growth, or behavior. Although risk associated with acute mortality is medium, we have low confidence in this determination because only a subset of product labels containing chloropicrin produced EECs which exceeded this determination threshold. Additionally, the likelihood of exposure characterizations for products containing 1,3-D indicate a greater likelihood than is anticipated because labeled use sites are broadly categorized (e.g. field crops). No changes in population growth rate occurred at the one percent mortality level for any model runs. This suggests that no changes in population growth would occur at the percent mortalities anticipated (less than one percent) with exposures to 1,3-D. Slight shifts in population growth rate occurred at the mortality levels anticipated for some formulated products containing chloropicrin, and increased with the percentage of the population exposed. Exposure to multiple ingredients from formulated products and tank mixtures containing 1,3-D may result in increased toxicity. NMFS has determined the overall risk to the species from the effects of the action is medium and the confidence associated with that risk is low.

12.2.12 Coho Salmon, Central California Coast ESU (*Oncorhynchus kisutch*)

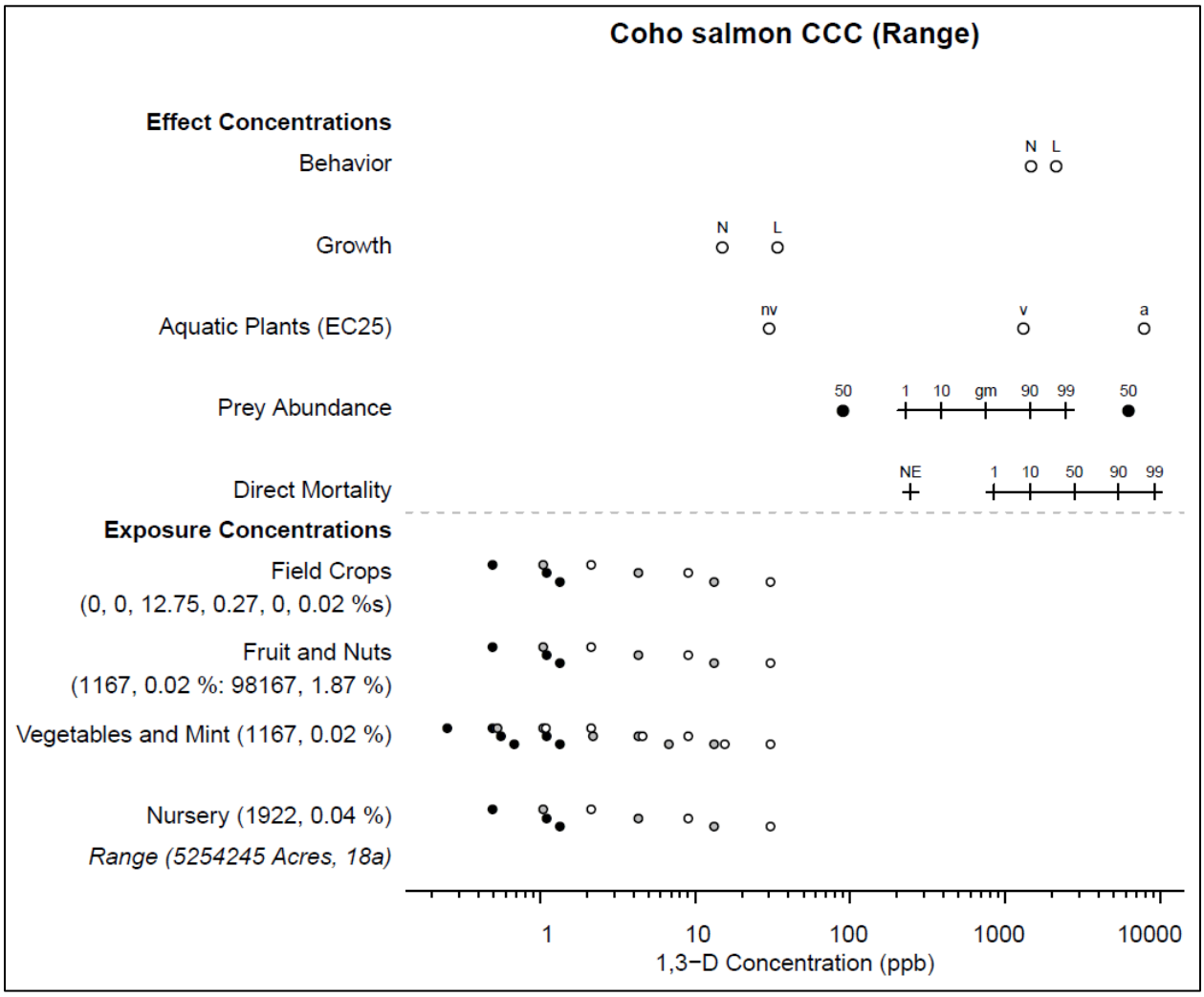


Figure 14. Effects analysis Risk-plot for Coho salmon, Central California Coast ESU and products containing 1,3-Dichloropropene

Table 70. Likelihood of exposure determination for Coho salmon, Central California Coast ESU and products containing 1,3-Dichloropropene

	Percent Overlap Category	Seasonal Analysis	Persistence	Multiple Applications	Proximity Analysis	Duration of migration/residency	Likelihood of Exposure
Mint	1	yes	no	no	no	3	**Low**
Nursery	1	yes	no	no	no	3	**Low**
Fruit and Nuts	2	yes	no	no	NA	3	**Medium**
Field Crops	3	yes	no	no	NA	3	**Medium**
Vegetable Crops	1	yes	no	no	no	3	**Low**

Table 71. Direct mortality risk hypothesis; Coho salmon, Central California Coast ESU and products containing 1,3-Dichloropropene

Endpoint: Mortality				
Use Category	**% Overlap**	**Effect of Exposure**		**Likelihood of Exposure**
		1,3-D	**Chloropicrin**	
Mint	0.02	None Expected	Medium	Low
Nursery	0.04	None Expected	Medium	Low
Fruit and Nuts	0.02, 1.87	None Expected	Medium	Medium
Field Crops	0, 0, 12.75, 0.27, 0, 0.02	None Expected	Medium	Medium
Vegetable Crops	0.02	None Expected	Medium	Low
Risk Hypothesis: Exposure to products containing products containing 1,3-Dichloropropene is sufficient to reduce abundance via acute lethality.				
Risk	**Confidence**			
Medium	**Low**			

Table 72. Prey risk hypothesis; Coho salmon, Central California Coast ESU and products containing 1,3-Dichloropropene

Endpoint: Prey				
Use Category	**% Overlap**	**Effect of Exposure**		**Likelihood of Exposure**
		1,3-D	**Chloropicrin**	
Mint	0.02	None Expected	None Expected	Low
Nursery	0.04	None Expected	None Expected	Low

Fruit and Nuts	0.02, 1.87	None Expected	None Expected	Medium
Field Crops	0, 0, 12.75, 0.27, 0, 0.02	None Expected	None Expected	Medium
Vegetable Crops	0.02	None Expected	None Expected	Low
Risk Hypothesis: Exposure to products containing products containing 1,3-Dichloropropene is sufficient to reduce abundance via reduction in prey availability.				
Risk	**Confidence**			
Low	**Medium**			

Table 73. Growth risk hypothesis; Coho salmon, Central California Coast ESU and products containing 1,3-Dichloropropene

Endpoint: Growth			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Mint	0.02	None Expected	Low
Nursery	0.04	None Expected	Low
Fruit and Nuts	0.02, 1.87	None Expected	Medium
Field Crops	0, 0, 12.75, 0.27, 0, 0.02	None Expected	Medium
Vegetable Crops	0.02	None Expected	Low
Risk Hypothesis: Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via impacts to growth (direct toxicity).			
Risk	**Confidence**		
Low	**High**		

Table 74. Behavior risk hypothesis; Coho salmon, Central California Coast ESU and products containing 1,3-Dichloropropene

Endpoint: Behavior			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Mint	0.02	None Expected	Low
Nursery	0.04	None Expected	Low
Fruit and Nuts	0.02, 1.87	None Expected	Medium
Field Crops	0, 0, 12.75, 0.27, 0, 0.02	None Expected	Medium
Vegetable Crops	0.02	None Expected	Low
Risk Hypothesis: Exposure to products containing 1,3-Dichloropropene is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.			
Risk	**Confidence**		

Low	**High**	

Table 75. Effects analysis summary table: Coho salmon, Central California Coast ESU and products containing 1,3-Dichloropropene

Risk Hypothesis	Risk-plot Derived		Population Model Results	Risk Hypothesis Supported? Yes/No
	Risk 1,3-D Chloropicrin	Confidence 1,3-D Chloropicrin		
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via acute lethality.	Medium	Low	No impact for 1,3-D; some associated with chloropicrin (See chapter 11.5).	No
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via reduction in prey availability.	Low	Medium	Not modelled	No
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via impacts to growth (direct toxicity).	Low	High	Not modelled	No
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.	Low	High	Not modelled	No

Effects analysis summary: Coho salmon, Central California Coast ESU are not anticipated to experience reductions in abundance through any of the risk hypotheses assessed from exposure to products containing 1,3-D or associated degradates. Some take is anticipated when formulated products containing chloropicrin are used in proximity to low flow, low volume species habitats. We did not find support for the risk hypotheses for prey abundance, growth, or behavior. Although risk associated with acute mortality is medium, we have low confidence in this determination because only a subset of product labels containing chloropicrin produced EECs which exceeded this determination threshold. Additionally, the likelihood of exposure

characterizations for products containing 1,3-D indicate a greater likelihood than is anticipated because labeled use sites are broadly categorized (e.g. field crops). No changes in population growth rate occurred at the one percent mortality level for any model runs. This suggests that no changes in population growth would occur at the percent mortalities anticipated (less than one percent) with exposures to 1,3-D. Slight shifts in population growth rate occurred at the mortality levels anticipated for some formulated products containing chloropicrin, and increased with the percentage of the population exposed. Exposure to multiple ingredients from formulated products and tank mixtures containing 1,3-D may result in increased toxicity. NMFS has determined the overall risk to the species from the effects of the action is medium and the confidence associated with that risk is low.

12.2.13 Coho Salmon, Lower Columbia River ESU (*Oncorhynchus kisutch*)

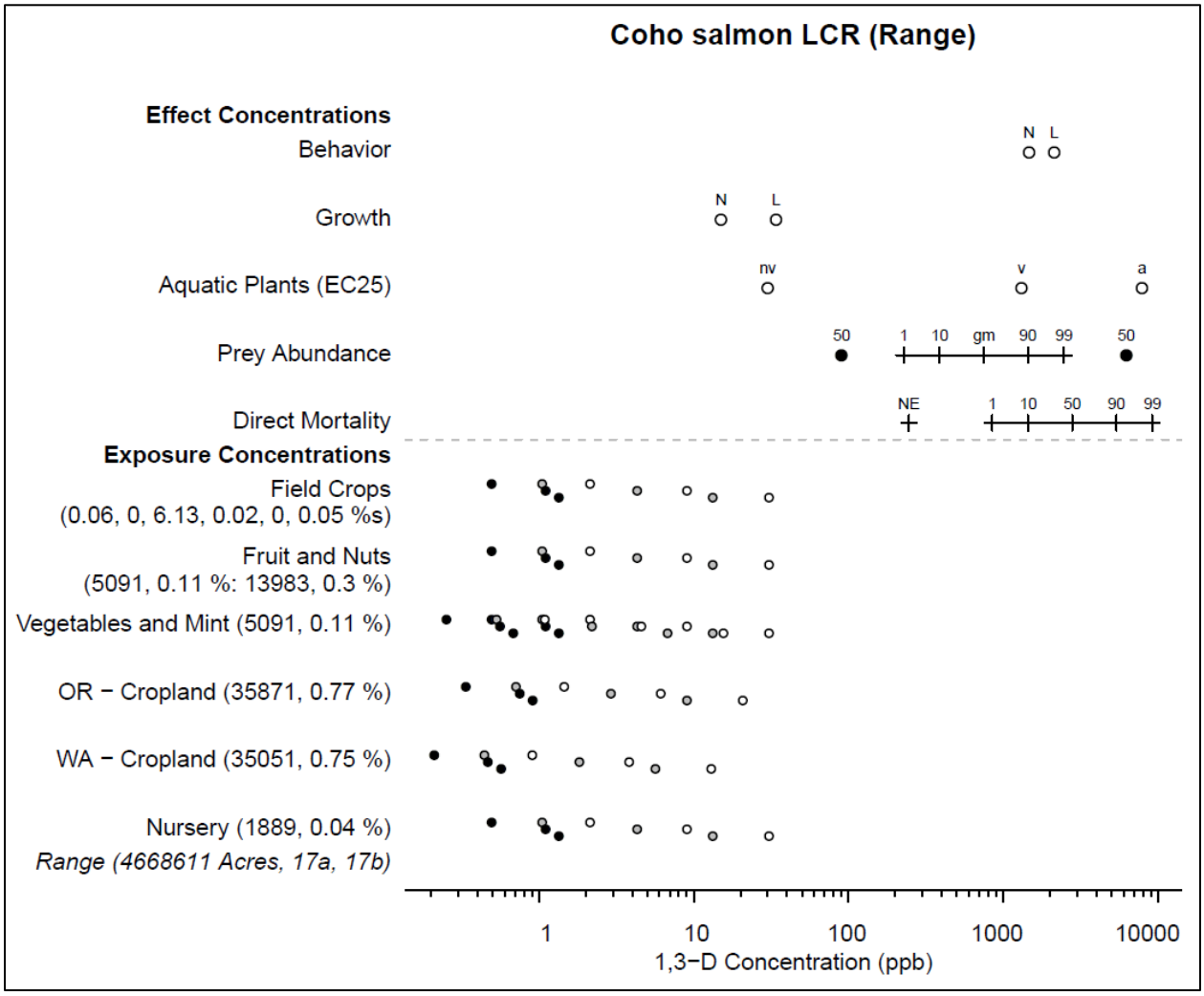


Figure 15. Effects analysis Risk-plot for Coho salmon, Lower Columbia River ESU and products containing 1,3-Dichloropropene

Table 76. Likelihood of exposure determination for Coho salmon, Lower Columbia River ESU and products containing 1,3-Dichloropropene

	Percent Overlap Category	Seasonal Analysis	Persistence	Multiple Applications	Proximity Analysis	Duration of migration/residency	Likelihood of Exposure
OR Cropland	1	yes	no	yes	yes	3	High
WA Cropland	1	yes	no	yes	yes	3	High
Mint	1	yes	no	no	yes	3	Medium
Nursery	1	yes	no	no	no	3	Low
Fruit and Nuts	1	yes	no	no	yes	3	Medium
Field Crops	3	yes	no	no	NA	3	Medium
Vegetable Crops	1	yes	no	no	yes	3	Medium

Table 77. Direct mortality risk hypothesis; Coho salmon, Lower Columbia River ESU and products containing 1,3-Dichloropropene

Endpoint: Mortality				
Use Category	**% Overlap**	**Effect of Exposure**		**Likelihood of Exposure**
		1,3-D	**Chloropicrin**	
OR Cropland	0.77	None Expected	Medium	High
WA Cropland	0.75	None Expected	Medium	High
Mint	0.11	None Expected	Medium	Medium
Nursery	0.04	None Expected	Medium	Low
Fruit and Nuts	0.11, 0.3	None Expected	Medium	Medium
Field Crops	0.06, 0, 6.13, 0.02, 0, 0.05	None Expected	Medium	Medium
Vegetable Crops	0.11	None Expected	None Expected	Medium
Risk Hypothesis: Exposure to products containing products containing 1,3-Dichloropropene is sufficient to reduce abundance via acute lethality.				
Risk	**Confidence**			
Medium	**Low**			

Table 78. Prey risk hypothesis; Coho salmon, Lower Columbia River ESU and products containing 1,3-Dichloropropene

Endpoint: Prey

Use Category	% Overlap	Effect of Exposure		Likelihood of Exposure
		1,3-D	Chloropicrin	
OR Cropland	0.77	None Expected	None Expected	High
WA Cropland	0.75	None Expected	None Expected	High
Mint	0.11	None Expected	None Expected	Medium
Nursery	0.04	None Expected	None Expected	Low
Fruit and Nuts	0.11, 0.3	None Expected	None Expected	Medium
Field Crops	0.06, 0, 6.13, 0.02, 0, 0.05	None Expected	None Expected	Medium
Vegetable Crops	0.11	None Expected	None Expected	Medium
Risk Hypothesis: Exposure to products containing products containing 1,3-Dichloropropene is sufficient to reduce abundance via reduction in prey availability.				
Risk	**Confidence**			
Low	**Medium**			

Table 79. Growth risk hypothesis; Coho salmon, Lower Columbia River ESU and products containing 1,3-Dichloropropene

Endpoint: Growth			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
OR Cropland	0.77	None Expected	High
WA Cropland	0.75		High
Mint	0.11	None Expected	Medium
Nursery	0.04	None Expected	Low
Fruit and Nuts	0.11, 0.3	None Expected	Medium
Field Crops	0.06, 0, 6.13, 0.02, 0, 0.05	None Expected	Medium
Vegetable Crops	0.11	None Expected	Medium
Risk Hypothesis: Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via impacts to growth (direct toxicity).			
Risk	**Confidence**		
Low	**High**		

Table 80. Behavior risk hypothesis; Coho salmon, Lower Columbia River ESU and products containing 1,3-Dichloropropene

Endpoint: Behavior

Use Category	% Overlap	Effect of Exposure	Likelihood of Exposure
OR Cropland	0.77	None Expected	High
WA Cropland	0.75		High
Mint	0.11	None Expected	Medium
Nursery	0.04	None Expected	Low
Fruit and Nuts	0.11, 0.3	None Expected	Medium
Field Crops	0.06, 0, 6.13, 0.02, 0, 0.05	None Expected	Medium
Vegetable Crops	0.11	None Expected	Medium
Risk Hypothesis: Exposure to products containing 1,3-Dichloropropene is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.			
Risk	**Confidence**		
Low	**High**		

Table 81. Effects analysis summary table: Coho salmon, Lower Columbia River ESU and products containing 1,3-Dichloropropene

Risk Hypothesis	Risk-plot Derived		Population Model Results	Risk Hypothesis Supported? Yes/No
	Risk 1,3-D Chloropicrin	Confidence 1,3-D Chloropicrin		
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via acute lethality.	Medium	Low	No impact for 1,3-D; some associated with chloropicrin (See chapter 11.5).	No
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via reduction in prey availability.	Low	Medium	Not modelled	No
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via impacts to growth (direct toxicity).	Low	High	Not modelled	No
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce adult	Low	High	Not modelled	No

and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.				

Effects analysis summary: Coho salmon, Lower Columbia River ESU are not anticipated to experience reductions in abundance through any of the risk hypotheses assessed from exposure to products containing 1,3-D or associated degradates. Some take is anticipated when formulated products containing chloropicrin are used in proximity to low flow, low volume species habitats. We did not find support for the risk hypotheses for prey abundance, growth, or behavior. Although risk associated with acute mortality is medium, we have low confidence in this determination because only a subset of product labels containing chloropicrin produced EECs which exceeded this determination threshold. Additionally, the likelihood of exposure characterizations for products containing 1,3-D indicate a greater likelihood than is anticipated because labeled use sites are broadly categorized (e.g. field crops). No changes in population growth rate occurred at the one percent mortality level for any model runs. This suggests that no changes in population growth would occur at the percent mortalities anticipated (less than one percent) with exposures to 1,3-D. Slight shifts in population growth rate occurred at the mortality levels anticipated for some formulated products containing chloropicrin, and increased with the percentage of the population exposed. Exposure to multiple ingredients from formulated products and tank mixtures containing 1,3-D may result in increased toxicity. NMFS has determined the overall risk to the species from the effects of the action is medium and the confidence associated with that risk is low.

12.2.14 Coho Salmon, Oregon Coast ESU (*Oncorhynchus kisutch*)

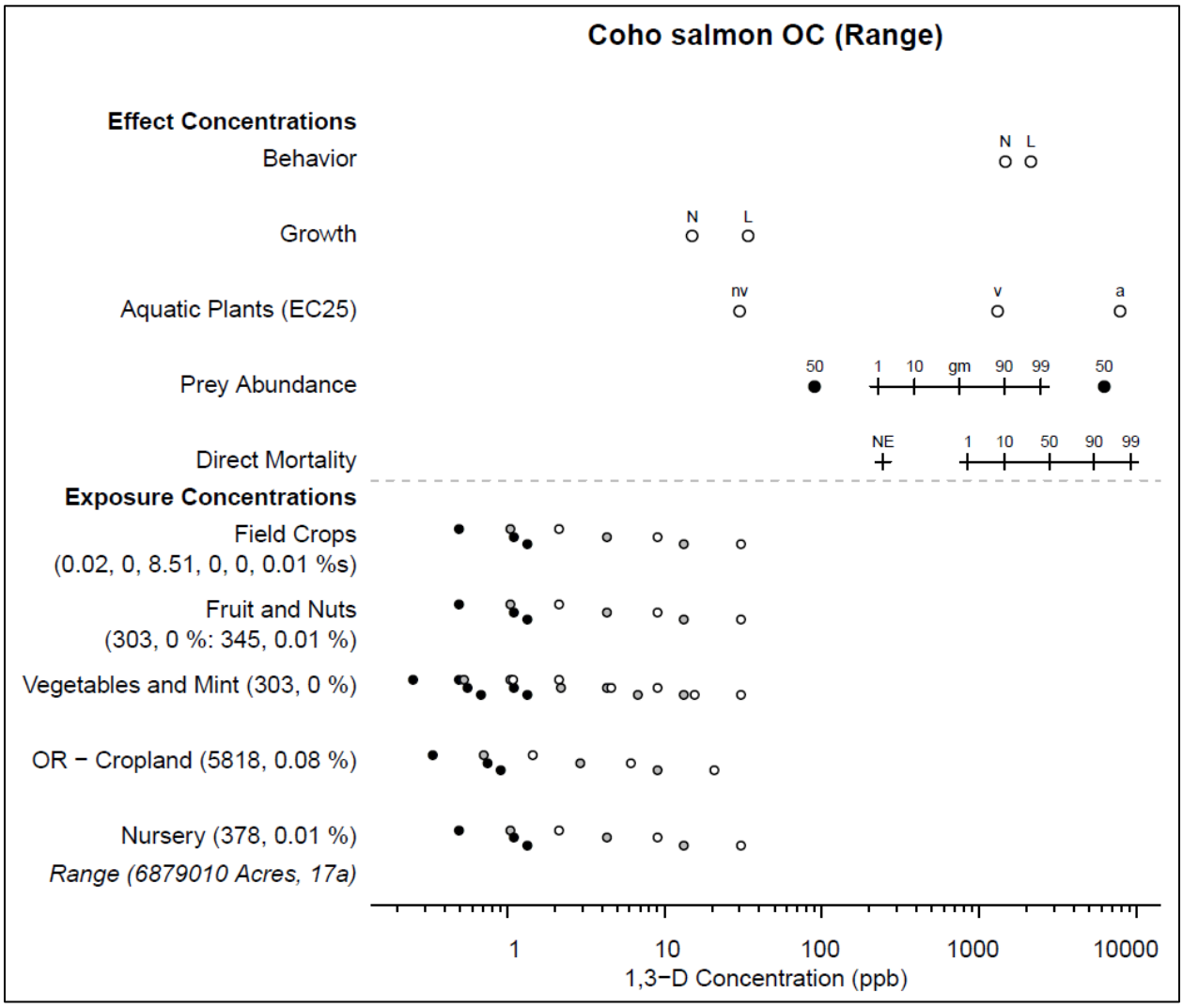
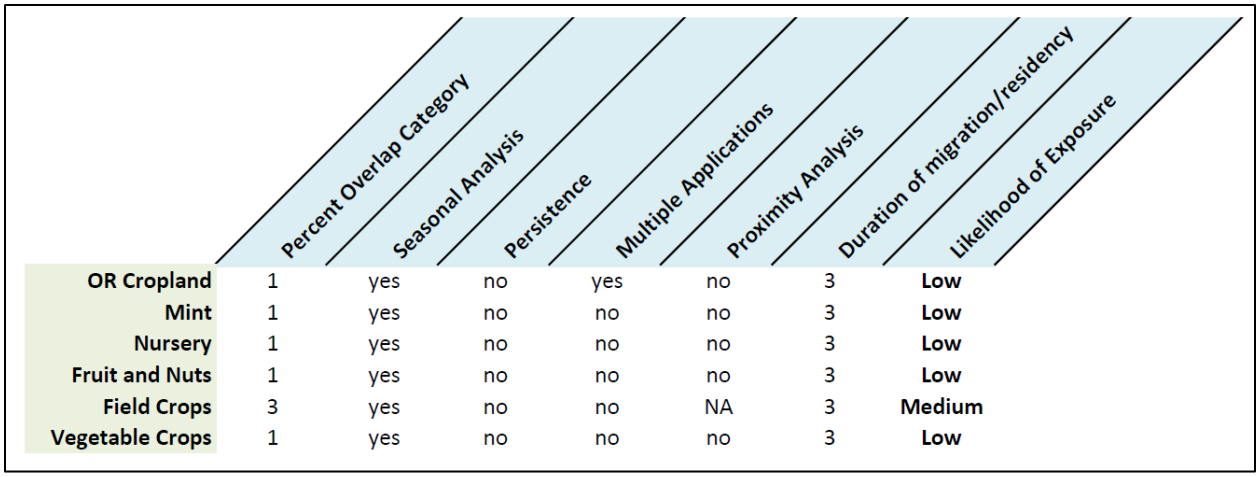


Figure 16. Effects analysis Risk-plot for Coho salmon, Oregon Coast ESU and products containing 1,3-Dichloropropene

Table 82. Likelihood of exposure determination for Coho salmon, Oregon Coast ESU and products containing 1,3-Dichloropropene



	Percent Overlap Category	Seasonal Analysis	Persistence	Multiple Applications	Proximity Analysis	Duration of migration/residency	Likelihood of Exposure
OR Cropland	1	yes	no	yes	no	3	Low
Mint	1	yes	no	no	no	3	Low
Nursery	1	yes	no	no	no	3	Low
Fruit and Nuts	1	yes	no	no	no	3	Low
Field Crops	3	yes	no	no	NA	3	Medium
Vegetable Crops	1	yes	no	no	no	3	Low

Table 83. Direct mortality risk hypothesis; Coho salmon, Oregon Coast ESU and products containing 1,3-Dichloropropene

Endpoint: Mortality				
Use Category	**% Overlap**	**Effect of Exposure**		**Likelihood of Exposure**
		1,3-D	**Chloropicrin**	
OR Cropland	0.08	None Expected	Medium	Low
Mint	0	None Expected	Medium	Low
Nursery	0.01	None Expected	Medium	Low
Fruit and Nuts	0, 0.01	None Expected	Medium	Low
Field Crops	0.02, 0, 8.51, 0, 0, 0.01	None Expected	Medium	Medium
Vegetable Crops	0	None Expected	Medium	Low
Risk Hypothesis: Exposure to products containing products containing 1,3-Dichloropropene is sufficient to reduce abundance via acute lethality.				
Risk	**Confidence**			
Low	**High**			

Table 84. Prey risk hypothesis; Coho salmon, Oregon Coast ESU and products containing 1,3-Dichloropropene

Endpoint: Prey				
Use Category	**% Overlap**	**Effect of Exposure**		**Likelihood of Exposure**
		1,3-D	**Chloropicrin**	

OR Cropland	0.08	None Expected	None Expected	Low
Mint	0	None Expected	None Expected	Low
Nursery	0.01	None Expected	None Expected	Low
Fruit and Nuts	0, 0.01	None Expected	None Expected	Low
Field Crops	0.02, 0, 8.51, 0, 0, 0.01	None Expected	None Expected	Medium
Vegetable Crops	0	None Expected	None Expected	Low
Risk Hypothesis: Exposure to products containing products containing 1,3-Dichloropropene is sufficient to reduce abundance via reduction in prey availability.				
Risk	**Confidence**			
Low	**Medium**			

Table 85. Growth risk hypothesis; Coho salmon, Oregon Coast ESU and products containing 1,3-Dichloropropene

Endpoint: Growth			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
OR Cropland	0.08	None Expected	Low
Mint	0.01	None Expected	Low
Nursery	0, 0.01	None Expected	Low
Fruit and Nuts	0.02, 0, 8.51, 0, 0, 0.01	None Expected	Medium
Field Crops	0	None Expected	Low
Vegetable Crops	0.08	None Expected	Low
Risk Hypothesis: Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via impacts to growth (direct toxicity).			
Risk	**Confidence**		
Low	**High**		

Table 86. Behavior risk hypothesis; Coho salmon, Oregon Coast ESU and products containing 1,3-Dichloropropene

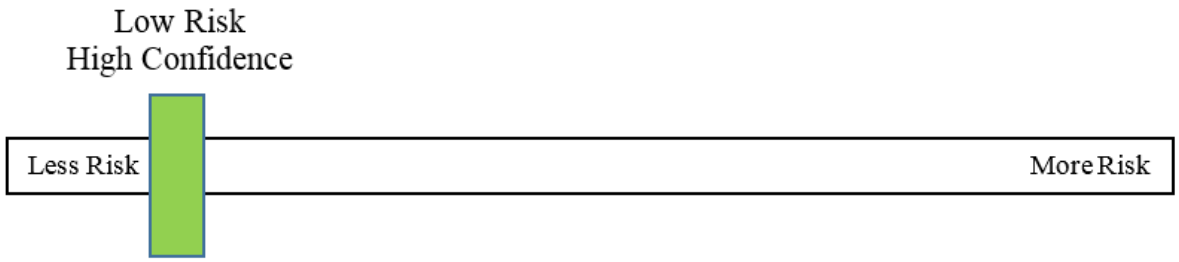
Endpoint: Behavior			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
OR Cropland	0.08	None Expected	Low
Mint	0.01	None Expected	Low
Nursery	0, 0.01	None Expected	Low

Fruit and Nuts	0.02, 0, 8.51, 0, 0, 0.01	None Expected	Medium
Field Crops	0	None Expected	Low
Vegetable Crops	0.08	None Expected	Low
Risk Hypothesis: Exposure to products containing 1,3-Dichloropropene is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.			
Risk	**Confidence**		
Low	**High**		

Table 87. Effects analysis summary table: Coho salmon, Oregon Coast ESU and products containing 1,3-Dichloropropene

Risk Hypothesis	**Risk-plot Derived**		**Population Model Results**	**Risk Hypothesis Supported? Yes/No**
	Risk 1,3-D Chloropicrin	**Confidence 1,3-D Chloropicrin**		
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via acute lethality.	Low	High	No impact for 1,3-D; some associated with chloropicrin (See chapter 11.5).	No
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via reduction in prey availability.	Low	Medium	Not modelled	No
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via impacts to growth (direct toxicity).	Low	High	Not modelled	No
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.	Low	High	Not modelled	No

Effects analysis summary: Coho salmon, Oregon Coast ESU are not anticipated to experience reductions in abundance through any of the risk hypotheses assessed from exposure to 1,3-D or associated degradates. No changes in population growth rate occurred at the one percent mortality level for any model runs. This suggests that no changes in population growth would occur at the percent mortalities anticipated (less than one percent) with exposures to 1,3-D. Slight shifts in population growth rate occurred at the mortality levels anticipated for some formulated products containing chloropicrin, and increased with the percentage of the population exposed. Where formulated products and tank mixtures containing 1,3-D occur in aquatic habitats, individuals may experience increased toxicity. NMFS has determined the overall risk to the species from the effects of the action is low and the confidence associated with that risk is high given the low risk associated with all risk hypotheses evaluated.



12.2.15 Coho Salmon, Southern Oregon/Northern California Coast ESU (*Oncorhynchus kisutch*)

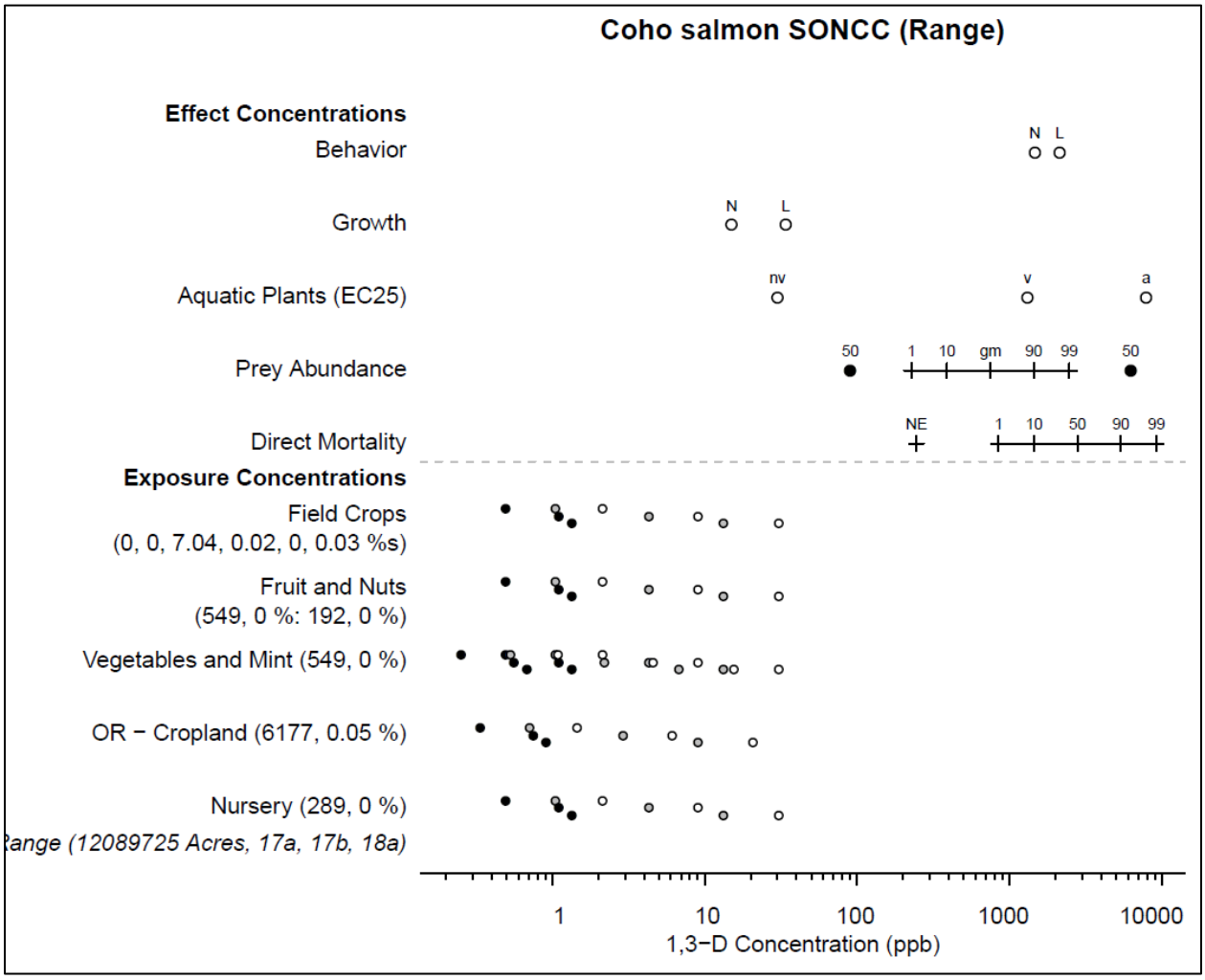


Figure 17. Effects analysis Risk-plot for Coho salmon, Southern Oregon Northern California Coast ESU and products containing 1,3-Dichloropropene

Table 88. Likelihood of exposure determination for Coho salmon, Southern Oregon Northern California Coast ESU and products containing 1,3-Dichloropropene

	Percent Overlap Category	Seasonal Analysis	Persistence	Multiple Applications	Proximity Analysis	Duration of migration/residency	Likelihood of Exposure
OR Cropland	1	yes	no	yes	yes	3	**High**
Mint	1	yes	no	no	no	3	**Low**
Nursery	1	yes	no	no	no	3	**Low**
Fruit and Nuts	1	yes	no	no	no	3	**Low**
Field Crops	3	yes	no	no	NA	3	**Medium**
Vegetable Crops	1	yes	no	no	no	3	**Low**

Table 89. Direct mortality risk hypothesis; Coho salmon, Southern Oregon Northern California Coast ESU and products containing 1,3-Dichloropropene

Endpoint: Mortality				
Use Category	**% Overlap**	**Effect of Exposure**		**Likelihood of Exposure**
		1,3-D	**Chloropicrin**	
OR Cropland	0.05	None Expected	Medium	High
Mint	0	None Expected	Medium	Low
Nursery	0	None Expected	Medium	Low
Fruit and Nuts	0,0	None Expected	Medium	Low
Field Crops	0, 0, 7.04, 0.02, 0, 0.03	None Expected	Medium	Medium
Vegetable Crops	0	None Expected	Medium	Low
Risk Hypothesis: Exposure to products containing products containing 1,3-Dichloropropene is sufficient to reduce abundance via acute lethality.				
Risk	**Confidence**			
Medium	**Low**			

Table 90. Prey risk hypothesis; Coho salmon, Southern Oregon Northern California Coast ESU and products containing 1,3-Dichloropropene

Endpoint: Prey				
Use Category	**% Overlap**	**Effect of Exposure**		**Likelihood of Exposure**
		1,3-D	**Chloropicrin**	
OR Cropland	0.05	None Expected	None Expected	High
Mint	0	None Expected	None Expected	Low
Nursery	0	None Expected	None Expected	Low
Fruit and Nuts	0,0	None Expected	None Expected	Low
Field Crops	0, 0, 7.04, 0.02, 0, 0.03	None Expected	None Expected	Medium
Vegetable Crops	0	None Expected	None Expected	Low
Risk Hypothesis: Exposure to products containing products containing 1,3-Dichloropropene is sufficient to reduce abundance via reduction in prey availability.				
Risk	**Confidence**			
Low	**Medium**			

Table 91. Growth risk hypothesis; Coho salmon, Southern Oregon Northern California Coast ESU and products containing 1,3-Dichloropropene

Endpoint: Growth			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
OR Cropland	0.05	None Expected	High
Mint	0	None Expected	Low
Nursery	0	None Expected	Low
Fruit and Nuts	0,0	None Expected	Low
Field Crops	0, 0, 7.04, 0.02, 0, 0.03	None Expected	Medium
Vegetable Crops	0	None Expected	Low
Risk Hypothesis: Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via impacts to growth (direct toxicity).			
Risk	**Confidence**		
Low	**High**		

Table 92. Behavior risk hypothesis; Coho salmon, Southern Oregon Northern California Coast ESU and products containing 1,3-Dichloropropene

Endpoint: Behavior			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
OR Cropland	0.05	None Expected	High
Mint	0	None Expected	Low
Nursery	0	None Expected	Low
Fruit and Nuts	0,0	None Expected	Low
Field Crops	0, 0, 7.04, 0.02, 0, 0.03	None Expected	Medium
Vegetable Crops	0	None Expected	Low
Risk Hypothesis: Exposure to products containing 1,3-Dichloropropene is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.			
Risk	**Confidence**		
Low	**High**		

Table 93. Effects analysis summary table: Coho salmon, Southern Oregon Northern California Coast ESU and products containing 1,3-Dichloropropene

Risk Hypothesis	**Risk-plot Derived**		**Population Model Results**	**Risk Hypothesis Supported? Yes/No**
	Risk 1,3-D Chloropicrin	**Confidence 1,3-D Chloropicrin**		
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via acute lethality.	Medium	Low	No impact for 1,3-D; some associated with chloropicrin (See chapter 11.5).	No
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via reduction in prey availability.	Low	Medium	Not modelled	No
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via impacts to growth (direct toxicity).	Low	High	Not modelled	No

Exposure to products containing 1,3-Dichloropropene is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.	Low	High	Not modelled	No

Effects analysis summary: Coho salmon, Southern Oregon Northern California Coast ESU are not anticipated to experience reductions in abundance through any of the risk hypotheses assessed from exposure to products containing 1,3-D or associated degradates. Some take is anticipated when formulated products containing chloropicrin are used in proximity to low flow, low volume species habitats. We did not find support for the risk hypotheses for prey abundance, growth, or behavior. Although risk associated with acute mortality is medium, we have low confidence in this determination because only a subset of product labels containing chloropicrin produced EECs which exceeded this determination threshold. Additionally, the likelihood of exposure characterizations for products containing 1,3-D indicate a greater likelihood than is anticipated because labeled use sites are broadly categorized (e.g. field crops). No changes in population growth rate occurred at the one percent mortality level for any model runs. This suggests that no changes in population growth would occur at the percent mortalities anticipated (less than one percent) with exposures to 1,3-D. Slight shifts in population growth rate occurred at the mortality levels anticipated for some formulated products containing chloropicrin, and increased with the percentage of the population exposed. Exposure to multiple ingredients from formulated products and tank mixtures containing 1,3-D may result in increased toxicity. NMFS has determined the overall risk to the species from the effects of the action is medium and the confidence associated with that risk is low.

12.2.16 Sockeye Salmon, Ozette Lake ESU (*Oncorhynchus nerka*)

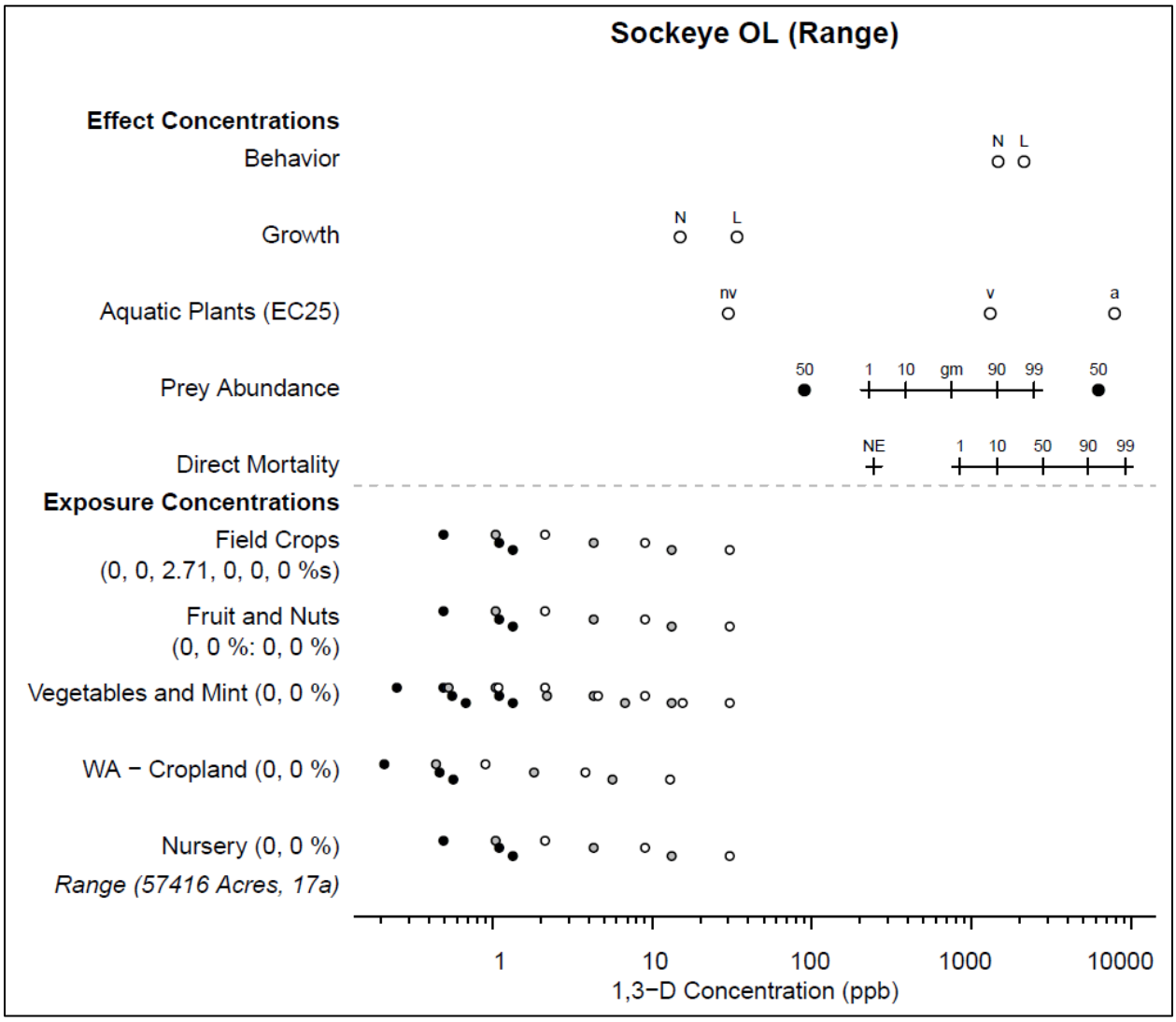


Figure 18. Effects analysis Risk-plot for Sockeye salmon, Ozette Lake ESU and products containing 1,3-Dichloropropene

Table 94. Likelihood of exposure determination for Sockeye salmon, Ozette Lake ESU and products containing 1,3-Dichloropropene

	Percent Overlap Category	Seasonal Analysis	Persistence	Multiple Applications	Proximity Analysis	Duration of migration/residency	Likelihood of Exposure
WA Cropland	1	yes	no	yes	no	3	**Low**
Mint	1	yes	no	no	no	3	**Low**
Nursery	1	yes	no	no	no	3	**Low**
Fruit and Nuts	1	yes	no	no	no	3	**Low**
Field Crops	2	yes	no	no	NA	3	**Medium**
Vegetable Crops	1	yes	no	no	no	3	**Low**

Table 95. Direct mortality risk hypothesis; Sockeye salmon, Ozette Lake ESU and products containing 1,3-Dichloropropene

Endpoint: Mortality				
Use Category	**% Overlap**	**Effect of Exposure**		**Likelihood of Exposure**
		1,3-D	**Chloropicrin**	
WA Cropland	0	None Expected	Medium	Low
Mint	0	None Expected	Medium	Low
Nursery	0	None Expected	Medium	Low
Fruit and Nuts	0,0	None Expected	Medium	Low
Field Crops	0, 0, 2.71, 0, 0, 0	None Expected	Medium	Medium
Vegetable Crops	0	None Expected	Medium	Low
Risk Hypothesis: Exposure to products containing products containing 1,3-Dichloropropene is sufficient to reduce abundance via acute lethality.				
Risk	**Confidence**			
Low	**High**			

Table 96. Prey risk hypothesis; Sockeye salmon, Ozette Lake ESU and products containing 1,3-Dichloropropene

Endpoint: Prey				
Use Category	**% Overlap**	**Effect of Exposure**		**Likelihood of Exposure**
		1,3-D	**Chloropicrin**	

WA Cropland	0	None Expected	None Expected	Low
Mint	0	None Expected	None Expected	Low
Nursery	0	None Expected	None Expected	Low
Fruit and Nuts	0,0	None Expected	None Expected	Low
Field Crops	0, 0, 2.71, 0, 0, 0	None Expected	None Expected	Medium
Vegetable Crops	0	None Expected	None Expected	Low
Risk Hypothesis: Exposure to products containing products containing 1,3-Dichloropropene is sufficient to reduce abundance via reduction in prey availability.				
Risk	**Confidence**			
Low	**Medium**			

Table 97. Growth risk hypothesis; Sockeye salmon, Ozette Lake ESU and products containing 1,3-Dichloropropene

Endpoint: Growth			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
WA Cropland	0	None Expected	Low
Mint	0	None Expected	Low
Nursery	0	None Expected	Low
Fruit and Nuts	0,0	None Expected	Low
Field Crops	0, 0, 2.71, 0, 0, 0	None Expected	Medium
Vegetable Crops	0	None Expected	Low
Risk Hypothesis: Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via impacts to growth (direct toxicity).			
Risk	**Confidence**		
Low	**High**		

Table 98. Behavior risk hypothesis; Sockeye salmon, Ozette Lake ESU and products containing 1,3-Dichloropropene

Endpoint: Behavior			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
WA Cropland	0	None Expected	Low
Mint	0	None Expected	Low
Nursery	0	None Expected	Low
Fruit and Nuts	0,0	None Expected	Low

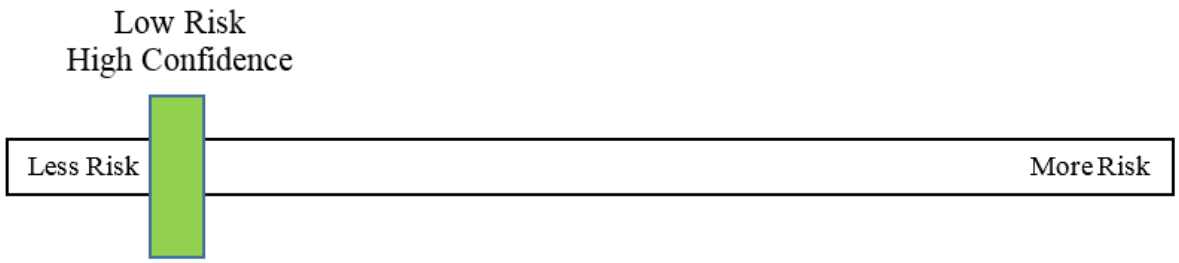
Field Crops	0, 0, 2.71, 0, 0, 0	None Expected	Medium
Vegetable Crops	0	None Expected	Low
Risk Hypothesis: Exposure to products containing 1,3-Dichloropropene is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.			
Risk	**Confidence**		
Low	**High**		

Table 99. Effects analysis summary table: Sockeye salmon, Ozette Lake ESU and products containing 1,3-Dichloropropene

Risk Hypothesis	Risk-plot Derived		Population Model Results	Risk Hypothesis Supported? Yes/No
	Risk 1,3-D Chloropicrin	Confidence 1,3-D Chloropicrin		
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via acute lethality.	Low	High	No impact for 1,3-D; some associated with chloropicrin (See chapter 11.5).	No
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via reduction in prey availability.	Low	Medium	Not modelled	No
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via impacts to growth (direct toxicity).	Low	High	Not modelled	No
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.	Low	High	Not modelled	No

Effects analysis summary: Sockeye salmon, Ozette Lake ESU are not anticipated to experience reductions in abundance through any of the risk hypotheses assessed from exposure to 1,3-D or

associated degradates. No changes in population growth rate occurred at the one percent mortality level for any model runs. This suggests that no changes in population growth would occur at the percent mortalities anticipated (less than one percent) with exposures to 1,3-D. Slight shifts in population growth rate occurred at the mortality levels anticipated for some formulated products containing chloropicrin, and increased with the percentage of the population exposed. Where formulated products and tank mixtures containing 1,3-D occur in aquatic habitats, individuals may experience increased toxicity. NMFS has determined the overall risk to the species from the effects of the action is low and the confidence associated with that risk is high given the low risk associated with all risk hypotheses evaluated.



