APPENDIX M SUPPLEMENTAL AQUATIC RQ TABLES

Exposures in the Aquatic Habitat Direct Effects to Aquatic-Phase CRLF

Because the AW is a terrestrial organism given its designated critical habitat as well as its prey base, the aquatic assessment does not include direct or indirect effects to the whipsnake.

Direct effects to the aquatic-phase CRLF are based on peak EECs in the standard pond and the lowest acute toxicity value for freshwater fish. Separate RQs were calculated for the acid/salts (runoff +drift) and the esters (runoff +drift and drift only). In addition, risks to the aquatic-phase CRLF were estimated for direct applications to water. In order to assess direct chronic risks to the CRLF, 60-day EECs and the lowest acid/salts chronic toxicity value for freshwater fish were used. Due to the unlikelihood of long-term exposures, chronic risks of esters were not estimated.

	Table M.1. Acute and chronic RQs for freshwater fish based on EECs for runoff and drift used to								
	D acid and salt uses								
Master Label Use Category (Acid, DMA, TIPA, IPA, DEA, Na)	PRZM/EXAMS Scenario (first app date)	Method ¹	Application Rate (interval between applications)		60-day EEC (µg/L)	Acute RQ	Chronic RQ		
Orchard Uses									
Nut Orchards, Pistachios	CA Almond wirrig STD (10-Feb)	G	2 apps @ 2 lb a.e./acre (30-day interval)	13.69	11.10	< 0.01	< 0.01		
Filberts	CA Almond wirrig STD (10-Feb)	G	4 apps @ 0.5 lb a.e./acre ³ (30-day interval)	4.06	3.38	< 0.01	< 0.01		
Grapes	CA Grapes STD (1-Mar)	G	1 app @ 1.36 lb a.e./acre	4.52	3.59	< 0.01	< 0.01		
Grapes	CA Wine Grapes RLF (1-Mar)	G	1 app @ 1.36 lb a.e./acre	2.94	2.34	< 0.01	< 0.01		
Blueberries	CA Wine Grapes RLF (5-Mar)	G	1 post-emergence app @ 1.4 lb a.e./acre and 1 post-harvest app @ 1.4 lb a.e./acre	3.15	2.58	<0.01	<0.01		
Stone and Pome Fruits	CA Fruit wirrig STD (1-Mar)	G	2 apps @ 2 lb a.e./acre (75-day interval)	6.98	5.30	< 0.01	< 0.01		
Citrus ²	CA citrus STD	G	1 app @ 0.1 lb a.e./acre	0.08	0.07	< 0.01	< 0.01		
		A	1 арр & 0.1 10 а.с./астс	0.32	0.24	< 0.01	< 0.01		
Agricultural – Fo	od Crop Uses			•	1				
Field Corn, Popcorn	CA Corn OP (15-Mar)	G	1 app @ 1.0 lb a.e./acre March 15, 1 app @ 0.5 lb a.e./acre April 29 1 app @ 1.5 lb a.e./acre August 15 (pre-harvest)	9.41	7.40	<0.01	<0.01		
		A	1 app @ 1.0 lb a.e./acre March 15,	12.17	9.84	< 0.01	< 0.01		

Table M.1. Acute and chronic RQs for freshwater fish based on EECs for runoff and drift used to represent 2,4-D acid and salt uses									
Master Label Use Category (Acid, DMA, TIPA, IPA, DEA, Na)	PRZM/EXAMS Scenario (first app date)	Method ¹	applications) (µ		60-day EEC (µg/L)	Acute RQ	Chronic RQ		
, ,			1 app @ 0.5 lb a.e./acre April 29 1 app @ 1.5 lb a.e./acre August 15 (pre-harvest)						
Sweet Corn	CA Corn OP	G	1 app @ 1 lb a.e./acre March 15; 1 app @ 0.5 lb a.e./acre April 29	7.41	6.00	<0.01	<0.01		
	(15-Mar)	A	1 app @ 1 lb a.e./acre on March 15; and 1 app @ 0.5 lb a.e./acre on April 29	9.57	8.00	<0.01	<0.01		
Potatoes	CA Potato RLF	G	2 apps @ 0.07 lb a.e./acre (10-day interval)	0.1190	0.0867	< 0.01	<0.01		
	(1-Apr)	A	2 apps @ 0.07 lb a.e./acre (10-day interval)	0.4175	0.3044	< 0.01	< 0.01		
Sugargana	CA Sugarbeet wirrig OP	G	1 pre-emergence and 1 post- emergence app @ 2 lb a.e./acre	25.85	21.02	0.01	<0.01		
Sugarcane	(20-Jan)	A	1 pre-emergence and 1 post- emergence app @ 2 lb a.e./acre	33.31	27.40	0.01	<0.01		
	CA Wheat RLF	G	1 post-emergence app @ 1.25 lb a.e./acre and 1 pre-harvest app @ 0.5 lb a.e./acre (90-day interval)	21.39	17.19	0.01	<0.01		
Cereal Grains	(10-Feb)	A	1 post-emergence app @ 1.25 lb a.e./acre and 1 pre-harvest app @ 0.5 lb a.e./acre (90-day interval)	23.43	18.85	0.01 <0.01 0.01 <0.01 0.01 <0.01 <0.01 <0.01	<0.01		
Grain or Forage	CA Wheat RLF	G	1 post-emergence app @ 1.0 lb a.e./acre	17.00	13.66	< 0.01	<0.01		
Sorghum	(10-Feb)	A	1 post-emergence app @ 1.0 lb a.e./acre	18.61	14.96	< 0.01	<0.01		
Hana	OR hops STD	G	3 apps @ 0.5 lb a.e./acre (30-day interval)	1.73	1.33	<0.01	<0.01		
Hops	(10-Apr)	A	3 apps @ 0.5 lb a.e./acre (30-day interval)	4.62	3.69	<0.01	<0.01		
	CA Row Crop RLF	G	2 apps @ 2 lb a.e./acre (30-day interval)	12.62	10.85	<0.01	<0.01		
Asparagus	(1-Apr)	A	2 apps @ 2 lb a.e./acre (30-day interval)	20.14	16.87	<0.01	<0.01		
Fallowland and	CA Row Crop RLF	G	2 apps @ 2 lb a.e./acre (30-day interval)	2.16	1.69	<0.01	<0.01		
Crop Stubble	(1-Aug)	A	2 apps @ 2 lb a.e./acre (30-day interval)	10.70	8.32	<0.01	<0.01		
	n-food Crop Uses								
Established Grass Pastures,	CA Rangeland Hay RLF (1-Mar)	G	2 apps @ 2 lb a.e./acre (30-day interval)	13.021	10.520	< 0.01	<0.01		

Table M.1. Ac	Table M.1. Acute and chronic RQs for freshwater fish based on EECs for runoff and drift used to									
represent 2,4-	D acid and salt uses									
Master Label Use Category (Acid, DMA, TIPA, IPA, DEA, Na)	PRZM/EXAMS Scenario (first app date)	Method ¹	Application Rate Pe (interval between El applications) (µg		60-day EEC (µg/L)	Acute RQ	Chronic RQ			
Rangeland, Perennial Grassland Not										
in Agricultural Production										
Non-agriculural	Uses									
Non-cropland	CA Right-of-Way RLF (20-Feb)	G A	1 app @ 4 lb a.e./acre 1 app @ 4 lb a.e./