12.2.17 Sockeye Salmon, Snake River ESU (*Oncorhynchus nerka*)

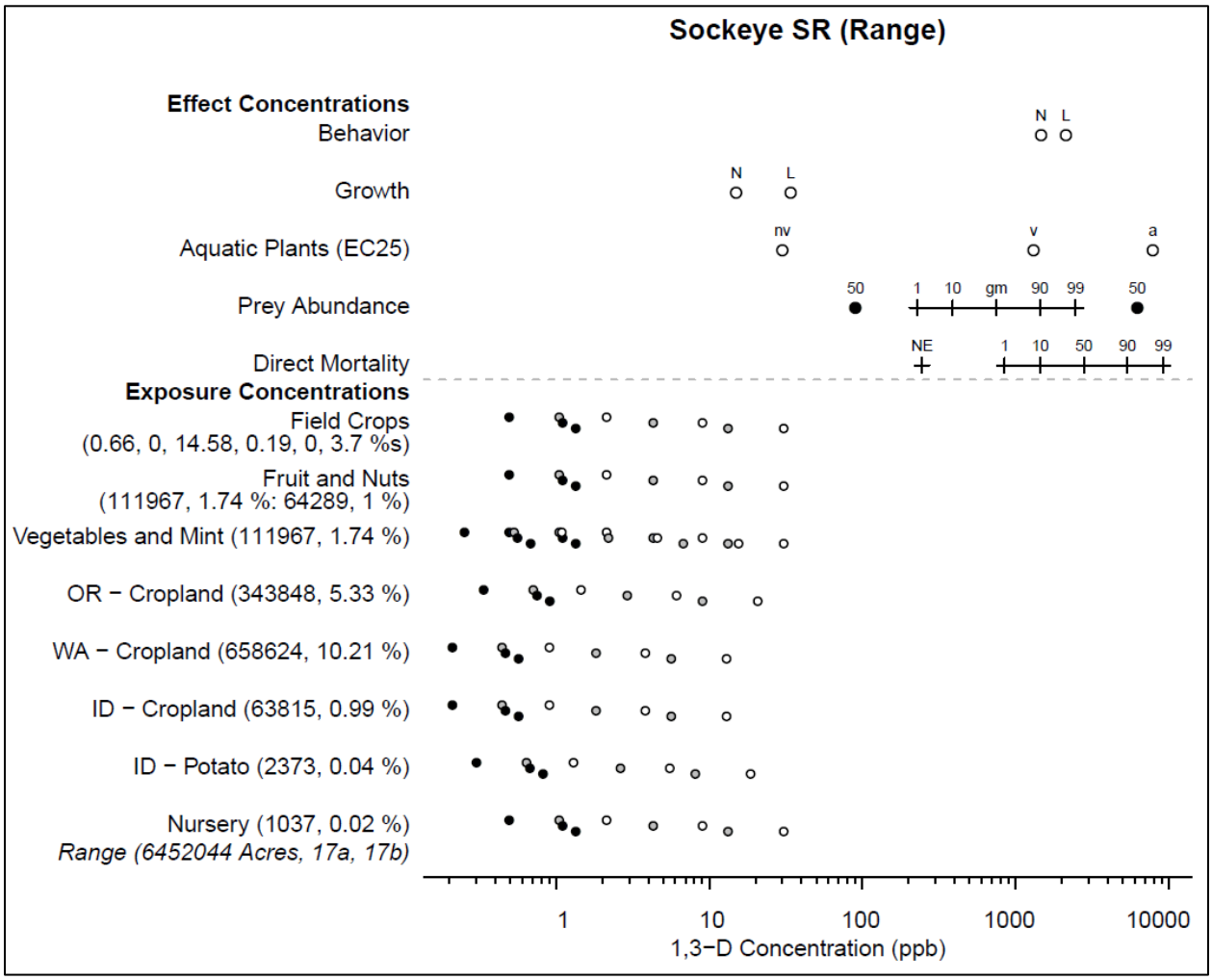


Figure 19. Effects analysis Risk-plot for Sockeye salmon, Snake River ESU and products containing 1,3-Dichloropropene

Table 100. Likelihood of exposure determination for Sockeye salmon, Snake River ESU and products containing 1,3-Dichloropropene

	Percent Overlap Category	Seasonal Analysis	Persistence	Multiple Applications	Proximity Analysis	Duration of migration/residency	Likelihood of Exposure
WA Cropland	3	yes	no	yes	NA	3	High
OR Cropland	3	yes	no	yes	NA	3	High
ID Cropland	1	yes	no	yes	no	3	Low
ID Potato	1	yes	no	yes	no	3	Low
Mint	2	yes	no	no	NA	3	Medium
Nursery	1	yes	no	no	no	3	Low
Fruit and Nuts	2	yes	no	no	NA	3	Medium
Field Crops	3	yes	no	no	NA	3	Medium
Vegetable Crops	2	yes	no	no	NA	3	Medium

Table 101. Direct mortality risk hypothesis; Sockeye salmon, Snake River ESU and products containing 1,3-Dichloropropene

Endpoint: Mortality				
Use Category	**% Overlap**	**Effect of Exposure**		**Likelihood of Exposure**
		1,3-D	**Chloropicrin**	
WA Cropland	10.21	None Expected	Medium	High
OR Cropland	5.33	None Expected	Medium	High
ID Cropland	0.99	None Expected	Medium	Low
ID Potato	0.04	None Expected	Medium	Low
Mint	1.74	None Expected	Medium	Medium
Nursery	0.02	None Expected	Medium	Low
Fruit and Nuts	1.74, 1	None Expected	Medium	Medium
Field Crops	0.66, 0, 14.58, 0.19, 0, 3.7	None Expected	Medium	Medium
Vegetable Crops	1.74	None Expected	Medium	Medium
Risk Hypothesis: Exposure to products containing products containing 1,3-Dichloropropene is sufficient to reduce abundance via acute lethality.				
Risk	**Confidence**			
Medium	**Low**			

Table 102. Prey risk hypothesis; Sockeye salmon, Snake River ESU and products containing 1,3-Dichloropropene

Endpoint: Prey				
Use Category	**% Overlap**	**Effect of Exposure**		**Likelihood of Exposure**
		1,3-D	**Chloropicrin**	
WA Cropland	10.21	None Expected	None Expected	High
OR Cropland	5.33	None Expected	None Expected	High
ID Cropland	0.99	None Expected	None Expected	Low
ID Potato	0.04	None Expected	None Expected	Low
Mint	1.74	None Expected	None Expected	Medium
Nursery	0.02	None Expected	None Expected	Low
Fruit and Nuts	1.74, 1	None Expected	None Expected	Medium
Field Crops	0.66, 0, 14.58, 0.19, 0, 3.7	None Expected	None Expected	Medium
Vegetable Crops	1.74	None Expected	None Expected	Medium
Risk Hypothesis: Exposure to products containing products containing 1,3-Dichloropropene is sufficient to reduce abundance via reduction in prey availability.				
Risk	**Confidence**			
Low	**Medium**			

Table 103. Growth risk hypothesis; Sockeye salmon, Snake River ESU and products containing 1,3-Dichloropropene

Endpoint: Growth			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
WA Cropland	10.21	None Expected	High
OR Cropland	5.33	None Expected	High
ID Cropland	0.99	None Expected	Low
ID Potato	0.04	None Expected	Low
Mint	1.74	None Expected	Medium
Nursery	0.02	None Expected	Low
Fruit and Nuts	1.74, 1	None Expected	Medium

Field Crops	0.66, 0, 14.58, 0.19, 0, 3.7	None Expected	Medium
Vegetable Crops	1.74	None Expected	Medium
Risk Hypothesis: Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via impacts to growth (direct toxicity).			
Risk	**Confidence**		
Low	**High**		

Table 104. Behavior risk hypothesis; Sockeye salmon, Snake River ESU and products containing 1,3-Dichloropropene

Endpoint: Behavior			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
WA Cropland	10.21	None Expected	High
OR Cropland	5.33	None Expected	High
ID Cropland	0.99	None Expected	Low
ID Potato	0.04	None Expected	Low
Mint	1.74	None Expected	Medium
Nursery	0.02	None Expected	Low
Fruit and Nuts	1.74, 1	None Expected	Medium
Field Crops	0.66, 0, 14.58, 0.19, 0, 3.7	None Expected	Medium
Vegetable Crops	1.74	None Expected	Medium
Risk Hypothesis: Exposure to products containing 1,3-Dichloropropene is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.			
Risk	**Confidence**		
Low	**High**		

Table 105. Effects analysis summary table: Sockeye salmon, Snake River ESU and products containing 1,3-Dichloropropene

Risk Hypothesis	**Risk-plot Derived**		**Population Model Results**	**Risk Hypothesis Supported? Yes/No**
	Risk 1,3-D Chloropicrin	**Confidence 1,3-D Chloropicrin**		
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via acute lethality.	Medium	Low	No impact for 1,3-D; some associated with chloropicrin (See chapter 11.5).	No

Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via reduction in prey availability.	Low	Medium	Not modelled	No
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via impacts to growth (direct toxicity).	Low	High	Not modelled	No
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.	Low	High	Not modelled	No

Effects analysis summary: Sockeye salmon, Snake River ESU are not anticipated to experience reductions in abundance through any of the risk hypotheses assessed from exposure to products containing 1,3-D or associated degradates. Some take is anticipated when formulated products containing chloropicrin are used in proximity to low flow, low volume species habitats. We did not find support for the risk hypotheses for prey abundance, growth, or behavior. Although risk associated with acute mortality is medium, we have low confidence in this determination because only a subset of product labels containing chloropicrin produced EECs which exceeded this determination threshold. Additionally, the likelihood of exposure characterizations for products containing 1,3-D indicate a greater likelihood than is anticipated because labeled use sites are broadly categorized (e.g. field crops). No changes in population growth rate occurred at the one percent mortality level for any model runs. This suggests that no changes in population growth would occur at the percent mortalities anticipated (less than one percent) with exposures to 1,3-D. Slight shifts in population growth rate occurred at the mortality levels anticipated for some formulated products containing chloropicrin, and increased with the percentage of the population exposed. Exposure to multiple ingredients from formulated products and tank mixtures containing 1,3-D may result in increased toxicity. NMFS has determined the overall risk to the species from the effects of the action is medium and the confidence associated with that risk is low.

Medium Risk
Low Confidence
Less Risk
More Risk

12.2.18 Steelhead, California Central Valley DPS (*Oncorhynchus mykiss*)

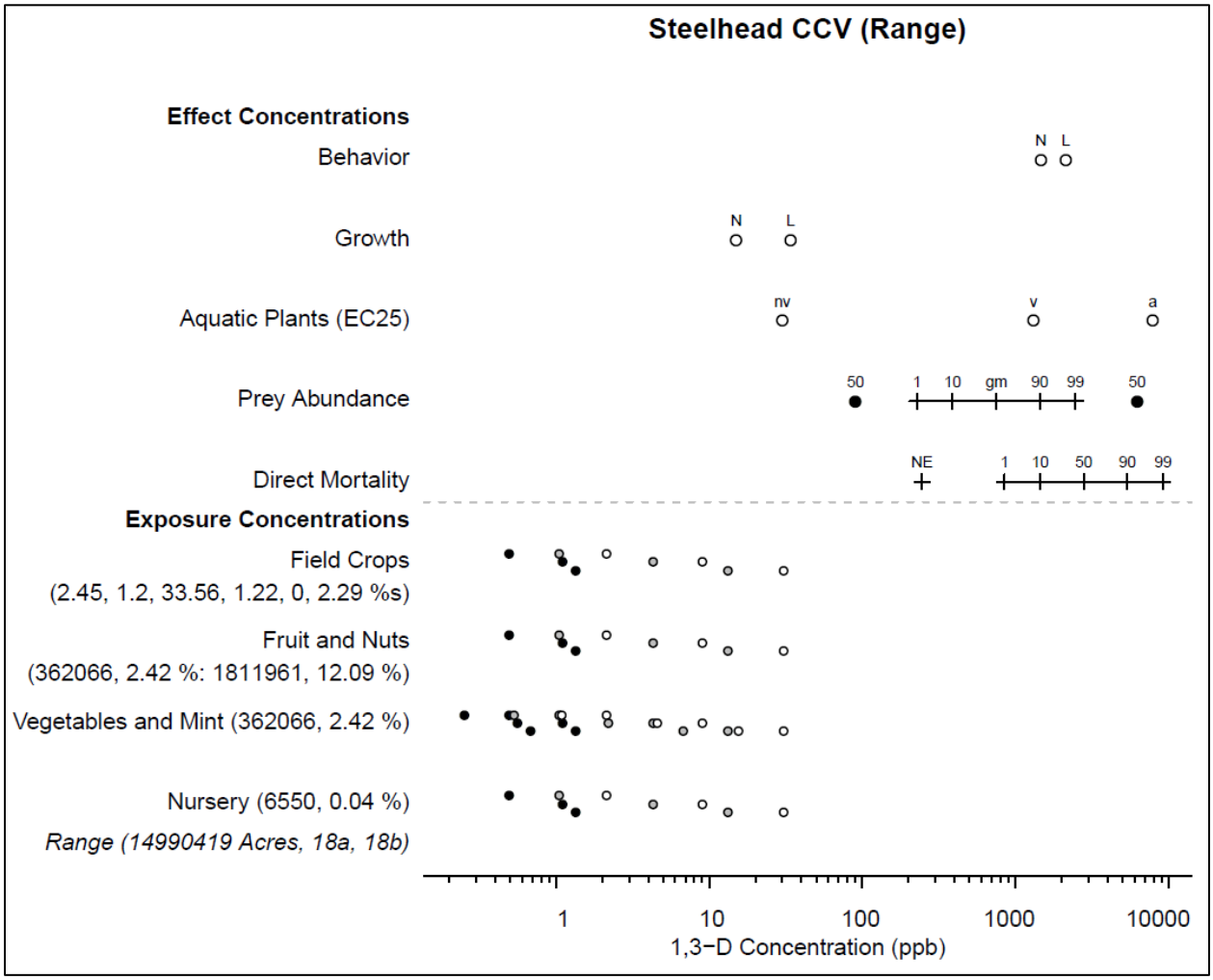


Figure 20. Effects analysis Risk-plot for Steelhead, California Central Valley DPS and products containing 1,3-Dichloropropene

Table 106. Likelihood of exposure determination for Steelhead, California Central Valley DPS and products containing 1,3-Dichloropropene

	Percent Overlap Category	Seasonal Analysis	Persistence	Multiple Applications	Proximity Analysis	Duration of migration/residency	Likelihood of Exposure
Mint	2	yes	no	no	NA	3	**Medium**
Nursery	1	yes	no	no	no	3	**Low**
Fruit and Nuts	3	yes	no	no	NA	3	**Medium**
Field Crops	3	yes	no	no	NA	3	**Medium**
Vegetable Crops	2	yes	no	no	NA	3	**Medium**

Table 107. Direct mortality risk hypothesis; Steelhead, California Central Valley DPS and products containing 1,3-Dichloropropene

Endpoint: Mortality				
Use Category	**% Overlap**	**Effect of Exposure**		**Likelihood of Exposure**
		1,3-D	**Chloropicrin**	
Mint	2.42	None Expected	Medium	Medium
Nursery	0.04	None Expected	Medium	Low
Fruit and Nuts	2.42, 12.09	None Expected	Medium	Medium
Field Crops	2.45, 1.2, 33.56, 1.22, 0, 2.29	None Expected	Medium	Medium
Vegetable Crops	2.42	None Expected	Medium	Medium
Risk Hypothesis: Exposure to products containing products containing 1,3-Dichloropropene is sufficient to reduce abundance via acute lethality.				
Risk	**Confidence**			
Medium	**Low**			

Table 108. Prey risk hypothesis; Steelhead, California Central Valley DPS and products containing 1,3-Dichloropropene

Endpoint: Prey				
Use Category	**% Overlap**	**Effect of Exposure (Invertebrates/Fish)**		**Likelihood of Exposure**
		1,3-D	**Chloropicrin**	
Mint	2.42	None Expected	None Expected / Medium	Medium

Nursery	0.04	None Expected	None Expected / Medium	Low
Fruit and Nuts	2.42, 12.09	None Expected	None Expected / Medium	Medium
Field Crops	2.45, 1.2, 33.56, 1.22, 0, 2.29	None Expected	None Expected / Medium	Medium
Vegetable Crops	2.42	None Expected	None Expected / Medium	Medium
Risk Hypothesis: Exposure to products containing products containing 1,3-Dichloropropene is sufficient to reduce abundance via reduction in prey availability.				
Risk	**Confidence**			
Low	**Medium**			

Table 109. Growth risk hypothesis; Steelhead, California Central Valley DPS and products containing 1,3-Dichloropropene

Endpoint: Growth			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Mint	2.42	None Expected	Medium
Nursery	0.04	None Expected	Low
Fruit and Nuts	2.42, 12.09	None Expected	Medium
Field Crops	2.45, 1.2, 33.56, 1.22, 0, 2.29	None Expected	Medium
Vegetable Crops	2.42	None Expected	Medium
Risk Hypothesis: Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via impacts to growth (direct toxicity).			
Risk	**Confidence**		
Low	**High**		

Table 110. Behavior risk hypothesis; Steelhead, California Central Valley DPS and products containing 1,3-Dichloropropene

Endpoint: Behavior			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Mint	2.42	None Expected	Medium
Nursery	0.04	None Expected	Low
Fruit and Nuts	2.42, 12.09	None Expected	Medium
Field Crops	2.45, 1.2, 33.56, 1.22, 0, 2.29	None Expected	Medium
Vegetable Crops	2.42	None Expected	Medium

Risk Hypothesis: Exposure to products containing 1,3-Dichloropropene is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.		
Risk	**Confidence**	
Low	**High**	

Table 111. Effects analysis summary table: Steelhead, California Central Valley DPS and products containing 1,3-Dichloropropene

Risk Hypothesis	**Risk-plot Derived**		**Population Model Results**	**Risk Hypothesis Supported? Yes/No**
	Risk 1,3-D Chloropicrin	**Confidence 1,3-D Chloropicrin**		
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via acute lethality.	Medium	Low	Not Applicable	No
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via reduction in prey availability.	Low	Medium		No
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via impacts to growth (direct toxicity).	Low	High		No
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.	Low	High		No

Effects analysis summary:

Steelhead, California Central Valley DPS are not anticipated to experience reductions in abundance through any of the risk hypotheses assessed from exposure to products containing 1,3-D or associated degradates. Some take is anticipated when formulated products containing chloropicrin are used in proximity to low flow, low volume species habitats. We did not find

support for the risk hypotheses for prey abundance, growth, or behavior. Although risk associated with acute mortality is medium, we have low confidence in this determination because only a subset of product labels containing chloropicrin produced EECs which exceeded this determination threshold. Additionally, the likelihood of exposure characterizations for products containing 1,3-D indicate a greater likelihood than is anticipated because labeled use sites are broadly categorized (e.g. field crops). Exposure to multiple ingredients from formulated products and tank mixtures containing 1,3-D may result in increased toxicity. NMFS has determined the overall risk to the species from the effects of the action is medium and the confidence associated with that risk is low.

12.2.19 Steelhead, Central California Coast DPS (*Oncorhynchus mykiss*)

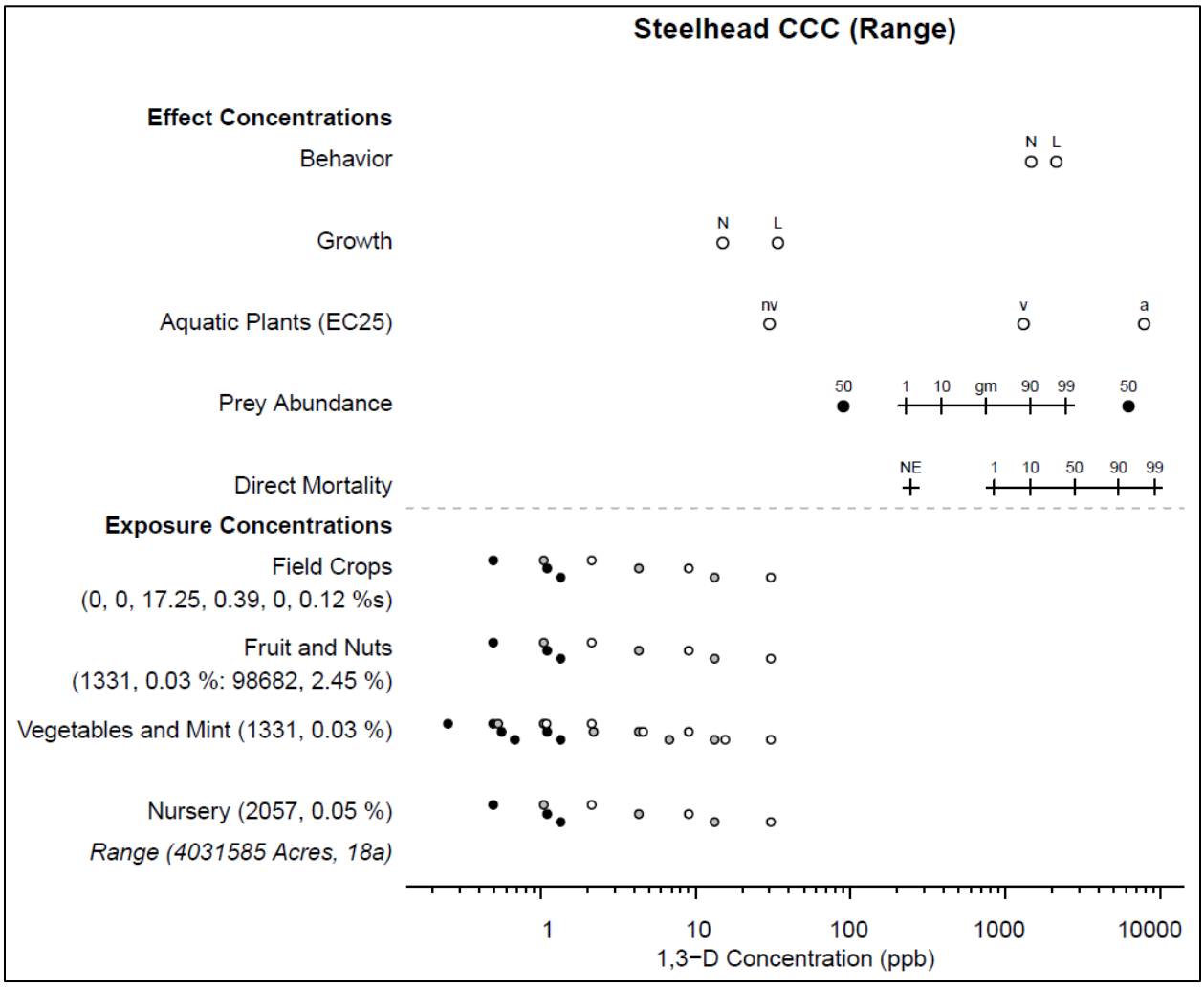


Figure 21. Effects analysis Risk-plot for Steelhead, California Coastal DPS and products containing 1,3-Dichloropropene

Table 112. Likelihood of exposure determination for Steelhead, California Coastal DPS and products containing 1,3-Dichloropropene

	Percent Overlap Category	Seasonal Analysis	Persistence	Multiple Applications	Proximity Analysis	Duration of migration/residency	Likelihood of Exposure
Mint	1	yes	no	no	no	3	**Low**
Nursery	1	yes	no	no	no	3	**Low**
Fruit and Nuts	2	yes	no	no	NA	3	**Medium**
Field Crops	3	yes	no	no	NA	3	**Medium**
Vegetable Crops	1	yes	no	no	no	3	**Low**

Table 113. Direct mortality risk hypothesis; Steelhead, California Coastal DPS and products containing 1,3-Dichloropropene

Endpoint: Mortality				
Use Category	**% Overlap**	**Effect of Exposure**		**Likelihood of Exposure**
		1,3-D	**Chloropicrin**	
Mint	0.03	None Expected	Medium	Low
Nursery	0.05	None Expected	Medium	Low
Fruit and Nuts	0.03, 2.45	None Expected	Medium	Medium
Field Crops	0, 0, 17.25, 0.39, 0, 0.12	None Expected	Medium	Medium
Vegetable Crops	0.03	None Expected	Medium	Low
Risk Hypothesis: Exposure to products containing products containing 1,3-Dichloropropene is sufficient to reduce abundance via acute lethality.				
Risk	**Confidence**			
Medium	**Low**			

Table 114. Prey risk hypothesis; Steelhead, California Coastal DPS and products containing 1,3-Dichloropropene

Endpoint: Prey				
Use Category	**% Overlap**	**Effect of Exposure (Invertebrates/Fish)**		**Likelihood of Exposure**
		1,3-D	**Chloropicrin**	
Mint	0.03	None Expected	None Expected / Medium	Low

Nursery	0.05	None Expected	None Expected / Medium	Low
Fruit and Nuts	0.03, 2.45	None Expected	None Expected / Medium	Medium
Field Crops	0, 0, 17.25, 0.39, 0, 0.12	None Expected	None Expected / Medium	Medium
Vegetable Crops	0.03	None Expected	None Expected / Medium	Low
Risk Hypothesis: Exposure to products containing products containing 1,3-Dichloropropene is sufficient to reduce abundance via reduction in prey availability.				
Risk	**Confidence**			
Low	**Medium**			

Table 115. Growth risk hypothesis; Steelhead, California Coastal DPS and products containing 1,3-Dichloropropene

Endpoint: Growth			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Mint	0.03	None Expected	Low
Nursery	0.05	None Expected	Low
Fruit and Nuts	0.03, 2.45	None Expected	Medium
Field Crops	0, 0, 17.25, 0.39, 0, 0.12	None Expected	Medium
Vegetable Crops	0.03	None Expected	Low
Risk Hypothesis: Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via impacts to growth (direct toxicity).			
Risk	**Confidence**		
Low	**High**		

Table 116. Behavior risk hypothesis; Steelhead, California Coastal DPS and products containing 1,3-Dichloropropene

Endpoint: Behavior			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Mint	0.03	None Expected	Low
Nursery	0.05	None Expected	Low
Fruit and Nuts	0.03, 2.45	None Expected	Medium
Field Crops	0, 0, 17.25, 0.39, 0, 0.12	None Expected	Medium
Vegetable Crops	0.03	None Expected	Low

Risk Hypothesis: Exposure to products containing 1,3-Dichloropropene is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.		
Risk	**Confidence**	
Low	**High**	

Table 117. Effects analysis summary table: Steelhead, California Coastal DPS and products containing 1,3-Dichloropropene

Risk Hypothesis	**Risk-plot Derived**		**Population Model Results**	**Risk Hypothesis Supported? Yes/No**
	Risk 1,3-D Chloropicrin	**Confidence 1,3-D Chloropicrin**		
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via acute lethality.	Medium	Low	Not Applicable	No
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via reduction in prey availability.	Low	Medium		No
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via impacts to growth (direct toxicity).	Low	High		No
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.	Low	High		No

Effects analysis summary: Steelhead, California Coastal DPS are not anticipated to experience reductions in abundance through any of the risk hypotheses assessed from exposure to products containing 1,3-D or associated degradates. Some take is anticipated when formulated products containing chloropicrin are used in proximity to low flow, low volume species habitats. The anticipated levels of products containing 1,3-D within the species range are not expected to substantially impact the overall abundance and therefore availability of aquatic invertebrates.

1,3-D products containing chloropicrin, however, may result in some reductions in the availability of juvenile fish as steelhead prey in low flow, low volume habitats. We did not find support for the risk hypotheses for growth or behavior. Although risk associated with acute mortality is medium, we have low confidence in this determination because only a subset of product labels containing chloropicrin produced EECs which exceeded this determination threshold. Additionally, the likelihood of exposure characterizations for products containing 1,3-D indicate a greater likelihood than is anticipated because labeled use sites are broadly categorized (e.g. field crops). Exposure to multiple ingredients from formulated products and tank mixtures containing 1,3-D may result in increased toxicity. NMFS has determined the overall risk to the species from the effects of the action is medium and the confidence associated with that risk is low.

12.2.20 Steelhead, Lower Columbia River DPS (*Oncorhynchus mykiss*)

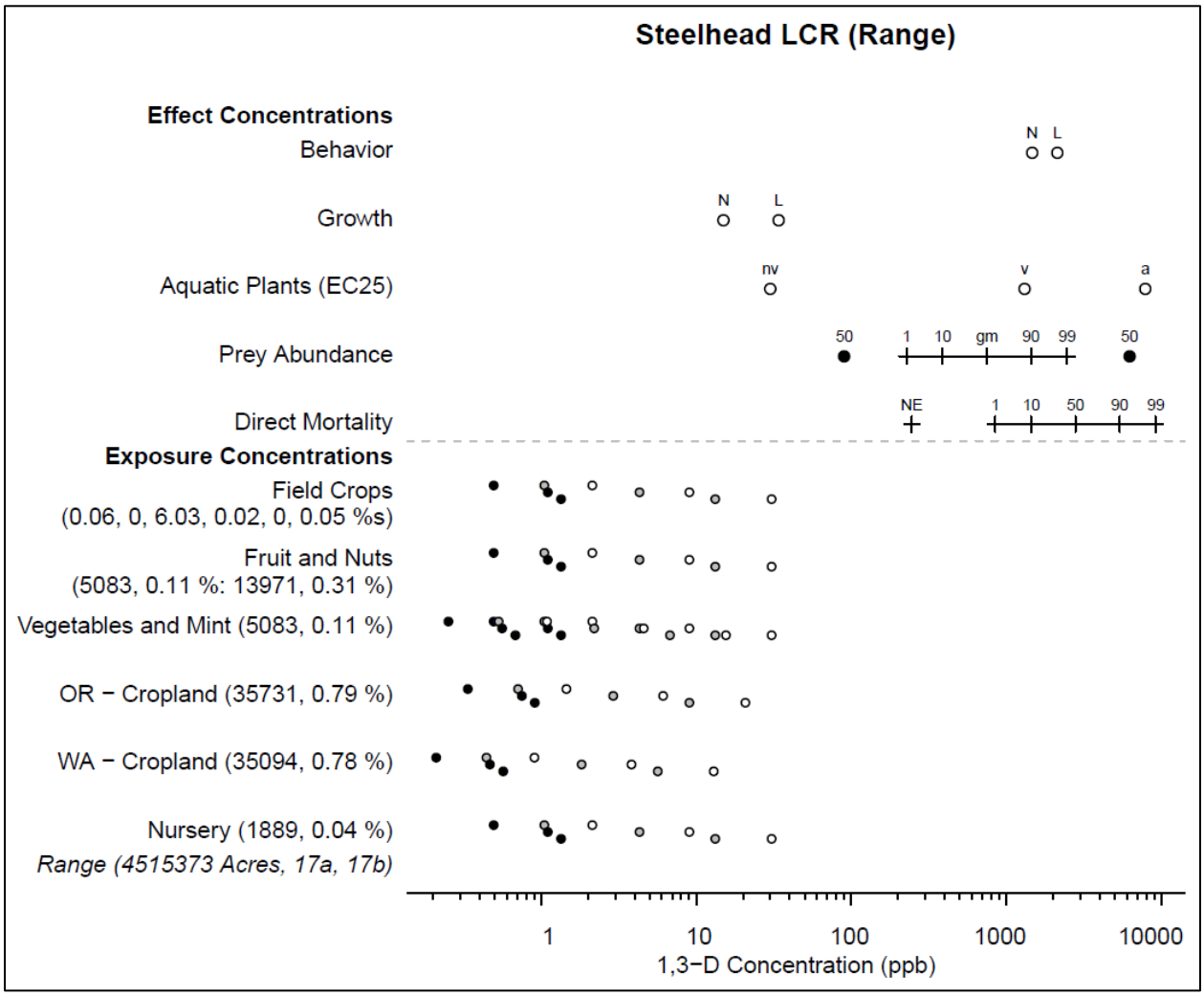


Figure 22. Effects analysis Risk-plot for Steelhead, Lower Columbia River DPS and products containing 1,3-Dichloropropene

Table 118. Likelihood of exposure determination for Steelhead, Lower Columbia River DPS and products containing 1,3-Dichloropropene

	Percent Overlap Category	Seasonal Analysis	Persistence	Multiple Applications	Proximity Analysis	Duration of migration/residency	Likelihood of Exposure
WA Cropland	1	yes	no	yes	yes	3	High
OR Cropland	1	yes	no	yes	yes	3	High
Mint	1	yes	no	no	yes	3	Medium
Nursery	1	yes	no	no	no	3	Low
Fruit and Nuts	1	yes	no	no	yes	3	Medium
Field Crops	3	yes	no	no	NA	3	Medium
Vegetable Crops	1	yes	no	no	yes	3	Medium

Table 119. Direct mortality risk hypothesis; Steelhead, Lower Columbia River DPS and products containing 1,3-Dichloropropene

Endpoint: Mortality				
Use Category	**% Overlap**	**Effect of Exposure**		**Likelihood of Exposure**
		1,3-D	**Chloropicrin**	
WA Cropland	0.78	None Expected	Medium	High
OR Cropland	0.79	None Expected	Medium	High
Mint	0.11	None Expected	Medium	Medium
Nursery	0.04	None Expected	Medium	Low
Fruit and Nuts	0.11, 0.31	None Expected	Medium	Medium
Field Crops	0.06, 0, 6.03, 0.02, 0, 0.05	None Expected	Medium	Medium
Vegetable Crops	0.11	None Expected	None Expected	Medium
Risk Hypothesis: Exposure to products containing products containing 1,3-Dichloropropene is sufficient to reduce abundance via acute lethality.				
Risk	**Confidence**			
Medium	**Low**			

Table 120. Prey risk hypothesis; Steelhead, Lower Columbia River DPS and products containing 1,3-Dichloropropene

Endpoint: Prey

Use Category	% Overlap	Effect of Exposure (Invertebrates / Fish)		Likelihood of Exposure
		1,3-D	Chloropicrin	
WA Cropland	0.78	None Expected	None Expected / Medium	High
OR Cropland	0.79	None Expected	None Expected / Medium	High
Mint	0.11	None Expected	None Expected / Medium	Medium
Nursery	0.04	None Expected	None Expected / Medium	Low
Fruit and Nuts	0.11, 0.31	None Expected	None Expected / Medium	Medium
Field Crops	0.06, 0, 6.03, 0.02, 0, 0.05	None Expected	None Expected / Medium	Medium
Vegetable Crops	0.11	None Expected	None Expected / Medium	Medium
Risk Hypothesis: Exposure to products containing products containing 1,3-Dichloropropene is sufficient to reduce abundance via reduction in prey availability.				
Risk	**Confidence**			
Low	**Medium**			

Table 121. Growth risk hypothesis; Steelhead, Lower Columbia River DPS and products containing 1,3-Dichloropropene

Endpoint: Growth			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
WA Cropland	0.78	None Expected	High
OR Cropland	0.79	None Expected	High
Mint	0.11	None Expected	Medium
Nursery	0.04	None Expected	Low
Fruit and Nuts	0.11, 0.31	None Expected	Medium
Field Crops	0.06, 0, 6.03, 0.02, 0, 0.05	None Expected	Medium
Vegetable Crops	0.11	None Expected	Medium
Risk Hypothesis: Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via impacts to growth (direct toxicity).			
Risk	**Confidence**		
Low	**High**		

Table 122. Behavior risk hypothesis; Steelhead, Lower Columbia River DPS and products containing 1,3-Dichloropropene

Endpoint: Behavior			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
WA Cropland	0.78	None Expected	High
OR Cropland	0.79	None Expected	High
Mint	0.11	None Expected	Medium
Nursery	0.04	None Expected	Low
Fruit and Nuts	0.11, 0.31	None Expected	Medium
Field Crops	0.06, 0, 6.03, 0.02, 0, 0.05	None Expected	Medium
Vegetable Crops	0.11	None Expected	Medium
Risk Hypothesis: Exposure to products containing 1,3-Dichloropropene is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.			
Risk	**Confidence**		
Low	**High**		

Table 123. Effects analysis summary table: Steelhead, Lower Columbia River DPS and products containing 1,3-Dichloropropene

Risk Hypothesis	**Risk-plot Derived**		**Population Model Results**	**Risk Hypothesis Supported? Yes/No**
	Risk 1,3-D Chloropicrin	**Confidence 1,3-D Chloropicrin**		
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via acute lethality.	Medium	Low	Not Applicable	No
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via reduction in prey availability.	Low	Medium		No
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via impacts to growth (direct toxicity).	Low	High		No
Exposure to products containing 1,3-	Low	High		No

Dichloropropene is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.				

Effects analysis summary: Steelhead, Lower Columbia River DPS are not anticipated to experience reductions in abundance through any of the risk hypotheses assessed from exposure to products containing 1,3-D or associated degradates. Some take is anticipated when formulated products containing chloropicrin are used in proximity to low flow, low volume species habitats. The anticipated levels of products containing 1,3-D within the species range are not expected to substantially impact the overall abundance and therefore availability of aquatic invertebrates. 1,3-D products containing chloropicrin, however, may result in some reductions in the availability of juvenile fish as steelhead prey in low flow, low volume habitats. We did not find support for the risk hypotheses for growth or behavior. Although risk associated with acute mortality is medium, we have low confidence in this determination because only a subset of product labels containing chloropicrin produced EECs which exceeded this determination threshold. Additionally, the likelihood of exposure characterizations for products containing 1,3-D indicate a greater likelihood than is anticipated because labeled use sites are broadly categorized (e.g. field crops). Exposure to multiple ingredients from formulated products and tank mixtures containing 1,3-Dichloropropene may result in increased toxicity. NMFS has determined the overall risk to the species from the effects of the action is medium and the confidence associated with that risk is low.

12.2.21 Steelhead, Middle Columbia River DPS (*Oncorhynchus mykiss*)

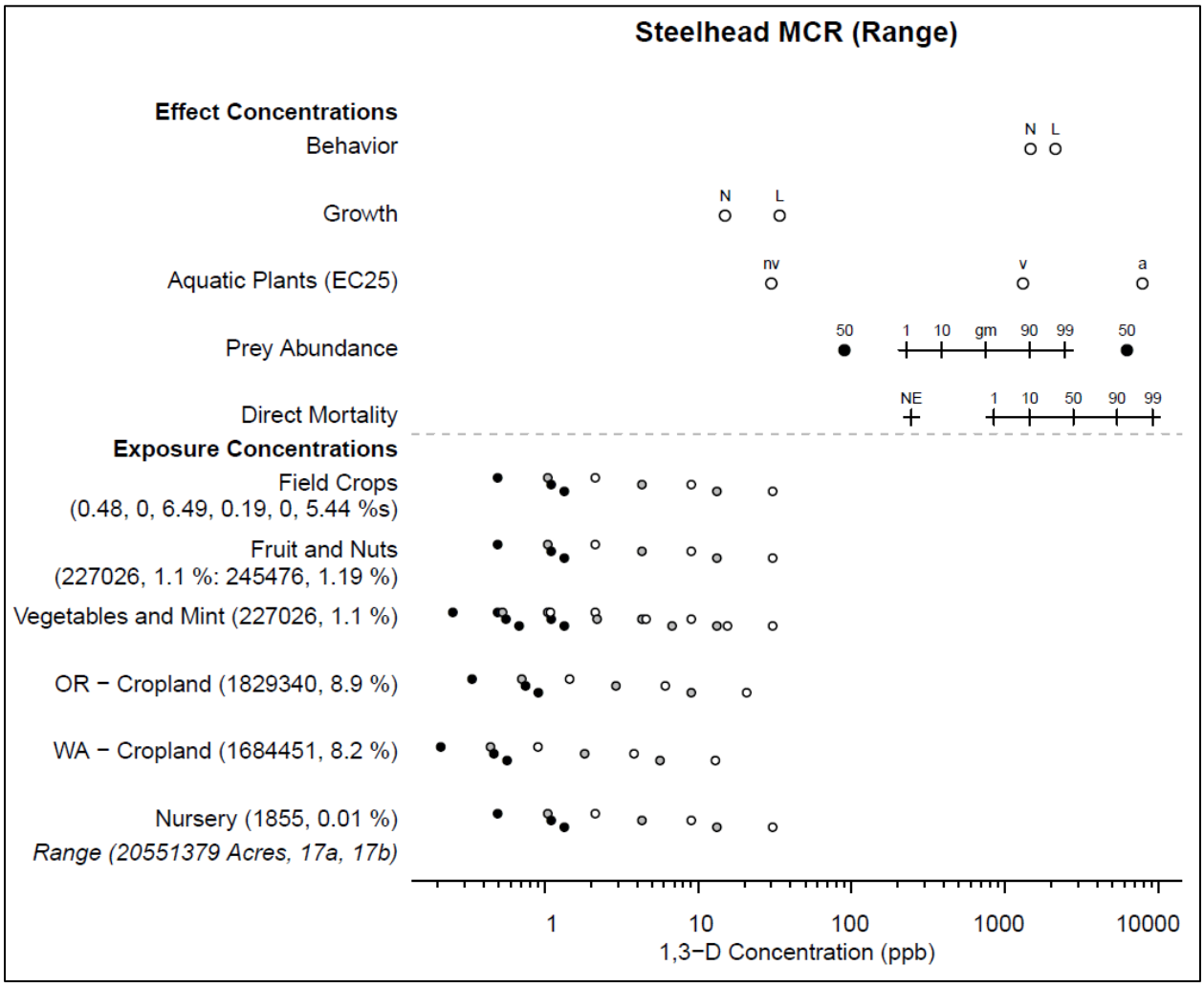


Figure 23. Effects analysis Risk-plot for Steelhead, Middle Columbia River DPS and products containing 1,3-Dichloropropene

Table 124. Likelihood of exposure determination for Steelhead, Middle Columbia River DPS and products containing 1,3-Dichloropropene

	Percent Overlap Category	Seasonal Analysis	Persistence	Multiple Applications	Proximity Analysis	Duration of migration/residency	Likelihood of Exposure
WA Cropland	3	yes	no	yes	NA	3	**High**
OR Cropland	3	yes	no	yes	NA	3	**High**
Mint	2	yes	no	no	NA	3	**Medium**
Nursery	1	yes	no	no	no	3	**Low**
Fruit and Nuts	2	yes	no	no	NA	3	**Medium**
Field Crops	3	yes	no	no	NA	3	**Medium**
Vegetable Crops	2	yes	no	no	NA	3	**Medium**

Table 125. Direct mortality risk hypothesis; Steelhead, Middle Columbia River DPS and products containing 1,3-Dichloropropene

Endpoint: Mortality				
Use Category	**% Overlap**	**Effect of Exposure**		**Likelihood of Exposure**
		1,3-D	**Chloropicrin**	
WA Cropland	8.2	None Expected	Medium	High
OR Cropland	8.9	None Expected	Medium	High
Mint	1.1	None Expected	Medium	Medium
Nursery	0.01	None Expected	Medium	Low
Fruit and Nuts	1.1, 1.19	None Expected	Medium	Medium
Field Crops	0.48, 0, 6.49, 0.19, 0, 5.44	None Expected	Medium	Medium
Vegetable Crops	1.1	None Expected	None Expected	Medium
Risk Hypothesis: Exposure to products containing products containing 1,3-Dichloropropene is sufficient to reduce abundance via acute lethality.				
Risk	**Confidence**			
Medium	**Low**			

Table 126. Prey risk hypothesis; Steelhead, Middle Columbia River DPS and products containing 1,3-Dichloropropene

Endpoint: Prey

Use Category	% Overlap	Effect of Exposure (Invertebrates / Fish)		Likelihood of Exposure
		1,3-D	Chloropicrin	
WA Cropland	8.2	None Expected	None Expected / Medium	High
OR Cropland	8.9	None Expected	None Expected / Medium	High
Mint	1.1	None Expected	None Expected / Medium	Medium
Nursery	0.01	None Expected	None Expected / Medium	Low
Fruit and Nuts	1.1, 1.19	None Expected	None Expected / Medium	Medium
Field Crops	0.48, 0, 6.49, 0.19, 0, 5.44	None Expected	None Expected / Medium	Medium
Vegetable Crops	1.1	None Expected	None Expected / Medium	Medium
Risk Hypothesis: Exposure to products containing products containing 1,3-Dichloropropene is sufficient to reduce abundance via reduction in prey availability.				
Risk	**Confidence**			
Low	**Medium**			

Table 127. Growth risk hypothesis; Steelhead, Middle Columbia River DPS and products containing 1,3-Dichloropropene

Endpoint: Growth			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
WA Cropland	8.2	None Expected	High
OR Cropland	8.9	None Expected	High
Mint	1.1	None Expected	Medium
Nursery	0.01	None Expected	Low
Fruit and Nuts	1.1, 1.19	None Expected	Medium
Field Crops	0.48, 0, 6.49, 0.19, 0, 5.44	None Expected	Medium
Vegetable Crops	1.1	None Expected	Medium
Risk Hypothesis: Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via impacts to growth (direct toxicity).			
Risk	**Confidence**		
Low	**High**		

Table 128. Behavior risk hypothesis; Steelhead, Middle Columbia River DPS and products containing 1,3-Dichloropropene

Endpoint: Behavior			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
WA Cropland	8.2	None Expected	High
OR Cropland	8.9	None Expected	High
Mint	1.1	None Expected	Medium
Nursery	0.01	None Expected	Low
Fruit and Nuts	1.1, 1.19	None Expected	Medium
Field Crops	0.48, 0, 6.49, 0.19, 0, 5.44	None Expected	Medium
Vegetable Crops	1.1	None Expected	Medium
Risk Hypothesis: Exposure to products containing 1,3-Dichloropropene is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.			
Risk	**Confidence**		
Low	**High**		

Table 129. Effects analysis summary table: Steelhead, Middle Columbia River DPS and products containing 1,3-Dichloropropene

Risk Hypothesis	**Risk-plot Derived**		**Population Model Results**	**Risk Hypothesis Supported? Yes/No**
	Risk 1,3-D Chloropicrin	**Confidence 1,3-D Chloropicrin**		
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via acute lethality.	Medium	Low	Not Applicable	No
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via reduction in prey availability.	Low	Medium		No
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via impacts to growth (direct toxicity).	Low	High		No
Exposure to products containing 1,3-	Low	High		No

Dichloropropene is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.				

Effects analysis summary: Steelhead, Middle Columbia River DPS are not anticipated to experience reductions in abundance through any of the risk hypotheses assessed from exposure to products containing 1,3-D or associated degradates. Some take is anticipated when formulated products containing chloropicrin are used in proximity to low flow, low volume species habitats. The anticipated levels of products containing 1,3-D within the species range are not expected to substantially impact the overall abundance and therefore availability of aquatic invertebrates. 1,3-D products containing chloropicrin, however, may result in some reductions in the availability of juvenile fish as steelhead prey in low flow, low volume habitats. We did not find support for the risk hypotheses for growth or behavior. Although risk associated with acute mortality is medium, we have low confidence in this determination because only a subset of product labels containing chloropicrin produced EECs which exceeded this determination threshold. Additionally, the likelihood of exposure characterizations for products containing 1,3-D indicate a greater likelihood than is anticipated because labeled use sites are broadly categorized (e.g. field crops). Exposure to multiple ingredients from formulated products and tank mixtures containing 1,3-Dichloropropene may result in increased toxicity. NMFS has determined the overall risk to the species from the effects of the action is medium and the confidence associated with that risk is low.

12.2.22 Steelhead, Northern California DPS (*Oncorhynchus mykiss*)

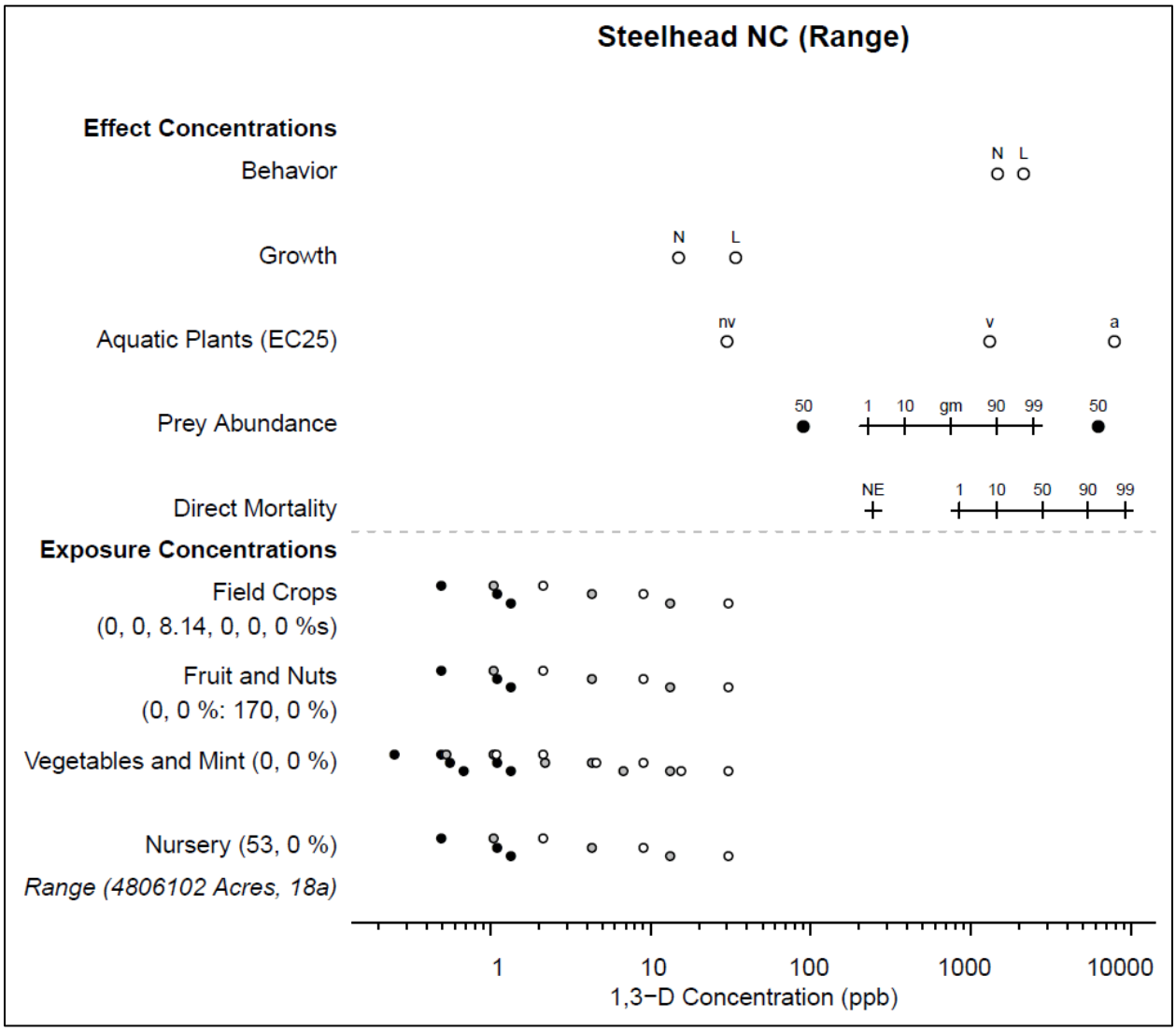
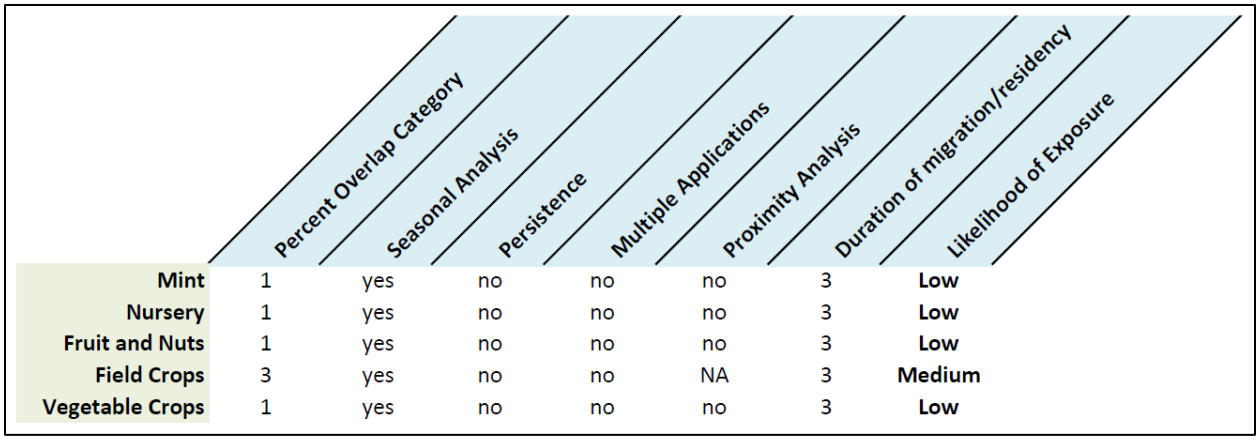


Figure 24. Effects analysis Risk-plot for Steelhead, Northern California DPS and products containing 1,3-Dichloropropene

Table 130. Likelihood of exposure determination for Steelhead, Northern California DPS and products containing 1,3-Dichloropropene



	Percent Overlap Category	Seasonal Analysis	Persistence	Multiple Applications	Proximity Analysis	Duration of migration/residency	Likelihood of Exposure
Mint	1	yes	no	no	no	3	**Low**
Nursery	1	yes	no	no	no	3	**Low**
Fruit and Nuts	1	yes	no	no	no	3	**Low**
Field Crops	3	yes	no	no	NA	3	**Medium**
Vegetable Crops	1	yes	no	no	no	3	**Low**

Table 131. Direct mortality risk hypothesis; Steelhead, Northern California DPS and products containing 1,3-Dichloropropene

Endpoint: Mortality				
Use Category	**% Overlap**	**Effect of Exposure**		**Likelihood of Exposure**
		1,3-D	**Chloropicrin**	
Mint	0	None Expected	Medium	Low
Nursery	0	None Expected	Medium	Low
Fruit and Nuts	0,0	None Expected	Medium	Low
Field Crops	0, 0, 8.14, 0, 0, 0	None Expected	Medium	Medium
Vegetable Crops	0	None Expected	Medium	Low
Risk Hypothesis: Exposure to products containing products containing 1,3-Dichloropropene is sufficient to reduce abundance via acute lethality.				
Risk	**Confidence**			
Low	**High**			

Table 132. Prey risk hypothesis; Steelhead, Northern California DPS and products containing 1,3-Dichloropropene

Endpoint: Prey				
Use Category	**% Overlap**	**Effect of Exposure (Invertebrates / Fish)**		**Likelihood of Exposure**
		1,3-D	**Chloropicrin**	
Mint	0	None Expected	None Expected / Medium	Low

Nursery	0	None Expected	None Expected / Medium	Low
Fruit and Nuts	0,0	None Expected	None Expected / Medium	Low
Field Crops	0, 0, 8.14, 0, 0, 0	None Expected	None Expected / Medium	Medium
Vegetable Crops	0	None Expected	None Expected / Medium	Low
Risk Hypothesis: Exposure to products containing products containing 1,3-Dichloropropene is sufficient to reduce abundance via reduction in prey availability.				
Risk	**Confidence**			
Low	**Medium**			

Table 133. Growth risk hypothesis; Steelhead, Northern California DPS and products containing 1,3-Dichloropropene

Endpoint: Growth			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Mint	0	None Expected	Low
Nursery	0	None Expected	Low
Fruit and Nuts	0,0	None Expected	Low
Field Crops	0, 0, 8.14, 0, 0, 0	None Expected	Medium
Vegetable Crops	0	None Expected	Low
Risk Hypothesis: Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via impacts to growth (direct toxicity).			
Risk	**Confidence**		
Low	**High**		

Table 134. Behavior risk hypothesis; Steelhead, Northern California DPS and products containing 1,3-Dichloropropene

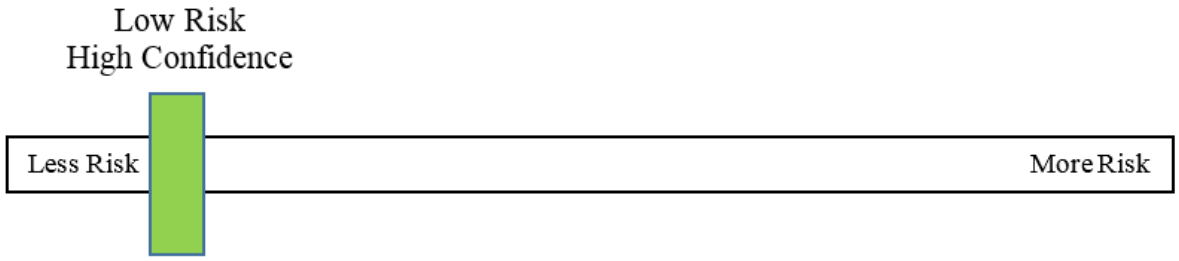
Endpoint: Behavior			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Mint	0	None Expected	Low
Nursery	0	None Expected	Low
Fruit and Nuts	0,0	None Expected	Low
Field Crops	0, 0, 8.14, 0, 0, 0	None Expected	Medium
Vegetable Crops	0	None Expected	Low
Risk Hypothesis: Exposure to products containing 1,3-Dichloropropene is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.			
Risk	**Confidence**		

Low	**High**	

Table 135. Effects analysis summary table: Steelhead, Northern California DPS and products containing 1,3-Dichloropropene

Risk Hypothesis	**Risk-plot Derived**		**Population Model Results**	**Risk Hypothesis Supported? Yes/No**
	Risk 1,3-D Chloropicrin	**Confidence 1,3-D Chloropicrin**		
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via acute lethality.	Low	High	Not Applicable	No
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via reduction in prey availability.	Low	Medium		No
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via impacts to growth (direct toxicity).	Low	High		No
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.	Low	High		No

Effects analysis summary: Steelhead, Northern California DPS are not anticipated to experience reductions in abundance through any of the risk hypotheses assessed from exposure to 1,3-D or associated degradates. Where formulated products and tank mixtures containing 1,3-Dichloropropene occur in aquatic habitats, individuals may experience increased toxicity. NMFS has determined the overall risk to the species from the effects of the action is low and the confidence associated with that risk is high given the low risk associated with all risk hypotheses evaluated.


Low Risk
High Confidence
Less Risk
More Risk

12.2.23 Steelhead, Puget Sound DPS (*Oncorhynchus mykiss*)

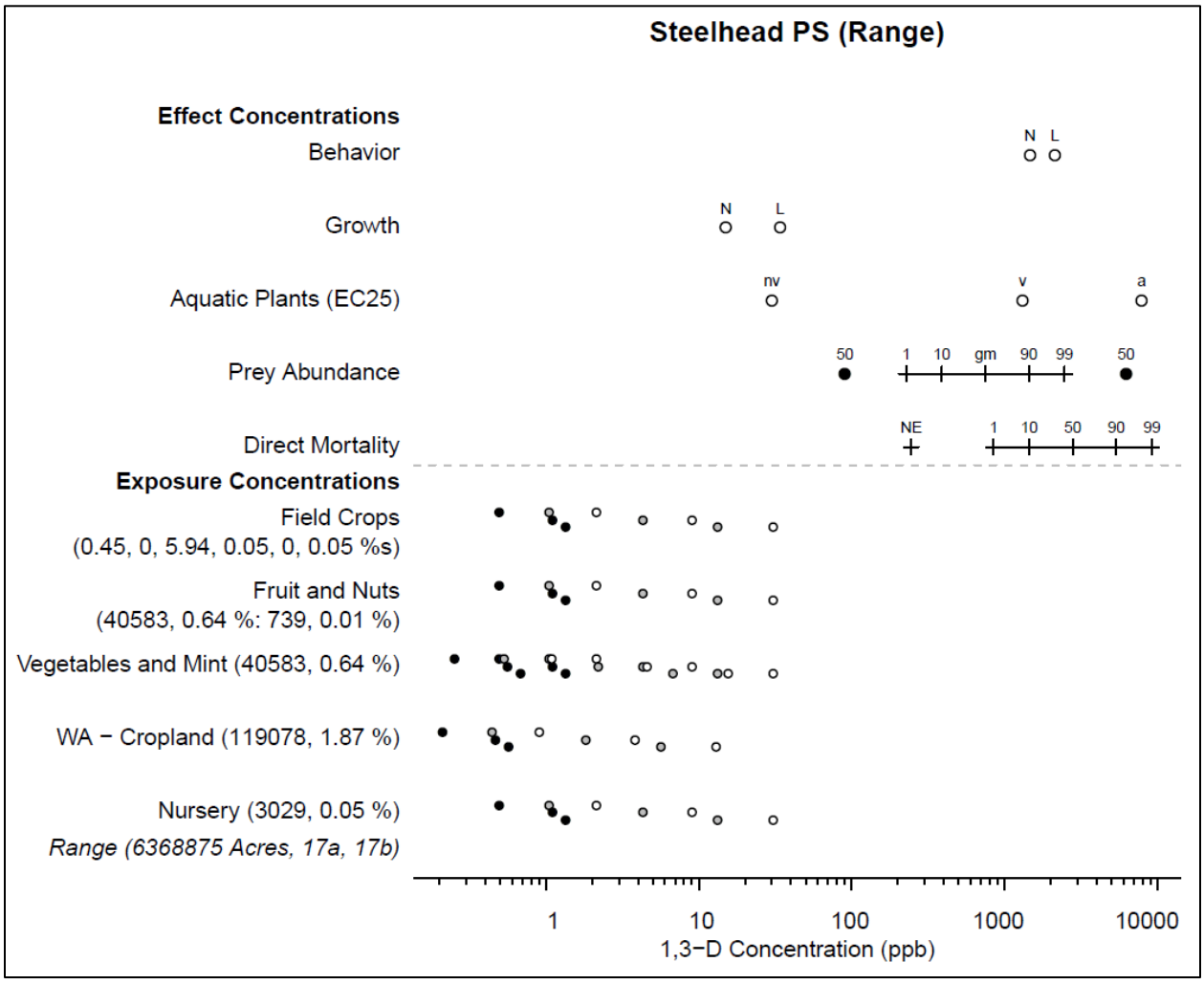


Figure 25. Effects analysis Risk-plot for Steelhead, Puget Sound DPS and products containing 1,3-Dichloropropene

Table 136. Likelihood of exposure determination for Steelhead, Puget Sound DPS and products containing 1,3-Dichloropropene

	Percent Overlap Category	Seasonal Analysis	Persistence	Multiple Applications	Proximity Analysis	Duration of migration/residency	Likelihood of Exposure
WA Cropland	2	yes	no	yes	NA	3	**Medium**
Mint	1	yes	no	no	yes	3	**Medium**
Nursery	1	yes	no	no	no	3	**Low**
Fruit and Nuts	1	yes	no	no	yes	3	**Medium**
Field Crops	3	yes	no	no	NA	3	**Medium**
Vegetable Crops	1	yes	no	no	yes	3	**Medium**

Table 137. Direct mortality risk hypothesis; Steelhead, Puget Sound DPS and products containing 1,3-Dichloropropene

Endpoint: Mortality				
Use Category	**% Overlap**	**Effect of Exposure**		**Likelihood of Exposure**
		1,3-D	**Chloropicrin**	
WA Cropland	1.87	None Expected	Medium	Medium
Mint	0.64	None Expected	Medium	Medium
Nursery	0.05	None Expected	Medium	Low
Fruit and Nuts	0.64, 0.01	None Expected	Medium	Medium
Field Crops	0.45, 0, 5.94, 0.05, 0, 0.05	None Expected	Medium	Medium
Vegetable Crops	0.64	None Expected	Medium	Medium
Risk Hypothesis: Exposure to products containing products containing 1,3-Dichloropropene is sufficient to reduce abundance via acute lethality.				
Risk	**Confidence**			
Medium	**Low**			

Table 138. Prey risk hypothesis; Steelhead, Puget Sound DPS and products containing 1,3-Dichloropropene

Endpoint: Prey				
Use Category	**% Overlap**	**Effect of Exposure (Invertebrates / Fish)**		**Likelihood of Exposure**
		1,3-D	**Chloropicrin**	

WA Cropland	1.87	None Expected	None Expected / Medium	Medium
Mint	0.64	None Expected	None Expected / Medium	Medium
Nursery	0.05	None Expected	None Expected / Medium	Low
Fruit and Nuts	0.64, 0.01	None Expected	None Expected / Medium	Medium
Field Crops	0.45, 0, 5.94, 0.05, 0, 0.05	None Expected	None Expected / Medium	Medium
Vegetable Crops	0.64	None Expected	None Expected / Medium	Medium
Risk Hypothesis: Exposure to products containing products containing 1,3-Dichloropropene is sufficient to reduce abundance via reduction in prey availability.				
Risk	**Confidence**			
Low	**Medium**			

Table 139. Growth risk hypothesis; Steelhead, Puget Sound DPS and products containing 1,3-Dichloropropene

Endpoint: Growth			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
WA Cropland	1.87	None Expected	Medium
Mint	0.64	None Expected	Medium
Nursery	0.05	None Expected	Low
Fruit and Nuts	0.64, 0.01	None Expected	Medium
Field Crops	0.45, 0, 5.94, 0.05, 0, 0.05	None Expected	Medium
Vegetable Crops	0.64	None Expected	Medium
Risk Hypothesis: Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via impacts to growth (direct toxicity).			
Risk	**Confidence**		
Low	**High**		

Table 140. Behavior risk hypothesis; Steelhead, Puget Sound DPS and products containing 1,3-Dichloropropene

Endpoint: Behavior			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
WA Cropland	1.87	None Expected	Medium
Mint	0.64	None Expected	Medium
Nursery	0.05	None Expected	Low

Fruit and Nuts	0.64, 0.01	None Expected	Medium
Field Crops	0.45, 0, 5.94, 0.05, 0, 0.05	None Expected	Medium
Vegetable Crops	0.64	None Expected	Medium
Risk Hypothesis: Exposure to products containing 1,3-Dichloropropene is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.			
Risk	**Confidence**		
Low	**High**		

Table 141. Effects analysis summary table: Steelhead, Puget Sound DPS and products containing 1,3-Dichloropropene

Risk Hypothesis	Risk-plot Derived		Population Model Results	Risk Hypothesis Supported? Yes/No
	Risk 1,3-D Chloropicrin	Confidence 1,3-D Chloropicrin		
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via acute lethality.	Medium	Low	Not Applicable	No
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via reduction in prey availability.	Low	Medium		No
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via impacts to growth (direct toxicity).	Low	High		No
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.	Low	High		No

Effects analysis summary: Steelhead, Puget Sound DPS are not anticipated to experience reductions in abundance through any of the risk hypotheses assessed from exposure to products

containing 1,3-D or associated degradates. Some take is anticipated when formulated products containing chloropicrin are used in proximity to low flow, low volume species habitats. The anticipated levels of products containing 1,3-D within the species range are not expected to substantially impact the overall abundance and therefore availability of aquatic invertebrates. 1,3-D products containing chloropicrin, however, may result in some reductions in the availability of juvenile fish as steelhead prey in low flow, low volume habitats. We did not find support for the risk hypotheses for growth or behavior. Although risk associated with acute mortality is medium, we have low confidence in this determination because only a subset of product labels containing chloropicrin produced EECs which exceeded this determination threshold. Additionally, the likelihood of exposure characterizations for products containing 1,3-D indicate a greater likelihood than is anticipated because labeled use sites are broadly categorized (e.g. field crops). Exposure to multiple ingredients from formulated products and tank mixtures containing 1,3-Dichloropropene may result in increased toxicity. NMFS has determined the overall risk to the species from the effects of the action is medium and the confidence associated with that risk is low.

12.2.24 Steelhead, Snake River Basin DPS (*Oncorhynchus mykiss*)

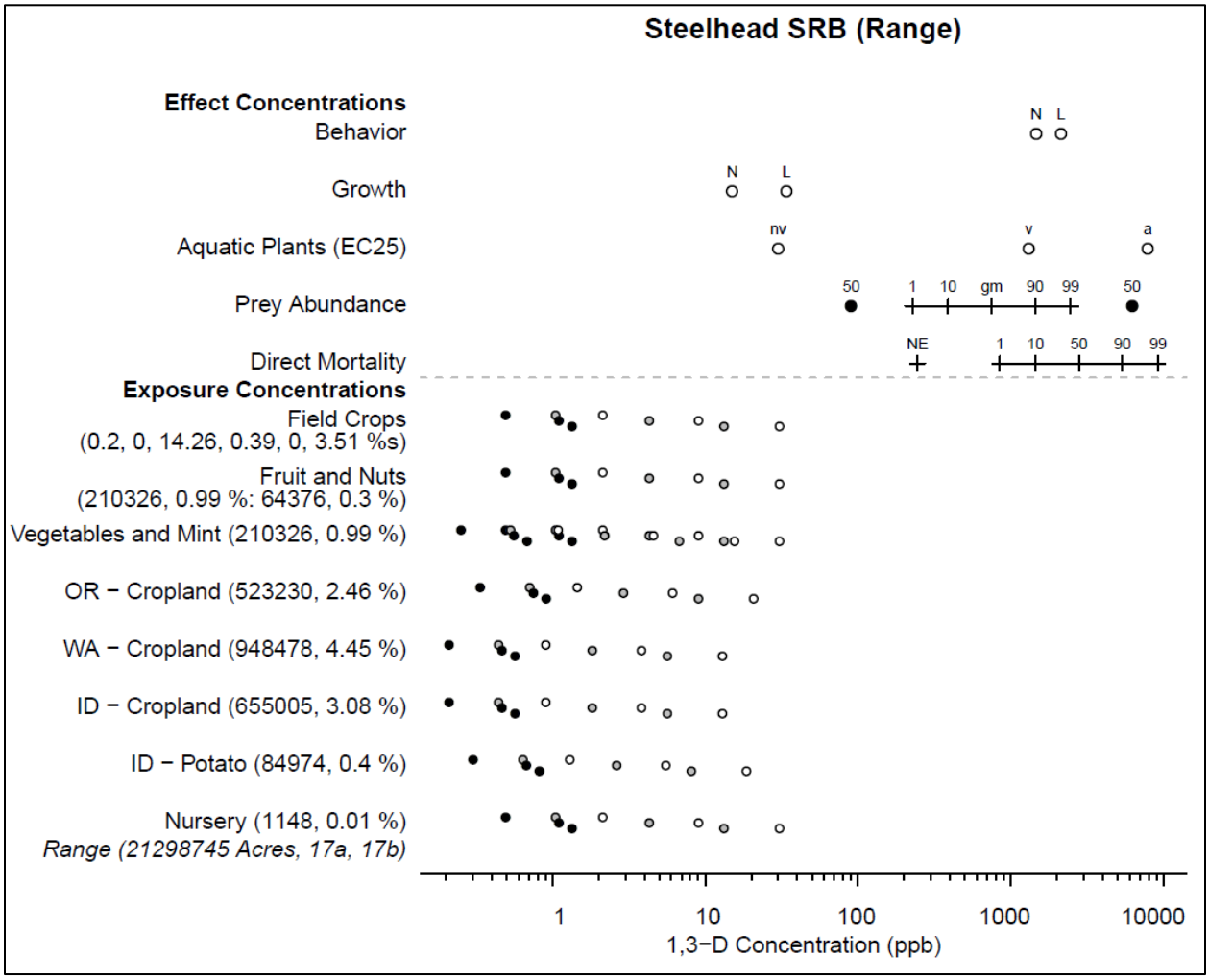


Figure 26. Effects analysis Risk-plot for Steelhead, Snake River Basin DPS and products containing 1,3-Dichloropropene

Table 142. Likelihood of exposure determination for Steelhead, Snake River Basin DPS and products containing 1,3-Dichloropropene

	Percent Overlap Category	Seasonal Analysis	Persistence	Multiple Applications	Proximity Analysis	Duration of migration/residency	Likelihood of Exposure
WA Cropland	2	yes	no	yes	NA	3	Medium
OR Cropland	2	yes	no	yes	NA	3	Medium
ID Cropland	2	yes	no	yes	NA	3	Medium
ID Potato	1	yes	no	yes	no	3	Low
Mint	1	yes	no	no	yes	3	Medium
Nursery	1	yes	no	no	no	3	Low
Fruit and Nuts	1	yes	no	no	yes	3	Medium
Field Crops	3	yes	no	no	NA	3	Medium
Vegetable Crops	1	yes	no	no	yes	3	Medium

Table 143. Direct mortality risk hypothesis; Steelhead, Snake River Basin DPS and products containing 1,3-Dichloropropene

Endpoint: Mortality				
Use Category	**% Overlap**	**Effect of Exposure**		**Likelihood of Exposure**
		1,3-D	**Chloropicrin**	
WA Cropland	4.45	None Expected	Medium	Medium
OR Cropland	2.46	None Expected	Medium	Medium
ID Cropland	3.08	None Expected	Medium	Medium
ID Potato	0.4	None Expected	Medium	Low
Mint	0.99	None Expected	Medium	Medium
Nursery	0.01	None Expected	Medium	Low
Fruit and Nuts	0.99, 0.3	None Expected	Medium	Medium
Field Crops	0.2, 0, 14.26, 0.39, 0, 3.51	None Expected	Medium	Medium
Vegetable Crops	0.99	None Expected	Medium	Medium
Risk Hypothesis: Exposure to products containing products containing 1,3-Dichloropropene is sufficient to reduce abundance via acute lethality.				
Risk	**Confidence**			
Medium	**Low**			

Table 144. Prey risk hypothesis; Steelhead, Snake River Basin DPS and products containing 1,3-Dichloropropene

Endpoint: Prey				
Use Category	**% Overlap**	**Effect of Exposure (Invertebrates / Fish)**		**Likelihood of Exposure**
		1,3-D	**Chloropicrin**	
OR Cropland	4.45	None Expected	None Expected / Medium	Medium
WA Cropland	2.46	None Expected	None Expected / Medium	Medium
ID Cropland	3.08	None Expected	None Expected / Medium	Medium
ID Potato	0.4	None Expected	None Expected / Medium	Low
Mint	0.99	None Expected	None Expected / Medium	Medium
Nursery	0.01	None Expected	None Expected / Medium	Low
Fruit and Nuts	0.99, 0.3	None Expected	None Expected / Medium	Medium
Field Crops	0.2, 0, 14.26, 0.39, 0, 3.51	None Expected	None Expected / Medium	Medium
Vegetable Crops	0.99	None Expected	None Expected / Medium	Medium
Risk Hypothesis: Exposure to products containing products containing 1,3-Dichloropropene is sufficient to reduce abundance via reduction in prey availability.				
Risk	**Confidence**			
Low	**Medium**			

Table 145. Growth risk hypothesis; Steelhead, Snake River Basin DPS and products containing 1,3-Dichloropropene

Endpoint: Growth			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
WA Cropland	4.45	None Expected	Medium
OR Cropland	2.46	None Expected	Medium
ID Cropland	3.08	None Expected	Medium
ID Potato	0.4	None Expected	Low
Mint	0.99	None Expected	Medium
Nursery	0.01	None Expected	Low
Fruit and Nuts	0.99, 0.3	None Expected	Medium

Field Crops	0.2, 0, 14.26, 0.39, 0, 3.51	None Expected	Medium
Vegetable Crops	0.99	None Expected	Medium
Risk Hypothesis: Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via impacts to growth (direct toxicity).			
Risk	**Confidence**		
Low	**High**		

Table 146. Behavior risk hypothesis; Steelhead, Snake River Basin DPS and products containing 1,3-Dichloropropene

Endpoint: Behavior			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
WA Cropland	4.45	None Expected	Medium
OR Cropland	2.46	None Expected	Medium
ID Cropland	3.08	None Expected	Medium
ID Potato	0.4	None Expected	Low
Mint	0.99	None Expected	Medium
Nursery	0.01	None Expected	Low
Fruit and Nuts	0.99, 0.3	None Expected	Medium
Field Crops	0.2, 0, 14.26, 0.39, 0, 3.51	None Expected	Medium
Vegetable Crops	0.99	None Expected	Medium
Risk Hypothesis: Exposure to products containing 1,3-Dichloropropene is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.			
Risk	**Confidence**		
Low	**High**		

Table 147. Effects analysis summary table: Steelhead, Snake River Basin DPS and products containing 1,3-Dichloropropene

Risk Hypothesis	**Risk-plot Derived**		**Population Model Results**	**Risk Hypothesis Supported? Yes/No**
	Risk 1,3-D Chloropicrin	**Confidence 1,3-D Chloropicrin**		
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via acute lethality.	Medium	Low	Not Applicable	No

Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via reduction in prey availability.	Low	Medium		No
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via impacts to growth (direct toxicity).	Low	High		No
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.	Low	High		No

Effects analysis summary: Steelhead, Snake River Basin DPS are not anticipated to experience reductions in abundance through any of the risk hypotheses assessed from exposure to products containing 1,3-D or associated degradates. Some take is anticipated when formulated products containing chloropicrin are used in proximity to low flow, low volume species habitats. The anticipated levels of products containing 1,3-D within the species range are not expected to substantially impact the overall abundance and therefore availability of aquatic invertebrates. 1,3-D products containing chloropicrin, however, may result in some reductions in the availability of juvenile fish as steelhead prey in low flow, low volume habitats. We did not find support for the risk hypotheses for growth or behavior. Although risk associated with acute mortality is medium, we have low confidence in this determination because only a subset of product labels containing chloropicrin produced EECs which exceeded this determination threshold. Additionally, the likelihood of exposure characterizations for products containing 1,3-D indicate a greater likelihood than is anticipated because labeled use sites are broadly categorized (e.g. field crops). Exposure to multiple ingredients from formulated products and tank mixtures containing 1,3-Dichloropropene may result in increased toxicity. NMFS has determined the overall risk to the species from the effects of the action is medium and the confidence associated with that risk is low.

Medium Risk
Low Confidence
Less Risk
More Risk

12.2.25 Steelhead, South-Central California Coast DPS (*Oncorhynchus mykiss*)

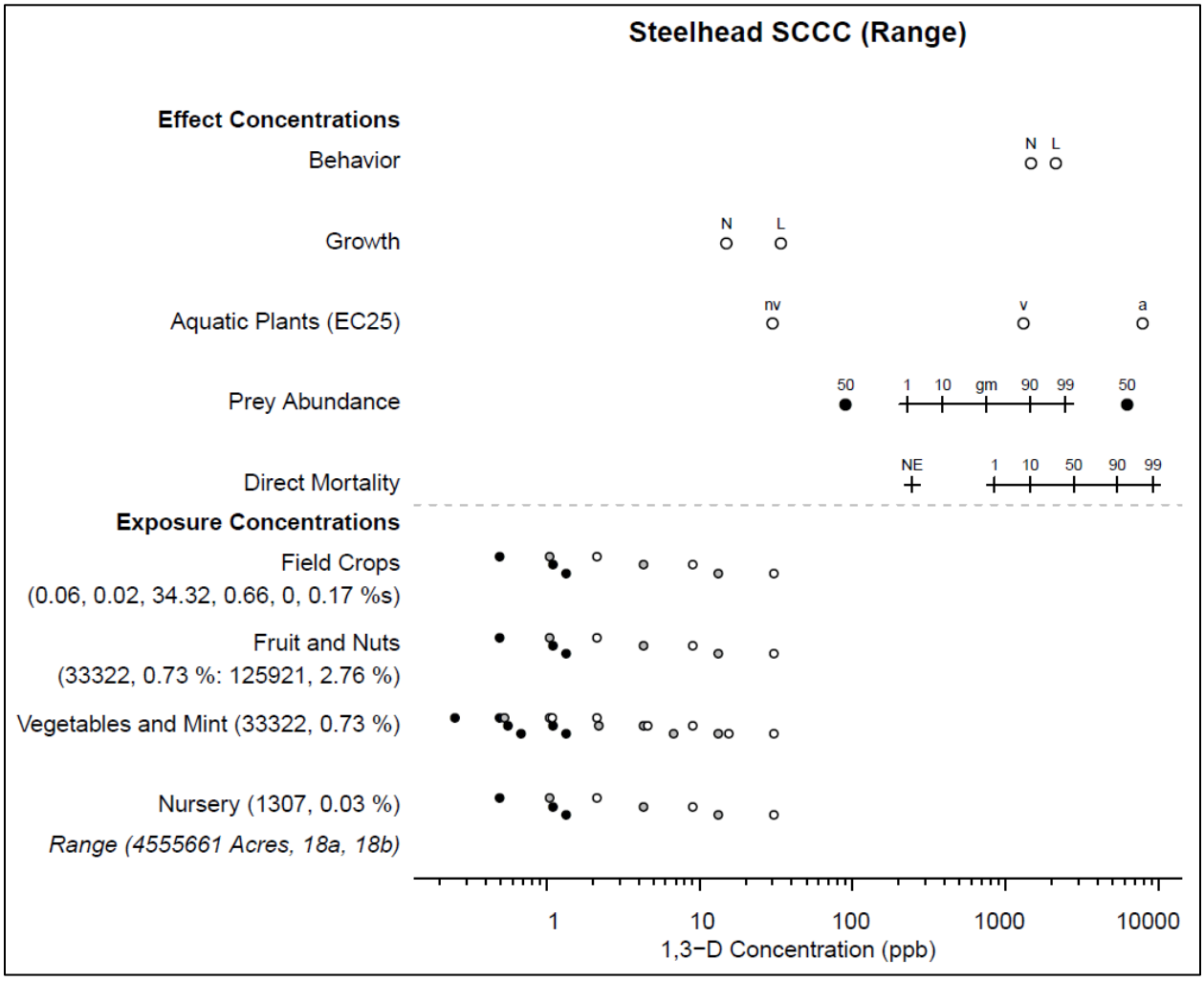


Figure 27. Effects analysis Risk-plot for Steelhead, South-Central California Coast DPS and products containing 1,3-Dichloropropene

Table 148. Likelihood of exposure determination for Steelhead, South-Central California Coast DPS and products containing 1,3-Dichloropropene

	Percent Overlap Category	Seasonal Analysis	Persistence	Multiple Applications	Proximity Analysis	Duration of migration/residency	Likelihood of Exposure
Mint	1	yes	no	no	yes	3	**Medium**
Nursery	1	yes	no	no	no	3	**Low**
Fruit and Nuts	2	yes	no	no	yes	3	**Medium**
Field Crops	3	yes	no	no	yes	3	**Medium**
Vegetable Crops	1	yes	no	no	yes	3	**Medium**

Table 149. Direct mortality risk hypothesis; Steelhead, South-Central California Coast DPS and products containing 1,3-Dichloropropene

Endpoint: Mortality				
Use Category	**% Overlap**	**Effect of Exposure**		**Likelihood of Exposure**
		1,3-D	**Chloropicrin**	
Mint	0.73	None Expected	Medium	Medium
Nursery	0.03	None Expected	Medium	Low
Fruit and Nuts	0.73, 2.76	None Expected	Medium	Medium
Field Crops	0.06, 0.02, 34.32, 0.66, 0, 0.17	None Expected	Medium	Medium
Vegetable Crops	0.73	None Expected	Medium	Medium
Risk Hypothesis: Exposure to products containing products containing 1,3-Dichloropropene is sufficient to reduce abundance via acute lethality.				
Risk	**Confidence**			
Medium	**Low**			

Table 150. Prey risk hypothesis; Steelhead, South-Central California Coast DPS and products containing 1,3-Dichloropropene

Endpoint: Prey				
Use Category	**% Overlap**	**Effect of Exposure (Invertebrates / Fish)**		**Likelihood of Exposure**
		1,3-D	**Chloropicrin**	
Mint	0.73	None Expected	None Expected / Medium	Medium

Nursery	0.03	None Expected	None Expected / Medium	Low
Fruit and Nuts	0.73, 2.76	None Expected	None Expected / Medium	Medium
Field Crops	0.06, 0.02, 34.32, 0.66, 0, 0.17	None Expected	None Expected / Medium	Medium
Vegetable Crops	0.73	None Expected	None Expected / Medium	Medium
Risk Hypothesis: Exposure to products containing products containing 1,3-Dichloropropene is sufficient to reduce abundance via reduction in prey availability.				
Risk	**Confidence**			
Low	**Medium**			

Table 151. Growth risk hypothesis; Steelhead, South-Central California Coast DPS and products containing 1,3-Dichloropropene

Endpoint: Growth			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Mint	0.73	None Expected	Medium
Nursery	0.03	None Expected	Low
Fruit and Nuts	0.73, 2.76	None Expected	Medium
Field Crops	0.06, 0.02, 34.32, 0.66, 0, 0.17	None Expected	Medium
Vegetable Crops	0.73	None Expected	Medium
Risk Hypothesis: Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via impacts to growth (direct toxicity).			
Risk	**Confidence**		
Low	**High**		

Table 152. Behavior risk hypothesis; Steelhead, South-Central California Coast DPS and products containing 1,3-Dichloropropene

Endpoint: Behavior			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Mint	0.73	None Expected	Medium
Nursery	0.03	None Expected	Low
Fruit and Nuts	0.73, 2.76	None Expected	Medium
Field Crops	0.06, 0.02, 34.32, 0.66, 0, 0.17	None Expected	Medium
Vegetable Crops	0.73	None Expected	Medium

Risk Hypothesis: Exposure to products containing 1,3-Dichloropropene is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.		
Risk	**Confidence**	
Low	**High**	

Table 153. Effects analysis summary table: Steelhead, South-Central California Coast DPS and products containing 1,3-Dichloropropene

Risk Hypothesis	**Risk-plot Derived**		**Population Model Results**	**Risk Hypothesis Supported? Yes/No**
	Risk 1,3-D Chloropicrin	**Confidence 1,3-D Chloropicrin**		
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via acute lethality.	Medium	Low	Not Applicable	No
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via reduction in prey availability.	Low	Medium		No
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via impacts to growth (direct toxicity).	Low	High		No
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.	Low	High		No

Effects analysis summary: Steelhead, South-Central California Coast DPS are not anticipated to experience reductions in abundance through any of the risk hypotheses assessed from exposure to products containing 1,3-D or associated degradates. Some take is anticipated when formulated products containing chloropicrin are used in proximity to low flow, low volume species habitats. The anticipated levels of products containing 1,3-D within the species range are not expected to substantially impact the overall abundance and therefore availability of aquatic invertebrates.

1,3-D products containing chloropicrin, however, may result in some reductions in the availability of juvenile fish as steelhead prey in low flow, low volume habitats. We did not find support for the risk hypotheses for growth or behavior. Although risk associated with acute mortality is medium, we have low confidence in this determination because only a subset of product labels containing chloropicrin produced EECs which exceeded this determination threshold. Additionally, the likelihood of exposure characterizations for products containing 1,3-D indicate a greater likelihood than is anticipated because labeled use sites are broadly categorized (e.g. field crops). Exposure to multiple ingredients from formulated products and tank mixtures containing 1,3-Dichloropropene may result in increased toxicity. NMFS has determined the overall risk to the species from the effects of the action is medium and the confidence associated with that risk is low.

12.2.26 Steelhead, Southern California DPS (*Oncorhynchus mykiss*)

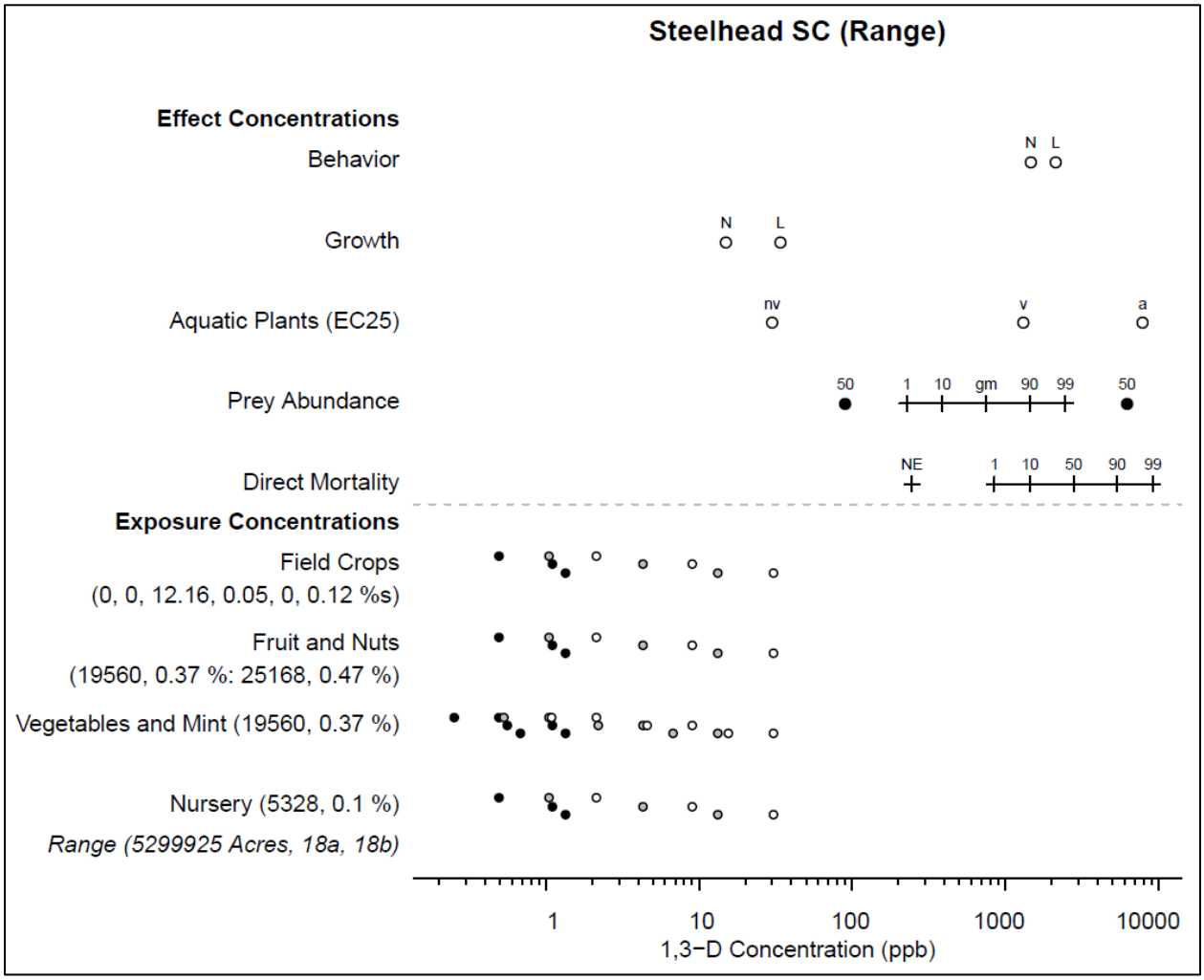


Figure 28. Effects analysis Risk-plot for Steelhead, Southern California DPS and products containing 1,3-Dichloropropene

Table 154. Likelihood of exposure determination for Steelhead, Southern California DPS and products containing 1,3-Dichloropropene

	Percent Overlap Category	Seasonal Analysis	Persistence	Multiple Applications	Proximity Analysis	Duration of migration/residency	Likelihood of Exposure
Mint	1	yes	no	no	yes	3	**Medium**
Nursery	1	yes	no	no	no	3	**Low**
Fruit and Nuts	2	yes	no	no	NA	3	**Medium**
Field Crops	3	yes	no	no	NA	3	**Medium**
Vegetable Crops	1	yes	no	no	yes	3	**Medium**

Table 155. Direct mortality risk hypothesis; Steelhead, Southern California DPS and products containing 1,3-Dichloropropene

Endpoint: Mortality				
Use Category	**% Overlap**	**Effect of Exposure**		**Likelihood of Exposure**
		1,3-D	**Chloropicrin**	
Mint	0.37	None Expected	Medium	Medium
Nursery	0.1	None Expected	Medium	Low
Fruit and Nuts	0.37, 0.47	None Expected	Medium	Medium
Field Crops	0, 0, 12.16, 0.05, 0, 0.12	None Expected	Medium	Medium
Vegetable Crops	0.37	None Expected	Medium	Medium
Risk Hypothesis: Exposure to products containing products containing 1,3-Dichloropropene is sufficient to reduce abundance via acute lethality.				
Risk	**Confidence**			
Medium	**Low**			

Table 156. Prey risk hypothesis; Steelhead, Southern California DPS and products containing 1,3-Dichloropropene

Endpoint: Prey				
Use Category	**% Overlap**	**Effect of Exposure (Invertebrates / Fish)**		**Likelihood of Exposure**
		1,3-D	**Chloropicrin**	
Mint	0.37	None Expected	None Expected / Medium	Medium

Nursery	0.1	None Expected	None Expected / Medium	Low
Fruit and Nuts	0.37, 0.47	None Expected	None Expected / Medium	Medium
Field Crops	0, 0, 12.16, 0.05, 0, 0.12	None Expected	None Expected / Medium	Medium
Vegetable Crops	0.37	None Expected	None Expected / Medium	Medium
Risk Hypothesis: Exposure to products containing products containing 1,3-Dichloropropene is sufficient to reduce abundance via reduction in prey availability.				
Risk	**Confidence**			
Low	**Medium**			

Table 157. Growth risk hypothesis; Steelhead, Southern California DPS and products containing 1,3-Dichloropropene

Endpoint: Growth			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Mint	0.37	None Expected	Medium
Nursery	0.1	None Expected	Low
Fruit and Nuts	0.37, 0.47	None Expected	Medium
Field Crops	0, 0, 12.16, 0.05, 0, 0.12	None Expected	Medium
Vegetable Crops	0.37	None Expected	Medium
Risk Hypothesis: Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via impacts to growth (direct toxicity).			
Risk	**Confidence**		
Low	**High**		

Table 158. Behavior risk hypothesis; Steelhead, Southern California DPS and products containing 1,3-Dichloropropene

Endpoint: Behavior			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Mint	0.37	None Expected	Medium
Nursery	0.1	None Expected	Low
Fruit and Nuts	0.37, 0.47	None Expected	Medium
Field Crops	0, 0, 12.16, 0.05, 0, 0.12	None Expected	Medium
Vegetable Crops	0.37	None Expected	Medium

Risk Hypothesis: Exposure to products containing 1,3-Dichloropropene is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.		
Risk	**Confidence**	
Low	**High**	

Table 159. Effects analysis summary table: Steelhead, Southern California DPS and products containing 1,3-Dichloropropene

Risk Hypothesis	**Risk-plot Derived**		**Population Model Results**	**Risk Hypothesis Supported? Yes/No**
	Risk 1,3-D Chloropicrin	**Confidence 1,3-D Chloropicrin**		
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via acute lethality.	Medium	Low	Not Applicable	No
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via reduction in prey availability.	Low	Medium		No
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via impacts to growth (direct toxicity).	Low	High		No
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.	Low	High		No

Effects analysis summary: Steelhead, Southern California DPS are not anticipated to experience reductions in abundance through any of the risk hypotheses assessed from exposure to products containing 1,3-D or associated degradates. Some take is anticipated when formulated products containing chloropicrin are used in proximity to low flow, low volume species habitats. The anticipated levels of products containing 1,3-D within the species range are not expected to substantially impact the overall abundance and therefore availability of aquatic invertebrates.

1,3-D products containing chloropicrin, however, may result in some reductions in the availability of juvenile fish as steelhead prey in low flow, low volume habitats. We did not find support for the risk hypotheses for growth or behavior. Although risk associated with acute mortality is medium, we have low confidence in this determination because only a subset of product labels containing chloropicrin produced EECs which exceeded this determination threshold. Additionally, the likelihood of exposure characterizations for products containing 1,3-D indicate a greater likelihood than is anticipated because labeled use sites are broadly categorized (e.g. field crops). Exposure to multiple ingredients from formulated products and tank mixtures containing 1,3-Dichloropropene may result in increased toxicity. NMFS has determined the overall risk to the species from the effects of the action is medium and the confidence associated with that risk is low.

12.2.27 Steelhead, Upper Columbia River DPS (*Oncorhynchus mykiss*)

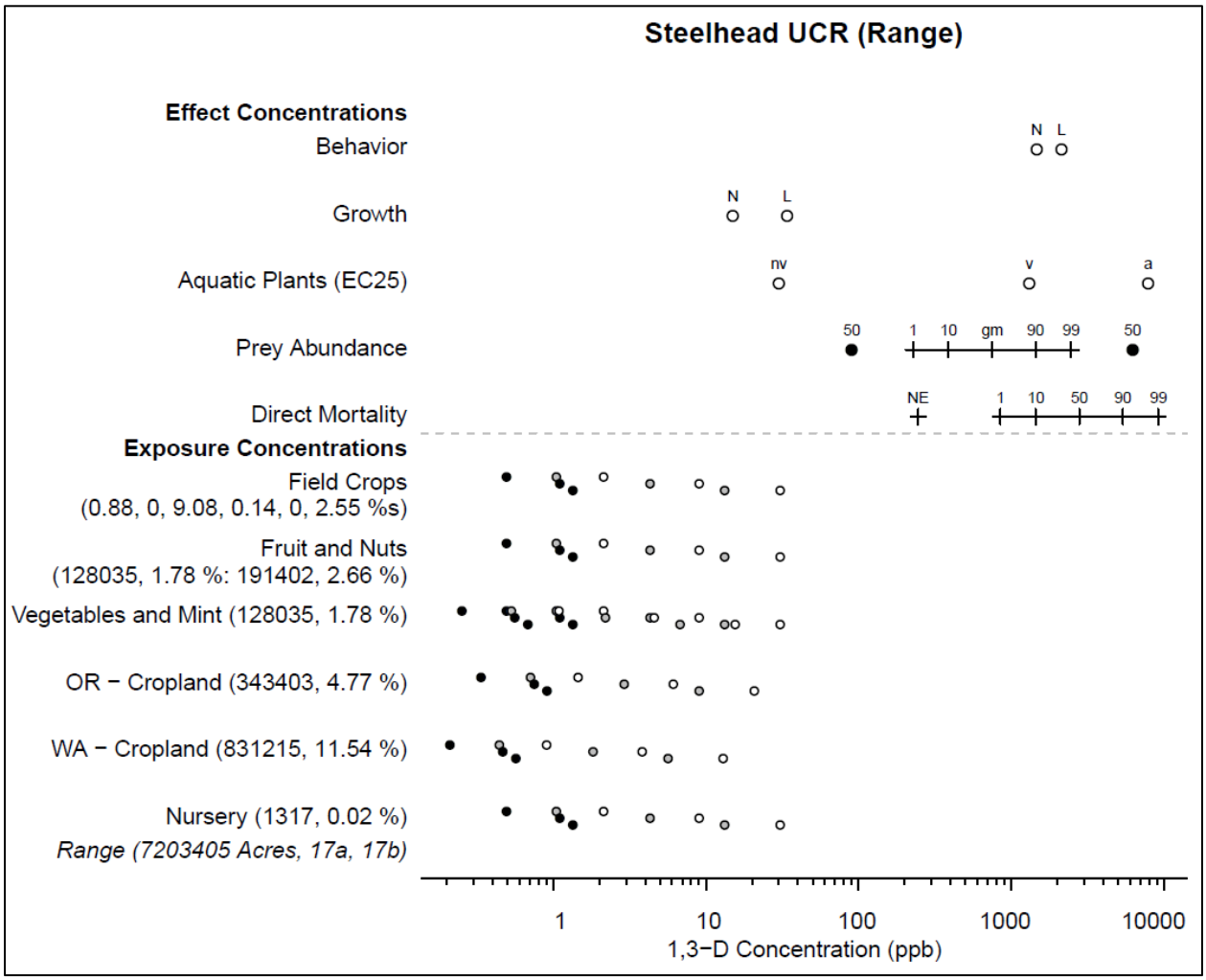


Figure 29. Effects analysis Risk-plot for Steelhead, Upper Columbia River DPS and products containing 1,3-Dichloropropene

Table 160. Likelihood of exposure determination for Steelhead, Upper Columbia River DPS and products containing 1,3-Dichloropropene

	Percent Overlap Category	Seasonal Analysis	Persistence	Multiple Applications	Proximity Analysis	Duration of migration/residency	Likelihood of Exposure
WA Cropland	3	yes	no	yes	NA	3	High
OR Cropland	2	yes	no	yes	NA	3	Medium
Mint	2	yes	no	no	NA	3	Medium
Nursery	1	yes	no	no	no	3	Low
Fruit and Nuts	2	yes	no	no	NA	3	Medium
Field Crops	3	yes	no	no	NA	3	Medium
Vegetable Crops	2	yes	no	no	NA	3	Medium

Table 161. Direct mortality risk hypothesis; Steelhead, Upper Columbia River DPS and products containing 1,3-Dichloropropene

Endpoint: Mortality				
Use Category	**% Overlap**	**Effect of Exposure**		**Likelihood of Exposure**
		1,3-D	**Chloropicrin**	
WA Cropland	11.54	None Expected	Medium	High
OR Cropland	4.77	None Expected	Medium	Medium
Mint	1.78	None Expected	Medium	Medium
Nursery	0.02	None Expected	Medium	Low
Fruit and Nuts	1.78, 2.66	None Expected	Medium	Medium
Field Crops	0.88, 0, 9.08, 0.14, 0, 2.55	None Expected	Medium	Medium
Vegetable Crops	1.78	None Expected	Medium	Medium
Risk Hypothesis: Exposure to products containing products containing 1,3-Dichloropropene is sufficient to reduce abundance via acute lethality.				
Risk	**Confidence**			
Medium	**Low**			

Table 162. Prey risk hypothesis; Steelhead, Upper Columbia River DPS and products containing 1,3-Dichloropropene

Endpoint: Prey

Use Category	% Overlap	Effect of Exposure (Invertebrates / Fish)		Likelihood of Exposure
		1,3-D	Chloropicrin	
WA Cropland	11.54	None Expected	None Expected / Medium	High
OR Cropland	4.77	None Expected	None Expected / Medium	Medium
Mint	1.78	None Expected	None Expected / Medium	Medium
Nursery	0.02	None Expected	None Expected / Medium	Low
Fruit and Nuts	1.78, 2.66	None Expected	None Expected / Medium	Medium
Field Crops	0.88, 0, 9.08, 0.14, 0, 2.55	None Expected	None Expected / Medium	Medium
Vegetable Crops	1.78	None Expected	None Expected / Medium	Medium
Risk Hypothesis: Exposure to products containing products containing 1,3-Dichloropropene is sufficient to reduce abundance via reduction in prey availability.				
Risk	**Confidence**			
Low	**Medium**			

Table 163. Growth risk hypothesis; Steelhead, Upper Columbia River DPS and products containing 1,3-Dichloropropene

Endpoint: Growth			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
WA Cropland	11.54	None Expected	High
OR Cropland	4.77	None Expected	Medium
Mint	1.78	None Expected	Medium
Nursery	0.02	None Expected	Low
Fruit and Nuts	1.78, 2.66	None Expected	Medium
Field Crops	0.88, 0, 9.08, 0.14, 0, 2.55	None Expected	Medium
Vegetable Crops	1.78	None Expected	Medium
Risk Hypothesis: Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via impacts to growth (direct toxicity).			
Risk	**Confidence**		
Low	**High**		

Table 164. Behavior risk hypothesis; Steelhead, Upper Columbia River DPS and products containing 1,3-Dichloropropene

Endpoint: Behavior			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
WA Cropland	11.54	None Expected	High
OR Cropland	4.77	None Expected	Medium
Mint	1.78	None Expected	Medium
Nursery	0.02	None Expected	Low
Fruit and Nuts	1.78, 2.66	None Expected	Medium
Field Crops	0.88, 0, 9.08, 0.14, 0, 2.55	None Expected	Medium
Vegetable Crops	1.78	None Expected	Medium
Risk Hypothesis: Exposure to products containing 1,3-Dichloropropene is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.			
Risk	**Confidence**		
Low	**High**		

Table 165. Effects analysis summary table: Steelhead, Upper Columbia River DPS and products containing 1,3-Dichloropropene

Risk Hypothesis	**Risk-plot Derived**		**Population Model Results**	**Risk Hypothesis Supported? Yes/No**
	Risk 1,3-D Chloropicrin	**Confidence 1,3-D Chloropicrin**		
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via acute lethality.	Medium	Low	Not Applicable	No
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via reduction in prey availability.	Low	Medium		No
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via impacts to growth (direct toxicity).	Low	High		No
Exposure to products containing 1,3-	Low	High		No

Dichloropropene is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.				

Effects analysis summary:

Steelhead, Upper Columbia River DPS are not anticipated to experience reductions in abundance through any of the risk hypotheses assessed from exposure to products containing 1,3-D or associated degradates. Some take is anticipated when formulated products containing chloropicrin are used in proximity to low flow, low volume species habitats. The anticipated levels of products containing 1,3-D within the species range are not expected to substantially impact the overall abundance and therefore availability of aquatic invertebrates. 1,3-D products containing chloropicrin, however, may result in some reductions in the availability of juvenile fish as steelhead prey in low flow, low volume habitats. We did not find support for the risk hypotheses for growth or behavior. Although risk associated with acute mortality is medium, we have low confidence in this determination because only a subset of product labels containing chloropicrin produced EECs which exceeded this determination threshold. Additionally, the likelihood of exposure characterizations for products containing 1,3-D indicate a greater likelihood than is anticipated because labeled use sites are broadly categorized (e.g. field crops). Exposure to multiple ingredients from formulated products and tank mixtures containing 1,3-Dichloropropene may result in increased toxicity. NMFS has determined the overall risk to the species from the effects of the action is medium and the confidence associated with that risk is low.

12.2.28 Steelhead, Upper Willamette River DPS (*Oncorhynchus mykiss*)

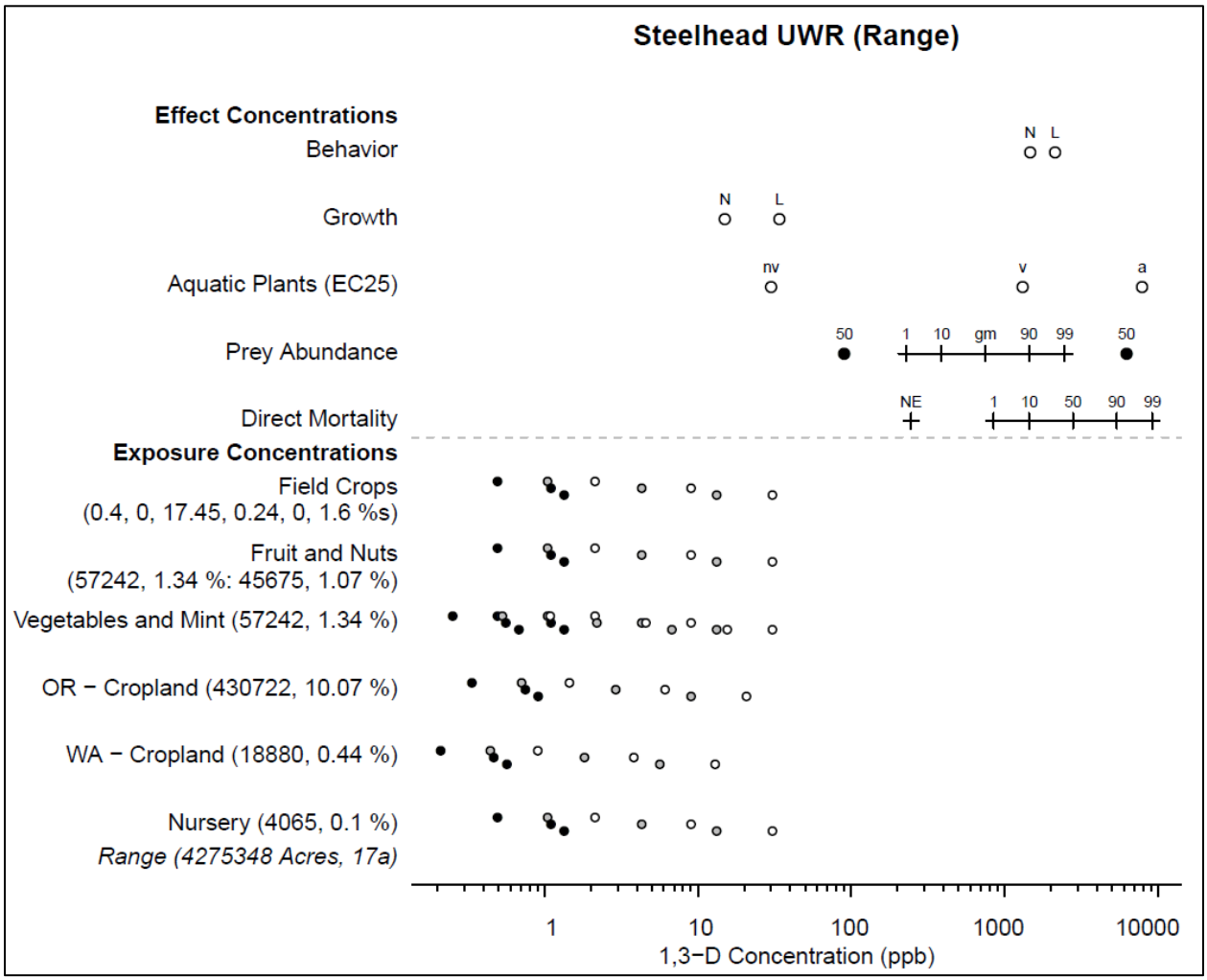
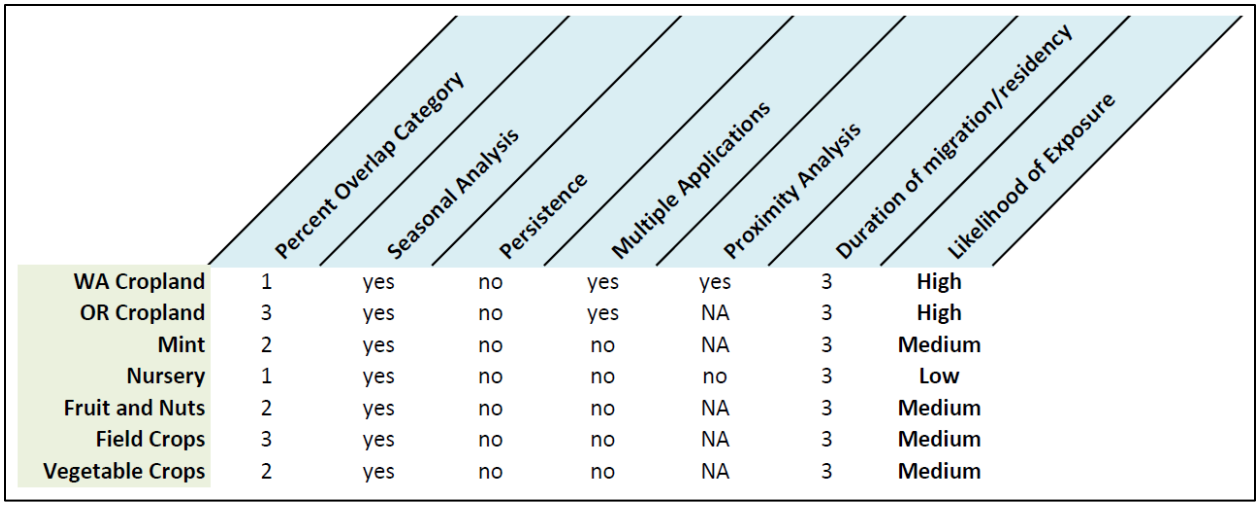


Figure 30. Effects analysis Risk-plot for Steelhead, Upper Willamette River DPS and products containing 1,3-Dichloropropene

Table 166. Likelihood of exposure determination for Steelhead, Upper Willamette River DPS and products containing 1,3-Dichloropropene



	Percent Overlap Category	Seasonal Analysis	Persistence	Multiple Applications	Proximity Analysis	Duration of migration/residency	Likelihood of Exposure
WA Cropland	1	yes	no	yes	yes	3	High
OR Cropland	3	yes	no	yes	NA	3	High
Mint	2	yes	no	no	NA	3	Medium
Nursery	1	yes	no	no	no	3	Low
Fruit and Nuts	2	yes	no	no	NA	3	Medium
Field Crops	3	yes	no	no	NA	3	Medium
Vegetable Crops	2	yes	no	no	NA	3	Medium

Table 167. Direct mortality risk hypothesis; Steelhead, Upper Willamette River DPS and products containing 1,3-Dichloropropene

Endpoint: Mortality				
Use Category	**% Overlap**	**Effect of Exposure**		**Likelihood of Exposure**
		1,3-D	**Chloropicrin**	
WA Cropland	0.44	None Expected	Medium	High
OR Cropland	10.07	None Expected	Medium	High
Mint	1.34	None Expected	Medium	Medium
Nursery	0.1	None Expected	Medium	Low
Fruit and Nuts	1.34, 1.07	None Expected	Medium	Medium
Field Crops	0.4, 0, 17.45, 0.24, 0, 1.6	None Expected	Medium	Medium
Vegetable Crops	1.34	None Expected	Medium	Medium
Risk Hypothesis: Exposure to products containing products containing 1,3-Dichloropropene is sufficient to reduce abundance via acute lethality.				
Risk	**Confidence**			
Medium	**Low**			

Table 168. Prey risk hypothesis; Steelhead, Upper Willamette River DPS and products containing 1,3-Dichloropropene

Endpoint: Prey

Use Category	% Overlap	Effect of Exposure (Invertebrates / Fish)		Likelihood of Exposure
		1,3-D	Chloropicrin	
WA Cropland	0.44	None Expected	None Expected / Medium	High
OR Cropland	10.07	None Expected	None Expected / Medium	High
Mint	1.34	None Expected	None Expected / Medium	Medium
Nursery	0.1	None Expected	None Expected / Medium	Low
Fruit and Nuts	1.34, 1.07	None Expected	None Expected / Medium	Medium
Field Crops	0.4, 0, 17.45, 0.24, 0, 1.6	None Expected	None Expected / Medium	Medium
Vegetable Crops	1.34	None Expected	None Expected / Medium	Medium
Risk Hypothesis: Exposure to products containing products containing 1,3-Dichloropropene is sufficient to reduce abundance via reduction in prey availability.				
Risk	**Confidence**			
Low	**Medium**			

Table 169. Growth risk hypothesis; Steelhead, Upper Willamette River DPS and products containing 1,3-Dichloropropene

Endpoint: Growth			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
WA Cropland	0.44	None Expected	High
OR Cropland	10.07	None Expected	High
Mint	1.34	None Expected	Medium
Nursery	0.1	None Expected	Low
Fruit and Nuts	1.34, 1.07	None Expected	Medium
Field Crops	0.4, 0, 17.45, 0.24, 0, 1.6	None Expected	Medium
Vegetable Crops	1.34	None Expected	Medium
Risk Hypothesis: Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via impacts to growth (direct toxicity).			
Risk	**Confidence**		
Low	**High**		

Table 170. Behavior risk hypothesis; Steelhead, Upper Willamette River DPS and products containing 1,3-Dichloropropene

Endpoint: Behavior			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
WA Cropland	0.44	None Expected	High
OR Cropland	10.07	None Expected	High
Mint	1.34	None Expected	Medium
Nursery	0.1	None Expected	Low
Fruit and Nuts	1.34, 1.07	None Expected	Medium
Field Crops	0.4, 0, 17.45, 0.24, 0, 1.6	None Expected	Medium
Vegetable Crops	1.34	None Expected	Medium
Risk Hypothesis: Exposure to products containing 1,3-Dichloropropene is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.			
Risk	**Confidence**		
Low	**High**		

Table 171. Effects analysis summary table: Steelhead, Upper Willamette River DPS and products containing 1,3-Dichloropropene

Risk Hypothesis	**Risk-plot Derived**		**Population Model Results**	**Risk Hypothesis Supported? Yes/No**
	Risk 1,3-D Chloropicrin	**Confidence 1,3-D Chloropicrin**		
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via acute lethality.	Medium	Low	Not Applicable	No
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via reduction in prey availability.	Low	Medium		No
Exposure to products containing 1,3-Dichloropropene is sufficient to reduce abundance via impacts to growth (direct toxicity).	Low	High		No
Exposure to products containing 1,3-	Low	High		No

Dichloropropene is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.				

Effects analysis summary: Steelhead, Upper Willamette River DPS are not anticipated to experience reductions in abundance through any of the risk hypotheses assessed from exposure to products containing 1,3-D or associated degradates. Some take is anticipated when formulated products containing chloropicrin are used in proximity to low flow, low volume species habitats. The anticipated levels of products containing 1,3-D within the species range are not expected to substantially impact the overall abundance and therefore availability of aquatic invertebrates. 1,3-D products containing chloropicrin, however, may result in some reductions in the availability of juvenile fish as steelhead prey in low flow, low volume habitats. We did not find support for the risk hypotheses for growth or behavior. Although risk associated with acute mortality is medium, we have low confidence in this determination because only a subset of product labels containing chloropicrin produced EECs which exceeded this determination threshold. Additionally, the likelihood of exposure characterizations for products containing 1,3-D indicate a greater likelihood than is anticipated because labeled use sites are broadly categorized (e.g. field crops). Exposure to multiple ingredients from formulated products and tank mixtures containing 1,3-Dichloropropene may result in increased toxicity. NMFS has determined the overall risk to the species from the effects of the action is medium and the confidence associated with that risk is low.

12.3 Metolachlor Effects Analysis

The response endpoints displayed in the metolachlor risk plots that follow are provided in Table 172. See the introduction to the effects analysis chapter for more information regarding the available relevant toxicological data for these compounds.

Table 172. Effects endpoints displayed in risk plots for metolachlor

Endpoint: Behavior

Test species: Bluegill sunfish; Rainbow Trout; Sheepshead minnow
Duration: 96-hr
Toxicity value (ppb): NOAEC (N) / LOAEC (L) = 2590/3290; 2500/5300; 6040/12100
Citation/MRID: 43928910; 43928911; 46829506

Endpoint: Growth

Test species: Fathead Minnow
Duration: 30-day
Toxicity value (ppb): NOAEC (N) = 30; LOAEC (L) = 56
Citation/MRID: 44995903

Endpoint: Aquatic Plants

Test species: Green algae (a); Duckweed (v); Freshwater diatom (nv)
Duration: 5-day; 14-day; 5-day
Toxicity value (ppb): EC25= 4.8; 13; 42
Citation/MRID: 43928929; 43928931; 43541302

Endpoint: Prey Abundance

Test species: Water flea
Duration: 96-hr
Toxicity value (ppb): LC50 (black diamond) = 23,500; 25,100; geometric mean* (gm) = 24,287; slope = 4.5 (assumed)
Citation/MRID: 40098001; 00015546

Endpoint: Direct Mortality

Test species: Rainbow Trout; Rainbow Trout
Duration: 96-hr

Toxicity value (ppb): LC50 (black diamond) = 3,900; 11,900; geometric mean* (gm) = 6,840 slope = 4.5 (assumed); None Expected (NE) = 600 Citation/MRID: 00018722; 43928911
**The calculation and reference to the geometric mean of the two different LC50s was determined appropriate as the studies were otherwise comparable in regards to species tested, exposure duration, and overall data quality.*

12.3.1 Chum Salmon, Columbia River ESU (*Oncorhynchus keta*)

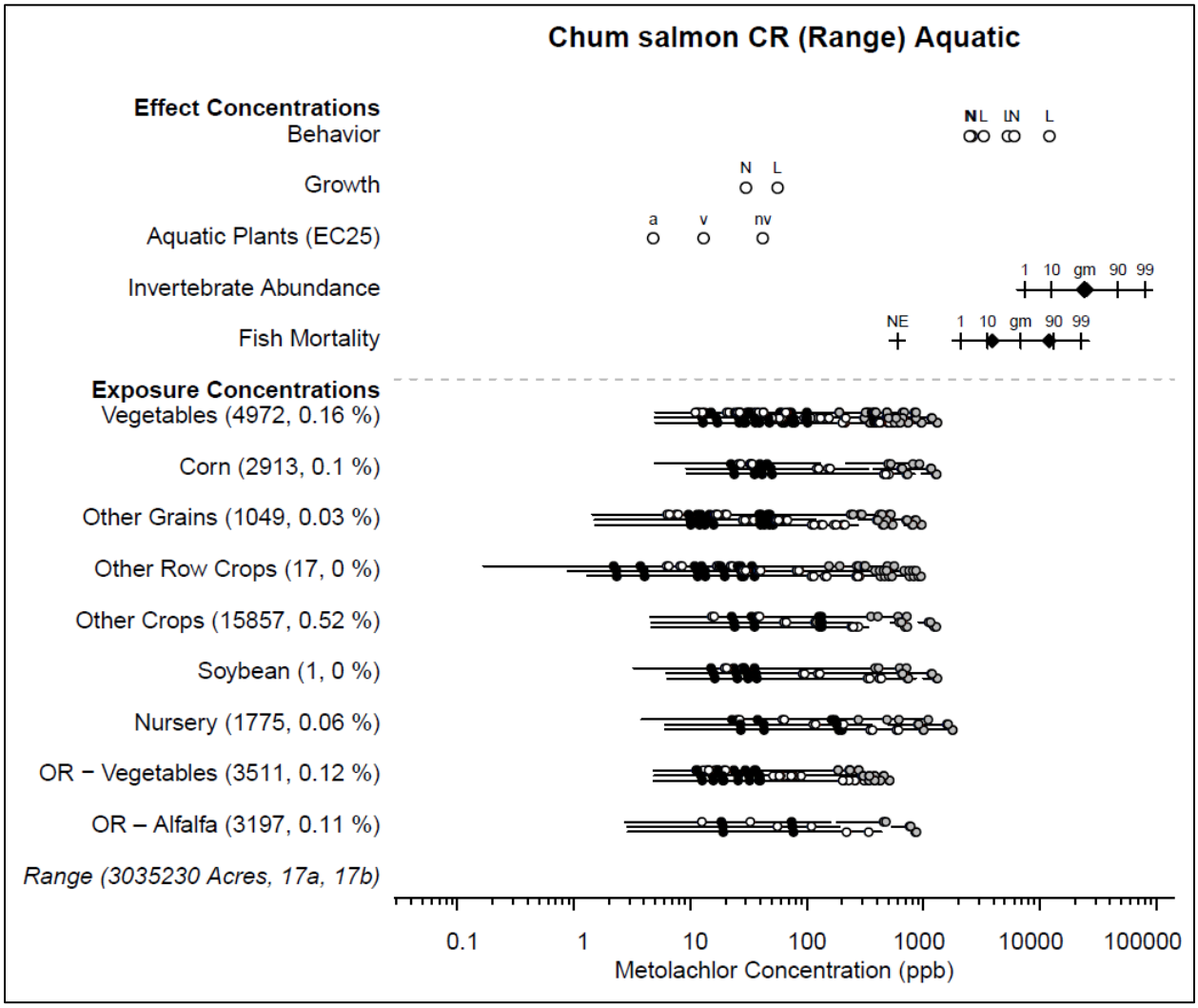


Figure 31. Effects analysis Risk-plot for Chum salmon, Columbia River ESU and Metolachlor

Table 173. Likelihood of exposure determination for Chum salmon, Columbia River ESU and Metolachlor

	Percent Overlap Category	Seasonal Analysis	Persistence	Multiple Applications	Proximity Analysis	Duration of migration/residency	Likelihood of Exposure
Vegetables	1	yes	no	yes	yes	2	Medium
Corn	1	yes	no	yes	yes	2	Medium
Other Grains	1	yes	no	yes	no	2	Low
Other Row Crops	1	yes	no	yes	no	2	Low
Other Crops	1	yes	no	yes	yes	2	Medium
Soybean	1	yes	no	yes	no	2	Low
Nursery	1	yes	no	yes	no	2	Low
OR - Vegetables	1	yes	no	yes	yes	2	Medium
OR - Alfalfa	1	yes	no	yes	no	2	Low

Table 174. Direct mortality risk hypothesis; Chum salmon, Columbia River ESU and Metolachlor

Endpoint: Mortality			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	0.16	Low	Medium
Corn	0.1	Low	Medium
Other Grains	0.03	Low	Low
Other Row Crops	0	Low	Low
Other Crops	0.52	Low	Medium
Soybean	0	Low	Low
Nursery	0.06	Low	Low
OR - Vegetables	0.12	None Expected	Medium
OR - Alfalfa	0.11	Low	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via acute lethality.			
Risk	**Confidence**		
Medium	**Low**		

Table 175. Prey risk hypothesis; Chum salmon, Columbia River ESU and Metolachlor

Endpoint: Prey			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	0.16	None Expected	Medium
Corn	0.1	None Expected	Medium
Other Grains	0.03	None Expected	Low

Other Row Crops	0	None Expected	Low
Other Crops	0.52	None Expected	Medium
Soybean	0	None Expected	Low
Nursery	0.06	Low	Low
OR - Vegetables	0.12	None Expected	Medium
OR - Alfalfa	0.11	None Expected	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via reduction in prey availability.			
Risk	**Confidence**		
Low	**High**		

Table 176. Growth risk hypothesis; Chum salmon, Columbia River ESU and Metolachlor

Endpoint: Growth			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	0.16	Medium	Medium
Corn	0.1	Medium	Medium
Other Grains	0.03	Medium	Low
Other Row Crops	0	Medium	Low
Other Crops	0.52	Medium	Medium
Soybean	0	Medium	Low
Nursery	0.06	Medium	Low
OR - Vegetables	0.12	Medium	Medium
OR - Alfalfa	0.11	Medium	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via impacts to growth (direct toxicity).			
Risk	**Confidence**		
High	**Low**		

Table 177. Behavior risk hypothesis; Chum salmon, Columbia River ESU and Metolachlor

Endpoint: Behavior			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	0.16	None Expected	Medium
Corn	0.1	None Expected	Medium
Other Grains	0.03	None Expected	Low
Other Row Crops	0	None Expected	Low
Other Crops	0.52	None Expected	Medium
Soybean	0	None Expected	Low
Nursery	0.06	None Expected	Low
OR - Vegetables	0.12	None Expected	Medium
OR - Alfalfa	0.11	None Expected	Low

Risk Hypothesis: Exposure to metolachlor is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.		
Risk	**Confidence**	
Low	**High**	

Table 178. Effects analysis summary table: Chum salmon, Columbia River ESU and Metolachlor

Risk Hypothesis	Risk-plot Derived		Population Model Results	Risk Hypothesis Supported? Yes/No
	Risk	Confidence		
Exposure to metolachlor is sufficient to reduce abundance via acute lethality.	Medium	Low	Not Applicable	No
Exposure to metolachlor is sufficient to reduce abundance via reduction in prey availability.	Low	High		No
Exposure to metolachlor is sufficient to reduce abundance via impacts to growth (direct toxicity).	High	Low		No
Exposure to metolachlor is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.	Low	High		No

Effects analysis summary: Chum salmon, Columbia River ESU are not anticipated to experience reductions in abundance through any of the risk hypotheses assessed from exposure to metolachlor or associated degradates. For metolachlor, some of the use categories have the potential to overestimate the spatial footprint of authorized use. We did not find support for the direct mortality risk hypothesis. Although risk associated with acute mortality is medium, we have low confidence in this determination because the likelihood of exposure characterizations are greater than would be anticipated. We did not find support for the growth risk hypothesis. Although we characterized risk associated with effects to growth as high, our confidence in this risk is low given the chronic exposure to metolachlor at the duration evaluated under this study is not expected. Where formulated products and tank mixtures containing metolachlor occur in aquatic habitats, individuals may experience increased toxicity. NMFS has determined the overall risk to the species from the effects of the action is medium and the confidence associated with that risk is low.

Medium Risk
Low Confidence
Less Risk
More Risk

12.3.2 Chum Salmon, Hood Canal summer-run ESU (*Oncorhynchus keta*)

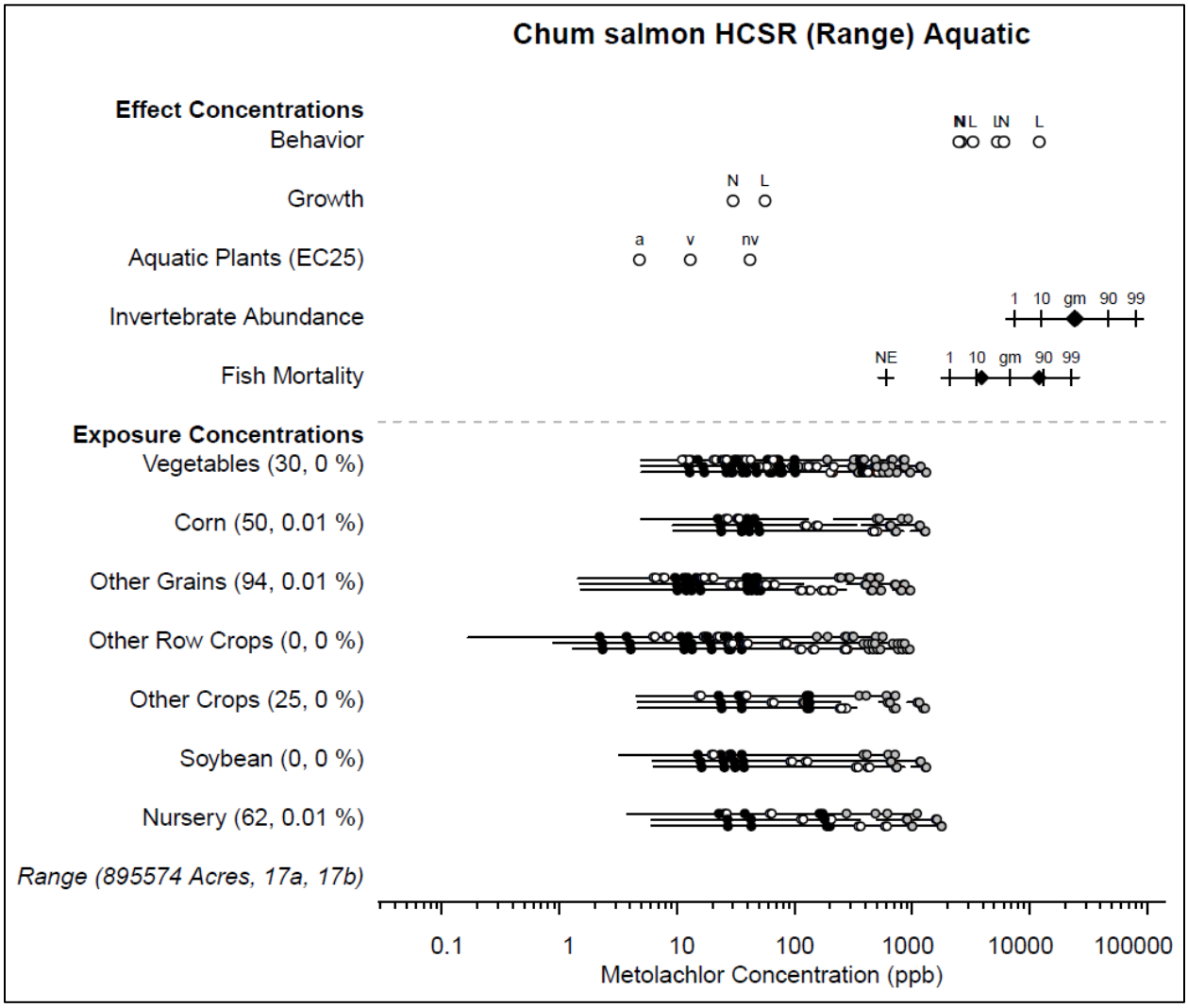


Figure 32. Effects analysis Risk-plot for Chum salmon, Hood Canal summer-run ESU and Metolachlor

Table 179. Likelihood of exposure determination for Chum salmon, Hood Canal summer-run ESU and Metolachlor

	Percent Overlap Category	Seasonal Analysis	Persistence	Multiple Applications	Proximity Analysis	Duration of migration/residency	Likelihood of Exposure
Vegetables	1	yes	no	yes	no	2	Low
Corn	1	yes	no	yes	no	2	Low
Other Grains	1	yes	no	yes	no	2	Low
Other Row Crops	1	yes	no	yes	no	2	Low
Other Crops	1	yes	no	yes	no	2	Low
Soybean	1	yes	no	yes	no	2	Low
Nursery	1	yes	no	yes	no	2	Low

Table 180. Direct mortality risk hypothesis; Chum salmon, Hood Canal summer-run ESU and Metolachlor

Endpoint: Mortality			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	0	Low	Low
Corn	0.01	Low	Low
Other Grains	0.01	Low	Low
Other Row Crops	0	Low	Low
Other Crops	0	Low	Low
Soybean	0	Low	Low
Nursery	0.01	Low	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via acute lethality.			
Risk	**Confidence**		
Low	**High**		

Table 181. Prey risk hypothesis; Chum salmon, Hood Canal summer-run ESU and Metolachlor

Endpoint: Prey			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	0	None Expected	Low
Corn	0.01	None Expected	Low
Other Grains	0.01	None Expected	Low
Other Row Crops	0	None Expected	Low
Other Crops	0	None Expected	Low
Soybean	0	None Expected	Low
Nursery	0.01	Low	Low

Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via reduction in prey availability.		
Risk	**Confidence**	
Low	**High**	

Table 182. Growth risk hypothesis; Chum salmon, Hood Canal summer-run ESU and Metolachlor

Endpoint: Growth			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	0	Medium	Low
Corn	0.01	Medium	Low
Other Grains	0.01	Medium	Low
Other Row Crops	0	Medium	Low
Other Crops	0	Medium	Low
Soybean	0	Medium	Low
Nursery	0.01	Medium	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via impacts to growth (direct toxicity).			
Risk	**Confidence**		
Low	**High**		

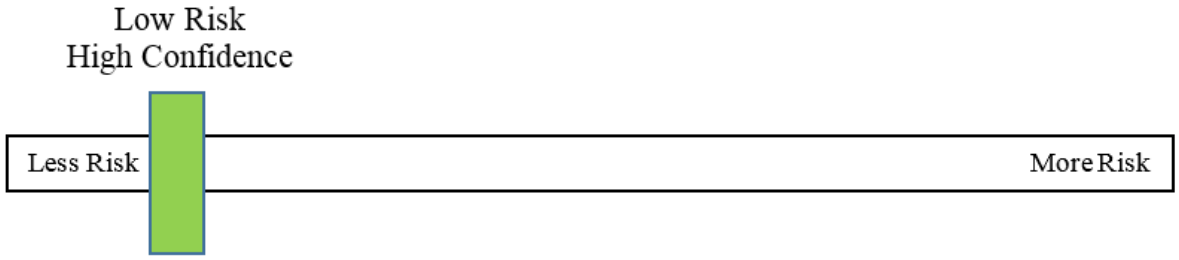
Table 183. Behavior risk hypothesis; Chum salmon, Hood Canal summer-run ESU and Metolachlor

Endpoint: Behavior			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	0	None Expected	Low
Corn	0.01	None Expected	Low
Other Grains	0.01	None Expected	Low
Other Row Crops	0	None Expected	Low
Other Crops	0	None Expected	Low
Soybean	0	None Expected	Low
Nursery	0.01	None Expected	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.			
Risk	**Confidence**		
Low	**High**		

Table 184. Effects analysis summary table: Chum salmon, Hood Canal summer-run ESU and Metolachlor

Risk Hypothesis	Risk-plot Derived		Population Model Results	Risk Hypothesis Supported? Yes/No
	Risk	Confidence		
Exposure to metolachlor is sufficient to reduce abundance via acute lethality.	Low	High	Not Applicable	No
Exposure to metolachlor is sufficient to reduce abundance via reduction in prey availability.	Low	High		No
Exposure to metolachlor is sufficient to reduce abundance via impacts to growth (direct toxicity).	Low	High		No
Exposure to metolachlor is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.	Low	High		No

Effects analysis summary: Chum salmon, Hood Canal summer-run ESU are not anticipated to experience reductions in abundance through any of the risk hypotheses assessed from exposure to metolachlor or associated degradates. Where formulated products and tank mixtures containing metolachlor occur in aquatic habitats, individuals may experience increased toxicity. NMFS has determined the overall risk to the species from the effects of the action is low and the confidence associated with that risk is high given the low risk associated with all risk hypotheses evaluated.



12.3.3 Chinook Salmon, California Coastal (*Oncorhynchus tshawytscha*)

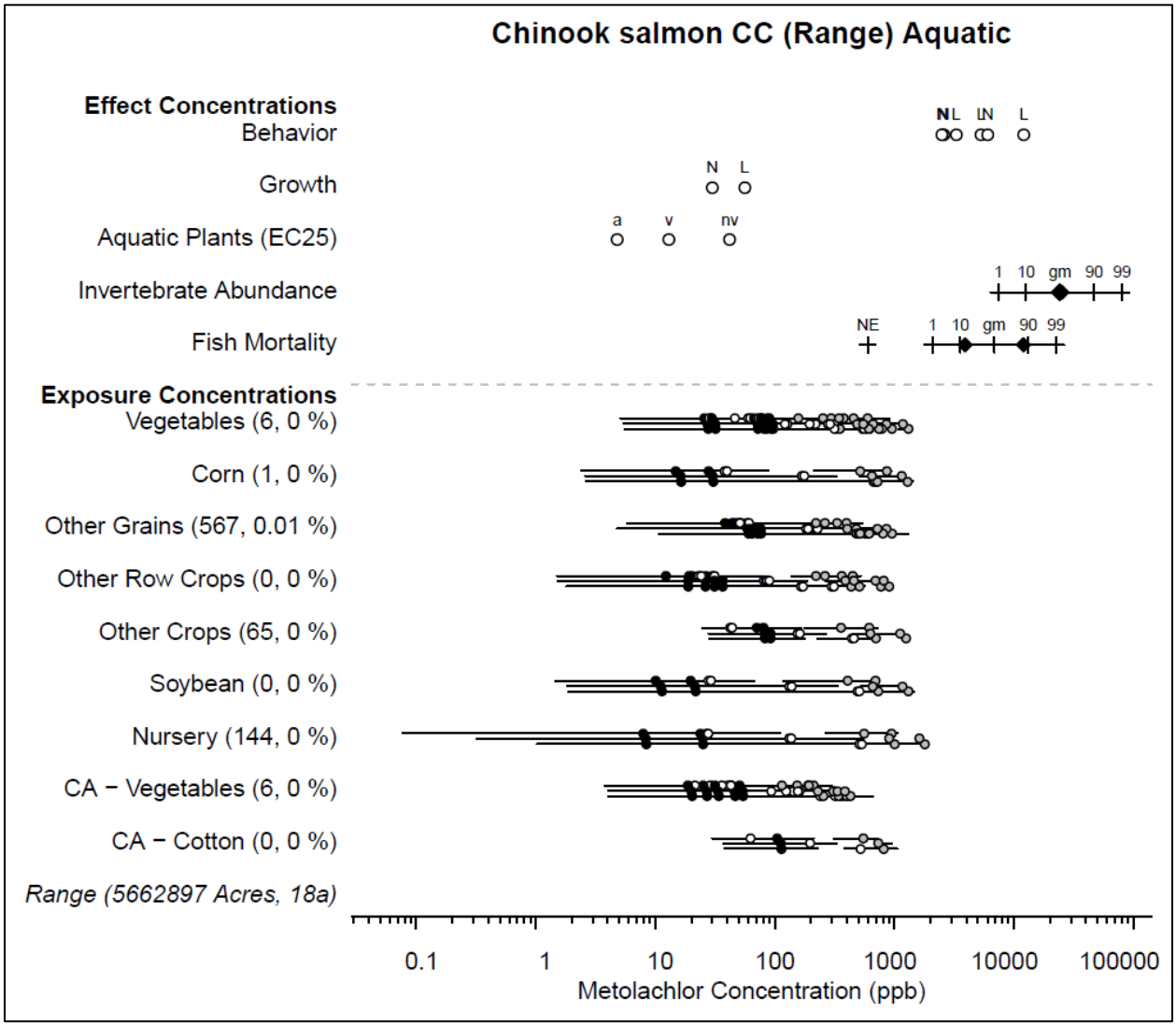


Figure 33. Effects analysis Risk-plot for Chinook salmon, California Coastal ESU and Metolachlor

Table 185. Likelihood of exposure determination for Chinook salmon, California Coastal ESU and Metolachlor

	Percent Overlap Category	Seasonal Analysis	Persistence	Multiple Applications	Proximity Analysis	Duration of migration/residency	Likelihood of Exposure
Vegetables	1	yes	no	yes	no	3	Low
Corn	1	yes	no	yes	no	3	Low
Other Grains	1	yes	no	yes	no	3	Low
Other Row Crops	1	yes	no	yes	no	3	Low
Other Crops	1	yes	no	yes	no	3	Low
Soybean	1	yes	no	yes	no	3	Low
Nursery	1	yes	no	yes	no	3	Low
CA - Vegetables	1	yes	no	yes	no	3	Low
CA - Cotton	1	yes	no	yes	no	3	Low

Table 186. Direct mortality risk hypothesis; Chinook salmon, California Coastal ESU and Metolachlor

Endpoint: Mortality			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	0	Low	Low
Corn	0	Low	Low
Other Grains	0.01	Low	Low
Other Row Crops	0	Low	Low
Other Crops	0	Low	Low
Soybean	0	Low	Low
Nursery	0	Low	Low
CA - Vegetables	0	None Expected	Low
CA - Cotton	0	Low	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via acute lethality.			
Risk	**Confidence**		
Low	**High**		

Table 187. Prey risk hypothesis; Chinook salmon, California Coastal ESU and Metolachlor

Endpoint: Prey			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	0	None Expected	Low
Corn	0	None Expected	Low
Other Grains	0.01	None Expected	Low

Other Row Crops	0	None Expected	Low
Other Crops	0	None Expected	Low
Soybean	0	None Expected	Low
Nursery	0	Low	Low
CA - Vegetables	0	None Expected	Low
CA - Cotton	0	None Expected	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via reduction in prey availability.			
Risk	**Confidence**		
Low	**High**		

Table 188. Growth risk hypothesis; Chinook salmon, California Coastal ESU and Metolachlor

Endpoint: Growth			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	0	Medium	Low
Corn	0	Medium	Low
Other Grains	0.01	Medium	Low
Other Row Crops	0	Medium	Low
Other Crops	0	Medium	Low
Soybean	0	Medium	Low
Nursery	0	Medium	Low
CA - Vegetables	0	Medium	Low
CA - Cotton	0	Medium	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via impacts to growth (direct toxicity).			
Risk	**Confidence**		
Low	**High**		

Table 189. Behavior risk hypothesis; Chinook salmon, California Coastal ESU and Metolachlor

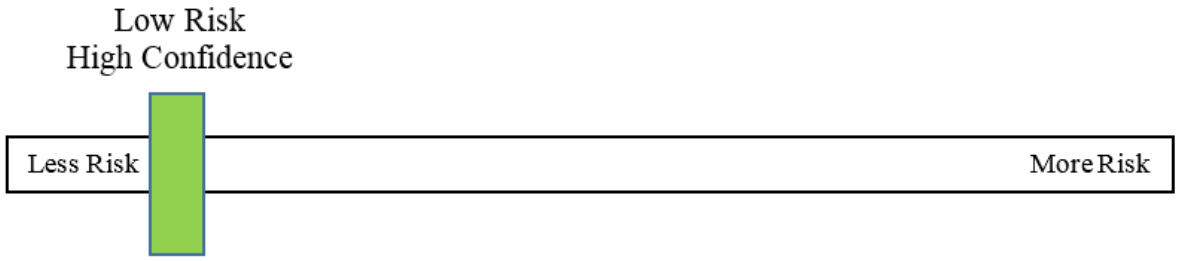
Endpoint: Behavior			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	0	None Expected	Low
Corn	0	None Expected	Low
Other Grains	0.01	None Expected	Low
Other Row Crops	0	None Expected	Low
Other Crops	0	None Expected	Low
Soybean	0	None Expected	Low
Nursery	0	None Expected	Low

CA - Vegetables	0	None Expected	Low
CA - Cotton	0	None Expected	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.			
Risk	**Confidence**		
Low	**High**		

Table 190. Effects analysis summary table: Chinook salmon, California Coastal ESU and Metolachlor

Risk Hypothesis	Risk-plot Derived		Population Model Results	Risk Hypothesis Supported? Yes/No
	Risk	Confidence		
Exposure to metolachlor is sufficient to reduce abundance via acute lethality.	Low	High	No significant reductions in population growth rate. (See chapter 11.5).	No
Exposure to metolachlor is sufficient to reduce abundance via reduction in prey availability.	Low	High		No
Exposure to metolachlor is sufficient to reduce abundance via impacts to growth (direct toxicity).	Low	High		No
Exposure to metolachlor is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.	Low	High		No

Effects analysis summary: Chinook salmon, California Coastal ESU are not anticipated to experience reductions in abundance through any of the risk hypotheses assessed from exposure to metolachlor or associated degradates. No changes in population growth rate occurred at the one percent mortality level for any model runs. This suggests that no changes in population growth would occur at the percent mortalities anticipated (less than one percent) with exposures to metolachlor. Where formulated products and tank mixtures containing metolachlor occur in aquatic habitats, individuals may experience increased toxicity. NMFS has determined the overall risk to the species from the effects of the action is low and the confidence associated with that risk is high given the low risk associated with all risk hypotheses evaluated.


Low Risk
High Confidence
Less Risk
More Risk

12.3.4 Chinook Salmon, Central Valley spring-run ESU (*Oncorhynchus tshawytscha*)

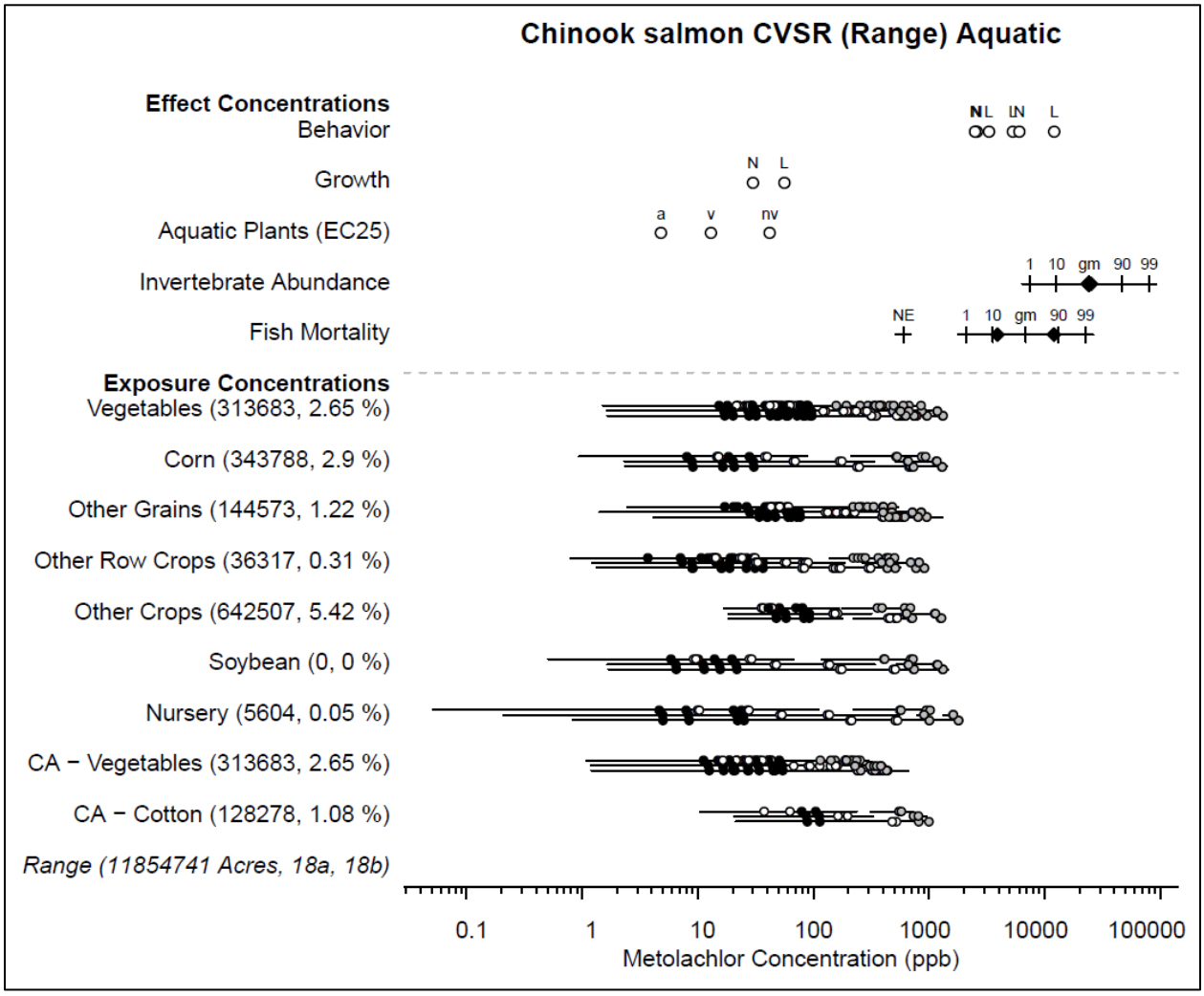


Figure 34. Effects analysis Risk-plot for Chinook salmon, Central Valley spring-run ESU and Metolachlor

Table 191. Likelihood of exposure determination for Chinook salmon, Central Valley spring-run ESU and Metolachlor

	Percent Overlap Category	Seasonal Analysis	Persistence	Multiple Applications	Proximity Analysis	Duration of migration/residency	Likelihood of Exposure
Vegetables	2	yes	no	yes	NA	3	Medium
Corn	2	yes	no	yes	NA	3	Medium
Other Grains	2	yes	no	yes	NA	3	Medium
Other Row Crops	1	yes	no	yes	yes	3	High
Other Crops	3	yes	no	yes	NA	3	High
Soybean	1	yes	no	yes	no	3	Low
Nursery	1	yes	no	yes	no	3	Low
CA - Vegetables	2	yes	no	yes	NA	3	Medium
CA - Cotton	2	yes	no	yes	NA	3	Medium

Table 192. Direct mortality risk hypothesis; Chinook salmon, Central Valley spring-run ESU and Metolachlor

Endpoint: Mortality			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	2.65	Low	Medium
Corn	2.9	Low	Medium
Other Grains	1.22	Low	Medium
Other Row Crops	0.31	Low	High
Other Crops	5.42	Low	High
Soybean	0	Low	Low
Nursery	0.05	Low	Low
CA - Vegetables	2.65	None Expected	Medium
CA - Cotton	1.08	Low	Medium
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via acute lethality.			
Risk	**Confidence**		
Medium	**Low**		

Table 193. Prey risk hypothesis; Chinook salmon, Central Valley spring-run ESU and Metolachlor

Endpoint: Prey			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	2.65	None Expected	Medium

Corn	2.9	None Expected	Medium
Other Grains	1.22	None Expected	Medium
Other Row Crops	0.31	None Expected	High
Other Crops	5.42	None Expected	High
Soybean	0	None Expected	Low
Nursery	0.05	Low	Low
CA - Vegetables	2.65	None Expected	Medium
CA - Cotton	1.08	None Expected	Medium
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via reduction in prey availability.			
Risk	**Confidence**		
Low	**High**		

Table 194. Growth risk hypothesis; Chinook salmon, Central Valley spring-run ESU and Metolachlor

Endpoint: Growth			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	2.65	Medium	Medium
Corn	2.9	Medium	Medium
Other Grains	1.22	Medium	Medium
Other Row Crops	0.31	Medium	High
Other Crops	5.42	Medium	High
Soybean	0	Medium	Low
Nursery	0.05	Medium	Low
CA - Vegetables	2.65	Medium	Medium
CA - Cotton	1.08	Medium	Medium
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via impacts to growth (direct toxicity).			
Risk	**Confidence**		
High	**Low**		

Table 195. Behavior risk hypothesis; Chinook salmon, Central Valley spring-run ESU and Metolachlor

Endpoint: Behavior			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	2.65	None Expected	Medium
Corn	2.9	None Expected	Medium
Other Grains	1.22	None Expected	Medium
Other Row Crops	0.31	None Expected	High
Other Crops	5.42	None Expected	High

Soybean	0	None Expected	Low
Nursery	0.05	None Expected	Low
CA - Vegetables	2.65	None Expected	Medium
CA - Cotton	1.08	None Expected	Medium
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.			
Risk	**Confidence**		
Low	**High**		

Table 196. Effects analysis summary table: Chinook salmon, Central Valley spring-run ESU and Metolachlor

Risk Hypothesis	Risk-plot Derived		Population Model Results	Risk Hypothesis Supported? Yes/No
	Risk	Confidence		
Exposure to metolachlor is sufficient to reduce abundance via acute lethality.	Medium	Low	No significant reductions in population growth rate. (See chapter 11.5).	No
Exposure to metolachlor is sufficient to reduce abundance via reduction in prey availability.	Low	High		No
Exposure to metolachlor is sufficient to reduce abundance via impacts to growth (direct toxicity).	High	Low		No
Exposure to metolachlor is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.	Low	High		No

Effects analysis summary: Chinook salmon, Central Valley spring-run ESU are not anticipated to experience reductions in abundance through any of the risk hypotheses assessed from exposure to metolachlor or associated degradates. For metolachlor, some of the use categories have the potential to overestimate the spatial footprint of authorized use. We did not find support for the direct mortality risk hypothesis. Although risk associated with acute mortality is medium, we have low confidence in this determination because the likelihood of exposure characterizations are greater than would be anticipated. We did not find support for the growth risk hypothesis. Although we characterized risk associated with effects to growth as high, our

confidence in this risk is low given the chronic exposure to metolachlor at the duration evaluated under this study is not expected. No changes in population growth rate occurred at the one percent mortality level for any model runs. This suggests that no changes in population growth would occur at the percent mortalities anticipated (less than one percent) with exposures to metolachlor. Where formulated products and tank mixtures containing metolachlor occur in aquatic habitats, individuals may experience increased toxicity. NMFS has determined the overall risk to the species from the effects of the action is medium and the confidence associated with that risk is low.

12.3.5 Chinook Salmon, Lower Columbia River ESU (*Oncorhynchus tshawytscha*)

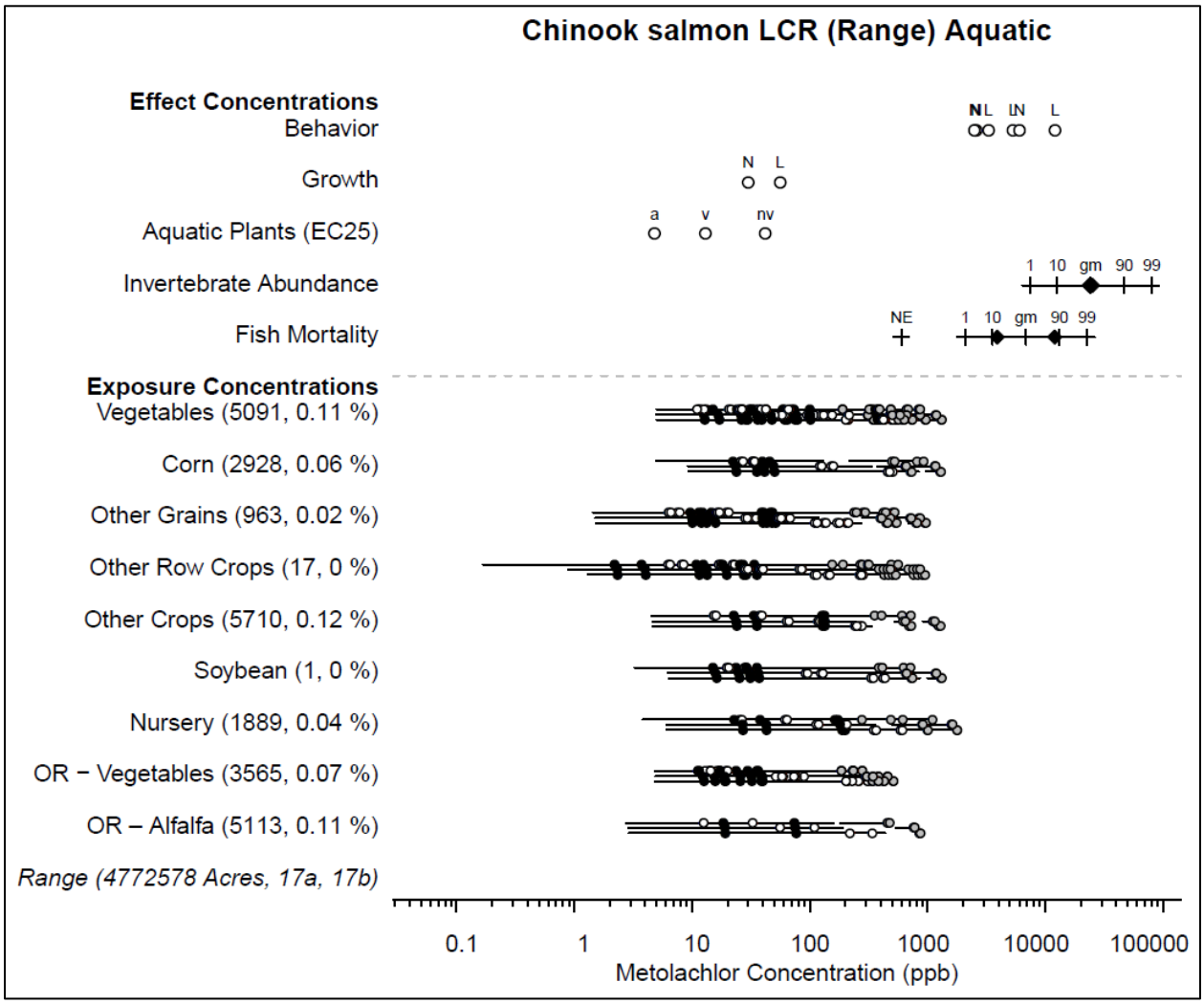


Figure 35. Effects analysis Risk-plot for Chinook salmon, Lower Columbia River ESU and Metolachlor

Table 197. Likelihood of exposure determination for Chinook salmon, Lower Columbia River ESU and Metolachlor

	Percent Overlap Category	Seasonal Analysis	Persistence	Multiple Applications	Proximity Analysis	Duration of migration/residency	Likelihood of Exposure
Vegetables	1	yes	no	yes	yes	3	**High**
Corn	1	yes	no	yes	yes	3	**High**
Other Grains	1	yes	no	yes	no	3	**Low**
Other Row Crops	1	yes	no	yes	no	3	**Low**
Other Crops	1	yes	no	yes	yes	3	**High**
Soybean	1	yes	no	yes	no	3	**Low**
Nursery	1	yes	no	yes	no	3	**Low**
OR - Vegetables	1	yes	no	yes	no	3	**Low**
OR - Alfalfa	1	yes	no	yes	no	3	**Low**

Table 198. Direct mortality risk hypothesis; Chinook salmon, Lower Columbia River ESU and Metolachlor

Endpoint: Mortality			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	0.11	Low	High
Corn	0.06	Low	High
Other Grains	0.02	Low	Low
Other Row Crops	0	Low	Low
Other Crops	0.12	Low	High
Soybean	0	Low	Low
Nursery	0.04	Low	Low
OR - Vegetables	0.07	None Expected	Low
OR - Alfalfa	0.11	Low	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via acute lethality.			
Risk	**Confidence**		
Medium	**Low**		

Table 199. Prey risk hypothesis; Chinook salmon, Lower Columbia River ESU and Metolachlor

Endpoint: Prey			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	0.11	None Expected	High
Corn	0.06	None Expected	High

Other Grains	0.02	None Expected	Low
Other Row Crops	0	None Expected	Low
Other Crops	0.12	None Expected	High
Soybean	0	None Expected	Low
Nursery	0.04	Low	Low
OR - Vegetables	0.07	None Expected	Low
OR - Alfalfa	0.11	None Expected	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via reduction in prey availability.			
Risk	**Confidence**		
Low	**High**		

Table 200. Growth risk hypothesis; Chinook salmon, Lower Columbia River ESU and Metolachlor

Endpoint: Growth			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	0.11	Medium	High
Corn	0.06	Medium	High
Other Grains	0.02	Medium	Low
Other Row Crops	0	Medium	Low
Other Crops	0.12	Medium	High
Soybean	0	Medium	Low
Nursery	0.04	Medium	Low
OR - Vegetables	0.07	Medium	Low
OR - Alfalfa	0.11	Medium	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via impacts to growth (direct toxicity).			
Risk	**Confidence**		
High	**Low**		

Table 201. Behavior risk hypothesis; Chinook salmon, Lower Columbia River ESU and Metolachlor

Endpoint: Behavior			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	0.11	None Expected	High
Corn	0.06	None Expected	High
Other Grains	0.02	None Expected	Low
Other Row Crops	0	None Expected	Low
Other Crops	0.12	None Expected	High
Soybean	0	None Expected	Low

Nursery	0.04	None Expected	Low
OR - Vegetables	0.07	None Expected	Low
OR - Alfalfa	0.11	None Expected	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.			
Risk	**Confidence**		
Low	**High**		

Table 202. Effects analysis summary table: Chinook salmon, Lower Columbia River ESU and Metolachlor

Risk Hypothesis	Risk-plot Derived		Population Model Results	Risk Hypothesis Supported? Yes/No
	Risk	Confidence		
Exposure to metolachlor is sufficient to reduce abundance via acute lethality.	Medium	Low	No significant reductions in population growth rate. (See chapter 11.5).	No
Exposure to metolachlor is sufficient to reduce abundance via reduction in prey availability.	Low	High		No
Exposure to metolachlor is sufficient to reduce abundance via impacts to growth (direct toxicity).	High	Low		No
Exposure to metolachlor is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.	Low	High		No

Effects analysis summary: Chinook salmon, Lower Columbia River ESU are not anticipated to experience reductions in abundance through any of the risk hypotheses assessed from exposure to metolachlor or associated degradates. For metolachlor, some of the use categories have the potential to overestimate the spatial footprint of authorized use. We did not find support for the direct mortality risk hypothesis. Although risk associated with acute mortality is medium, we have low confidence in this determination because the likelihood of exposure characterizations are greater than would be anticipated. We did not find support for the growth risk hypothesis. Although we characterized risk associated with effects to growth as high, our confidence in this risk is low given the chronic exposure to metolachlor at the duration evaluated under this study is

not expected. No changes in population growth rate occurred at the one percent mortality level for any model runs. This suggests that no changes in population growth would occur at the percent mortalities anticipated (less than one percent) with exposures to metolachlor. Where formulated products and tank mixtures containing metolachlor occur in aquatic habitats, individuals may experience increased toxicity. NMFS has determined the overall risk to the species from the effects of the action is medium and the confidence associated with that risk is low.

12.3.6 Chinook salmon, Puget Sound ESU (*Oncorhynchus tshawytscha*)

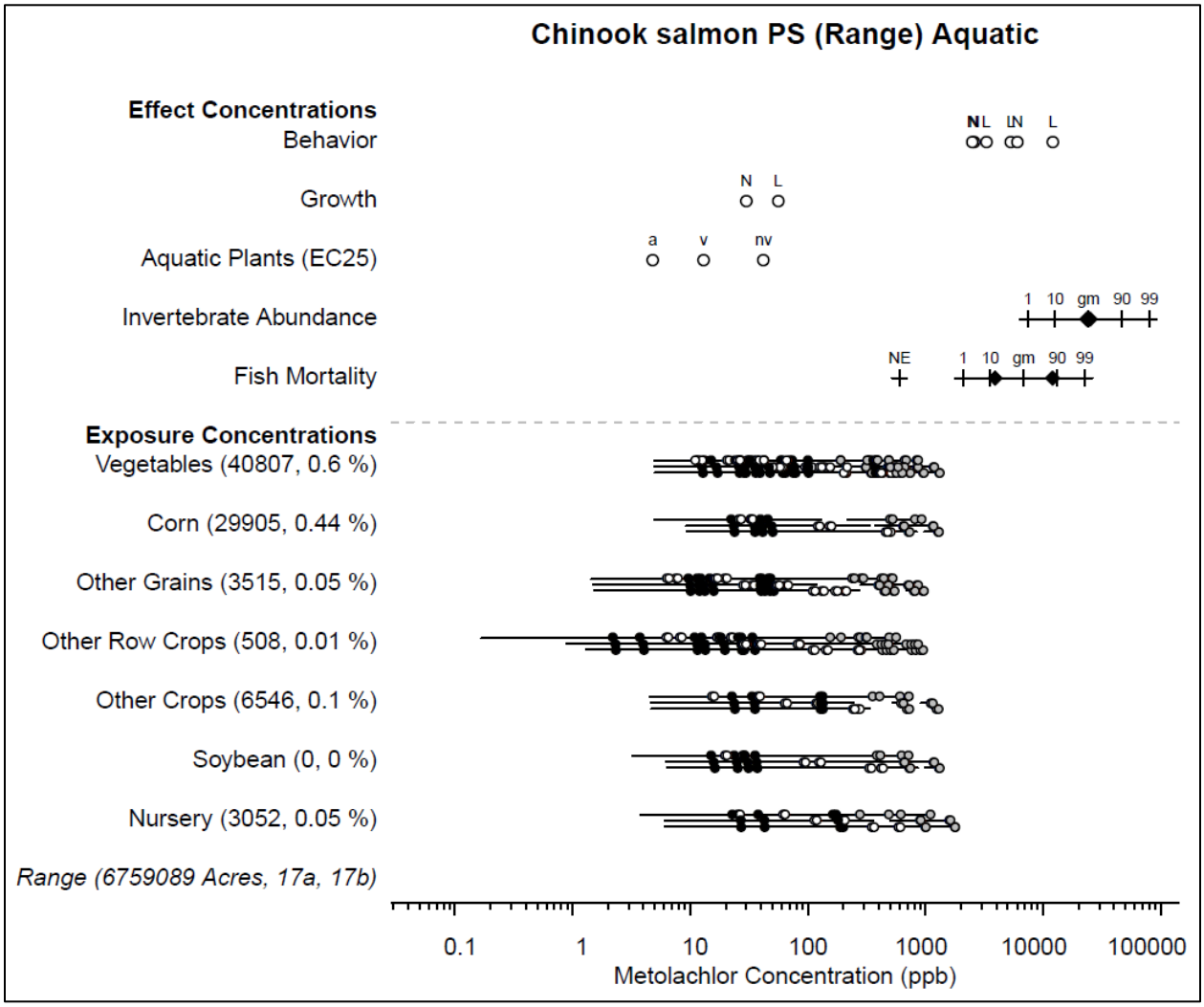


Figure 36. Effects analysis Risk-plot for Chinook salmon, Puget Sound ESU and Metolachlor

Table 203. Likelihood of exposure determination for Chinook salmon, Puget Sound ESU and Metolachlor

	Percent Overlap Category	Seasonal Analysis	Persistence	Multiple Applications	Proximity Analysis	Duration of migration/residency	Likelihood of Exposure
Vegetables	1	yes	no	yes	yes	3	High
Corn	1	yes	no	yes	yes	3	High
Other Grains	1	yes	no	yes	no	3	Low
Other Row Crops	1	yes	no	yes	no	3	Low
Other Crops	1	yes	no	yes	no	3	Low
Soybean	1	yes	no	yes	no	3	Low
Nursery	1	yes	no	yes	no	3	Low

Table 204. Direct mortality risk hypothesis; Chinook salmon, Puget Sound ESU and Metolachlor

Endpoint: Mortality			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	0.6	Low	High
Corn	0.44	Low	High
Other Grains	0.05	Low	Low
Other Row Crops	0.01	Low	Low
Other Crops	0.1	Low	Low
Soybean	0	Low	Low
Nursery	0.05	Low	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via acute lethality.			
Risk	**Confidence**		
Medium	**Low**		

Table 205. Prey risk hypothesis; Chinook salmon, Puget Sound ESU and Metolachlor

Endpoint: Prey			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	0.6	None Expected	High
Corn	0.44	None Expected	High
Other Grains	0.05	None Expected	Low
Other Row Crops	0.01	None Expected	Low
Other Crops	0.1	None Expected	Low
Soybean	0	None Expected	Low

Nursery	0.05	Low	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via reduction in prey availability.			
Risk	**Confidence**		
Low	**High**		

Table 206. Growth risk hypothesis; Chinook salmon, Puget Sound ESU and Metolachlor

Endpoint: Growth			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	0.6	Medium	High
Corn	0.44	Medium	High
Other Grains	0.05	Medium	Low
Other Row Crops	0.01	Medium	Low
Other Crops	0.1	Medium	Low
Soybean	0	Medium	Low
Nursery	0.05	Medium	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via impacts to growth (direct toxicity).			
Risk	**Confidence**		
High	**Low**		

Table 207. Behavior risk hypothesis; Chinook salmon, Puget Sound ESU and Metolachlor

Endpoint: Behavior			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	0.6	None Expected	High
Corn	0.44	None Expected	High
Other Grains	0.05	None Expected	Low
Other Row Crops	0.01	None Expected	Low
Other Crops	0.1	None Expected	Low
Soybean	0	None Expected	Low
Nursery	0.05	None Expected	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.			
Risk	**Confidence**		
Low	**High**		

Table 208. Effects analysis summary table: Chinook salmon, Puget Sound ESU and Metolachlor

Risk Hypothesis	**Risk-plot Derived**		

	Risk	Confidence	Population Model Results	Risk Hypothesis Supported? Yes/No
Exposure to metolachlor is sufficient to reduce abundance via acute lethality.	Medium	Low	No significant reductions in population growth rate. (See chapter 11.5).	No
Exposure to metolachlor is sufficient to reduce abundance via reduction in prey availability.	Low	High		No
Exposure to metolachlor is sufficient to reduce abundance via impacts to growth (direct toxicity).	High	Low		No
Exposure to metolachlor is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.	Low	High		No

Effects analysis summary: Chinook salmon, Puget Sound ESU are not anticipated to experience reductions in abundance through any of the risk hypotheses assessed from exposure to metolachlor or associated degradates. For metolachlor, some of the use categories have the potential to overestimate the spatial footprint of authorized use. We did not find support for the direct mortality risk hypothesis. Although risk associated with acute mortality is medium, we have low confidence in this determination because the likelihood of exposure characterizations are greater than would be anticipated. We did not find support for the growth risk hypothesis. Although we characterized risk associated with effects to growth as high, our confidence in this risk is low given the chronic exposure to metolachlor at the duration evaluated under this study is not expected. No changes in population growth rate occurred at the one percent mortality level for any model runs. This suggests that no changes in population growth would occur at the percent mortalities anticipated (less than one percent) with exposures to metolachlor. Where formulated products and tank mixtures containing metolachlor occur in aquatic habitats, individuals may experience increased toxicity. NMFS has determined the overall risk to the species from the effects of the action is medium and the confidence associated with that risk is low.

Medium Risk
Low Confidence
Less Risk
More Risk

12.3.7 Chinook Salmon, Sacramento River winter-run (*Oncorhynchus tshawytscha*)

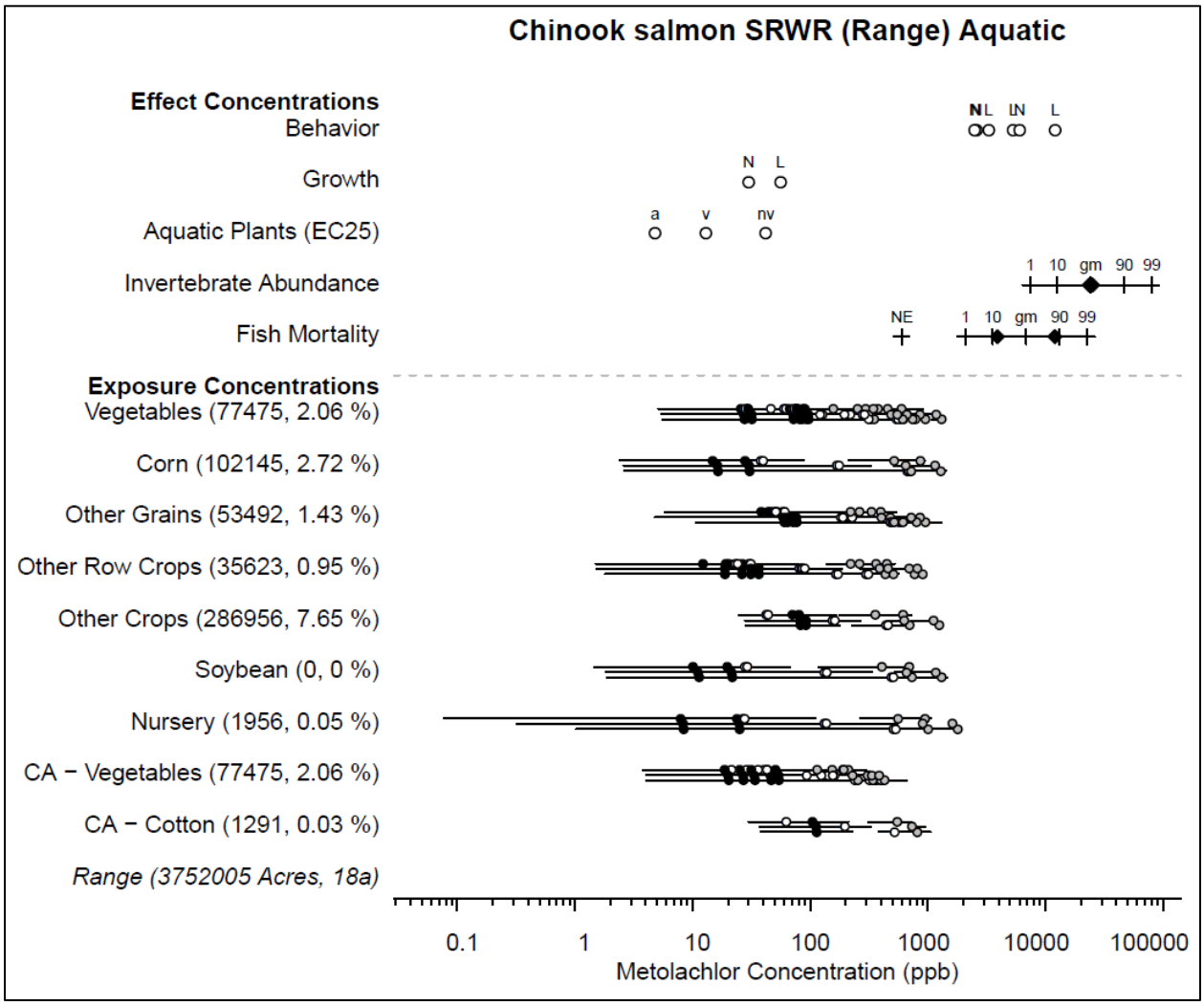


Figure 37. Effects analysis Risk-plot for Chinook salmon, Sacramento River winter-run ESU and Metolachlor

Table 209. Likelihood of exposure determination for Chinook salmon, Sacramento River winter-run ESU and Metolachlor

	Percent Overlap Category	Seasonal Analysis	Persistence	Multiple Applications	Proximity Analysis	Duration of migration/residency	Likelihood of Exposure
Vegetables	2	yes	no	yes	NA	3	**Medium**
Corn	2	yes	no	yes	NA	3	**Medium**
Other Grains	2	yes	no	yes	NA	3	**Medium**
Other Row Crops	1	yes	no	yes	no	3	**Low**
Other Crops	3	yes	no	yes	NA	3	**High**
Soybean	1	yes	no	yes	no	3	**Low**
Nursery	1	yes	no	yes	no	3	**Low**
CA - Vegetables	2	yes	no	yes	NA	3	**Medium**
CA - Cotton	1	yes	no	yes	no	3	**Low**

Table 210. Direct mortality risk hypothesis; Chinook salmon, Sacramento River winter-run ESU and Metolachlor

Endpoint: Mortality			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	2.06	Low	Medium
Corn	2.72	Low	Medium
Other Grains	1.43	Low	Medium
Other Row Crops	0.95	Low	Low
Other Crops	7.65	Low	High
Soybean	0	Low	Low
Nursery	0.05	Low	Low
CA – Vegetables	2.06	Low	Medium
CA – Cotton	0.03	None Expected	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via acute lethality.			
Risk	**Confidence**		
Medium	**Low**		

Table 211. Prey risk hypothesis; Chinook salmon, Sacramento River winter-run ESU and Metolachlor

Endpoint: Prey			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	2.06	None Expected	Medium
Corn	2.72	None Expected	Medium

Other Grains	1.43	None Expected	Medium
Other Row Crops	0.95	None Expected	Low
Other Crops	7.65	None Expected	High
Soybean	0	None Expected	Low
Nursery	0.05	Low	Low
CA – Vegetables	2.06	None Expected	Medium
CA – Cotton	0.03	None Expected	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via reduction in prey availability.			
Risk	**Confidence**		
Low	**High**		

Table 212. Growth risk hypothesis; Chinook salmon, Sacramento River winter-run ESU and Metolachlor

Endpoint: Growth			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	2.06	Medium	Medium
Corn	2.72	Medium	Medium
Other Grains	1.43	Medium	Medium
Other Row Crops	0.95	Medium	Low
Other Crops	7.65	Medium	High
Soybean	0	Medium	Low
Nursery	0.05	Medium	Low
CA – Vegetables	2.06	Medium	Medium
CA – Cotton	0.03	Medium	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via impacts to growth (direct toxicity).			
Risk	**Confidence**		
High	**Low**		

Table 213. Behavior risk hypothesis; Chinook salmon, Sacramento River winter-run ESU and Metolachlor

Endpoint: Behavior			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	2.06	None Expected	Medium
Corn	2.72	None Expected	Medium
Other Grains	1.43	None Expected	Medium
Other Row Crops	0.95	None Expected	Low
Other Crops	7.65	None Expected	High
Soybean	0	None Expected	Low

Nursery	0.05	None Expected	Low
CA – Vegetables	2.06	None Expected	Medium
CA – Cotton	0.03	None Expected	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.			
Risk	**Confidence**		
Low	**High**		

Table 214. Effects analysis summary table: Chinook salmon, Sacramento River winter-run ESU and Metolachlor

Risk Hypothesis	**Risk-plot Derived**		**Population Model Results**	**Risk Hypothesis Supported? Yes/No**
	Risk	**Confidence**		
Exposure to metolachlor is sufficient to reduce abundance via acute lethality.	Medium	Low	No significant reductions in population growth rate. (See chapter 11.5).	No
Exposure to metolachlor is sufficient to reduce abundance via reduction in prey availability.	Low	High		No
Exposure to metolachlor is sufficient to reduce abundance via impacts to growth (direct toxicity).	High	Low		No
Exposure to metolachlor is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.	Low	High		No

Effects analysis summary: Chinook salmon, Sacramento River winter-run ESU are not anticipated to experience reductions in abundance through any of the risk hypotheses assessed from exposure to metolachlor or associated degradates. For metolachlor, some of the use categories have the potential to overestimate the spatial footprint of authorized use. We did not find support for the direct mortality risk hypothesis. Although risk associated with acute mortality is medium, we have low confidence in this determination because the likelihood of exposure characterizations are greater than would be anticipated. We did not find support for the growth risk hypothesis. Although we characterized risk associated with effects to growth as high, our confidence in this risk is low given the chronic exposure to metolachlor at the duration

evaluated under this study is not expected. No changes in population growth rate occurred at the one percent mortality level for any model runs. This suggests that no changes in population growth would occur at the percent mortalities anticipated (less than one percent) with exposures to metolachlor. Where formulated products and tank mixtures containing metolachlor occur in aquatic habitats, individuals may experience increased toxicity. NMFS has determined the overall risk to the species from the effects of the action is medium and the confidence associated with that risk is low.

12.3.8 Chinook Salmon, Snake River fall-run ESU (*Oncorhynchus tshawytscha*)

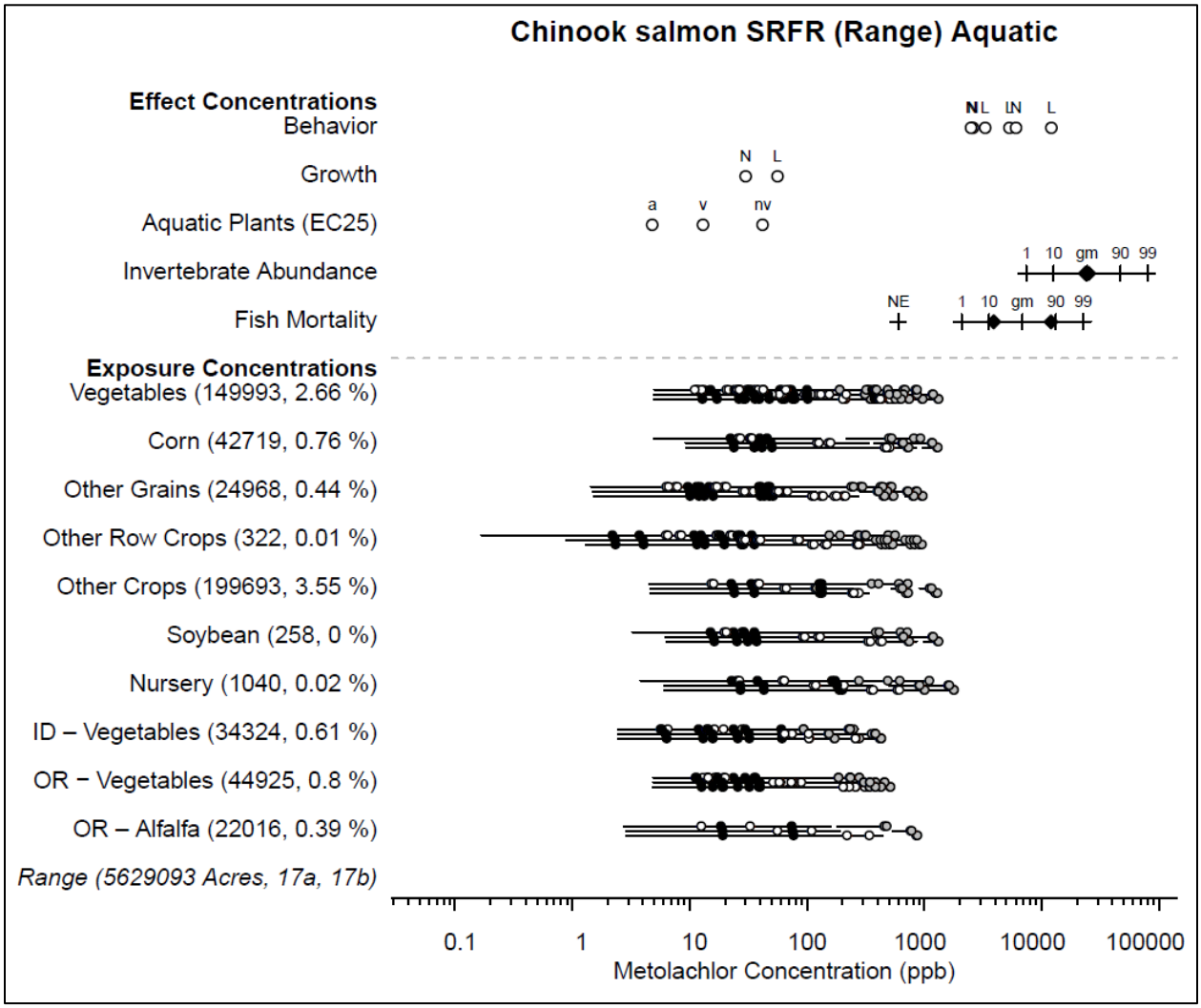


Figure 38. Effects analysis Risk-plot for Chinook salmon, Snake River fall-run ESU and Metolachlor

Table 215. Likelihood of exposure determination for Chinook salmon, Snake River fall-run ESU and Metolachlor

	Percent Overlap Category	Seasonal Analysis	Persistence	Multiple Applications	Proximity Analysis	Duration of migration/residency	Likelihood of Exposure
Vegetables	2	yes	no	yes	NA	3	Medium
Corn	1	yes	no	yes	yes	3	High
Other Grains	1	yes	no	yes	yes	3	High
Other Row Crops	1	yes	no	yes	no	3	Low
Other Crops	2	yes	no	yes	NA	3	Medium
Soybean	1	yes	no	yes	no	3	Low
Nursery	1	yes	no	yes	no	3	Low
ID - Vegetables	1	yes	no	yes	no	3	Low
OR - Vegetables	1	yes	no	yes	yes	3	High
OR - Alfalfa	1	yes	no	yes	no	3	Low

Table 216. Direct mortality risk hypothesis; Chinook salmon, Snake River fall-run ESU and Metolachlor

Endpoint: Mortality			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	2.66	Low	Medium
Corn	0.76	Low	High
Other Grains	0.44	Low	High
Other Row Crops	0.01	Low	Low
Other Crops	3.55	Low	Medium
Soybean	0	Low	Low
Nursery	0.02	Low	Low
ID – Vegetables	0.61	Low	Low
OR - Vegetables	0.8	None Expected	High
OR - Alfalfa	0.39	Low	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via acute lethality.			
Risk	**Confidence**		
Medium	**Low**		

Table 217. Prey risk hypothesis; Chinook salmon, Snake River fall-run ESU and Metolachlor

Endpoint: Prey			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**

Vegetables	2.66	None Expected	Medium
Corn	0.76	None Expected	High
Other Grains	0.44	None Expected	High
Other Row Crops	0.01	None Expected	Low
Other Crops	3.55	None Expected	Medium
Soybean	0	None Expected	Low
Nursery	0.02	Low	Low
ID – Vegetables	0.61	None Expected	Low
OR - Vegetables	0.8	None Expected	High
OR - Alfalfa	0.39	None Expected	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via reduction in prey availability.			
Risk	**Confidence**		
Low	**High**		

Table 218. Growth risk hypothesis; Chinook salmon, Snake River fall-run ESU and Metolachlor

Endpoint: Growth			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	2.66	Medium	Medium
Corn	0.76	Medium	High
Other Grains	0.44	Medium	High
Other Row Crops	0.01	Medium	Low
Other Crops	3.55	Medium	Medium
Soybean	0	Medium	Low
Nursery	0.02	Medium	Low
ID – Vegetables	0.61	Medium	Low
OR - Vegetables	0.8	Medium	High
OR - Alfalfa	0.39	Medium	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via impacts to growth (direct toxicity).			
Risk	**Confidence**		
High	**Low**		

Table 219. Behavior risk hypothesis; Chinook salmon, Snake River fall-run ESU and Metolachlor

Endpoint: Behavior			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	2.66	None Expected	Medium
Corn	0.76	None Expected	High

Other Grains	0.44	None Expected	High
Other Row Crops	0.01	None Expected	Low
Other Crops	3.55	None Expected	Medium
Soybean	0	None Expected	Low
Nursery	0.02	None Expected	Low
ID – Vegetables	0.61	None Expected	Low
OR - Vegetables	0.8	None Expected	High
OR - Alfalfa	0.39	None Expected	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.			
Risk	**Confidence**		
Low	**High**		

Table 220. Effects analysis summary table: Chinook salmon, Snake River fall-run ESU and Metolachlor

Risk Hypothesis	Risk-plot Derived		Population Model Results	Risk Hypothesis Supported? Yes/No
	Risk	Confidence		
Exposure to metolachlor is sufficient to reduce abundance via acute lethality.	Medium	Low	No significant reductions in population growth rate. (See chapter 11.5).	No
Exposure to metolachlor is sufficient to reduce abundance via reduction in prey availability.	Low	High		No
Exposure to metolachlor is sufficient to reduce abundance via impacts to growth (direct toxicity).	High	Low		No
Exposure to metolachlor is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.	Low	High		No

Effects analysis summary: Chinook salmon, Snake River fall-run ESU are not anticipated to experience reductions in abundance through any of the risk hypotheses assessed from exposure to metolachlor or associated degradates. For metolachlor, some of the use categories have the potential to overestimate the spatial footprint of authorized use. We did not find support for the

direct mortality risk hypothesis. Although risk associated with acute mortality is medium, we have low confidence in this determination because the likelihood of exposure characterizations are greater than would be anticipated. We did not find support for the growth risk hypothesis. Although we characterized risk associated with effects to growth as high, our confidence in this risk is low given the chronic exposure to metolachlor at the duration evaluated under this study is not expected. No changes in population growth rate occurred at the one percent mortality level for any model runs. This suggests that no changes in population growth would occur at the percent mortalities anticipated (less than one percent) with exposures to metolachlor. Where formulated products and tank mixtures containing metolachlor occur in aquatic habitats, individuals may experience increased toxicity. NMFS has determined the overall risk to the species from the effects of the action is medium and the confidence associated with that risk is low.

12.3.9 Chinook Salmon, Snake River spring/summer-run ESU (*Oncorhynchus tshawytscha*

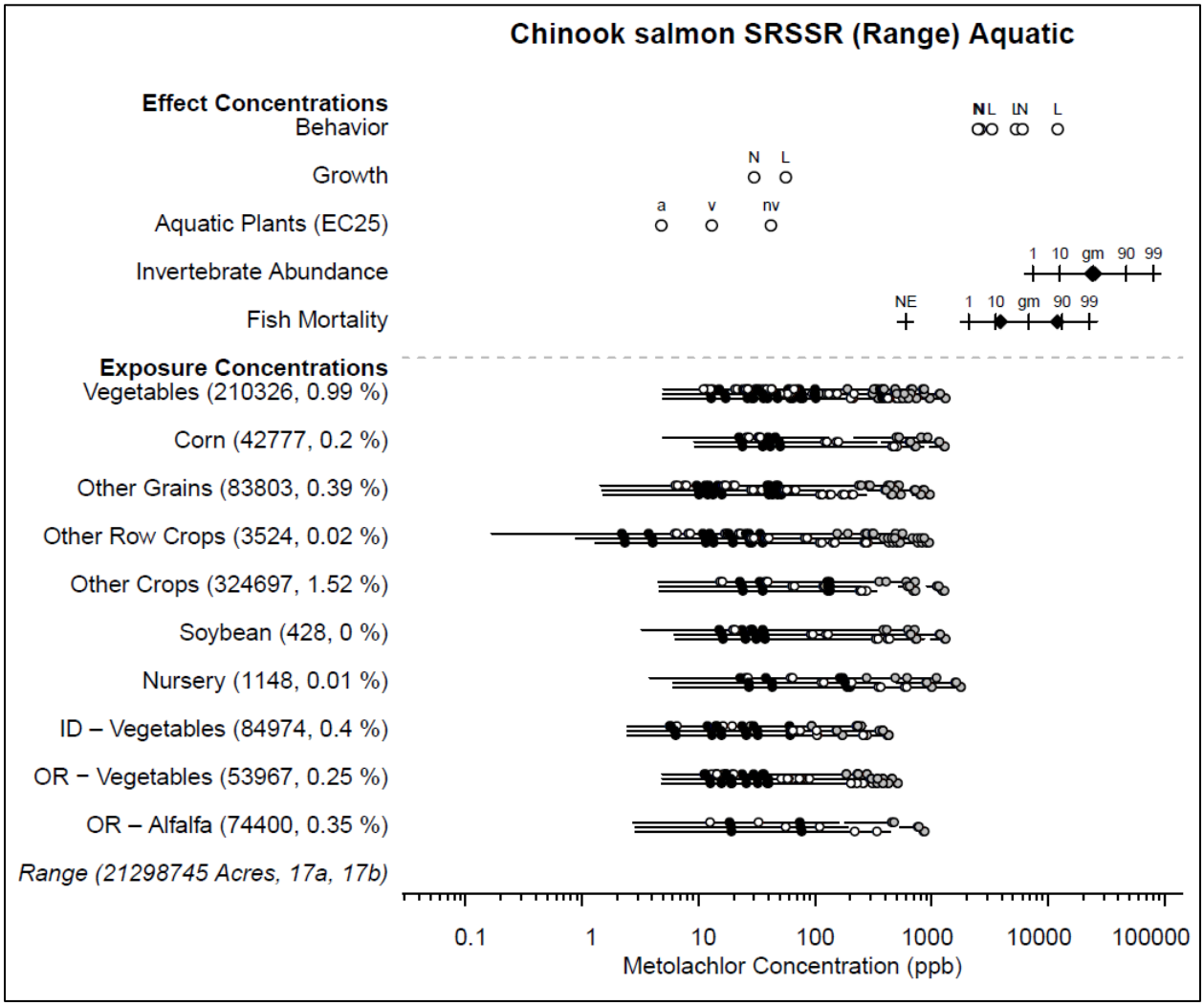


Figure 39. Effects analysis Risk-plot for Chinook salmon, Snake River spring/summer-run ESU and Metolachlor

Table 221. Likelihood of exposure determination for Chinook salmon, Snake River spring/summer-run ESU and Metolachlor

	Percent Overlap Category	Seasonal Analysis	Persistence	Multiple Applications	Proximity Analysis	Duration of migration/residency	Likelihood of Exposure
Vegetables	1	yes	no	yes	no	3	**Low**
Corn	1	yes	no	yes	yes	3	**High**
Other Grains	1	yes	no	yes	no	3	**Low**
Other Row Crops	1	yes	no	yes	no	3	**Low**
Other Crops	2	yes	no	yes	NA	3	**Medium**
Soybean	1	yes	no	yes	no	3	**Low**
Nursery	1	yes	no	yes	no	3	**Low**
ID - Vegetables	1	yes	no	yes	no	3	**Low**
OR - Vegetables	1	yes	no	yes	no	3	**Low**
OR - Alfalfa	1	yes	no	yes	no	3	**Low**

Table 222. Direct mortality risk hypothesis; Chinook salmon, Snake River spring/summer-run ESU and Metolachlor

Endpoint: Mortality			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	0.99	Low	Low
Corn	0.2	Low	High
Other Grains	0.39	Low	Low
Other Row Crops	0.02	Low	Low
Other Crops	1.52	Low	Medium
Soybean	0	Low	Low
Nursery	0.01	Low	Low
ID – Vegetables	0.4	Low	Low
OR - Vegetables	0.25	None Expected	Low
OR - Alfalfa	0.35	Low	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via acute lethality.			
Risk	**Confidence**		
Medium	**Low**		

Table 223. Prey risk hypothesis; Chinook salmon, Snake River spring/summer-run ESU and Metolachlor

Endpoint: Prey			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	0.99	None Expected	Low
Corn	0.2	None Expected	High
Other Grains	0.39	None Expected	Low
Other Row Crops	0.02	None Expected	Low
Other Crops	1.52	None Expected	Medium
Soybean	0	None Expected	Low
Nursery	0.01	Low	Low
ID – Vegetables	0.4	None Expected	Low
OR - Vegetables	0.25	None Expected	Low
OR - Alfalfa	0.35	None Expected	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via reduction in prey availability.			
Risk	**Confidence**		
Low	**High**		

Table 224. Growth risk hypothesis; Chinook salmon, Snake River spring/summer-run ESU and Metolachlor

Endpoint: Growth			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	0.99	Medium	Low
Corn	0.2	Medium	High
Other Grains	0.39	Medium	Low
Other Row Crops	0.02	Medium	Low
Other Crops	1.52	Medium	Medium
Soybean	0	Medium	Low
Nursery	0.01	Medium	Low
ID – Vegetables	0.4	Medium	Low
OR - Vegetables	0.25	Medium	Low
OR - Alfalfa	0.35	Medium	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via impacts to growth (direct toxicity).			
Risk	**Confidence**		
High	**Low**		

Table 225. Behavior risk hypothesis; Chinook salmon, Snake River spring/summer-run ESU and Metolachlor

Endpoint: Behavior			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	0.99	None Expected	Low
Corn	0.2	None Expected	High
Other Grains	0.39	None Expected	Low
Other Row Crops	0.02	None Expected	Low
Other Crops	1.52	None Expected	Medium
Soybean	0	None Expected	Low
Nursery	0.01	None Expected	Low
ID – Vegetables	0.4	None Expected	Low
OR - Vegetables	0.25	None Expected	Low
OR - Alfalfa	0.35	None Expected	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.			
Risk	**Confidence**		
Low	**High**		

Table 226. Effects analysis summary table: Chinook salmon, Snake River spring/summer-run ESU and Metolachlor

Risk Hypothesis	**Risk-plot Derived**		**Population Model Results**	**Risk Hypothesis Supported? Yes/No**
	Risk	**Confidence**		
Exposure to metolachlor is sufficient to reduce abundance via acute lethality.	Medium	Low	No significant reductions in population growth rate. (See chapter 11.5).	No
Exposure to metolachlor is sufficient to reduce abundance via reduction in prey availability.	Low	High		No
Exposure to metolachlor is sufficient to reduce abundance via impacts to growth (direct toxicity).	High	Low		No
Exposure to metolachlor is sufficient to reduce adult and juvenile abundance and adult productivity via impairments	Low	High		No

to ecologically significant behaviors.				

Effects analysis summary: Chinook salmon, Snake River spring/summer-run ESU are not anticipated to experience reductions in abundance through any of the risk hypotheses assessed from exposure to metolachlor or associated degradates. For metolachlor, some of the use categories have the potential to overestimate the spatial footprint of authorized use. We did not find support for the direct mortality risk hypothesis. Although risk associated with acute mortality is medium, we have low confidence in this determination because the likelihood of exposure characterizations are greater than would be anticipated. We did not find support for the growth risk hypothesis. Although we characterized risk associated with effects to growth as high, our confidence in this risk is low given the chronic exposure to metolachlor at the duration evaluated under this study is not expected. No changes in population growth rate occurred at the one percent mortality level for any model runs. This suggests that no changes in population growth would occur at the percent mortalities anticipated (less than one percent) with exposures to metolachlor. Where formulated products and tank mixtures containing metolachlor occur in aquatic habitats, individuals may experience increased toxicity. NMFS has determined the overall risk to the species from the effects of the action is medium and the confidence associated with that risk is low.

12.3.10 Chinook salmon, Upper Columbia River spring-run ESU (*Oncorhynchus tshawytscha*)

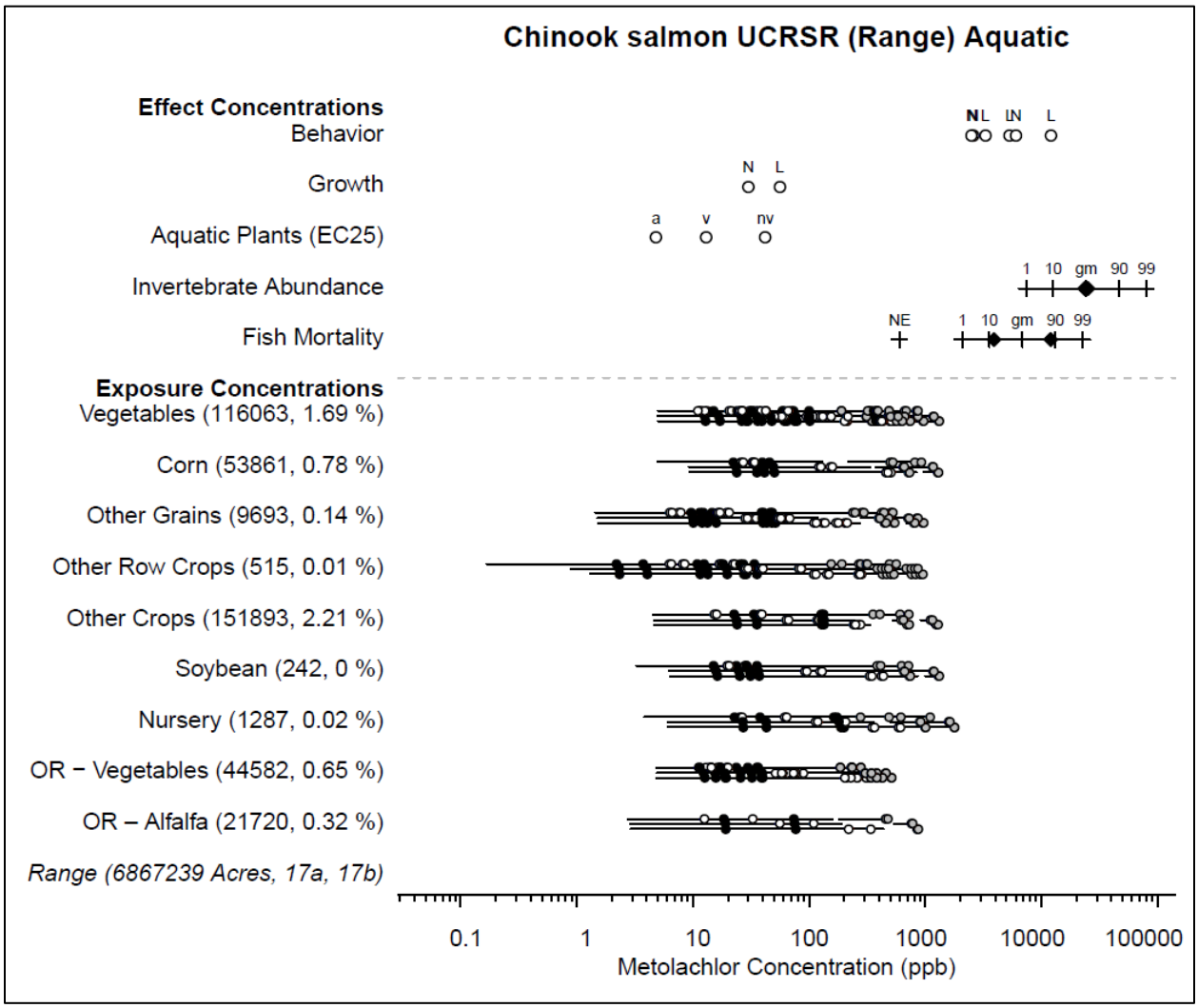


Figure 40. Effects analysis Risk-plot for Chinook salmon, Upper Columbia River spring-run ESU and Metolachlor

Table 227. Likelihood of exposure determination for Chinook salmon, Upper Columbia River spring-run ESU and Metolachlor

	Percent Overlap Category	Seasonal Analysis	Persistence	Multiple Applications	Proximity Analysis	Duration of migration/residency	Likelihood of Exposure
Vegetables	2	yes	no	yes	NA	3	Medium
Corn	1	yes	no	yes	yes	3	High
Other Grains	1	yes	no	yes	no	3	Low
Other Row Crops	1	yes	no	yes	no	3	Low
Other Crops	2	yes	no	yes	NA	3	Medium
Soybean	1	yes	no	yes	no	3	Low
Nursery	1	yes	no	yes	no	3	Low
OR - Vegetables	1	yes	no	yes	no	3	Low
OR - Alfalfa	1	yes	no	yes	no	3	Low

Table 228. Direct mortality risk hypothesis; Chinook salmon, Upper Columbia River spring-run ESU and Metolachlor

Endpoint: Mortality			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	1.69	Low	Medium
Corn	0.78	Low	High
Other Grains	0.14	Low	Low
Other Row Crops	0.01	Low	Low
Other Crops	2.21	Low	Medium
Soybean	0	Low	Low
Nursery	0.02	Low	Low
OR - Vegetables	0.65	None Expected	Low
OR - Alfalfa	0.32	Low	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via acute lethality.			
Risk	**Confidence**		
Medium	**Low**		

Table 229. Prey risk hypothesis; Chinook salmon, Upper Columbia River spring-run ESU and Metolachlor

Endpoint: Prey			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	1.69	None Expected	Medium
Corn	0.78	None Expected	High
Other Grains	0.14	None Expected	Low
Other Row Crops	0.01	None Expected	Low
Other Crops	2.21	None Expected	Medium
Soybean	0	None Expected	Low
Nursery	0.02	Low	Low
OR - Vegetables	0.65	None Expected	Low
OR - Alfalfa	0.32	None Expected	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via reduction in prey availability.			
Risk	**Confidence**		
Low	**High**		

Table 230. Growth risk hypothesis; Chinook salmon, Upper Columbia River spring-run ESU and Metolachlor

Endpoint: Growth			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	1.69	Medium	Medium
Corn	0.78	Medium	High
Other Grains	0.14	Medium	Low
Other Row Crops	0.01	Medium	Low
Other Crops	2.21	Medium	Medium
Soybean	0	Medium	Low
Nursery	0.02	Medium	Low
OR - Vegetables	0.65	Medium	Low
OR - Alfalfa	0.32	Medium	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via impacts to growth (direct toxicity).			
Risk	**Confidence**		
High	**Low**		

Table 231. Behavior risk hypothesis; Chinook salmon, Upper Columbia River spring-run ESU and Metolachlor

Endpoint: Behavior

Use Category	% Overlap	Effect of Exposure	Likelihood of Exposure
Vegetables	1.69	None Expected	Medium
Corn	0.78	None Expected	High
Other Grains	0.14	None Expected	Low
Other Row Crops	0.01	None Expected	Low
Other Crops	2.21	None Expected	Medium
Soybean	0	None Expected	Low
Nursery	0.02	None Expected	Low
OR - Vegetables	0.65	None Expected	Low
OR - Alfalfa	0.32	None Expected	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.			
Risk	**Confidence**		
Low	**High**		

Table 232. Effects analysis summary table: Chinook salmon, Upper Columbia River spring-run ESU and Metolachlor

Risk Hypothesis	Risk-plot Derived		Population Model Results	Risk Hypothesis Supported? Yes/No
	Risk	Confidence		
Exposure to metolachlor is sufficient to reduce abundance via acute lethality.	Medium	Low	No significant reductions in population growth rate. (See chapter 11.5).	No
Exposure to metolachlor is sufficient to reduce abundance via reduction in prey availability.	Low	High		No
Exposure to metolachlor is sufficient to reduce abundance via impacts to growth (direct toxicity).	High	Low		No
Exposure to metolachlor is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.	Low	High		No

Effects analysis summary: Chinook salmon, Upper Columbia River spring-run ESU are not anticipated to experience reductions in abundance through any of the risk hypotheses assessed from exposure to metolachlor or associated degradates. For metolachlor, some of the use categories have the potential to overestimate the spatial footprint of authorized use. We did not find support for the direct mortality risk hypothesis. Although risk associated with acute mortality is medium, we have low confidence in this determination because the likelihood of exposure characterizations are greater than would be anticipated. Although we characterized risk associated with effects to growth as high, our confidence in this risk is low given the chronic exposure to metolachlor at the duration evaluated under this study is not expected. No changes in population growth rate occurred at the one percent mortality level for any model runs. This suggests that no changes in population growth would occur at the percent mortalities anticipated (less than one percent) with exposures to metolachlor. Where formulated products and tank mixtures containing metolachlor occur in aquatic habitats, individuals may experience increased toxicity. NMFS has determined the overall risk to the species from the effects of the action is medium and the confidence associated with that risk is low.

12.3.11 Chinook Salmon, Upper Willamette River ESU (*Oncorhynchus tshawytscha*)

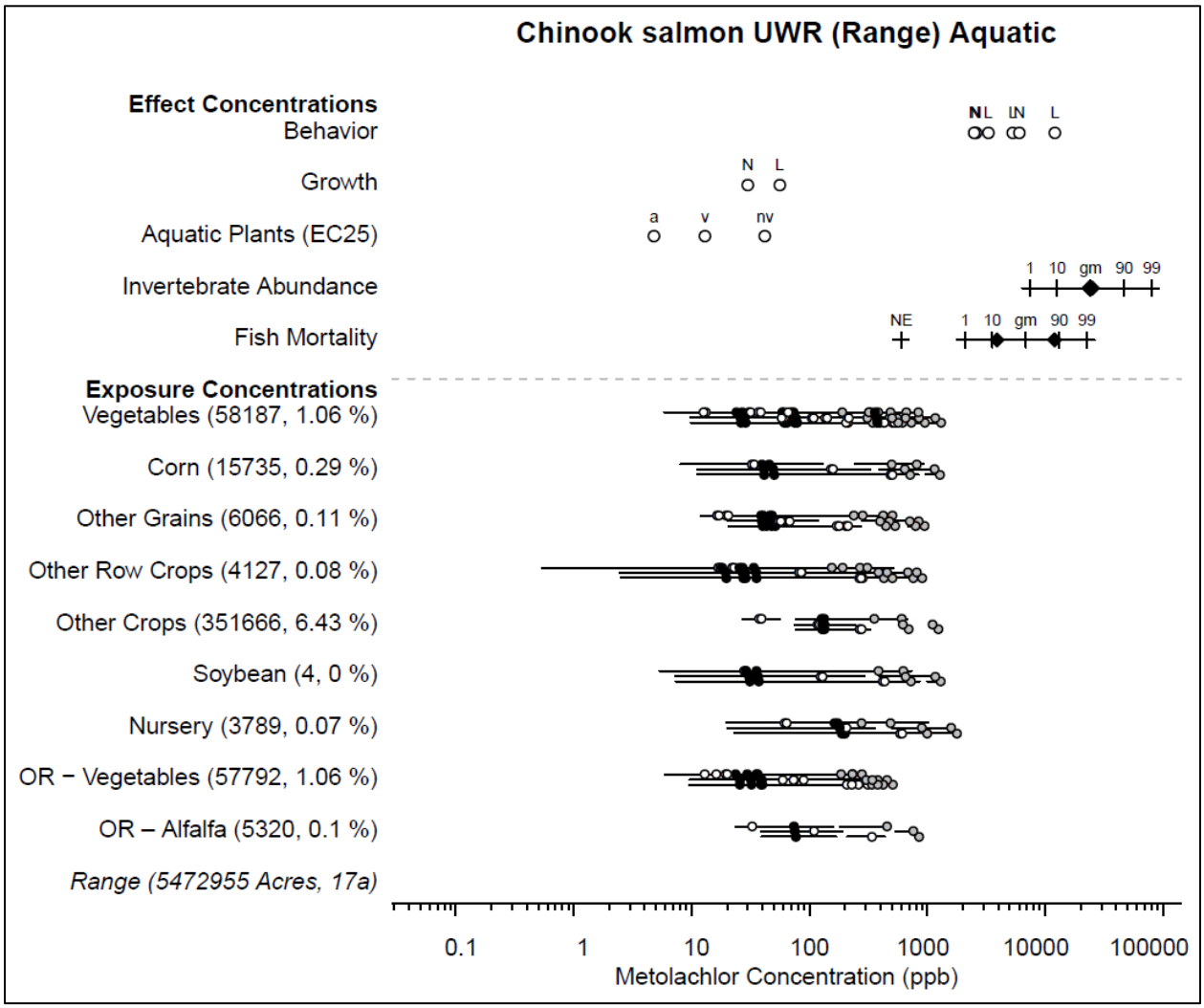
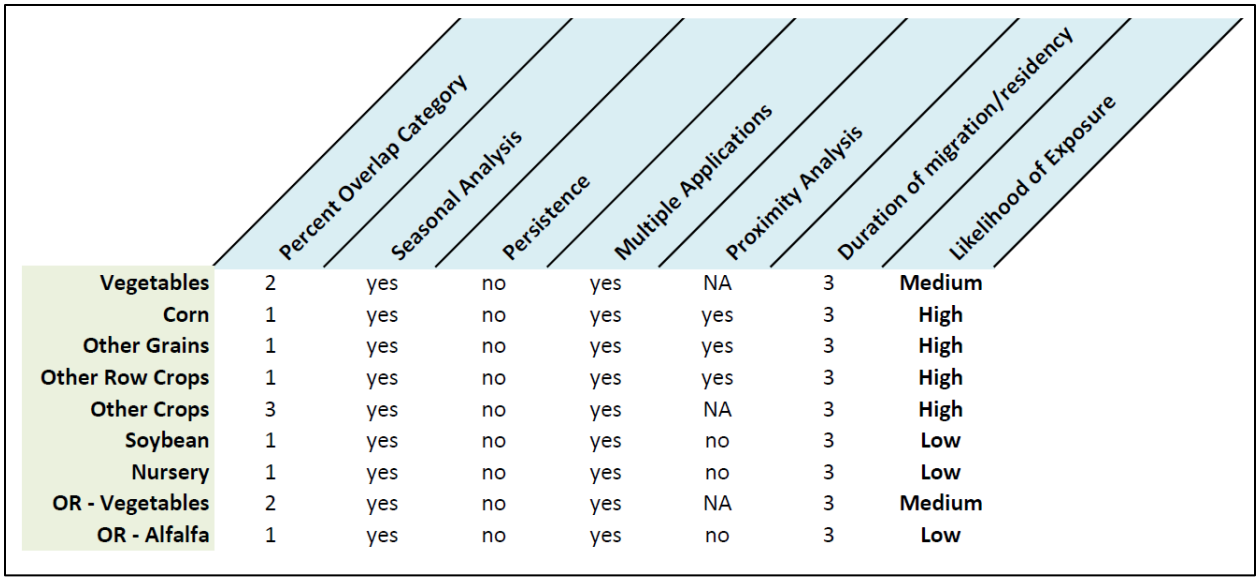


Figure 41. Effects analysis Risk-plot for Chinook salmon, Upper Willamette River ESU and Metolachlor

Table 233. Likelihood of exposure determination for Chinook salmon, Upper Willamette River ESU and Metolachlor



	Percent Overlap Category	Seasonal Analysis	Persistence	Multiple Applications	Proximity Analysis	Duration of migration/residency	Likelihood of Exposure
Vegetables	2	yes	no	yes	NA	3	Medium
Corn	1	yes	no	yes	yes	3	High
Other Grains	1	yes	no	yes	yes	3	High
Other Row Crops	1	yes	no	yes	yes	3	High
Other Crops	3	yes	no	yes	NA	3	High
Soybean	1	yes	no	yes	no	3	Low
Nursery	1	yes	no	yes	no	3	Low
OR - Vegetables	2	yes	no	yes	NA	3	Medium
OR - Alfalfa	1	yes	no	yes	no	3	Low

Table 234. Direct mortality risk hypothesis; Chinook salmon, Upper Willamette River ESU and Metolachlor

Endpoint: Mortality			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	1.06	Low	Medium
Corn	0.29	Low	High
Other Grains	0.11	Low	High
Other Row Crops	0.08	Low	High
Other Crops	6.43	Low	High
Soybean	0	Low	Low
Nursery	0.07	Low	Low
OR - Vegetables	1.06	None Expected	Medium
OR - Alfalfa	0.1	Low	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via acute lethality.			
Risk	**Confidence**		
Medium	**Low**		

Table 235. Prey risk hypothesis; Chinook salmon, Upper Willamette River ESU and Metolachlor

Endpoint: Prey			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	1.06	None Expected	Medium

Corn	0.29	None Expected	High
Other Grains	0.11	None Expected	High
Other Row Crops	0.08	None Expected	High
Other Crops	6.43	None Expected	High
Soybean	0	None Expected	Low
Nursery	0.07	Low	Low
OR - Vegetables	1.06	None Expected	Medium
OR - Alfalfa	0.1	None Expected	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via reduction in prey availability.			
Risk	**Confidence**		
Low	**High**		

Table 236. Growth risk hypothesis; Chinook salmon, Upper Willamette River ESU and Metolachlor

Endpoint: Growth			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	1.06	Medium	Medium
Corn	0.29	Medium	High
Other Grains	0.11	Medium	High
Other Row Crops	0.08	Medium	High
Other Crops	6.43	Medium	High
Soybean	0	Medium	Low
Nursery	0.07	Medium	Low
OR - Vegetables	1.06	Medium	Medium
OR - Alfalfa	0.1	Medium	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via impacts to growth (direct toxicity).			
Risk	**Confidence**		
High	**Low**		

Table 237. Behavior risk hypothesis; Chinook salmon, Upper Willamette River ESU and Metolachlor

Endpoint: Behavior			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	1.06	None Expected	Medium
Corn	0.29	None Expected	High
Other Grains	0.11	None Expected	High
Other Row Crops	0.08	None Expected	High
Other Crops	6.43	None Expected	High

Soybean	0	None Expected	Low
Nursery	0.07	None Expected	Low
OR - Vegetables	1.06	None Expected	Medium
OR - Alfalfa	0.1	None Expected	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.			
Risk	**Confidence**		
Low	**High**		

Table 238. Effects analysis summary table: Chinook salmon, Upper Willamette River ESU and Metolachlor

Risk Hypothesis	Risk-plot Derived		Population Model Results	Risk Hypothesis Supported? Yes/No
	Risk	Confidence		
Exposure to metolachlor is sufficient to reduce abundance via acute lethality.	Medium	Low	No significant reductions in population growth rate. (See chapter 11.5).	No
Exposure to metolachlor is sufficient to reduce abundance via reduction in prey availability.	Low	High		No
Exposure to metolachlor is sufficient to reduce abundance via impacts to growth (direct toxicity).	High	Low		No
Exposure to metolachlor is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.	Low	High		No

Effects analysis summary: Chinook salmon, Upper Willamette River ESU are not anticipated to experience reductions in abundance through any of the risk hypotheses assessed from exposure to metolachlor or associated degradates. For metolachlor, some of the use categories have the potential to overestimate the spatial footprint of authorized use. We did not find support for the direct mortality risk hypothesis. Although risk associated with acute mortality is medium, we have low confidence in this determination because the likelihood of exposure characterizations are greater than would be anticipated. We did not find support for the growth risk hypothesis. Although we characterized risk associated with effects to growth as high, our confidence in this

risk is low given the chronic exposure to metolachlor at the duration evaluated under this study is not expected. No changes in population growth rate occurred at the one percent mortality level for any model runs. This suggests that no changes in population growth would occur at the percent mortalities anticipated (less than one percent) with exposures to metolachlor. Where formulated products and tank mixtures containing metolachlor occur in aquatic habitats, individuals may experience increased toxicity. NMFS has determined the overall risk to the species from the effects of the action is medium and the confidence associated with that risk is low.

12.3.12 Coho Salmon, Central California Coast ESU (*Oncorhynchus kisutch*)

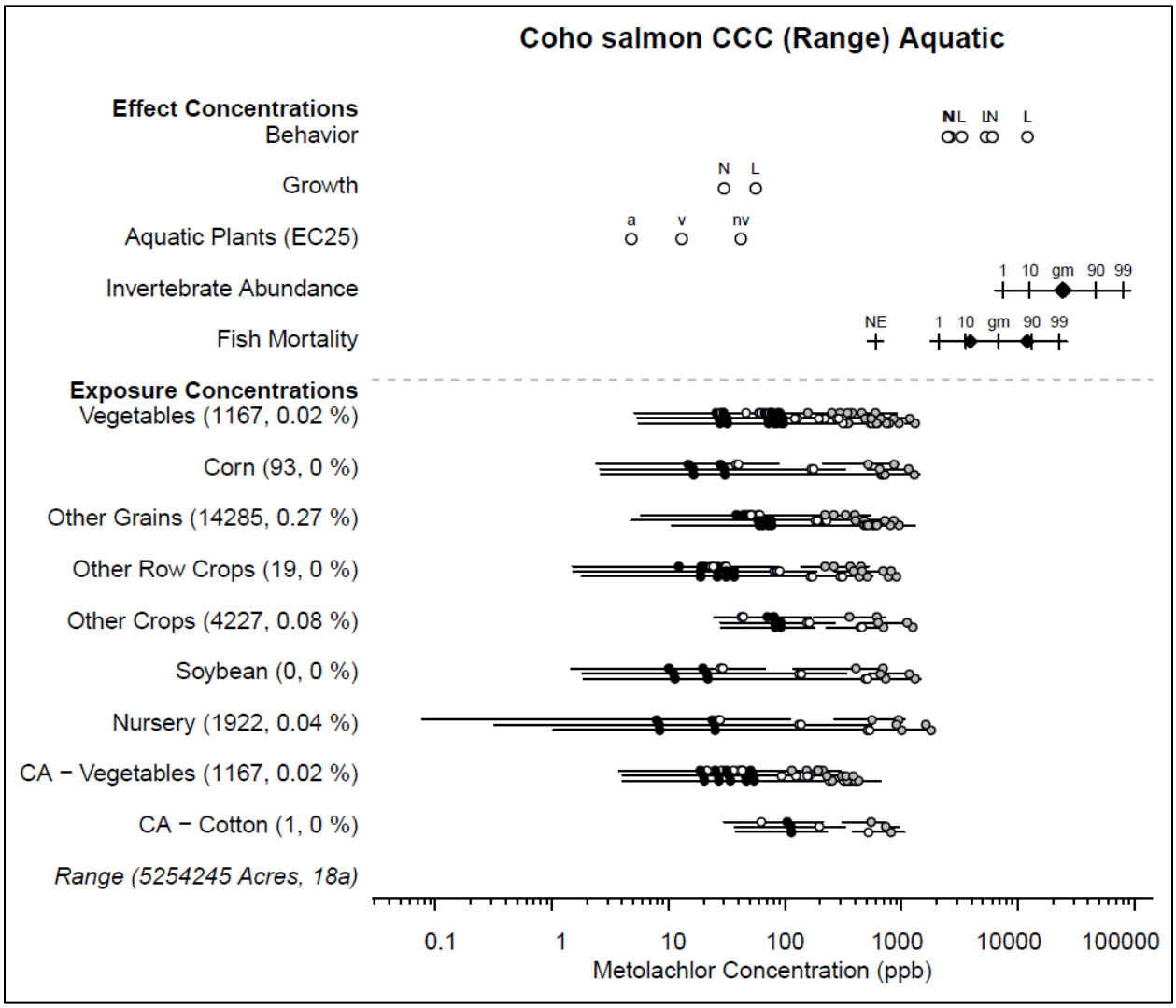
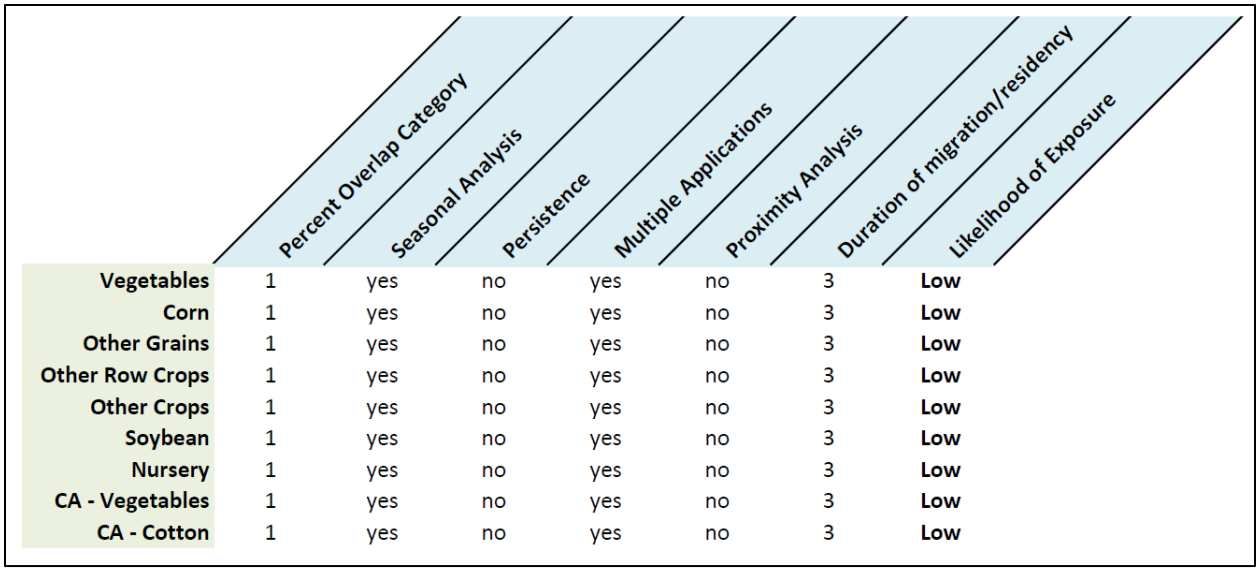


Figure 42. Effects analysis Risk-plot for Coho salmon, Central California Coast ESU and Metolachlor

Table 239. Likelihood of exposure determination for Coho salmon, Central California Coast ESU and Metolachlor



	Percent Overlap Category	Seasonal Analysis	Persistence	Multiple Applications	Proximity Analysis	Duration of migration/residency	Likelihood of Exposure
Vegetables	1	yes	no	yes	no	3	Low
Corn	1	yes	no	yes	no	3	Low
Other Grains	1	yes	no	yes	no	3	Low
Other Row Crops	1	yes	no	yes	no	3	Low
Other Crops	1	yes	no	yes	no	3	Low
Soybean	1	yes	no	yes	no	3	Low
Nursery	1	yes	no	yes	no	3	Low
CA - Vegetables	1	yes	no	yes	no	3	Low
CA - Cotton	1	yes	no	yes	no	3	Low

Table 240. Direct mortality risk hypothesis; Coho salmon, Central California Coast ESU and Metolachlor

Endpoint: Mortality			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	0.02	Low	Low
Corn	0	Low	Low
Other Grains	0.27	Low	Low
Other Row Crops	0	Low	Low
Other Crops	0.08	Low	Low
Soybean	0	Low	Low
Nursery	0.04	Low	Low
CA - Vegetables	0.02	None Expected	Low
CA - Cotton	0	Low	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via acute lethality.			
Risk	**Confidence**		
Low	**High**		

Table 241. Prey risk hypothesis; Coho salmon, Central California Coast ESU and Metolachlor

Endpoint: Prey			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	0.02	None Expected	Low

Corn	0	None Expected	Low
Other Grains	0.27	None Expected	Low
Other Row Crops	0	None Expected	Low
Other Crops	0.08	None Expected	Low
Soybean	0	None Expected	Low
Nursery	0.04	Low	Low
CA - Vegetables	0.02	None Expected	Low
CA - Cotton	0	None Expected	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via reduction in prey availability.			
Risk	**Confidence**		
Low	**High**		

Table 242. Growth risk hypothesis; Coho salmon, Central California Coast ESU and Metolachlor

Endpoint: Growth			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	0.02	Medium	Low
Corn	0	Medium	Low
Other Grains	0.27	Medium	Low
Other Row Crops	0	Medium	Low
Other Crops	0.08	Medium	Low
Soybean	0	Medium	Low
Nursery	0.04	Medium	Low
CA - Vegetables	0.02	Medium	Low
CA - Cotton	0	Medium	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via impacts to growth (direct toxicity).			
Risk	**Confidence**		
Low	**High**		

Table 243. Behavior risk hypothesis; Coho salmon, Central California Coast ESU and Metolachlor

Endpoint: Behavior			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	0.02	None Expected	Low
Corn	0	None Expected	Low
Other Grains	0.27	None Expected	Low
Other Row Crops	0	None Expected	Low
Other Crops	0.08	None Expected	Low

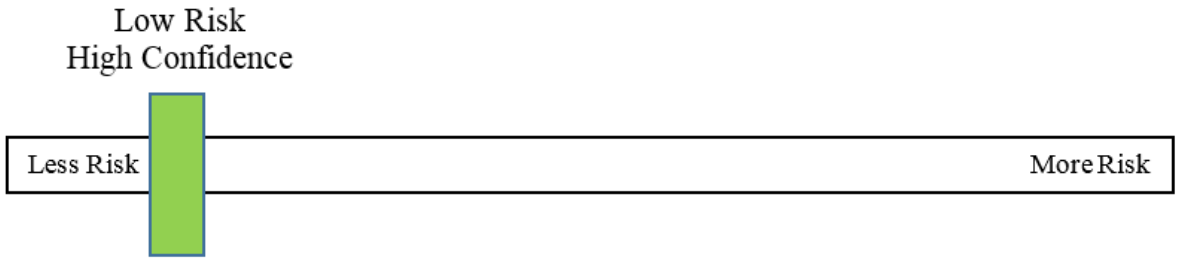
Soybean	0	None Expected	Low
Nursery	0.04	None Expected	Low
CA - Vegetables	0.02	None Expected	Low
CA - Cotton	0	None Expected	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.			
Risk	**Confidence**		
Low	**High**		

Table 244. Effects analysis summary table: Coho salmon, Central California Coast ESU and Metolachlor

Risk Hypothesis	Risk-plot Derived		Population Model Results	Risk Hypothesis Supported? Yes/No
	Risk	Confidence		
Exposure to metolachlor is sufficient to reduce abundance via acute lethality.	Low	High	No significant reductions in population growth rate. (See chapter 11.5).	No
Exposure to metolachlor is sufficient to reduce abundance via reduction in prey availability.	Low	High		No
Exposure to metolachlor is sufficient to reduce abundance via impacts to growth (direct toxicity).	Low	High		No
Exposure to metolachlor is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.	Low	High		No

Effects analysis summary: Coho salmon, Central California Coast ESU are not anticipated to experience reductions in abundance through any of the risk hypotheses assessed from exposure to metolachlor or associated degradates. No changes in population growth rate occurred at the one percent mortality level for any model runs. This suggests that no changes in population growth would occur at the percent mortalities anticipated (less than one percent) with exposures to metolachlor. Where formulated products and tank mixtures containing metolachlor occur in aquatic habitats, individuals may experience increased toxicity. NMFS has determined the

overall risk to the species from the effects of the action is low and the confidence associated with that risk is high given the low risk associated with all risk hypotheses evaluated.



12.3.13 Coho Salmon, Lower Columbia River ESU (*Oncorhynchus kisutch*)

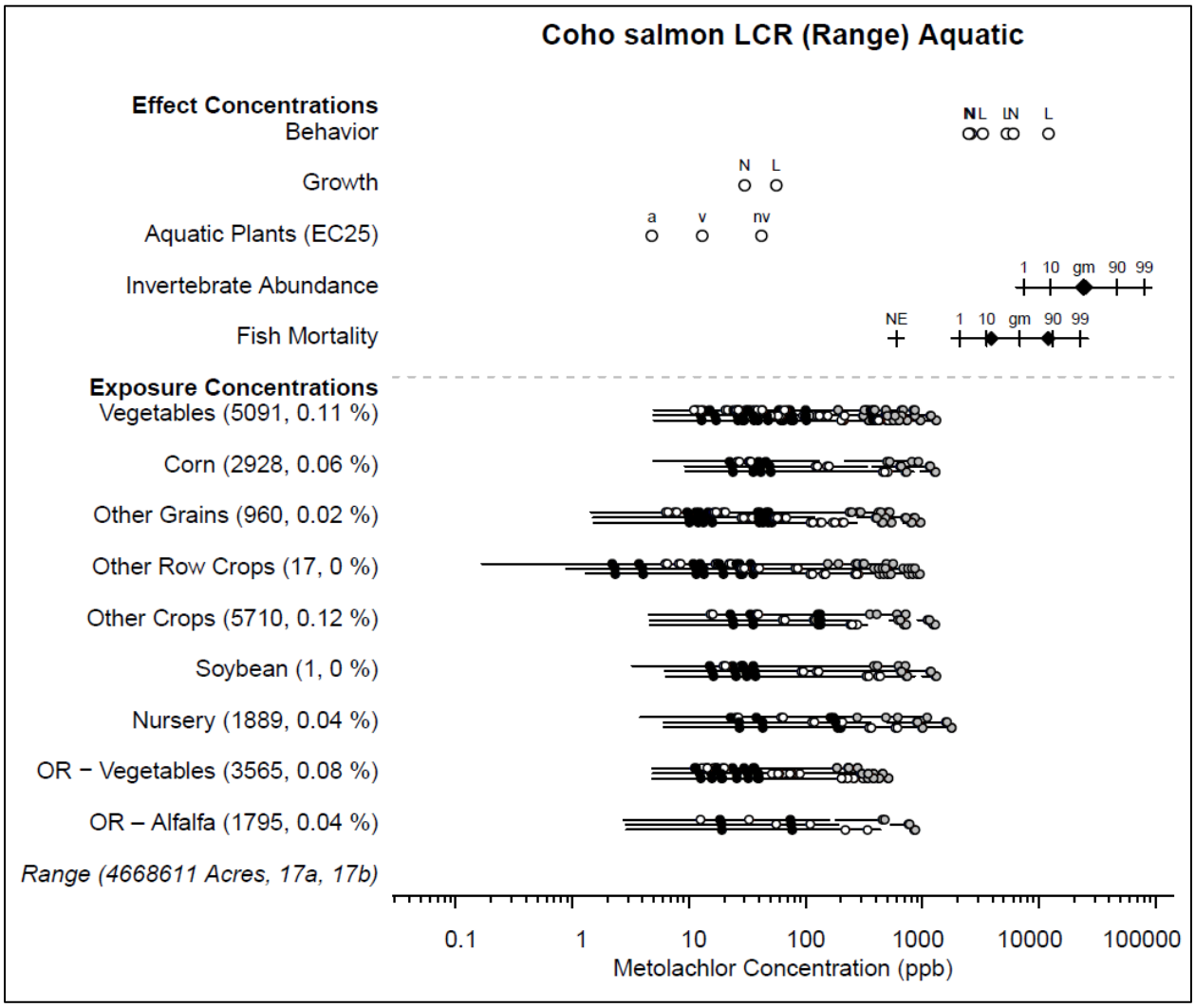


Figure 43. Effects analysis Risk-plot for Coho salmon, Lower Columbia River ESU and Metolachlor

Table 245. Likelihood of exposure determination for Coho salmon, Lower Columbia River ESU and Metolachlor

	Percent Overlap Category	Seasonal Analysis	Persistence	Multiple Applications	Proximity Analysis	Duration of migration/residency	Likelihood of Exposure
Vegetables	1	yes	no	yes	yes	3	**High**
Corn	1	yes	no	yes	yes	3	**High**
Other Grains	1	yes	no	yes	no	3	**Low**
Other Row Crops	1	yes	no	yes	no	3	**Low**
Other Crops	1	yes	no	yes	yes	3	**High**
Soybean	1	yes	no	yes	no	3	**Low**
Nursery	1	yes	no	yes	no	3	**Low**
OR - Vegetables	1	yes	no	yes	yes	3	**High**
OR - Alfalfa	1	yes	no	yes	no	3	**Low**

Table 246. Direct mortality risk hypothesis; Coho salmon, Lower Columbia River ESU and Metolachlor

Endpoint: Mortality			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	0.11	Low	High
Corn	0.06	Low	High
Other Grains	0.02	Low	Low
Other Row Crops	0	Low	Low
Other Crops	0.12	Low	High
Soybean	0	Low	Low
Nursery	0.04	Low	Low
OR - Vegetables	0.08	None Expected	High
OR - Alfalfa	0.04	Low	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via acute lethality.			
Risk	**Confidence**		
Medium	**Low**		

Table 247. Prey risk hypothesis; Coho salmon, Lower Columbia River ESU and Metolachlor

Endpoint: Prey			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	0.11	None Expected	High
Corn	0.06	None Expected	High

Other Grains	0.02	None Expected	Low
Other Row Crops	0	None Expected	Low
Other Crops	0.12	None Expected	High
Soybean	0	None Expected	Low
Nursery	0.04	Low	Low
OR - Vegetables	0.08	None Expected	High
OR - Alfalfa	0.04	None Expected	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via reduction in prey availability.			
Risk	**Confidence**		
Low	**High**		

Table 248. Growth risk hypothesis; Coho salmon, Lower Columbia River ESU and Metolachlor

Endpoint: Growth			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	0.11	Medium	High
Corn	0.06	Medium	High
Other Grains	0.02	Medium	Low
Other Row Crops	0	Medium	Low
Other Crops	0.12	Medium	High
Soybean	0	Medium	Low
Nursery	0.04	Medium	Low
OR - Vegetables	0.08	Medium	High
OR - Alfalfa	0.04	Medium	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via impacts to growth (direct toxicity).			
Risk	**Confidence**		
High	**Low**		

Table 249. Behavior risk hypothesis; Coho salmon, Lower Columbia River ESU and Metolachlor

Endpoint: Behavior			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	0.11	None Expected	High
Corn	0.06	None Expected	High
Other Grains	0.02	None Expected	Low
Other Row Crops	0	None Expected	Low
Other Crops	0.12	None Expected	High
Soybean	0	None Expected	Low

Nursery	0.04	None Expected	Low
OR - Vegetables	0.08	None Expected	High
OR - Alfalfa	0.04	None Expected	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.			
Risk	**Confidence**		
Low	**High**		

Table 250. Effects analysis summary table: Coho salmon, Lower Columbia River ESU and Metolachlor

Risk Hypothesis	Risk-plot Derived		Population Model Results	Risk Hypothesis Supported? Yes/No
	Risk	Confidence		
Exposure to metolachlor is sufficient to reduce abundance via acute lethality.	Medium	Low	No significant reductions in population growth rate. (See chapter 11.5).	No
Exposure to metolachlor is sufficient to reduce abundance via reduction in prey availability.	Low	High		No
Exposure to metolachlor is sufficient to reduce abundance via impacts to growth (direct toxicity).	High	Low		No
Exposure to metolachlor is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.	Low	High		No

Effects analysis summary: Coho salmon, Lower Columbia River ESU are not anticipated to experience reductions in abundance through any of the risk hypotheses assessed from exposure to metolachlor or associated degradates. For metolachlor, some of the use categories have the potential to overestimate the spatial footprint of authorized use. We did not find support for the direct mortality risk hypothesis. Although risk associated with acute mortality is medium, we have low confidence in this determination because the likelihood of exposure characterizations are greater than would be anticipated. We did not find support for the growth risk hypothesis. Although we characterized risk associated with effects to growth as high, our confidence in this risk is low given the chronic exposure to metolachlor at the duration evaluated under this study is

not expected. No changes in population growth rate occurred at the one percent mortality level for any model runs. This suggests that no changes in population growth would occur at the percent mortalities anticipated (less than one percent) with exposures to metolachlor. Where formulated products and tank mixtures containing metolachlor occur in aquatic habitats, individuals may experience increased toxicity. NMFS has determined the overall risk to the species from the effects of the action is medium and the confidence associated with that risk is low.

12.3.14 Coho Salmon, Oregon Coast ESU (*Oncorhynchus kisutch*)

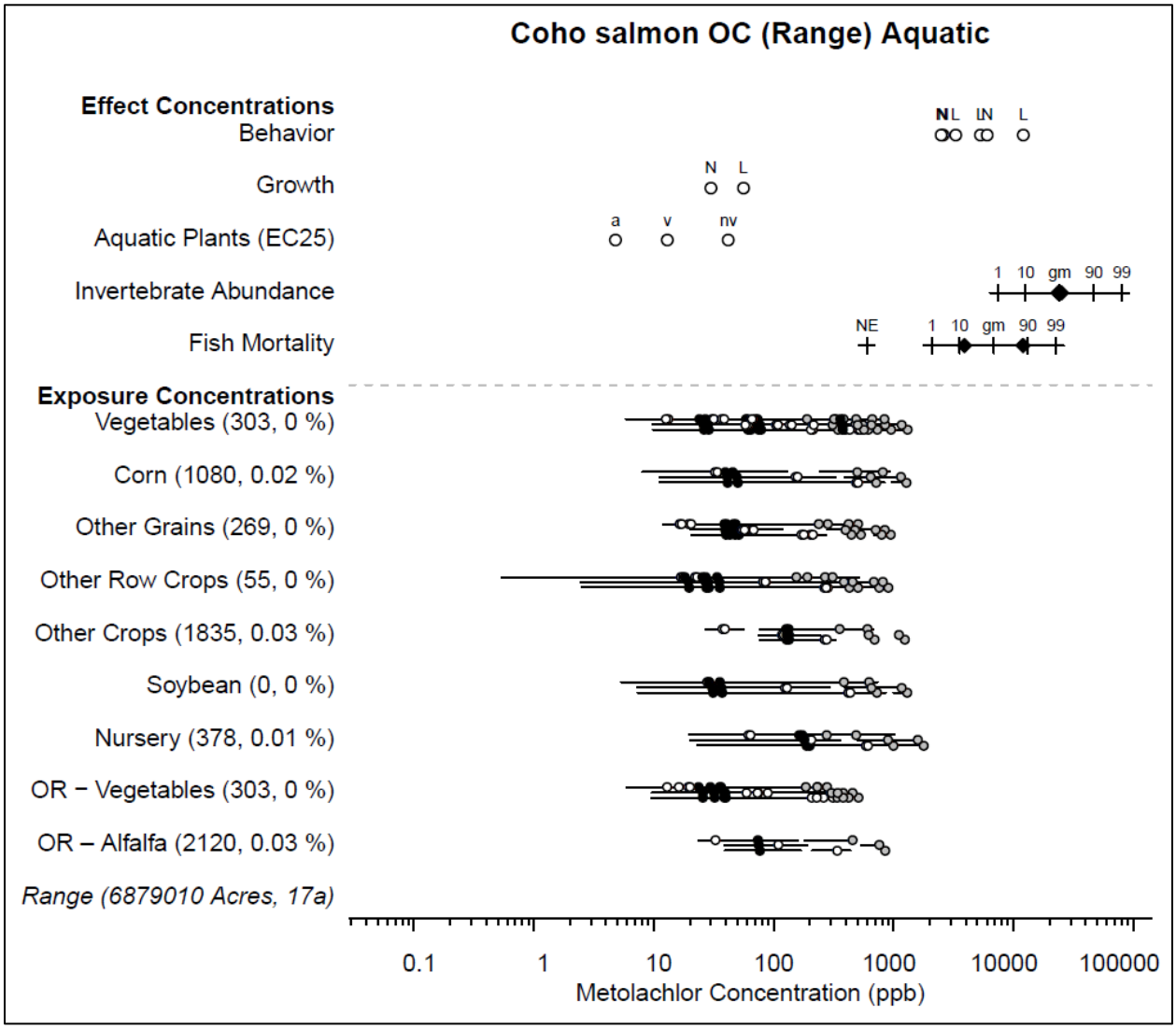


Figure 44. Effects analysis Risk-plot for Coho salmon, Oregon Coast ESU and Metolachlor

Table 251. Likelihood of exposure determination for Coho salmon, Oregon Coast ESU and Metolachlor

	Percent Overlap Category	Seasonal Analysis	Persistence	Multiple Applications	Proximity Analysis	Duration of migration/residency	Likelihood of Exposure
Vegetables	1	yes	no	yes	no	3	**Low**
Corn	1	yes	no	yes	no	3	**Low**
Other Grains	1	yes	no	yes	no	3	**Low**
Other Row Crops	1	yes	no	yes	no	3	**Low**
Other Crops	1	yes	no	yes	no	3	**Low**
Soybean	1	yes	no	yes	no	3	**Low**
Nursery	1	yes	no	yes	no	3	**Low**
OR - Vegetables	1	yes	no	yes	no	3	**Low**
OR - Alfalfa	1	yes	no	yes	no	3	**Low**

Table 252. Direct mortality risk hypothesis; Coho salmon, Oregon Coast ESU and Metolachlor

Endpoint: Mortality			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	0	Low	Low
Corn	0.02	Low	Low
Other Grains	0	Low	Low
Other Row Crops	0	Low	Low
Other Crops	0.03	Low	Low
Soybean	0	Low	Low
Nursery	0.01	Low	Low
OR- Vegetables	0	None Expected	Low
OR - Cotton	0.03	Low	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via acute lethality.			
Risk	**Confidence**		
Low	**High**		

Table 253. Prey risk hypothesis; Coho salmon, Oregon Coast ESU and Metolachlor

Endpoint: Prey			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	0	None Expected	Low
Corn	0.02	None Expected	Low
Other Grains	0	None Expected	Low

Other Row Crops	0	None Expected	Low
Other Crops	0.03	None Expected	Low
Soybean	0	None Expected	Low
Nursery	0.01	Low	Low
OR- Vegetables	0	None Expected	Low
OR - Cotton	0.03	None Expected	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via reduction in prey availability.			
Risk	**Confidence**		
Low	**High**		

Table 254. Growth risk hypothesis; Coho salmon, Oregon Coast ESU and Metolachlor

Endpoint: Growth			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	0	Medium	Low
Corn	0.02	Medium	Low
Other Grains	0	Medium	Low
Other Row Crops	0	Medium	Low
Other Crops	0.03	Medium	Low
Soybean	0	Medium	Low
Nursery	0.01	Medium	Low
OR- Vegetables	0	Medium	Low
OR - Cotton	0.03	Medium	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via impacts to growth (direct toxicity).			
Risk	**Confidence**		
Low	**High**		

Table 255. Behavior risk hypothesis; Coho salmon, Oregon Coast ESU and Metolachlor

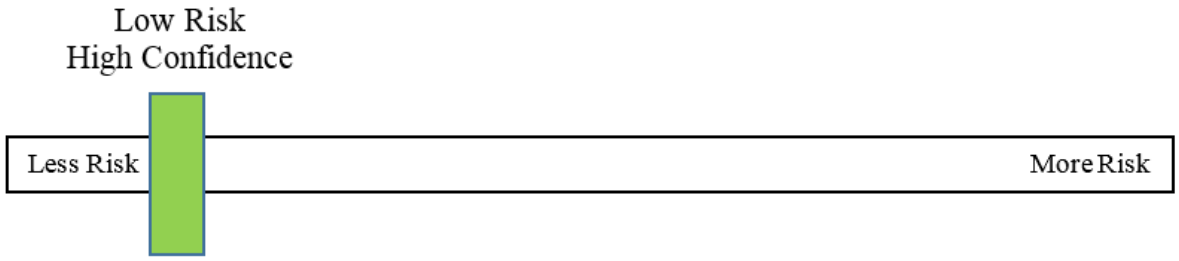
Endpoint: Behavior			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	0	None Expected	Low
Corn	0.02	None Expected	Low
Other Grains	0	None Expected	Low
Other Row Crops	0	None Expected	Low
Other Crops	0.03	None Expected	Low
Soybean	0	None Expected	Low
Nursery	0.01	None Expected	Low
OR- Vegetables	0	None Expected	Low
OR - Cotton	0.03	None Expected	Low

Risk Hypothesis: Exposure to metolachlor is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.		
Risk	**Confidence**	
Low	**High**	

Table 256. Effects analysis summary table: Coho salmon, Oregon Coast ESU and Metolachlor

Risk Hypothesis	Risk-plot Derived		Population Model Results	Risk Hypothesis Supported? Yes/No
	Risk	Confidence		
Exposure to metolachlor is sufficient to reduce abundance via acute lethality.	Low	High	No significant reductions in population growth rate. (See chapter 11.5).	No
Exposure to metolachlor is sufficient to reduce abundance via reduction in prey availability.	Low	High		No
Exposure to metolachlor is sufficient to reduce abundance via impacts to growth (direct toxicity).	Low	High		No
Exposure to metolachlor is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.	Low	High		No

Effects analysis summary: Coho salmon, Oregon Coast ESU are not anticipated to experience reductions in abundance through any of the risk hypotheses assessed from exposure to metolachlor or associated degradates. No changes in population growth rate occurred at the one percent mortality level for any model runs. This suggests that no changes in population growth would occur at the percent mortalities anticipated (less than one percent) with exposures to metolachlor. Where formulated products and tank mixtures containing metolachlor occur in aquatic habitats, individuals may experience increased toxicity. NMFS has determined the overall risk to the species from the effects of the action is low and the confidence associated with that risk is high given the low risk associated with all risk hypotheses evaluated.


Low Risk
High Confidence
Less Risk
More Risk

12.3.15 Coho Salmon, Southern Oregon/Northern California Coast ESU (*Oncorhynchus kisutch*)

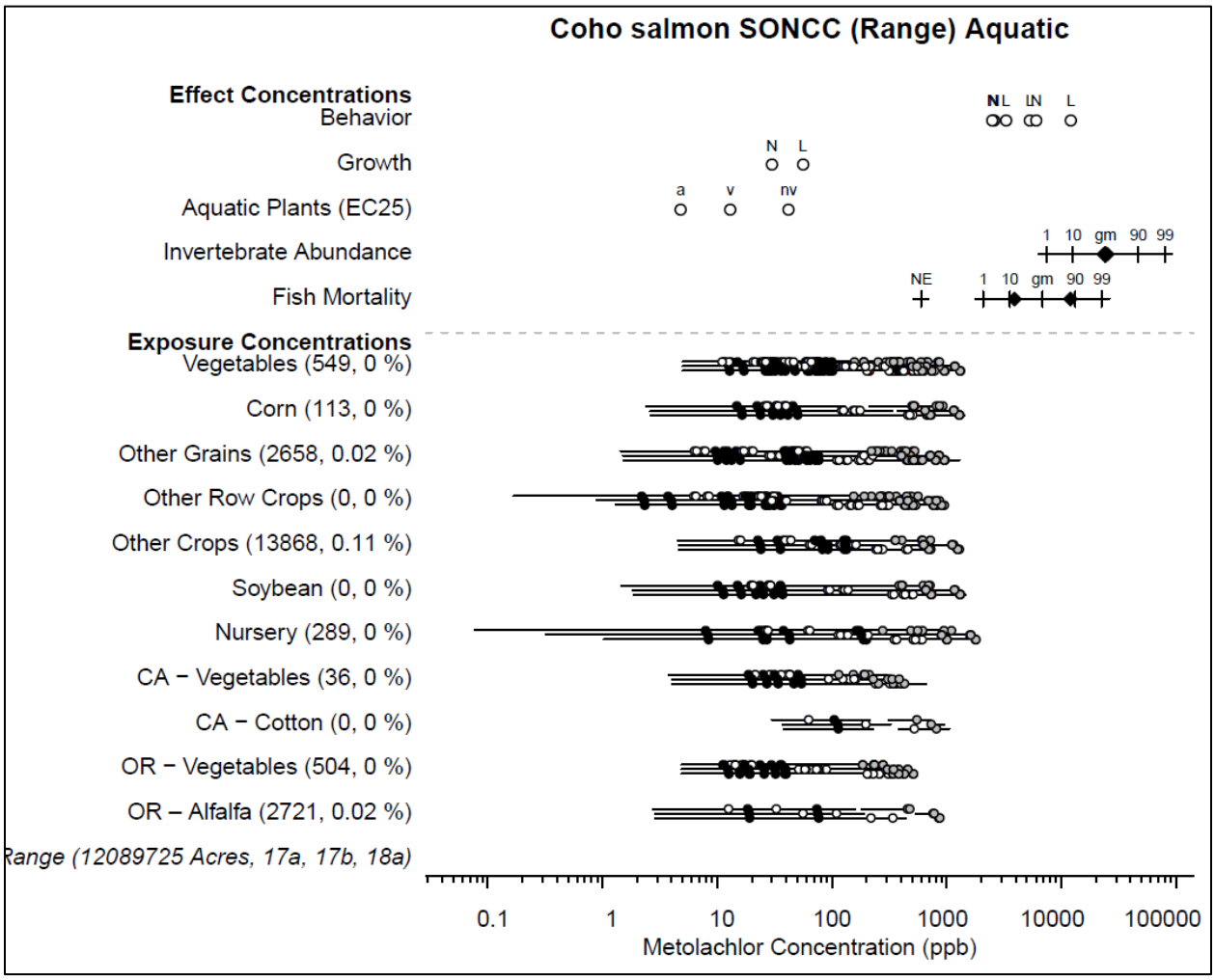


Figure 45. Effects analysis Risk-plot for Coho salmon, Southern Oregon Northern California ESU and Metolachlor

Table 257. Likelihood of exposure determination for Coho salmon, Southern Oregon Northern California ESU and Metolachlor

	Percent Overlap Category	Seasonal Analysis	Persistence	Multiple Applications	Proximity Analysis	Duration of migration/residency	Likelihood of Exposure
Vegetables	1	yes	no	yes	no	3	Low
Corn	1	yes	no	yes	no	3	Low
Other Grains	1	yes	no	yes	no	3	Low
Other Row Crops	1	yes	no	yes	no	3	Low
Other Crops	1	yes	no	yes	yes	3	High
Soybean	1	yes	no	yes	no	3	Low
Nursery	1	yes	no	yes	no	3	Low
CA - Vegetables	1	yes	no	yes	no	3	Low
CA - Cotton	1	yes	no	yes	no	3	Low
OR - Vegetables	1	yes	no	yes	no	3	Low
OR - Alfalfa	1	yes	no	yes	no	3	Low

Table 258. Direct mortality risk hypothesis; Coho salmon, Southern Oregon Northern California ESU and Metolachlor

Endpoint: Mortality			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	0	Low	Low
Corn	0	Low	Low
Other Grains	0.02	Low	Low
Other Row Crops	0	Low	Low
Other Crops	0.11	Low	High
Soybean	0	Low	Low
Nursery	0	Low	Low
CA - Vegetables	0	None Expected	Low
CA - Cotton	0	Low	Low
OR – Vegetables	0	Low	Low
OR – Alfalfa	0.02	Low	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via acute lethality.			
Risk	**Confidence**		
Low	**High**		

Table 259. Prey risk hypothesis; Coho salmon, Southern Oregon Northern California ESU and Metolachlor

Endpoint: Prey			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	0	None Expected	Low
Corn	0	None Expected	Low
Other Grains	0.02	None Expected	Low
Other Row Crops	0	None Expected	Low
Other Crops	0.11	None Expected	High
Soybean	0	None Expected	Low
Nursery	0	Low	Low
CA - Vegetables	0	None Expected	Low
CA - Cotton	0	None Expected	Low
OR – Vegetables	0	None Expected	Low
OR – Alfalfa	0.02	None Expected	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via reduction in prey availability.			
Risk	**Confidence**		
Low	**High**		

Table 260. Growth risk hypothesis; Coho salmon, Southern Oregon Northern California ESU and Metolachlor

Endpoint: Growth			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	0	Medium	Low
Corn	0	Medium	Low
Other Grains	0.02	Medium	Low
Other Row Crops	0	Medium	Low
Other Crops	0.11	Medium	High
Soybean	0	Medium	Low
Nursery	0	Medium	Low
CA - Vegetables	0	Medium	Low
CA - Cotton	0	Medium	Low
OR – Vegetables	0	Medium	Low
OR – Alfalfa	0.02	Medium	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via impacts to growth (direct toxicity).			
Risk	**Confidence**		
Medium	**Low**		

Table 261. Behavior risk hypothesis; Coho salmon, Southern Oregon Northern California ESU and Metolachlor

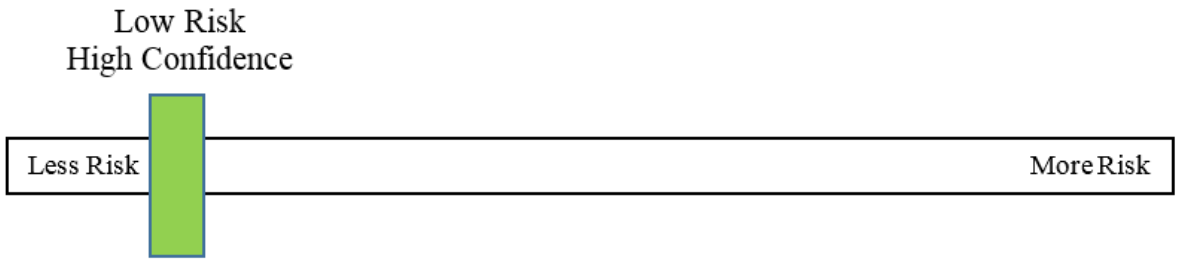
Endpoint: Behavior			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	0	None Expected	Low
Corn	0	None Expected	Low
Other Grains	0.02	None Expected	Low
Other Row Crops	0	None Expected	Low
Other Crops	0.11	None Expected	Low
Soybean	0	None Expected	Low
Nursery	0	None Expected	Low
CA - Vegetables	0	None Expected	Low
CA - Cotton	0	None Expected	Low
OR – Vegetables	0	None Expected	Low
OR – Alfalfa	0.02	None Expected	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.			
Risk	**Confidence**		
Low	**High**		

Table 262. Effects analysis summary table: Coho salmon, Southern Oregon Northern California ESU and Metolachlor

Risk Hypothesis	**Risk-plot Derived**		**Population Model Results**	**Risk Hypothesis Supported? Yes/No**
	Risk	**Confidence**		
Exposure to metolachlor is sufficient to reduce abundance via acute lethality.	Low	High	No significant reductions in population growth rate. (See chapter 11.5).	No
Exposure to metolachlor is sufficient to reduce abundance via reduction in prey availability.	Low	High		No
Exposure to metolachlor is sufficient to reduce abundance via impacts to growth (direct toxicity).	Medium	Low		No
Exposure to metolachlor is sufficient to reduce adult and juvenile abundance and adult	Low	High		No

productivity via impairments to ecologically significant behaviors.				

Effects analysis summary: Coho salmon, Southern Oregon Northern California ESU are not anticipated to experience reductions in abundance through any of the risk hypotheses assessed from exposure to metolachlor or associated degradates. We did not find support for the growth risk hypothesis. Although we characterized risk associated with effects to growth as medium, our confidence in this risk is low because of the lack of environmental relevance of the available study to the species in these habitats. No changes in population growth rate occurred at the one percent mortality level for any model runs. This suggests that no changes in population growth would occur at the percent mortalities anticipated (less than one percent) with exposures to metolachlor. Where formulated products and tank mixtures containing metolachlor occur in aquatic habitats, individuals may experience increased toxicity. NMFS has determined the overall risk to the species from the effects of the action is low and the confidence associated with that risk is high given the low risk associated with all risk hypotheses evaluated.



12.3.16 Sockeye Salmon, Ozette Lake ESU (*Oncorhynchus nerka*)

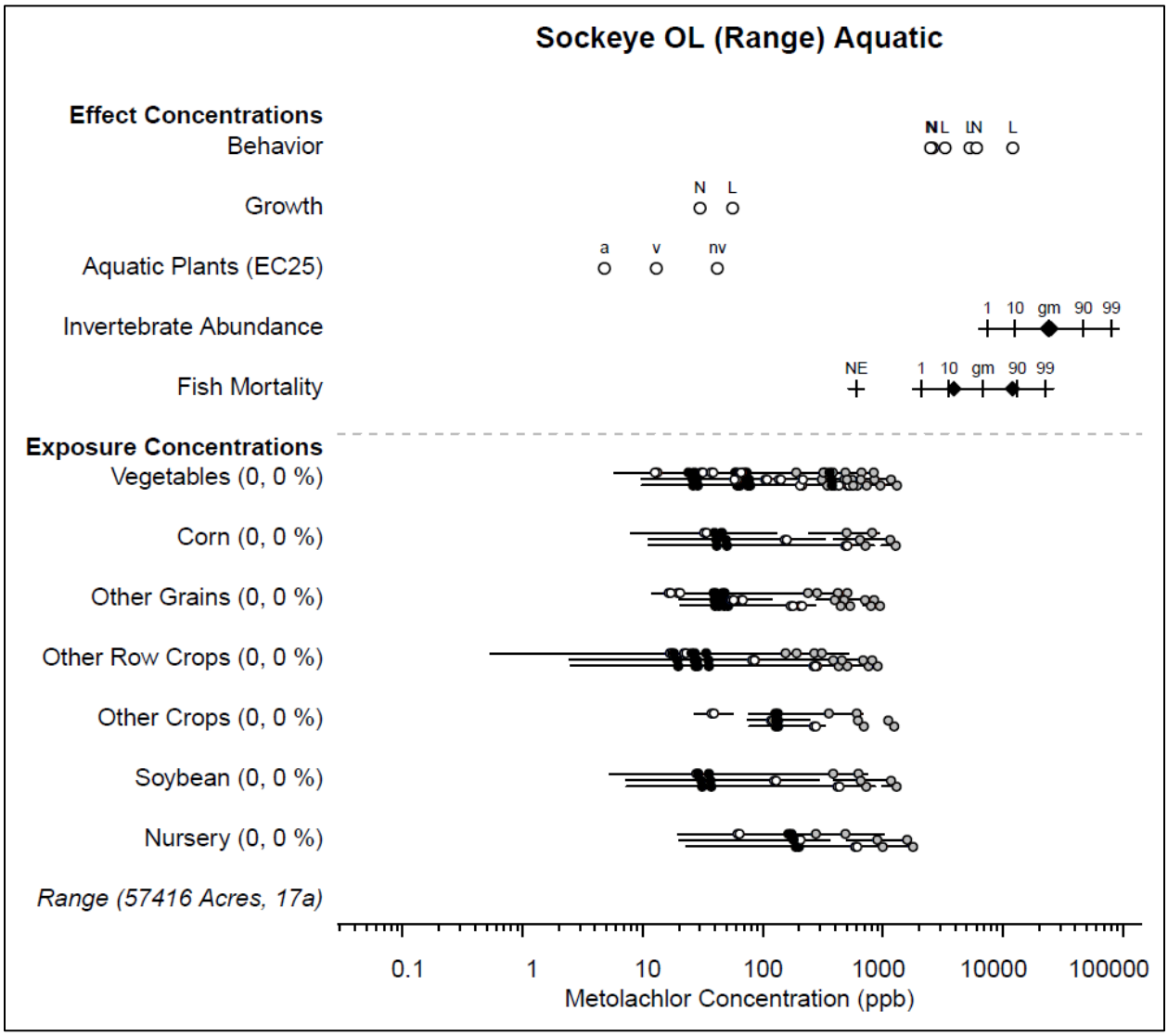
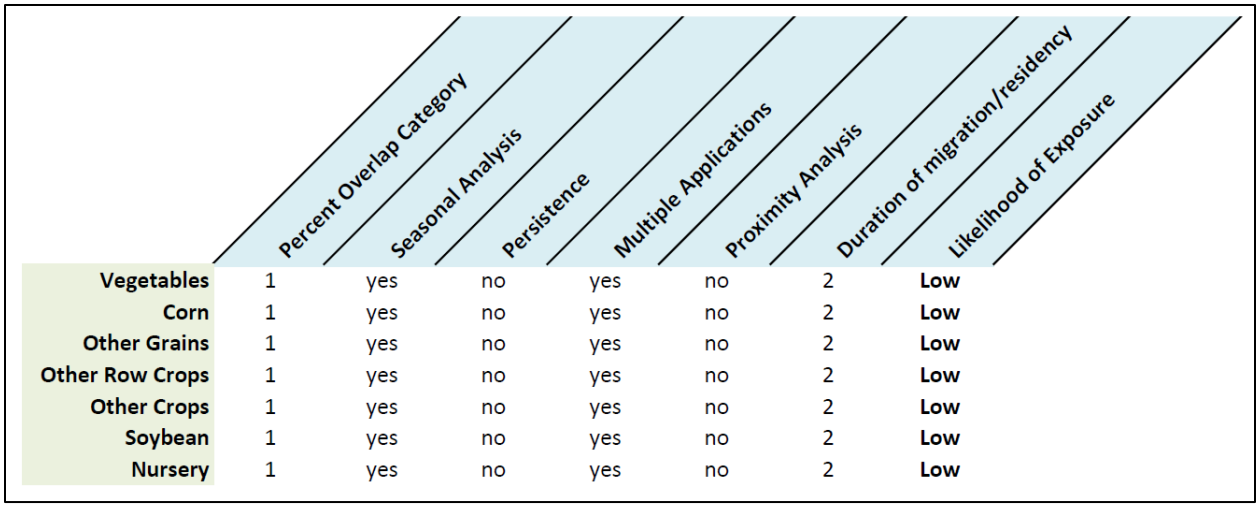


Figure 46. Effects analysis Risk-plot for Sockeye salmon, Lake Ozette ESU and Metolachlor

Table 263. Likelihood of exposure determination for Sockeye salmon, Lake Ozette ESU and Metolachlor



	Percent Overlap Category	Seasonal Analysis	Persistence	Multiple Applications	Proximity Analysis	Duration of migration/residency	Likelihood of Exposure
Vegetables	1	yes	no	yes	no	2	Low
Corn	1	yes	no	yes	no	2	Low
Other Grains	1	yes	no	yes	no	2	Low
Other Row Crops	1	yes	no	yes	no	2	Low
Other Crops	1	yes	no	yes	no	2	Low
Soybean	1	yes	no	yes	no	2	Low
Nursery	1	yes	no	yes	no	2	Low

Table 264. Direct mortality risk hypothesis; Sockeye salmon, Lake Ozette ESU and Metolachlor

Endpoint: Mortality			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	0	Low	Low
Corn	0	Low	Low
Other Grains	0	Low	Low
Other Row Crops	0	Low	Low
Other Crops	0	Low	Low
Soybean	0	Low	Low
Nursery	0	Low	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via acute lethality.			
Risk	**Confidence**		
Low	**High**		

Table 265. Prey risk hypothesis; Sockeye salmon, Lake Ozette ESU and Metolachlor

Endpoint: Prey			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	0	None Expected	Low
Corn	0	None Expected	Low
Other Grains	0	None Expected	Low
Other Row Crops	0	None Expected	Low
Other Crops	0	None Expected	Low
Soybean	0	None Expected	Low
Nursery	0	Low	Low

Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via reduction in prey availability.		
Risk	**Confidence**	
Low	**High**	

Table 266. Growth risk hypothesis; Sockeye salmon, Lake Ozette ESU and Metolachlor

Endpoint: Growth			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	0	Medium	Low
Corn	0	Medium	Low
Other Grains	0	Medium	Low
Other Row Crops	0	Medium	Low
Other Crops	0	Medium	Low
Soybean	0	Medium	Low
Nursery	0	Medium	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via impacts to growth (direct toxicity).			
Risk	**Confidence**		
Low	**High**		

Table 267. Behavior risk hypothesis; Sockeye salmon, Lake Ozette ESU and Metolachlor

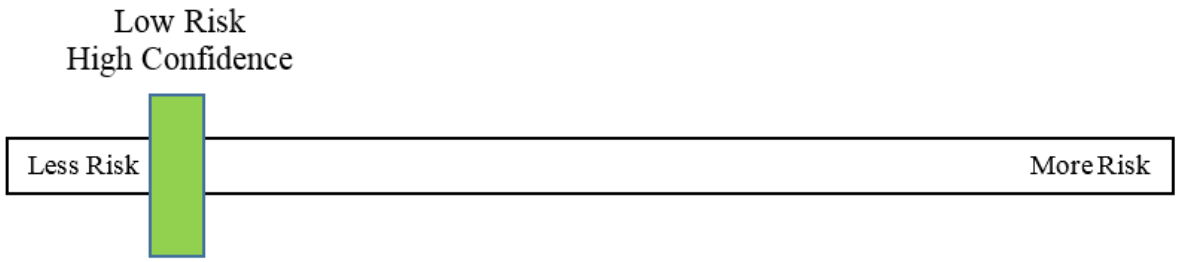
Endpoint: Behavior			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	0	None Expected	Low
Corn	0	None Expected	Low
Other Grains	0	None Expected	Low
Other Row Crops	0	None Expected	Low
Other Crops	0	None Expected	Low
Soybean	0	None Expected	Low
Nursery	0	None Expected	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.			
Risk	**Confidence**		
Low	**High**		

Table 268. Effects analysis summary table: Sockeye salmon, Lake Ozette ESU and Metolachlor

Risk Hypothesis	Risk-plot Derived		

	Risk	Confidence	Population Model Results	Risk Hypothesis Supported? Yes/No
Exposure to metolachlor is sufficient to reduce abundance via acute lethality.	Low	High	No significant reductions in population growth rate. (See chapter 11.5).	No
Exposure to metolachlor is sufficient to reduce abundance via reduction in prey availability.	Low	High		No
Exposure to metolachlor is sufficient to reduce abundance via impacts to growth (direct toxicity).	Low	High		No
Exposure to metolachlor is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.	Low	High		No

Effects analysis summary: Sockeye salmon, Lake Ozette ESU are not anticipated to experience reductions in abundance through any of the risk hypotheses assessed from exposure to metolachlor or associated degradates. We found no overlap of approved use sites within this species range. No changes in population growth rate occurred at the one percent mortality level for any model runs. This suggests that no changes in population growth would occur at the percent mortalities anticipated (less than one percent) with exposures to metolachlor. NMFS has determined there is no risk to the species from the effects of the action and the confidence associated with our risk determination is high given the low risk associated with all risk hypotheses evaluated.



12.3.17 Sockeye Salmon, Snake River ESU (Oncorhynchus nerka)

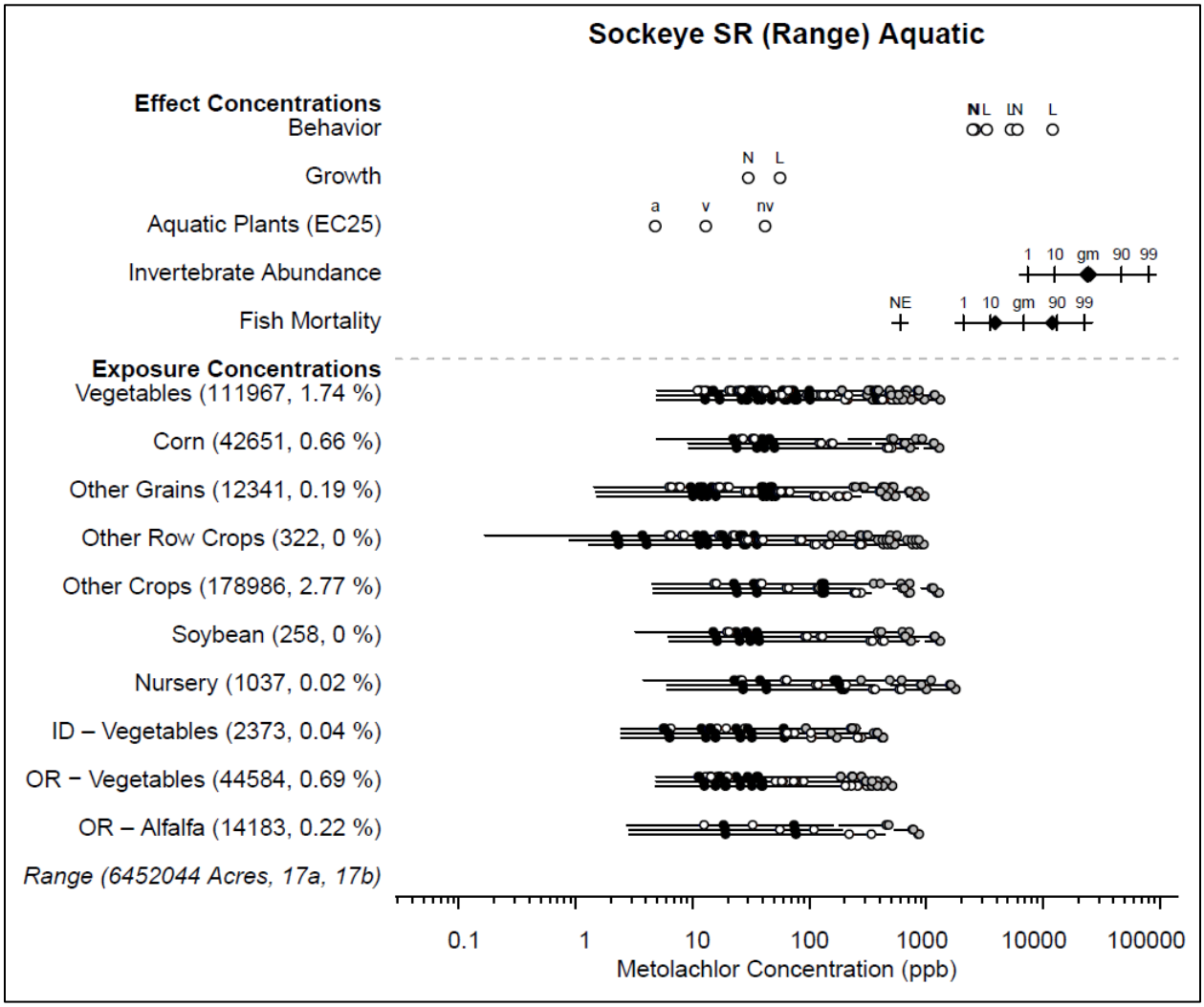


Figure 47. Effects analysis Risk-plot for Sockeye Salmon, Snake River ESU and Metolachlor

Table 269. Likelihood of exposure determination for Sockeye Salmon, Snake River ESU and Metolachlor

	Percent Overlap Category	Seasonal Analysis	Persistence	Multiple Applications	Proximity Analysis	Duration of migration/residency	Likelihood of Exposure
Vegetables	2	yes	no	yes	NA	3	Medium
Corn	1	yes	no	yes	yes	3	High
Other Grains	1	yes	no	yes	yes	3	High
Other Row Crops	1	yes	no	yes	no	3	Low
Other Crops	2	yes	no	yes	NA	3	Medium
Soybean	1	yes	no	yes	no	3	Low
Nursery	1	yes	no	yes	no	3	Low
ID - Vegetables	1	yes	no	yes	no	3	Low
OR - Vegetables	1	yes	no	yes	no	3	Low
OR - Alfalfa	1	yes	no	yes	no	3	Low

Table 270. Direct mortality risk hypothesis; Sockeye Salmon, Snake River ESU and Metolachlor

Endpoint: Mortality			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	1.74	Low	Medium
Corn	0.66	Low	High
Other Grains	0.19	Low	High
Other Row Crops	0	Low	Low
Other Crops	2.77	Low	Medium
Soybean	0	Low	Low
Nursery	0.02	Low	Low
ID – Vegetables	0.04	Low	Low
OR - Vegetables	0.69	None Expected	Low
OR - Alfalfa	0.22	Low	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via acute lethality.			
Risk	**Confidence**		
Medium	**Low**		

Table 271. Prey risk hypothesis; Sockeye Salmon, Snake River ESU and Metolachlor

Endpoint: Prey			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	1.74	None Expected	Medium

Corn	0.66	None Expected	High
Other Grains	0.19	None Expected	High
Other Row Crops	0	None Expected	Low
Other Crops	2.77	None Expected	Medium
Soybean	0	None Expected	Low
Nursery	0.02	Low	Low
ID – Vegetables	0.04	None Expected	Low
OR - Vegetables	0.69	None Expected	Low
OR - Alfalfa	0.22	None Expected	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via reduction in prey availability.			
Risk	**Confidence**		
Low	**High**		

Table 272. Growth risk hypothesis; Sockeye Salmon, Snake River ESU and Metolachlor

Endpoint: Growth			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	1.74	Medium	Medium
Corn	0.66	Medium	High
Other Grains	0.19	Medium	High
Other Row Crops	0	Medium	Low
Other Crops	2.77	Medium	Medium
Soybean	0	Medium	Low
Nursery	0.02	Medium	Low
ID – Vegetables	0.04	Medium	Low
OR - Vegetables	0.69	Medium	Low
OR - Alfalfa	0.22	Medium	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via impacts to growth (direct toxicity).			
Risk	**Confidence**		
High	**Low**		

Table 273. Behavior risk hypothesis; Sockeye Salmon, Snake River ESU and Metolachlor

Endpoint: Behavior			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	1.74	None Expected	Medium
Corn	0.66	None Expected	High
Other Grains	0.19	None Expected	High
Other Row Crops	0	None Expected	Low
Other Crops	2.77	None Expected	Medium

Soybean	0	None Expected	Low
Nursery	0.02	None Expected	Low
ID – Vegetables	0.04	None Expected	Low
OR - Vegetables	0.69	None Expected	Low
OR - Alfalfa	0.22	None Expected	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.			
Risk	**Confidence**		
Low	**High**		

Table 274. Effects analysis summary table: Sockeye Salmon, Snake River ESU and Metolachlor

Risk Hypothesis	Risk-plot Derived		Population Model Results	Risk Hypothesis Supported? Yes/No
	Risk	Confidence		
Exposure to metolachlor is sufficient to reduce abundance via acute lethality.	Medium	Low	No significant reductions in population growth rate. (See chapter 11.5).	No
Exposure to metolachlor is sufficient to reduce abundance via reduction in prey availability.	Low	High		No
Exposure to metolachlor is sufficient to reduce abundance via impacts to growth (direct toxicity).	High	Low		No
Exposure to metolachlor is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.	Low	High		No

Effects analysis summary: Sockeye Salmon, Snake River ESU are not anticipated to experience reductions in abundance through any of the risk hypotheses assessed from exposure to metolachlor or associated degradates. For metolachlor, some of the use categories have the potential to overestimate the spatial footprint of authorized use. We did not find support for the direct mortality risk hypothesis. Although risk associated with acute mortality is medium, we have low confidence in this determination because the likelihood of exposure characterizations are greater than would be anticipated. We did not find support for the growth risk hypothesis.

Although we characterized risk associated with effects to growth as high, our confidence in this risk is low given the chronic exposure to metolachlor at the duration evaluated under this study is not expected. No changes in population growth rate occurred at the one percent mortality level for any model runs. This suggests that no changes in population growth would occur at the percent mortalities anticipated (less than one percent) with exposures to metolachlor. Where formulated products and tank mixtures containing metolachlor occur in aquatic habitats, individuals may experience increased toxicity. NMFS has determined the overall risk to the species from the effects of the action is medium and the confidence associated with that risk is low.

12.3.18 Steelhead, California Central Valley DPS (*Oncorhynchus mykiss*)

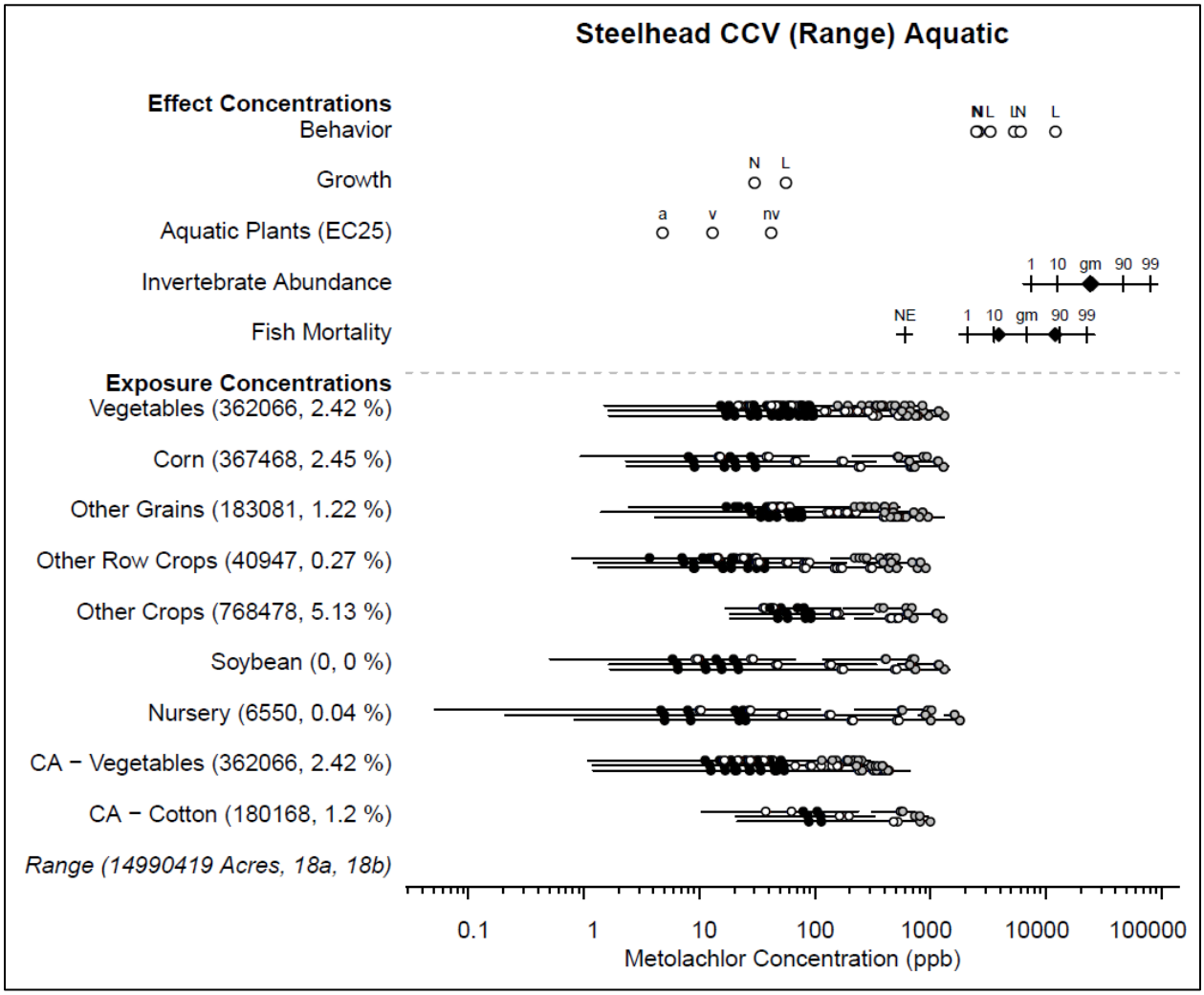


Figure 48. Effects analysis Risk-plot for Steelhead, California Central-Valley DPS and Metolachlor

Table 275. Likelihood of exposure determination for Steelhead, California Central-Valley DPS and Metolachlor

	Percent Overlap Category	Seasonal Analysis	Persistence	Multiple Applications	Proximity Analysis	Duration of migration/residency	Likelihood of Exposure
Vegetables	2	yes	no	yes	NA	3	**Medium**
Corn	2	yes	no	yes	NA	3	**Medium**
Other Grains	2	yes	no	yes	NA	3	**Medium**
Other Row Crops	1	yes	no	yes	yes	3	**High**
Other Crops	3	yes	no	yes	NA	3	**High**
Soybean	1	yes	no	yes	no	3	**Low**
Nursery	1	yes	no	yes	no	3	**Low**
CA - Vegetables	2	yes	no	yes	NA	3	**Medium**
CA - Cotton	2	yes	no	yes	NA	3	**Medium**

Table 276. Direct mortality risk hypothesis; Steelhead, California Central-Valley DPS and Metolachlor

Endpoint: Mortality			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	2.42	Low	Medium
Corn	2.45	Low	Medium
Other Grains	1.22	Low	Medium
Other Row Crops	0.27	Low	High
Other Crops	5.13	Low	High
Soybean	0	Low	Low
Nursery	0.04	Low	Low
CA - Vegetables	2.42	None Expected	Medium
CA - Cotton	1.2	Low	Medium
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via acute lethality.			
Risk	**Confidence**		
Medium	**Low**		

Table 277. Prey risk hypothesis; Steelhead, California Central-Valley DPS and Metolachlor

Endpoint: Prey			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	2.42	None Expected	Medium
Corn	2.45	None Expected	Medium
Other Grains	1.22	None Expected	Medium

Other Row Crops	0.27	None Expected	High
Other Crops	5.13	None Expected	High
Soybean	0	None Expected	Low
Nursery	0.04	Low	Low
CA - Vegetables	2.42	None Expected	Medium
CA - Cotton	1.2	None Expected	Medium
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via reduction in prey availability.			
Risk	**Confidence**		
Low	**High**		

Table 278. Growth risk hypothesis; Steelhead, California Central-Valley DPS and Metolachlor

Endpoint: Growth			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	2.42	Medium	Medium
Corn	2.45	Medium	Medium
Other Grains	1.22	Medium	Medium
Other Row Crops	0.27	Medium	High
Other Crops	5.13	Medium	High
Soybean	0	Medium	Low
Nursery	0.04	Medium	Low
CA - Vegetables	2.42	Medium	Medium
CA - Cotton	1.2	Medium	Medium
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via impacts to growth (direct toxicity).			
Risk	**Confidence**		
High	**Low**		

Table 279. Behavior risk hypothesis; Steelhead, California Central-Valley DPS and Metolachlor

Endpoint: Behavior			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	2.42	None Expected	Medium
Corn	2.45	None Expected	Medium
Other Grains	1.22	None Expected	Medium
Other Row Crops	0.27	None Expected	High
Other Crops	5.13	None Expected	High
Soybean	0	None Expected	Low
Nursery	0.04	None Expected	Low

CA - Vegetables	2.42	None Expected	Medium
CA - Cotton	1.2	None Expected	Medium
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.			
Risk	**Confidence**		
Low	**High**		

Table 280. Effects analysis summary table: Steelhead, California Central-Valley DPS and Metolachlor

Risk Hypothesis	Risk-plot Derived		Population Model Results	Risk Hypothesis Supported? Yes/No
	Risk	Confidence		
Exposure to metolachlor is sufficient to reduce abundance via acute lethality.	Medium	Low	Not Applicable	No
Exposure to metolachlor is sufficient to reduce abundance via reduction in prey availability.	Low	High		No
Exposure to metolachlor is sufficient to reduce abundance via impacts to growth (direct toxicity).	High	Low		No
Exposure to metolachlor is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.	Low	High		No

Effects analysis summary: Steelhead, California Central-Valley DPS are not anticipated to experience reductions in abundance through any of the risk hypotheses assessed from exposure to metolachlor or associated degradates. For metolachlor, some of the use categories have the potential to overestimate the spatial footprint of authorized use. We did not find support for the direct mortality risk hypothesis. Although risk associated with acute mortality is medium, we have low confidence in this determination because the likelihood of exposure characterizations are greater than would be anticipated. We did not find support for the growth risk hypothesis. Although we characterized risk associated with effects to growth as high, our confidence in this risk is low given the chronic exposure to metolachlor at the duration evaluated under this study is not expected. Where formulated products and tank mixtures containing metolachlor occur in aquatic habitats, individuals may experience increased toxicity. NMFS has determined the overall risk to the species from the effects of the action is medium and the confidence associated with that risk is low.

Medium Risk
Low Confidence
Less Risk
More Risk

12.3.19 Steelhead, Central California Coast DPS (*Oncorhynchus mykiss*)

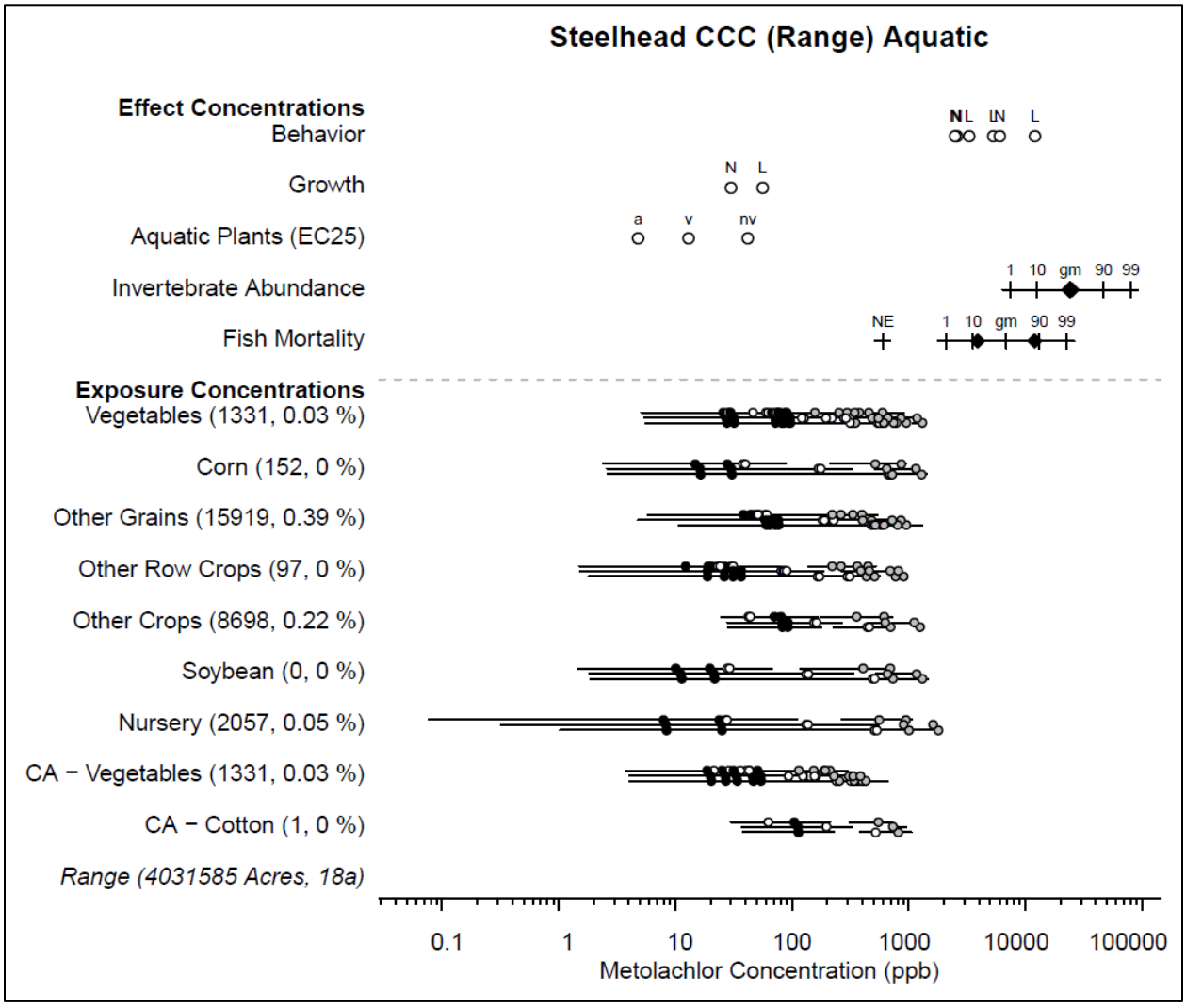


Figure 49. Effects analysis Risk-plot for Steelhead, Central California Coast DPS and Metolachlor

Table 281. Likelihood of exposure determination for Steelhead, Central California Coast DPS and Metolachlor

	Percent Overlap Category	Seasonal Analysis	Persistence	Multiple Applications	Proximity Analysis	Duration of migration/residency	Likelihood of Exposure
Vegetables	1	yes	no	yes	no	3	**Low**
Corn	1	yes	no	yes	no	3	**Low**
Other Grains	1	yes	no	yes	yes	3	**High**
Other Row Crops	1	yes	no	yes	no	3	**Low**
Other Crops	1	yes	no	yes	yes	3	**High**
Soybean	1	yes	no	yes	no	3	**Low**
Nursery	1	yes	no	yes	no	3	**Low**
CA - Vegetables	1	yes	no	yes	no	3	**Low**
CA - Cotton	1	yes	no	yes	no	3	**Low**

Table 282. Direct mortality risk hypothesis; Steelhead, Central California Coast DPS and Metolachlor

Endpoint: Mortality			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	0.03	Low	Low
Corn	0	Low	Low
Other Grains	0.39	Low	High
Other Row Crops	0	Low	Low
Other Crops	0.22	Low	High
Soybean	0	Low	Low
Nursery	0.05	Low	Low
CA - Vegetables	0.03	None Expected	Low
CA - Cotton	0	Low	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via acute lethality.			
Risk	**Confidence**		
Medium	**Low**		

Table 283. Prey risk hypothesis; Steelhead, Central California Coast DPS and Metolachlor

Endpoint: Prey			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	0.03	None Expected	Low
Corn	0	None Expected	Low
Other Grains	0.39	None Expected	High

Other Row Crops	0	None Expected	Low
Other Crops	0.22	None Expected	High
Soybean	0	None Expected	Low
Nursery	0.05	Low	Low
CA - Vegetables	0.03	None Expected	Low
CA - Cotton	0	None Expected	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via reduction in prey availability.			
Risk	**Confidence**		
Low	**High**		

Table 284. Growth risk hypothesis; Steelhead, Central California Coast DPS and Metolachlor

Endpoint: Growth			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	0.03	Medium	Low
Corn	0	Medium	Low
Other Grains	0.39	Medium	High
Other Row Crops	0	Medium	Low
Other Crops	0.22	Medium	High
Soybean	0	Medium	Low
Nursery	0.05	Medium	Low
CA - Vegetables	0.03	Medium	Low
CA - Cotton	0	Medium	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via impacts to growth (direct toxicity).			
Risk	**Confidence**		
High	**Low**		

Table 285. Behavior risk hypothesis; Steelhead, Central California Coast DPS and Metolachlor

Endpoint: Behavior			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	0.03	None Expected	Low
Corn	0	None Expected	Low
Other Grains	0.39	None Expected	High
Other Row Crops	0	None Expected	Low
Other Crops	0.22	None Expected	High
Soybean	0	None Expected	Low
Nursery	0.05	None Expected	Low

CA - Vegetables	0.03	None Expected	Low
CA - Cotton	0	None Expected	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.			
Risk	**Confidence**		
Low	**High**		

Table 286. Effects analysis summary table: Steelhead, Central California Coast DPS and Metolachlor

Risk Hypothesis	Risk-plot Derived		Population Model Results	Risk Hypothesis Supported? Yes/No
	Risk	Confidence		
Exposure to metolachlor is sufficient to reduce abundance via acute lethality.	Medium	Low	Not Applicable	No
Exposure to metolachlor is sufficient to reduce abundance via reduction in prey availability.	Low	High		No
Exposure to metolachlor is sufficient to reduce abundance via impacts to growth (direct toxicity).	High	Low		No
Exposure to metolachlor is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.	Low	High		No

Effects analysis summary: Steelhead, Central California Coast DPS are not anticipated to experience reductions in abundance through any of the risk hypotheses assessed from exposure to metolachlor or associated degradates. For metolachlor, some of the use categories have the potential to overestimate the spatial footprint of authorized use. We did not find support for the direct mortality risk hypothesis. Although risk associated with acute mortality is medium, we have low confidence in this determination because the likelihood of exposure characterizations are greater than would be anticipated. We did not find support for the growth risk hypothesis. Although we characterized risk associated with effects to growth as high, our confidence in this risk is low given the chronic exposure to metolachlor at the duration evaluated under this study is not expected. Where formulated products and tank mixtures containing metolachlor occur in aquatic habitats, individuals may experience increased toxicity. NMFS has determined the overall risk to the species from the effects of the action is medium and the confidence associated with that risk is low.

Medium Risk
Low Confidence
Less Risk
More Risk

12.3.20 Steelhead, Lower Columbia River DPS (*Oncorhynchus mykiss*)

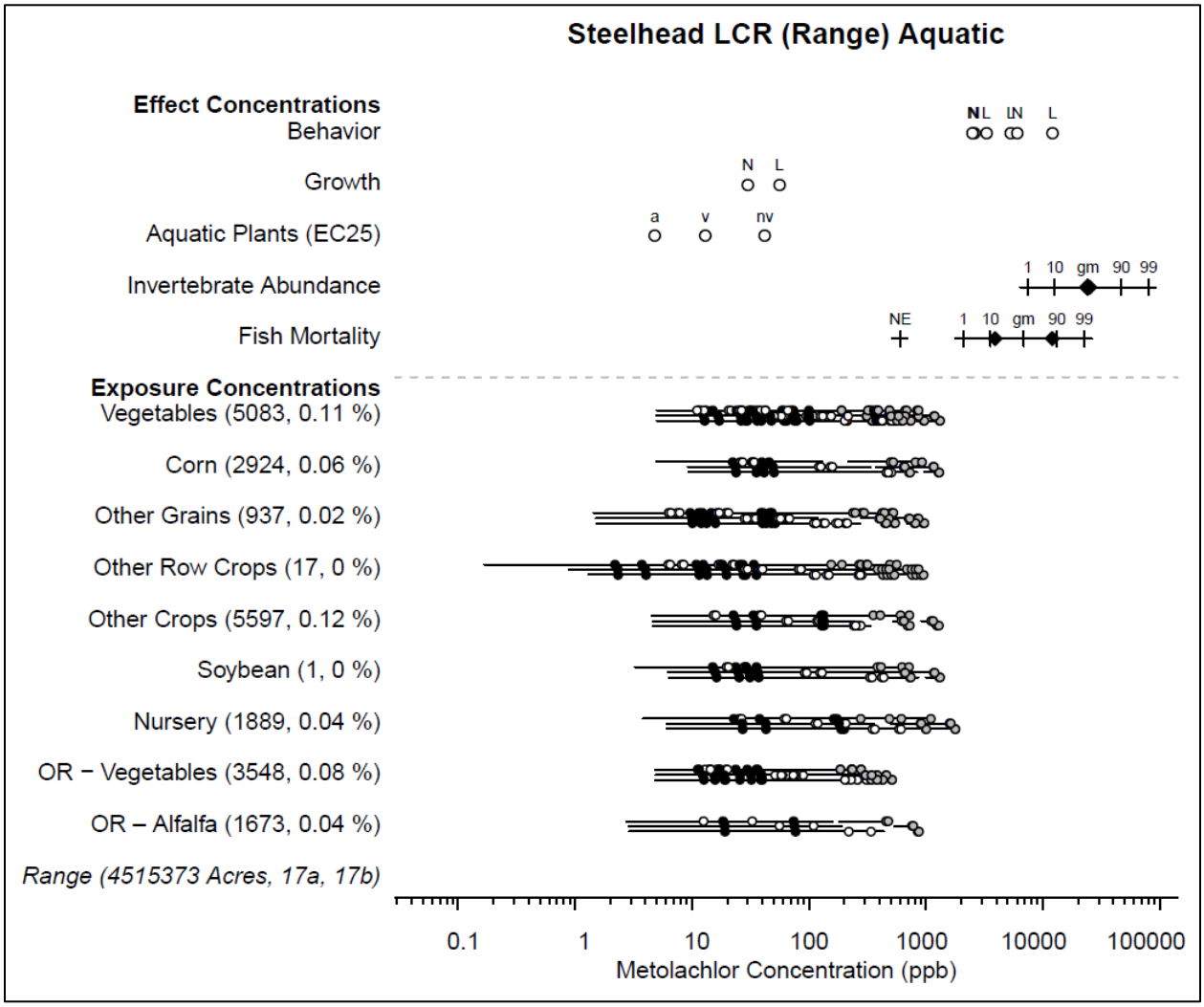
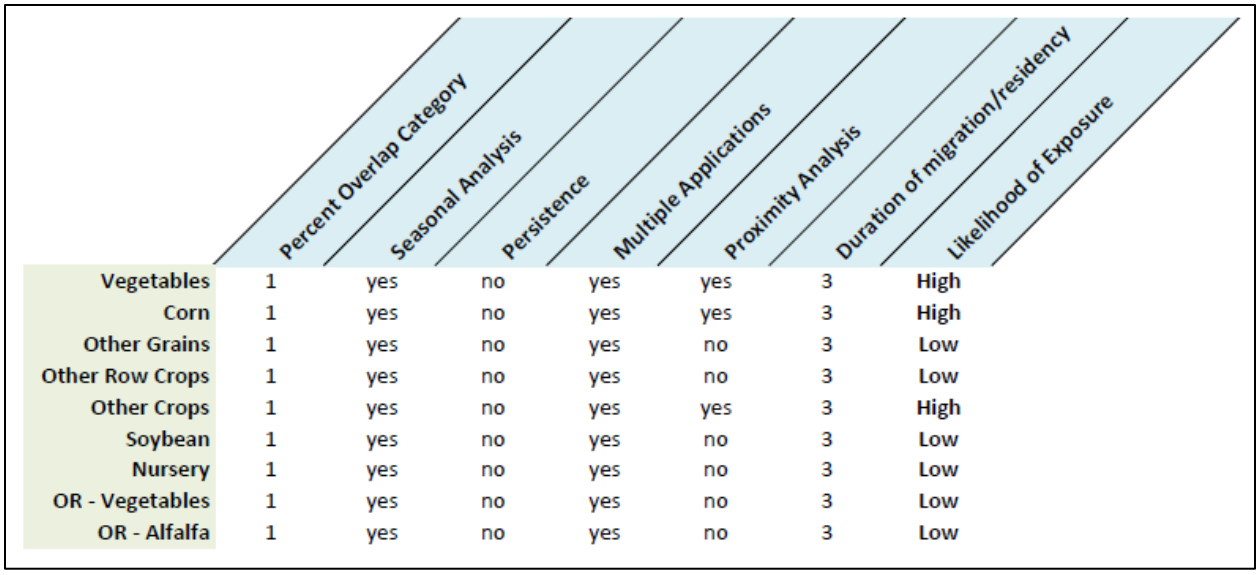


Figure 50. Effects analysis Risk-plot for Steelhead, Lower Columbia River DPS and Metolachlor

Table 287. Likelihood of exposure determination for Steelhead, Lower Columbia River DPS and Metolachlor



	Percent Overlap Category	Seasonal Analysis	Persistence	Multiple Applications	Proximity Analysis	Duration of migration/residency	Likelihood of Exposure
Vegetables	1	yes	no	yes	yes	3	High
Corn	1	yes	no	yes	yes	3	High
Other Grains	1	yes	no	yes	no	3	Low
Other Row Crops	1	yes	no	yes	no	3	Low
Other Crops	1	yes	no	yes	yes	3	High
Soybean	1	yes	no	yes	no	3	Low
Nursery	1	yes	no	yes	no	3	Low
OR - Vegetables	1	yes	no	yes	no	3	Low
OR - Alfalfa	1	yes	no	yes	no	3	Low

Table 288. Direct mortality risk hypothesis; Steelhead, Lower Columbia River DPS and Metolachlor

Endpoint: Mortality			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	0.11	Low	High
Corn	0.06	Low	High
Other Grains	0.02	Low	Low
Other Row Crops	0	Low	Low
Other Crops	0.12	Low	High
Soybean	0	Low	Low
Nursery	0.04	Low	Low
OR - Vegetables	0.08	None Expected	Low
OR - Alfalfa	0.04	Low	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via acute lethality.			
Risk	**Confidence**		
Medium	**Low**		

Table 289. Prey risk hypothesis; Steelhead, Lower Columbia River DPS and Metolachlor

Endpoint: Prey			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	0.11	None Expected	High
Corn	0.06	None Expected	High
Other Grains	0.02	None Expected	Low

Other Row Crops	0	None Expected	Low
Other Crops	0.12	None Expected	High
Soybean	0	None Expected	Low
Nursery	0.04	Low	Low
OR - Vegetables	0.08	None Expected	Low
OR - Alfalfa	0.04	None Expected	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via reduction in prey availability.			
Risk	**Confidence**		
Low	**High**		

Table 290. Growth risk hypothesis; Steelhead, Lower Columbia River DPS and Metolachlor

Endpoint: Growth			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	0.11	Medium	High
Corn	0.06	Medium	High
Other Grains	0.02	Medium	Low
Other Row Crops	0	Medium	Low
Other Crops	0.12	Medium	High
Soybean	0	Medium	Low
Nursery	0.04	Medium	Low
OR - Vegetables	0.08	Medium	Low
OR - Alfalfa	0.04	Medium	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via impacts to growth (direct toxicity).			
Risk	**Confidence**		
High	**Low**		

Table 291. Behavior risk hypothesis; Steelhead, Lower Columbia River DPS and Metolachlor

Endpoint: Behavior			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	0.11	None Expected	High
Corn	0.06	None Expected	High
Other Grains	0.02	None Expected	Low
Other Row Crops	0	None Expected	Low
Other Crops	0.12	None Expected	High
Soybean	0	None Expected	Low
Nursery	0.04	None Expected	Low

OR - Vegetables	0.08	None Expected	Low
OR - Alfalfa	0.04	None Expected	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.			
Risk	**Confidence**		
Low	**High**		

Table 292. Effects analysis summary table: Steelhead, Lower Columbia River DPS and Metolachlor

Risk Hypothesis	**Risk-plot Derived**		**Population Model Results**	**Risk Hypothesis Supported? Yes/No**
	Risk	**Confidence**		
Exposure to metolachlor is sufficient to reduce abundance via acute lethality.	Medium	Low	Not Applicable	No
Exposure to metolachlor is sufficient to reduce abundance via reduction in prey availability.	Low	High		No
Exposure to metolachlor is sufficient to reduce abundance via impacts to growth (direct toxicity).	High	Low		No
Exposure to metolachlor is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.	Low	High		No

Effects analysis summary: Steelhead, Lower Columbia River DPS are not anticipated to experience reductions in abundance through any of the risk hypotheses assessed from exposure to metolachlor or associated degradates. For metolachlor, some of the use categories have the potential to overestimate the spatial footprint of authorized use. We did not find support for the direct mortality risk hypothesis. Although risk associated with acute mortality is medium, we have low confidence in this determination because the likelihood of exposure characterizations are greater than would be anticipated. We did not find support for the growth risk hypothesis. Although we characterized risk associated with effects to growth as high, our confidence in this risk is low given the chronic exposure to metolachlor at the duration evaluated under this study is not expected. Where formulated products and tank mixtures containing metolachlor occur in aquatic habitats, individuals may experience increased toxicity. NMFS has determined the overall risk to the species from the effects of the action is medium and the confidence associated with that risk is low.

Medium Risk
Low Confidence
Less Risk
More Risk

12.3.21 Steelhead, Middle Columbia River DPS (*Oncorhynchus mykiss*)

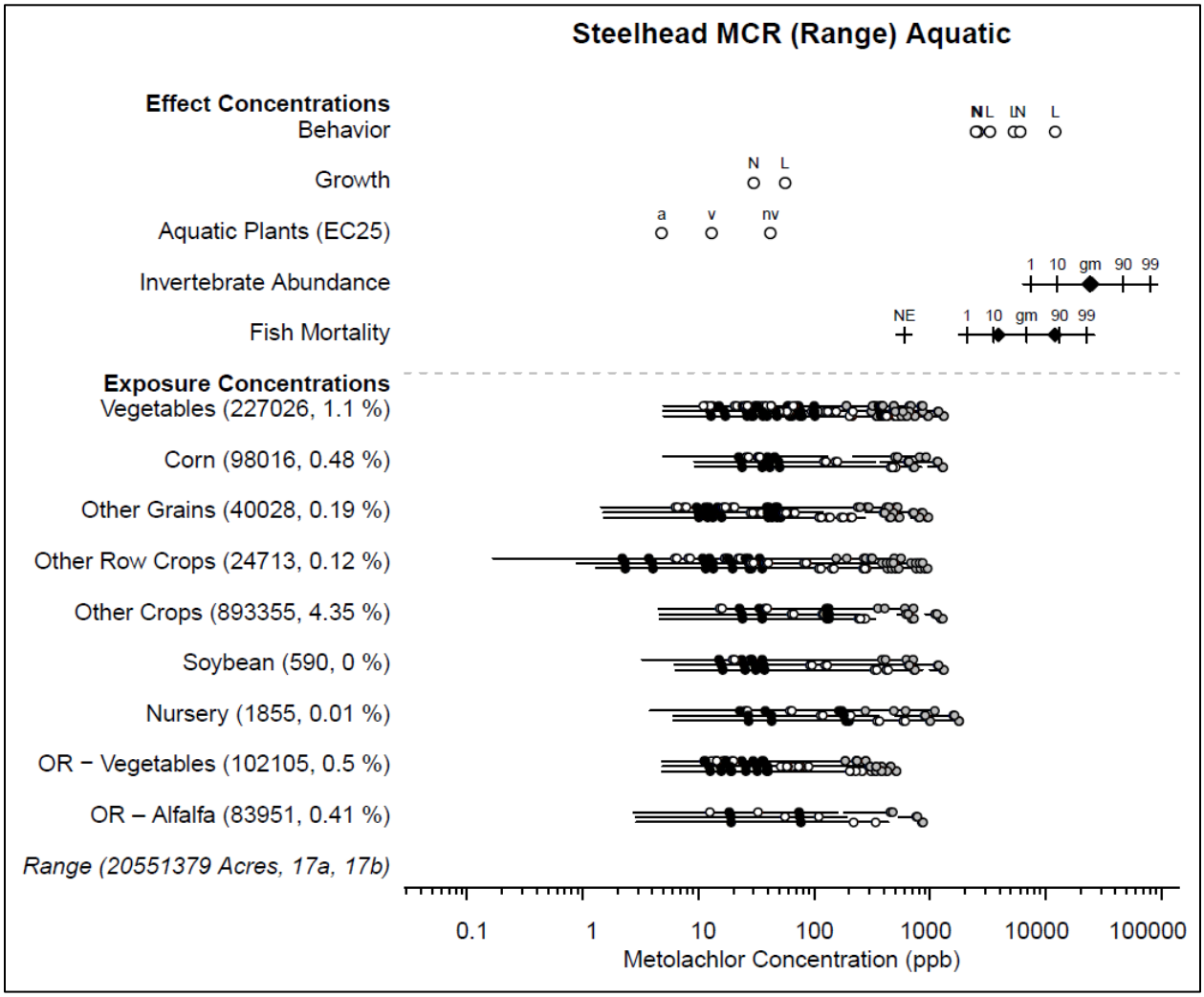


Figure 51. Effects analysis Risk-plot for Steelhead, Middle Columbia River DPS and Metolachlor

Table 293. Likelihood of exposure determination for Steelhead, Middle Columbia River DPS and Metolachlor

	Percent Overlap Category	Seasonal Analysis	Persistence	Multiple Applications	Proximity Analysis	Duration of migration/residency	Likelihood of Exposure
Vegetables	2	yes	no	yes	NA	3	Medium
Corn	1	yes	no	yes	yes	3	High
Other Grains	1	yes	no	yes	no	3	Low
Other Row Crops	1	yes	no	yes	yes	3	High
Other Crops	2	yes	no	yes	NA	3	Medium
Soybean	1	yes	no	yes	no	3	Low
Nursery	1	yes	no	yes	no	3	Low
OR - Vegetables	1	yes	no	yes	no	3	Low
OR - Alfalfa	1	yes	no	yes	no	3	Low

Table 294. Direct mortality risk hypothesis; Steelhead, Middle Columbia River DPS and Metolachlor

Endpoint: Mortality			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	1.1	Low	Medium
Corn	0.48	Low	High
Other Grains	0.19	Low	Low
Other Row Crops	0.12	Low	High
Other Crops	4.35	Low	Medium
Soybean	0	Low	Low
Nursery	0.01	Low	Low
OR - Vegetables	0.5	None Expected	Low
OR - Alfalfa	0.41	Low	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via acute lethality.			
Risk	**Confidence**		
Medium	**Low**		

Table 295. Prey risk hypothesis; Steelhead, Middle Columbia River DPS and Metolachlor

Endpoint: Prey			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	1.1	None Expected	Medium
Corn	0.48	None Expected	High
Other Grains	0.19	None Expected	Low

Other Row Crops	0.12	None Expected	High
Other Crops	4.35	None Expected	Medium
Soybean	0	None Expected	Low
Nursery	0.01	Low	Low
OR - Vegetables	0.5	None Expected	Low
OR - Alfalfa	0.41	None Expected	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via reduction in prey availability.			
Risk	**Confidence**		
Low	**High**		

Table 296. Growth risk hypothesis; Steelhead, Middle Columbia River DPS and Metolachlor

Endpoint: Growth			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	1.1	Medium	Medium
Corn	0.48	Medium	High
Other Grains	0.19	Medium	Low
Other Row Crops	0.12	Medium	High
Other Crops	4.35	Medium	Medium
Soybean	0	Medium	Low
Nursery	0.01	Medium	Low
OR - Vegetables	0.5	Medium	Low
OR - Alfalfa	0.41	Medium	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via impacts to growth (direct toxicity).			
Risk	**Confidence**		
High	**Low**		

Table 297. Behavior risk hypothesis; Steelhead, Middle Columbia River DPS and Metolachlor

Endpoint: Behavior			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	1.1	None Expected	Medium
Corn	0.48	None Expected	High
Other Grains	0.19	None Expected	Low
Other Row Crops	0.12	None Expected	High
Other Crops	4.35	None Expected	Medium
Soybean	0	None Expected	Low
Nursery	0.01	None Expected	Low

OR - Vegetables	0.5	None Expected	Low
OR - Alfalfa	0.41	None Expected	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.			
Risk	**Confidence**		
Low	**High**		

Table 298. Effects analysis summary table: Steelhead, Middle Columbia River DPS and Metolachlor

Risk Hypothesis	Risk-plot Derived		Population Model Results	Risk Hypothesis Supported? Yes/No
	Risk	Confidence		
Exposure to metolachlor is sufficient to reduce abundance via acute lethality.	Medium	Low	Not Applicable	No
Exposure to metolachlor is sufficient to reduce abundance via reduction in prey availability.	Low	High		No
Exposure to metolachlor is sufficient to reduce abundance via impacts to growth (direct toxicity).	High	Low		No
Exposure to metolachlor is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.	Low	High		No

Effects analysis summary: Steelhead, Middle Columbia River DPS are not anticipated to experience reductions in abundance through any of the risk hypotheses assessed from exposure to metolachlor or associated degradates. For metolachlor, some of the use categories have the potential to overestimate the spatial footprint of authorized use. We did not find support for the direct mortality risk hypothesis. Although risk associated with acute mortality is medium, we have low confidence in this determination because the likelihood of exposure characterizations are greater than would be anticipated. We did not find support for the growth risk hypothesis. Although we characterized risk associated with effects to growth as high, our confidence in this risk is low given the chronic exposure to metolachlor at the duration evaluated under this study is not expected. Where formulated products and tank mixtures containing metolachlor occur in aquatic habitats, individuals may experience increased toxicity. NMFS has determined the overall risk to the species from the effects of the action is medium and the confidence associated with that risk is low.

Medium Risk
Low Confidence
Less Risk
More Risk

12.3.22 Steelhead, Northern California DPS (*Oncorhynchus mykiss*)

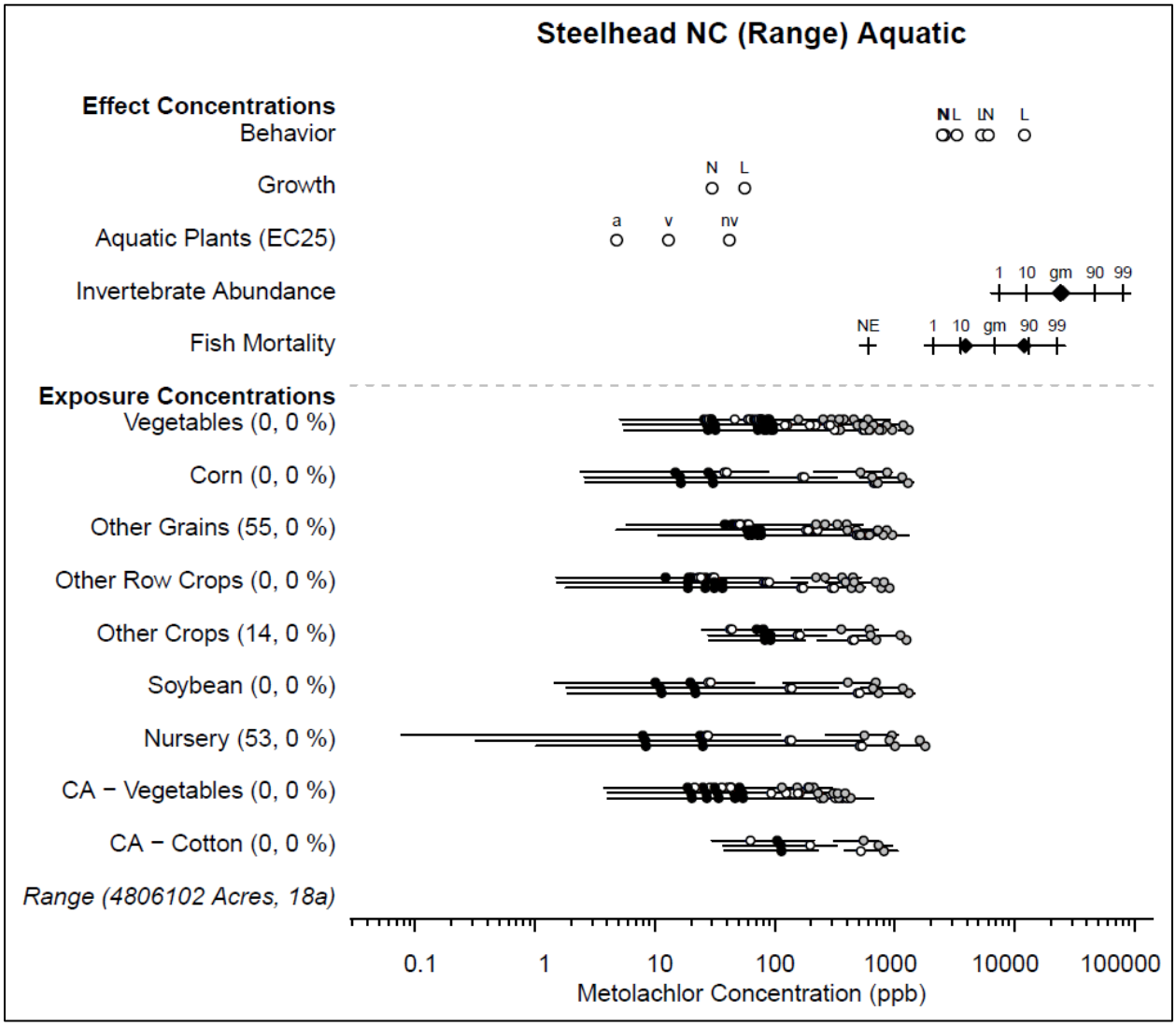


Figure 52. Effects analysis Risk-plot for Steelhead, Northern California DPS and Metolachlor

Table 299. Likelihood of exposure determination for Steelhead, Northern California DPS and Metolachlor

	Percent Overlap Category	Seasonal Analysis	Persistence	Multiple Applications	Proximity Analysis	Duration of migration/residency	Likelihood of Exposure
Vegetables	1	yes	no	yes	no	3	Low
Corn	1	yes	no	yes	no	3	Low
Other Grains	1	yes	no	yes	no	3	Low
Other Row Crops	1	yes	no	yes	no	3	Low
Other Crops	1	yes	no	yes	no	3	Low
Soybean	1	yes	no	yes	no	3	Low
Nursery	1	yes	no	yes	no	3	Low
CA - Vegetables	1	yes	no	yes	no	3	Low
CA - Cotton	1	yes	no	yes	no	3	Low

Table 300. Direct mortality risk hypothesis; Steelhead, Northern California DPS and Metolachlor

Endpoint: Mortality			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	0	Low	Low
Corn	0	Low	Low
Other Grains	0	Low	Low
Other Row Crops	0	Low	Low
Other Crops	0	Low	Low
Soybean	0	Low	Low
Nursery	0	Low	Low
CA - Vegetables	0	None Expected	Low
CA - Cotton	0	Low	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via acute lethality.			
Risk	**Confidence**		
Low	**High**		

Table 301. Prey risk hypothesis; Steelhead, Northern California DPS and Metolachlor

Endpoint: Prey			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	0	None Expected	Low
Corn	0	None Expected	Low
Other Grains	0	None Expected	Low

Other Row Crops	0	None Expected	Low
Other Crops	0	None Expected	Low
Soybean	0	None Expected	Low
Nursery	0	Low	Low
CA - Vegetables	0	None Expected	Low
CA - Cotton	0	None Expected	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via reduction in prey availability.			
Risk	**Confidence**		
Low	**High**		

Table 302. Growth risk hypothesis; Steelhead, Northern California DPS and Metolachlor

Endpoint: Growth			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	0	Medium	Low
Corn	0	Medium	Low
Other Grains	0	Medium	Low
Other Row Crops	0	Medium	Low
Other Crops	0	Medium	Low
Soybean	0	Medium	Low
Nursery	0	Medium	Low
CA - Vegetables	0	Medium	Low
CA - Cotton	0	Medium	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via impacts to growth (direct toxicity).			
Risk	**Confidence**		
Low	**High**		

Table 303. Behavior risk hypothesis; Steelhead, Northern California DPS and Metolachlor

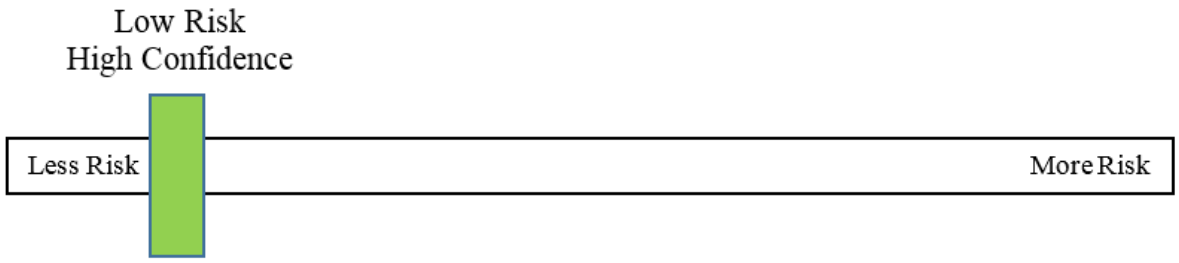
Endpoint: Behavior			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	0	None Expected	Low
Corn	0	None Expected	Low
Other Grains	0	None Expected	Low
Other Row Crops	0	None Expected	Low
Other Crops	0	None Expected	Low
Soybean	0	None Expected	Low
Nursery	0	None Expected	Low
CA - Vegetables	0	None Expected	Low
CA - Cotton	0	None Expected	Low

Risk Hypothesis: Exposure to metolachlor is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.		
Risk	**Confidence**	
Low	**High**	

Table 304. Effects analysis summary table: Steelhead, Northern California DPS and Metolachlor

Risk Hypothesis	Risk-plot Derived		Population Model Results	Risk Hypothesis Supported? Yes/No
	Risk	Confidence		
Exposure to metolachlor is sufficient to reduce abundance via acute lethality.	Low	High	Not Applicable	No
Exposure to metolachlor is sufficient to reduce abundance via reduction in prey availability.	Low	High		No
Exposure to metolachlor is sufficient to reduce abundance via impacts to growth (direct toxicity).	Low	High		No
Exposure to metolachlor is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.	Low	High		No

Effects analysis summary: Steelhead, Northern California DPS are not anticipated to experience reductions in abundance through any of the risk hypotheses assessed from exposure to metolachlor or associated degradates. We found no significant overlap of approved use sites within this species range. NMFS has determined that the risk to the species is insignificant from the effects of the action and the confidence associated with our risk determination is high given the low risk associated with all risk hypotheses evaluated.



12.3.23 Steelhead, Puget Sound DPS (*Oncorhynchus mykiss*)

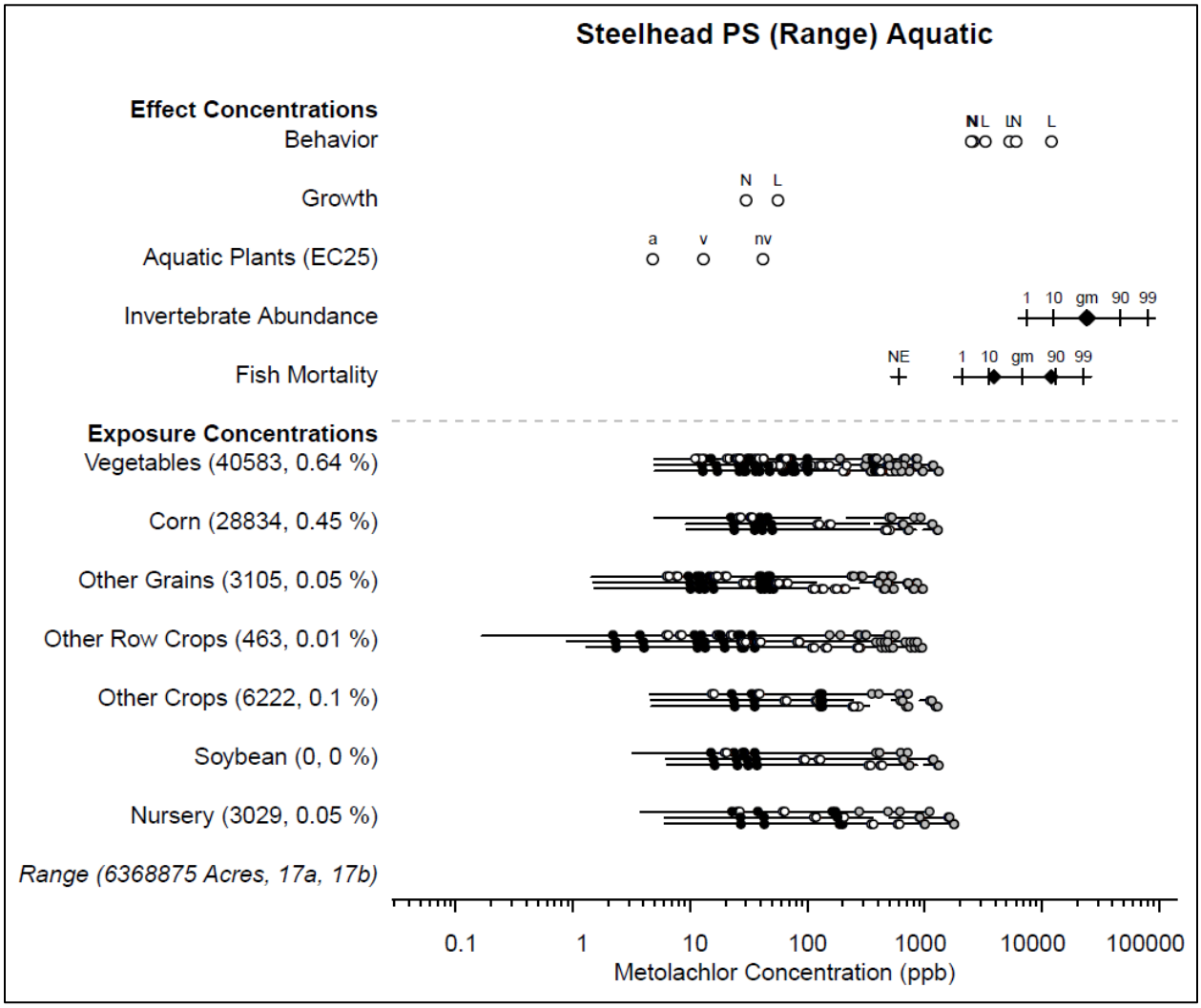


Figure 53. Effects analysis Risk-plot for Steelhead, Puget Sound DPS and Metolachlor

Table 305. Likelihood of exposure determination for Steelhead, Puget Sound DPS and Metolachlor

	Percent Overlap Category	Seasonal Analysis	Persistence	Multiple Applications	Proximity Analysis	Duration of migration/residency	Likelihood of Exposure
Vegetables	1	yes	no	yes	yes	3	**High**
Corn	1	yes	no	yes	yes	3	**High**
Other Grains	1	yes	no	yes	no	3	**Low**
Other Row Crops	1	yes	no	yes	no	3	**Low**
Other Crops	1	yes	no	yes	no	3	**Low**
Soybean	1	yes	no	yes	no	3	**Low**
Nursery	1	yes	no	yes	no	3	**Low**

Table 306. Direct mortality risk hypothesis; Steelhead, Puget Sound DPS and Metolachlor

Endpoint: Mortality			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	0.64	Low	High
Corn	0.45	Low	High
Other Grains	0.05	Low	Low
Other Row Crops	0.01	Low	Low
Other Crops	0.1	Low	Low
Soybean	0	Low	Low
Nursery	0.05	Low	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via acute lethality.			
Risk	**Confidence**		
Medium	**Low**		

Table 307. Prey risk hypothesis; Steelhead, Puget Sound DPS and Metolachlor

Endpoint: Prey			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	0.64	None Expected	High
Corn	0.45	None Expected	High
Other Grains	0.05	None Expected	Low
Other Row Crops	0.01	None Expected	Low
Other Crops	0.1	None Expected	Low
Soybean	0	None Expected	Low
Nursery	0.05	Low	Low

Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via reduction in prey availability.		
Risk	**Confidence**	
Low	**High**	

Table 308. Growth risk hypothesis; Steelhead, Puget Sound DPS and Metolachlor

Endpoint: Growth			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	0.64	Medium	High
Corn	0.45	Medium	High
Other Grains	0.05	Medium	Low
Other Row Crops	0.01	Medium	Low
Other Crops	0.1	Medium	Low
Soybean	0	Medium	Low
Nursery	0.05	Medium	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via impacts to growth (direct toxicity).			
Risk	**Confidence**		
High	**Low**		

Table 309. Behavior risk hypothesis; Steelhead, Puget Sound DPS and Metolachlor

Endpoint: Behavior			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	0.64	None Expected	High
Corn	0.45	None Expected	High
Other Grains	0.05	None Expected	Low
Other Row Crops	0.01	None Expected	Low
Other Crops	0.1	None Expected	Low
Soybean	0	None Expected	Low
Nursery	0.05	None Expected	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.			
Risk	**Confidence**		
Low	**High**		

Table 310. Effects analysis summary table: Steelhead, Puget Sound DPS and Metolachlor

Risk Hypothesis	Risk-plot Derived		Population Model Results	Risk Hypothesis Supported?
	Risk	**Confidence**		

				Yes/No
Exposure to metolachlor is sufficient to reduce abundance via acute lethality.	Medium	Low	Not Applicable	No
Exposure to metolachlor is sufficient to reduce abundance via reduction in prey availability.	Low	High		No
Exposure to metolachlor is sufficient to reduce abundance via impacts to growth (direct toxicity).	High	Low		No
Exposure to metolachlor is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.	Low	High		No

Effects analysis summary: Steelhead, Puget Sound DPS are not anticipated to experience reductions in abundance through any of the risk hypotheses assessed from exposure to metolachlor or associated degradates. For metolachlor, some of the use categories have the potential to overestimate the spatial footprint of authorized use. We did not find support for the direct mortality risk hypothesis. Although risk associated with acute mortality is medium, we have low confidence in this determination because the likelihood of exposure characterizations are greater than would be anticipated. We did not find support for the growth risk hypothesis. Although we characterized risk associated with effects to growth as high, our confidence in this risk is low given the chronic exposure to metolachlor at the duration evaluated under this study is not expected. Where formulated products and tank mixtures containing metolachlor occur in aquatic habitats, individuals may experience increased toxicity. NMFS has determined the overall risk to the species from the effects of the action is medium and the confidence associated with that risk is low.

12.3.24 Steelhead, Snake River Basin DPS (*Oncorhynchus mykiss*)

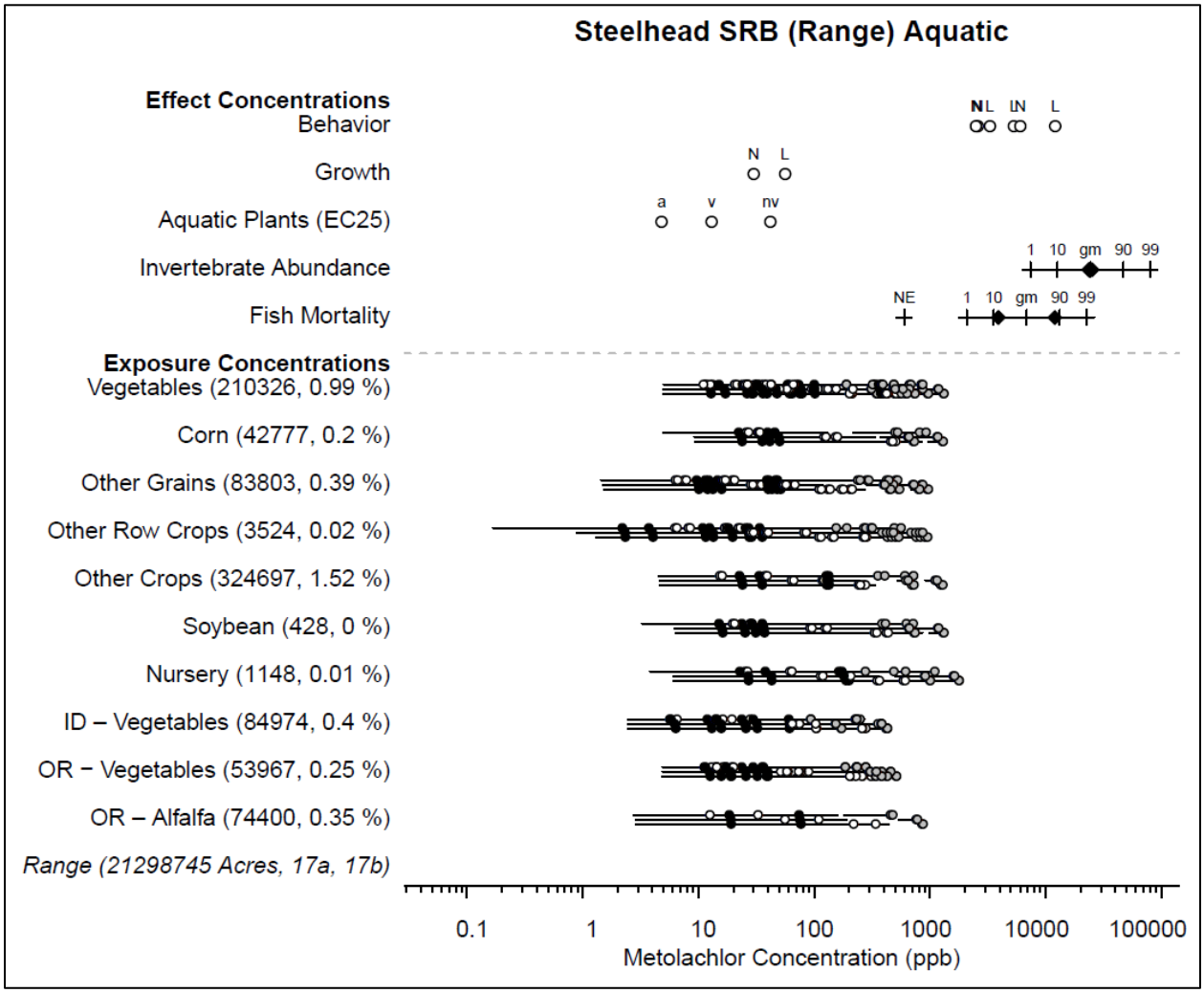


Figure 54. Effects analysis Risk-plot for Steelhead, Snake River Basin DPS and Metolachlor

Table 311. Likelihood of exposure determination for Steelhead, Snake River Basin DPS and Metolachlor

	Percent Overlap Category	Seasonal Analysis	Persistence	Multiple Applications	Proximity Analysis	Duration of migration/residency	Likelihood of Exposure
Vegetables	2	yes	no	yes	NA	3	Medium
Corn	1	yes	no	yes	yes	3	High
Other Grains	1	yes	no	yes	yes	3	High
Other Row Crops	1	yes	no	yes	no	3	Low
Other Crops	2	yes	no	yes	NA	3	Medium
Soybean	1	yes	no	yes	no	3	Low
Nursery	1	yes	no	yes	no	3	Low
ID - Vegetables	1	yes	no	yes	no	3	Low
OR - Vegetables	1	yes	no	yes	no	3	Low
OR - Alfalfa	1	yes	no	yes	no	3	Low

Table 312. Direct mortality risk hypothesis; Steelhead, Snake River Basin DPS and Metolachlor

Endpoint: Mortality			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	0.99	Low	Medium
Corn	0.2	Low	High
Other Grains	0.39	Low	High
Other Row Crops	0.02	Low	Low
Other Crops	1.52	Low	Medium
Soybean	0	Low	Low
Nursery	0.01	Low	Low
ID – Vegetables	0.4	Low	Low
OR - Vegetables	0.25	None Expected	Low
OR - Alfalfa	0.35	Low	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via acute lethality.			
Risk	**Confidence**		
Medium	**Low**		

Table 313. Prey risk hypothesis; Steelhead, Snake River Basin DPS and Metolachlor

Endpoint: Prey			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	0.99	None Expected	Medium

Corn	0.2	None Expected	High
Other Grains	0.39	None Expected	High
Other Row Crops	0.02	None Expected	Low
Other Crops	1.52	None Expected	Medium
Soybean	0	None Expected	Low
Nursery	0.01	Low	Low
ID – Vegetables	0.4	None Expected	Low
OR - Vegetables	0.25	None Expected	Low
OR - Alfalfa	0.35	None Expected	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via reduction in prey availability.			
Risk	**Confidence**		
Low	**High**		

Table 314. Growth risk hypothesis; Steelhead, Snake River Basin DPS and Metolachlor

Endpoint: Growth			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	0.99	Medium	Medium
Corn	0.2	Medium	High
Other Grains	0.39	Medium	High
Other Row Crops	0.02	Medium	Low
Other Crops	1.52	Medium	Medium
Soybean	0	Medium	Low
Nursery	0.01	Medium	Low
ID – Vegetables	0.4	Medium	Low
OR - Vegetables	0.25	Medium	Low
OR - Alfalfa	0.35	Medium	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via impacts to growth (direct toxicity).			
Risk	**Confidence**		
High	**Low**		

Table 315. Behavior risk hypothesis; Steelhead, Snake River Basin DPS and Metolachlor

Endpoint: Behavior			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	0.99	None Expected	Medium
Corn	0.2	None Expected	High
Other Grains	0.39	None Expected	High
Other Row Crops	0.02	None Expected	Low
Other Crops	1.52	None Expected	Medium

Soybean	0	None Expected	Low
Nursery	0.01	None Expected	Low
ID – Vegetables	0.4	None Expected	Low
OR - Vegetables	0.25	None Expected	Low
OR - Alfalfa	0.35	None Expected	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.			
Risk	**Confidence**		
Low	**High**		

Table 316. Effects analysis summary table: Steelhead, Snake River Basin DPS and Metolachlor

Risk Hypothesis	Risk-plot Derived		Population Model Results	Risk Hypothesis Supported? Yes/No
	Risk	Confidence		
Exposure to metolachlor is sufficient to reduce abundance via acute lethality.	Medium	Low	Not Applicable	No
Exposure to metolachlor is sufficient to reduce abundance via reduction in prey availability.	Low	High		No
Exposure to metolachlor is sufficient to reduce abundance via impacts to growth (direct toxicity).	High	Low		No
Exposure to metolachlor is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.	Low	High		No

Effects analysis summary: Steelhead, Snake River Basin DPS are not anticipated to experience reductions in abundance through any of the risk hypotheses assessed from exposure to metolachlor or associated degradates. For metolachlor, some of the use categories have the potential to overestimate the spatial footprint of authorized use. We did not find support for the direct mortality risk hypothesis. Although risk associated with acute mortality is medium, we have low confidence in this determination because the likelihood of exposure characterizations are greater than would be anticipated. We did not find support for the growth risk hypothesis. Although we characterized risk associated with effects to growth as high, our confidence in this risk is low given the chronic exposure to metolachlor at the duration evaluated under this study is not expected. Where formulated products and tank mixtures containing metolachlor occur in aquatic habitats, individuals may experience increased toxicity. NMFS has determined the

overall risk to the species from the effects of the action is medium and the confidence associated with that risk is low.

12.3.25 Steelhead, South-Central California Coast DPS (*Oncorhynchus mykiss*)

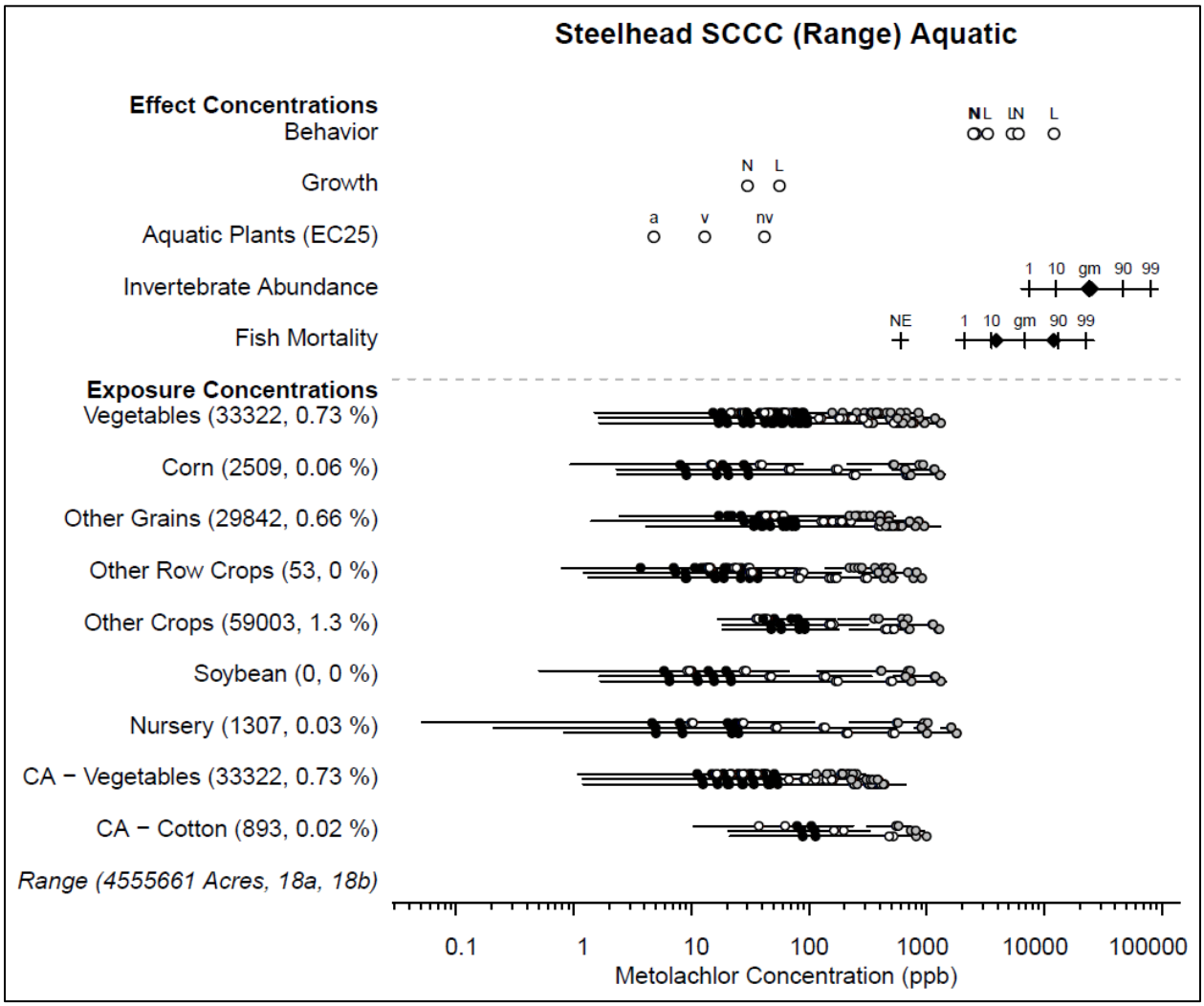


Figure 55. Effects analysis Risk-plot for Steelhead, South-Central California Coast DPS and Metolachlor

Table 317. Likelihood of exposure determination for Steelhead, South-Central California Coast DPS and Metolachlor

	Percent Overlap Category	Seasonal Analysis	Persistence	Multiple Applications	Proximity Analysis	Duration of migration/residency	Likelihood of Exposure
Vegetables	1	yes	no	yes	yes	3	**High**
Corn	1	yes	no	yes	yes	3	**High**
Other Grains	1	yes	no	yes	yes	3	**High**
Other Row Crops	1	yes	no	yes	no	3	**Low**
Other Crops	2	yes	no	yes	NA	3	**Medium**
Soybean	1	yes	no	yes	no	3	**Low**
Nursery	1	yes	no	yes	no	3	**Low**
CA - Vegetables	1	yes	no	yes	yes	3	**High**
CA - Cotton	1	yes	no	yes	no	3	**Low**

Table 318. Direct mortality risk hypothesis; Steelhead, South-Central California Coast DPS and Metolachlor

Endpoint: Mortality			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	0.73	Low	High
Corn	0.06	Low	High
Other Grains	0.66	Low	High
Other Row Crops	0	Low	Low
Other Crops	1.3	Low	Medium
Soybean	0	Low	Low
Nursery	0.03	Low	Low
CA - Vegetables	0.73	None Expected	High
CA - Cotton	0.02	Low	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via acute lethality.			
Risk	**Confidence**		
Medium	**Low**		

Table 319. Prey risk hypothesis; Steelhead, South-Central California Coast DPS and Metolachlor

Endpoint: Prey			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	0.73	None Expected	High
Corn	0.06	None Expected	High

Other Grains	0.66	None Expected	High
Other Row Crops	0	None Expected	Low
Other Crops	1.3	None Expected	Medium
Soybean	0	None Expected	Low
Nursery	0.03	Low	Low
CA - Vegetables	0.73	None Expected	High
CA - Cotton	0.02	None Expected	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via reduction in prey availability.			
Risk	**Confidence**		
Low	**High**		

Table 320. Growth risk hypothesis; Steelhead, South-Central California Coast DPS and Metolachlor

Endpoint: Growth			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	0.73	Medium	High
Corn	0.06	Medium	High
Other Grains	0.66	Medium	High
Other Row Crops	0	Medium	Low
Other Crops	1.3	Medium	Medium
Soybean	0	Medium	Low
Nursery	0.03	Medium	Low
CA - Vegetables	0.73	Medium	High
CA - Cotton	0.02	Medium	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via impacts to growth (direct toxicity).			
Risk	**Confidence**		
High	**Low**		

Table 321. Behavior risk hypothesis; Steelhead, South-Central California Coast DPS and Metolachlor

Endpoint: Behavior			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	0.73	None Expected	High
Corn	0.06	None Expected	High
Other Grains	0.66	None Expected	High
Other Row Crops	0	None Expected	Low
Other Crops	1.3	None Expected	Medium
Soybean	0	None Expected	Low

Nursery	0.03	None Expected	Low
CA - Vegetables	0.73	None Expected	High
CA - Cotton	0.02	None Expected	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.			
Risk	**Confidence**		
Low	**High**		

Table 322. Effects analysis summary table: Steelhead, South-Central California Coast DPS and Metolachlor

Risk Hypothesis	Risk-plot Derived		Population Model Results	Risk Hypothesis Supported? Yes/No
	Risk	Confidence		
Exposure to metolachlor is sufficient to reduce abundance via acute lethality.	Medium	Low	Not Applicable	No
Exposure to metolachlor is sufficient to reduce abundance via reduction in prey availability.	Low	High		No
Exposure to metolachlor is sufficient to reduce abundance via impacts to growth (direct toxicity).	High	Low		No
Exposure to metolachlor is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.	Low	High		No

Effects analysis summary: Steelhead, South-Central California Coast DPS are not anticipated to experience reductions in abundance through any of the risk hypotheses assessed from exposure to metolachlor or associated degradates. For metolachlor, some of the use categories have the potential to overestimate the spatial footprint of authorized use. We did not find support for the direct mortality risk hypothesis. Although risk associated with acute mortality is medium, we have low confidence in this determination because the likelihood of exposure characterizations are greater than would be anticipated. We did not find support for the growth risk hypothesis. Although we characterized risk associated with effects to growth as high, our confidence in this risk is low given the chronic exposure to metolachlor at the duration evaluated under this study is not expected. Where formulated products and tank mixtures containing metolachlor occur in aquatic habitats, individuals may experience increased toxicity. NMFS has determined the overall risk to the species from the effects of the action is medium and the confidence associated with that risk is low.

Medium Risk
Low Confidence
Less Risk
More Risk

12.3.26 Steelhead, Southern California DPS (*Oncorhynchus mykiss*)

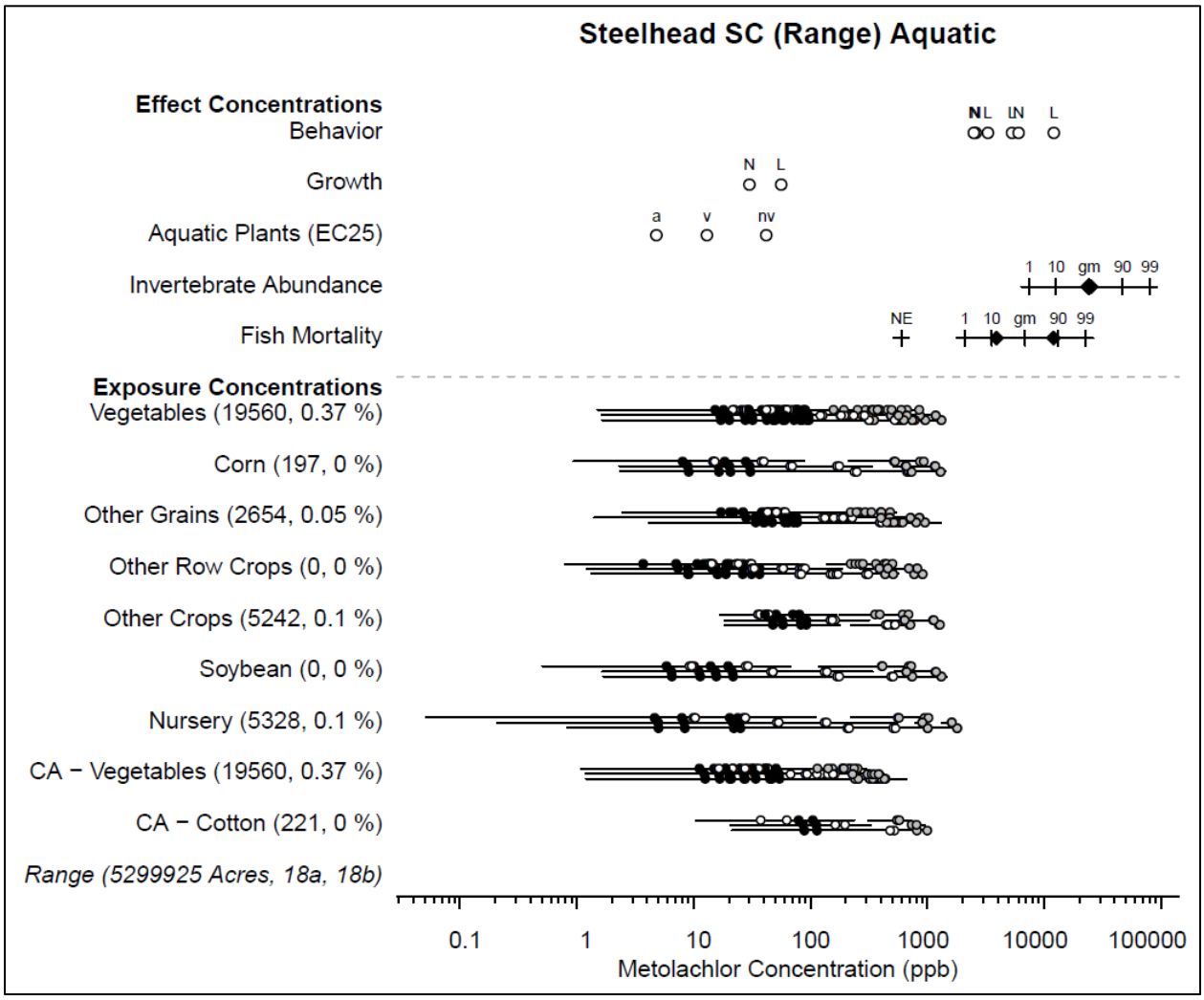


Figure 56. Effects analysis Risk-plot for Steelhead, Southern California DPS and Metolachlor

Table 323. Likelihood of exposure determination for Steelhead, Southern California DPS and Metolachlor

	Percent Overlap Category	Seasonal Analysis	Persistence	Multiple Applications	Proximity Analysis	Duration of migration/residency	Likelihood of Exposure
Vegetables	1	yes	no	yes	yes	3	**High**
Corn	1	yes	no	yes	yes	3	**High**
Other Grains	1	yes	no	yes	yes	3	**High**
Other Row Crops	1	yes	no	yes	no	3	**Low**
Other Crops	1	yes	no	yes	yes	3	**High**
Soybean	1	yes	no	yes	no	3	**Low**
Nursery	1	yes	no	yes	no	3	**Low**
CA - Vegetables	1	yes	no	yes	yes	3	**High**
CA - Cotton	1	yes	no	yes	yes	3	**High**

Table 324. Direct mortality risk hypothesis; Steelhead, Southern California DPS and Metolachlor

Endpoint: Mortality			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	0.37	Low	High
Corn	0	Low	High
Other Grains	0.05	Low	High
Other Row Crops	0	Low	Low
Other Crops	0.1	Low	High
Soybean	0	Low	Low
Nursery	0.1	Low	Low
CA - Vegetables	0.37	None Expected	High
CA - Cotton	0	Low	High
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via acute lethality.			
Risk	**Confidence**		
Medium	**Low**		

Table 325. Prey risk hypothesis; Steelhead, Southern California DPS and Metolachlor

Endpoint: Prey			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	0.37	None Expected	High
Corn	0	None Expected	High
Other Grains	0.05	None Expected	High

Other Row Crops	0	None Expected	Low
Other Crops	0.1	None Expected	High
Soybean	0	None Expected	Low
Nursery	0.1	Low	Low
CA - Vegetables	0.37	None Expected	High
CA - Cotton	0	None Expected	High
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via reduction in prey availability.			
Risk	**Confidence**		
Low	**High**		

Table 326. Growth risk hypothesis; Steelhead, Southern California DPS and Metolachlor

Endpoint: Growth			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	0.37	Medium	High
Corn	0	Medium	High
Other Grains	0.05	Medium	High
Other Row Crops	0	Medium	Low
Other Crops	0.1	Medium	High
Soybean	0	Medium	Low
Nursery	0.1	Medium	Low
CA - Vegetables	0.37	Medium	High
CA - Cotton	0	Medium	High
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via impacts to growth (direct toxicity).			
Risk	**Confidence**		
High	**Low**		

Table 327. Behavior risk hypothesis; Steelhead, Southern California DPS and Metolachlor

Endpoint: Behavior			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	0.37	None Expected	High
Corn	0	None Expected	High
Other Grains	0.05	None Expected	High
Other Row Crops	0	None Expected	Low
Other Crops	0.1	None Expected	High
Soybean	0	None Expected	Low
Nursery	0.1	None Expected	Low
CA - Vegetables	0.37	None Expected	High
CA - Cotton	0	None Expected	High

Risk Hypothesis: Exposure to metolachlor is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.		
Risk	**Confidence**	
Low	**High**	

Table 328. Effects analysis summary table: Steelhead, Southern California DPS and Metolachlor

Risk Hypothesis	Risk-plot Derived		Population Model Results	Risk Hypothesis Supported? Yes/No
	Risk	Confidence		
Exposure to metolachlor is sufficient to reduce abundance via acute lethality.	Medium	Low	Not Applicable	No
Exposure to metolachlor is sufficient to reduce abundance via reduction in prey availability.	Low	High		No
Exposure to metolachlor is sufficient to reduce abundance via impacts to growth (direct toxicity).	High	Low		No
Exposure to metolachlor is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.	Low	High		No

Effects analysis summary: Steelhead, Southern California DPS are not anticipated to experience reductions in abundance through any of the risk hypotheses assessed from exposure to metolachlor or associated degradates. For metolachlor, some of the use categories have the potential to overestimate the spatial footprint of authorized use. We did not find support for the direct mortality risk hypothesis. Although risk associated with acute mortality is medium, we have low confidence in this determination because the likelihood of exposure characterizations are greater than would be anticipated. We did not find support for the growth risk hypothesis. Although we characterized risk associated with effects to growth as high, our confidence in this risk is low given the chronic exposure to metolachlor at the duration evaluated under this study is not expected. Where formulated products and tank mixtures containing metolachlor occur in aquatic habitats, individuals may experience increased toxicity. NMFS has determined the overall risk to the species from the effects of the action is medium and the confidence associated with that risk is low.

Medium Risk
Low Confidence
Less Risk
More Risk

12.3.27 Steelhead, Upper Columbia River DPS (*Oncorhynchus mykiss*)

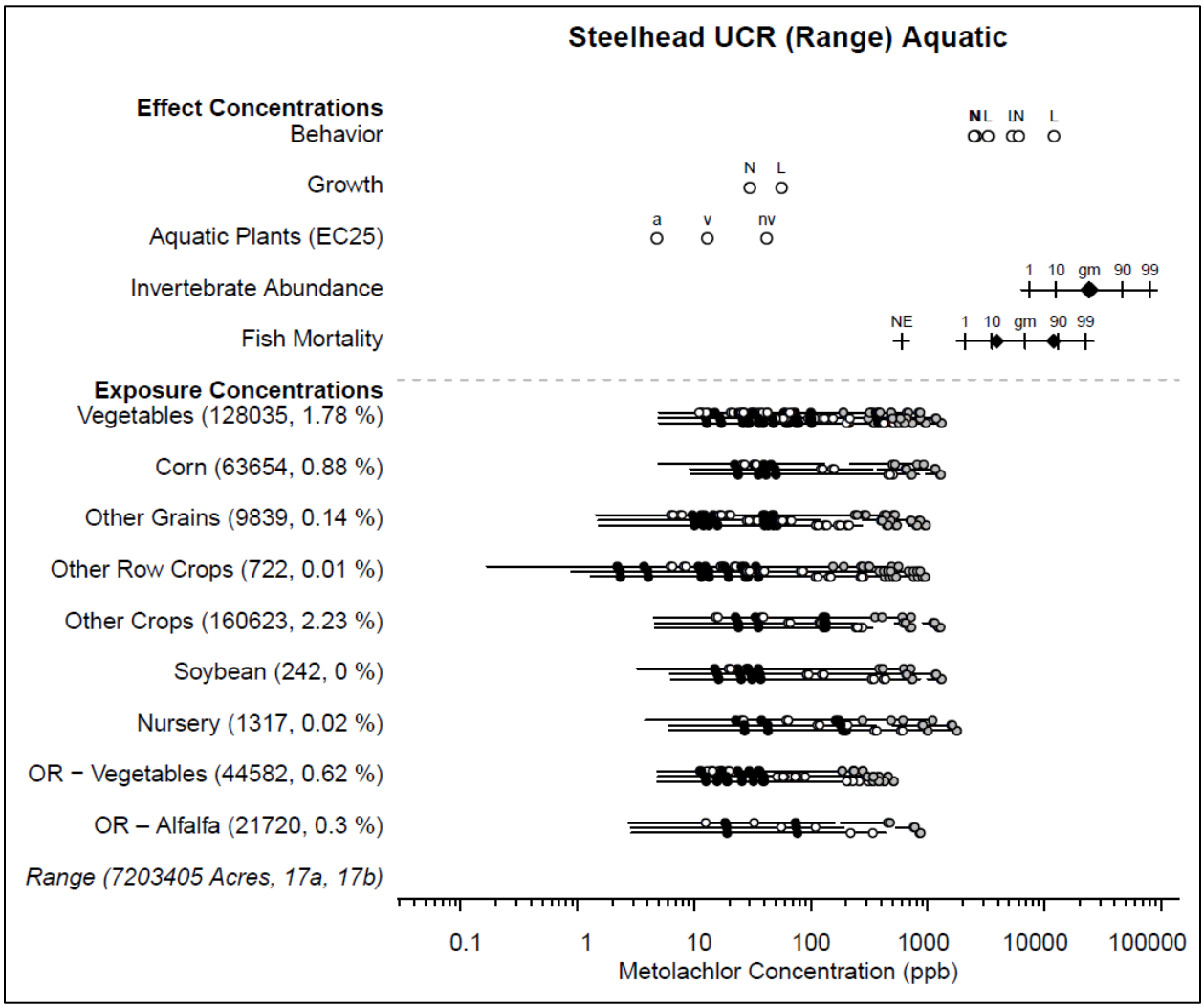


Figure 57. Effects analysis Risk-plot for Steelhead, Upper Columbia River DPS and Metolachlor

Table 329. Likelihood of exposure determination for Steelhead, Upper Columbia River DPS and Metolachlor

	Percent Overlap Category	Seasonal Analysis	Persistence	Multiple Applications	Proximity Analysis	Duration of migration/residency	Likelihood of Exposure
Vegetables	2	yes	no	yes	NA	3	Medium
Corn	1	yes	no	yes	yes	3	High
Other Grains	1	yes	no	yes	no	3	Low
Other Row Crops	1	yes	no	yes	no	3	Low
Other Crops	2	yes	no	yes	NA	3	Medium
Soybean	1	yes	no	yes	no	3	Low
Nursery	1	yes	no	yes	no	3	Low
OR - Vegetables	1	yes	no	yes	no	3	Low
OR - Alfalfa	1	yes	no	yes	no	3	Low

Table 330. Direct mortality risk hypothesis; Steelhead, Upper Columbia River DPS and Metolachlor

Endpoint: Mortality			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	1.78	Low	Medium
Corn	0.88	Low	High
Other Grains	0.14	Low	Low
Other Row Crops	0.01	Low	Low
Other Crops	2.23	Low	Medium
Soybean	0	Low	Low
Nursery	0.02	Low	Low
OR - Vegetables	0.62	None Expected	Low
OR - Alfalfa	0.3	Low	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via acute lethality.			
Risk	**Confidence**		
Medium	**Low**		

Table 331. Prey risk hypothesis; Steelhead, Upper Columbia River DPS and Metolachlor

Endpoint: Prey			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	1.78	None Expected	Medium
Corn	0.88	None Expected	High
Other Grains	0.14	None Expected	Low

Other Row Crops	0.01	None Expected	Low
Other Crops	2.23	None Expected	Medium
Soybean	0	None Expected	Low
Nursery	0.02	Low	Low
OR - Vegetables	0.62	None Expected	Low
OR - Alfalfa	0.3	None Expected	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via reduction in prey availability.			
Risk	**Confidence**		
Low	**High**		

Table 332. Growth risk hypothesis; Steelhead, Upper Columbia River DPS and Metolachlor

Endpoint: Growth			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	1.78	Medium	Medium
Corn	0.88	Medium	High
Other Grains	0.14	Medium	Low
Other Row Crops	0.01	Medium	Low
Other Crops	2.23	Medium	Medium
Soybean	0	Medium	Low
Nursery	0.02	Medium	Low
OR - Vegetables	0.62	Medium	Low
OR - Alfalfa	0.3	Medium	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via impacts to growth (direct toxicity).			
Risk	**Confidence**		
High	**Low**		

Table 333. Behavior risk hypothesis; Steelhead, Upper Columbia River DPS and Metolachlor

Endpoint: Behavior			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	1.78	None Expected	Medium
Corn	0.88	None Expected	High
Other Grains	0.14	None Expected	Low
Other Row Crops	0.01	None Expected	Low
Other Crops	2.23	None Expected	Medium
Soybean	0	None Expected	Low
Nursery	0.02	None Expected	Low

OR - Vegetables	0.62	None Expected	Low
OR - Alfalfa	0.3	None Expected	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.			
Risk	**Confidence**		
Low	**High**		

Table 334. Effects analysis summary table: Steelhead, Upper Columbia River DPS and Metolachlor

Risk Hypothesis	**Risk-plot Derived**		**Population Model Results**	**Risk Hypothesis Supported? Yes/No**
	Risk	**Confidence**		
Exposure to metolachlor is sufficient to reduce abundance via acute lethality.	Medium	Low	Not Applicable	No
Exposure to metolachlor is sufficient to reduce abundance via reduction in prey availability.	Low	High		No
Exposure to metolachlor is sufficient to reduce abundance via impacts to growth (direct toxicity).	High	Low		No
Exposure to metolachlor is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.	Low	High		No

Effects analysis summary: Steelhead, Upper Columbia River DPS are not anticipated to experience reductions in abundance through any of the risk hypotheses assessed from exposure to metolachlor or associated degradates. For metolachlor, some of the use categories have the potential to overestimate the spatial footprint of authorized use. We did not find support for the direct mortality risk hypothesis. Although risk associated with acute mortality is medium, we have low confidence in this determination because the likelihood of exposure characterizations are greater than would be anticipated. We did not find support for the growth risk hypothesis. Although we characterized risk associated with effects to growth as high, our confidence in this risk is low given the chronic exposure to metolachlor at the duration evaluated under this study is not expected. Where formulated products and tank mixtures containing metolachlor occur in aquatic habitats, individuals may experience increased toxicity. NMFS has determined the overall risk to the species from the effects of the action is medium and the confidence associated

with that risk is low.

12.3.28 Steelhead, Upper Willamette River DPS (*Oncorhynchus mykiss*)

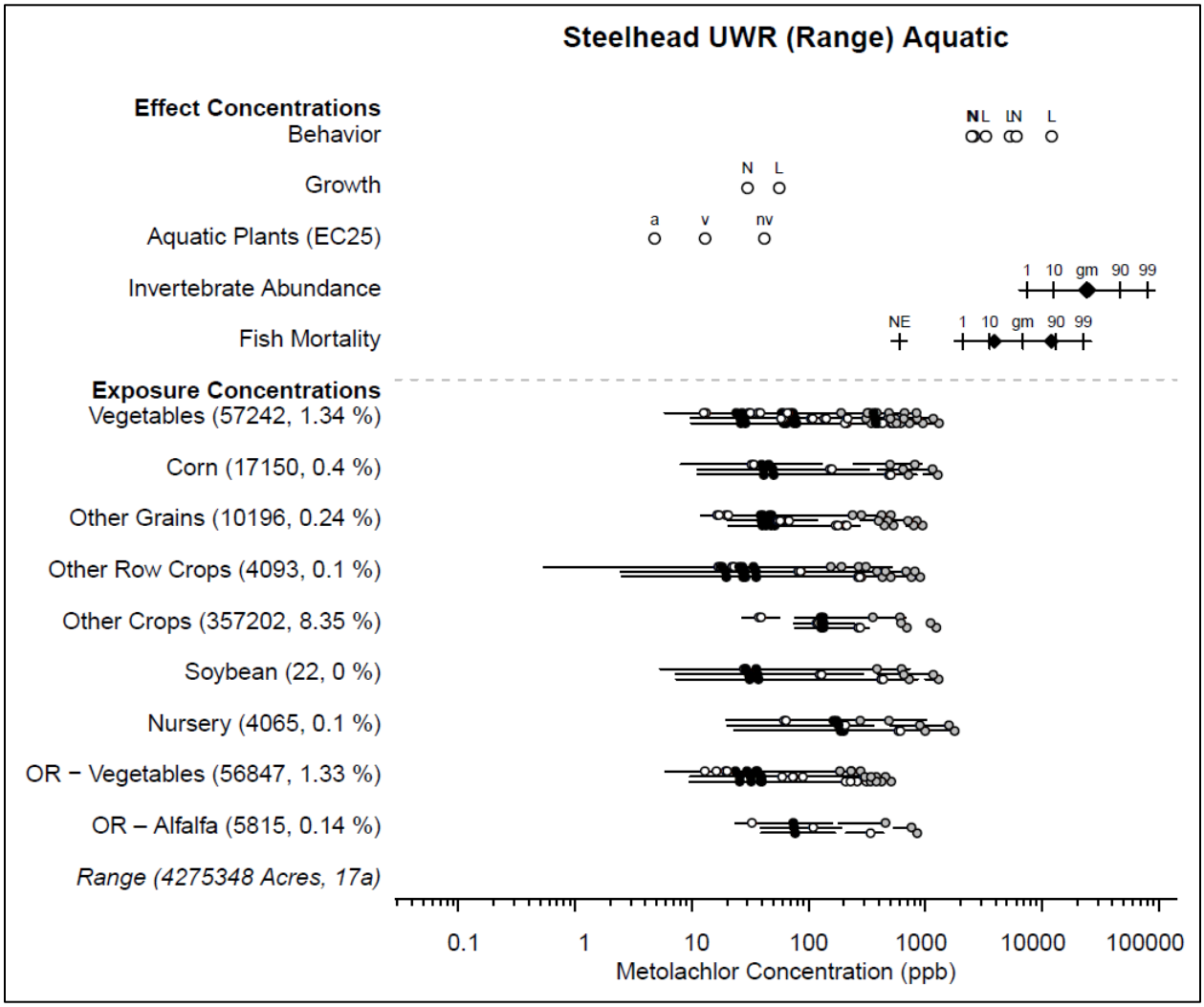


Figure 58. Effects analysis Risk-plot for Steelhead, Upper Willamette River DPS and Metolachlor

Table 335. Likelihood of exposure determination for Steelhead, Upper Willamette River DPS and Metolachlor

	Percent Overlap Category	Seasonal Analysis	Persistence	Multiple Applications	Proximity Analysis	Duration of migration/residency	Likelihood of Exposure
Vegetables	2	yes	no	yes	NA	3	**Medium**
Corn	1	yes	no	yes	yes	3	**High**
Other Grains	1	yes	no	yes	yes	3	**High**
Other Row Crops	1	yes	no	yes	yes	3	**High**
Other Crops	3	yes	no	yes	NA	3	**High**
Soybean	1	yes	no	yes	no	3	**Low**
Nursery	1	yes	no	yes	no	3	**Low**
OR - Vegetables	2	yes	no	yes	NA	3	**Medium**
OR - Alfalfa	1	yes	no	yes	no	3	**Low**

Table 336. Direct mortality risk hypothesis; Steelhead, Upper Willamette River DPS and Metolachlor

Endpoint: Mortality			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	1.34	Low	Medium
Corn	0.4	Low	High
Other Grains	0.24	Low	High
Other Row Crops	0.1	Low	High
Other Crops	8.35	Low	High
Soybean	0	Low	Low
Nursery	0.1	Low	Low
OR - Vegetables	1.33	None Expected	Medium
OR - Alfalfa	0.14	Low	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via acute lethality.			
Risk	**Confidence**		
Medium	**Low**		

Table 337. Prey risk hypothesis; Steelhead, Upper Willamette River DPS and Metolachlor

Endpoint: Prey			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	1.34	None Expected	Medium
Corn	0.4	None Expected	High
Other Grains	0.24	None Expected	High

Other Row Crops	0.1	None Expected	High
Other Crops	8.35	None Expected	High
Soybean	0	None Expected	Low
Nursery	0.1	Low	Low
OR - Vegetables	1.33	None Expected	Medium
OR - Alfalfa	0.14	None Expected	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via reduction in prey availability.			
Risk	**Confidence**		
Low	**High**		

Table 338. Growth risk hypothesis; Steelhead, Upper Willamette River DPS and Metolachlor

Endpoint: Growth			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	1.34	Medium	Medium
Corn	0.4	Medium	High
Other Grains	0.24	Medium	High
Other Row Crops	0.1	Medium	High
Other Crops	8.35	Medium	High
Soybean	0	Medium	Low
Nursery	0.1	Medium	Low
OR - Vegetables	1.33	Medium	Medium
OR - Alfalfa	0.14	Medium	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce abundance via impacts to growth (direct toxicity).			
Risk	**Confidence**		
High	**Low**		

Table 339. Behavior risk hypothesis; Steelhead, Upper Willamette River DPS and Metolachlor

Endpoint: Behavior			
Use Category	**% Overlap**	**Effect of Exposure**	**Likelihood of Exposure**
Vegetables	1.34	None Expected	Medium
Corn	0.4	None Expected	High
Other Grains	0.24	None Expected	High
Other Row Crops	0.1	None Expected	High
Other Crops	8.35	None Expected	High
Soybean	0	None Expected	Low
Nursery	0.1	None Expected	Low

OR - Vegetables	1.33	None Expected	Medium
OR - Alfalfa	0.14	None Expected	Low
Risk Hypothesis: Exposure to metolachlor is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.			
Risk	**Confidence**		
Low	**High**		

Table 340. Effects analysis summary table: Steelhead, Upper Willamette River DPS and Metolachlor

Risk Hypothesis	Risk-plot Derived		Population Model Results	Risk Hypothesis Supported? Yes/No
	Risk	Confidence		
Exposure to metolachlor is sufficient to reduce abundance via acute lethality.	Medium	Low	Not Applicable	No
Exposure to metolachlor is sufficient to reduce abundance via reduction in prey availability.	Low	High		No
Exposure to metolachlor is sufficient to reduce abundance via impacts to growth (direct toxicity).	High	Low		No
Exposure to metolachlor is sufficient to reduce adult and juvenile abundance and adult productivity via impairments to ecologically significant behaviors.	Low	High		No

Effects analysis summary: Steelhead, Upper Willamette River DPS are not anticipated to experience reductions in abundance through any of the risk hypotheses assessed from exposure to metolachlor or associated degradates. For metolachlor, some of the use categories have the potential to overestimate the spatial footprint of authorized use. We did not find support for the direct mortality risk hypothesis. Although risk associated with acute mortality is medium, we have low confidence in this determination because the likelihood of exposure characterizations are greater than would be anticipated. We did not find support for the growth risk hypothesis. Although we characterized risk associated with effects to growth as high, our confidence in this risk is low given the chronic exposure to metolachlor at the duration evaluated under this study is not expected. Where formulated products and tank mixtures containing metolachlor occur in aquatic habitats, individuals may experience increased toxicity. NMFS has determined the overall risk to the species from the effects of the action is medium and the confidence associated with that risk is low.

Medium Risk
Low Confidence
Less Risk
More Risk

Table 341. Summary of risk and confidence determinations for products containing 1,3-Dichloropropene and Pacific Salmonids.

Salmon Type	ESU/DPS	Risk	Confidence
Chum	Columbia River	Medium	Low
Chum	Hood Canal summer-run	Medium	Low
Chinook	California Coastal	Low	High
Chinook	CA Central Valley spring-run	Medium	Low
Chinook	Lower Columbia River	Medium	Low
Chinook	Puget Sound	Medium	Low
Chinook	Sacramento River winter-run	Medium	Low
Chinook	Snake River fall-run	Medium	Low
Chinook	Snake River spring/summer-run	Medium	Low
Chinook	Upper Columbia River spring-run	Medium	Low
Chinook	Upper Willamette River	Medium	Low
Coho	Central California Coast	Medium	Low
Coho	Lower Columbia River	Medium	Low
Coho	Oregon Coast	Low	High
Coho	S. Oregon N. California Coast	Medium	Low
Sockeye	Ozette Lake	Low	High
Sockeye	Snake River	Medium	Low
Steelhead	CA Central Valley	Medium	Low
Steelhead	Central California Coast	Medium	Low
Steelhead	Lower Columbia River	Medium	Low
Steelhead	Middle Columbia River	Medium	Low
Steelhead	Northern California	Low	High
Steelhead	Puget Sound	Medium	Low
Steelhead	Snake River Basin	Medium	Low
Steelhead	South-Central California Coast	Medium	Low
Steelhead	Southern California	Medium	Low
Steelhead	Upper Columbia River	Medium	Low
Steelhead	Upper Willamette River	Medium	Low

Table 342. Summary of risk and confidence determinations for metolachlor and Pacific Salmonids.

Salmon Type	ESU/DPS	Risk	Confidence
Chum	Columbia River	Medium	Low
Chum	Hood Canal summer-run	Low	High
Chinook	California Coastal	Low	High
Chinook	CA Central Valley spring-run	Medium	Low
Chinook	Lower Columbia River	Medium	Low
Chinook	Puget Sound	Medium	Low
Chinook	Sacramento River winter-run	Medium	Low
Chinook	Snake River fall-run	Medium	Low
Chinook	Snake River spring/summer-run	Medium	Low
Chinook	Upper Columbia River spring-run	Medium	Low
Chinook	Upper Willamette River	Medium	Low
Coho	Central California Coast	Low	High
Coho	Lower Columbia River	Medium	Low

Coho	Oregon Coast	Low	High
Coho	S. Oregon N. California Coast	Low	High
Sockeye	Ozette Lake	Low	High
Sockeye	Snake River	Medium	Low
Steelhead	CA Central Valley	Medium	Low
Steelhead	Central California Coast	Medium	Low
Steelhead	Lower Columbia River	Medium	Low
Steelhead	Middle Columbia River	Medium	Low
Steelhead	Northern California	Low	High
Steelhead	Puget Sound	Medium	Low
Steelhead	Snake River Basin	Medium	Low
Steelhead	South-Central California Coast	Medium	Low
Steelhead	Southern California	Medium	Low
Steelhead	Upper Columbia River	Medium	Low
Steelhead	Upper Willamette River	Medium	Low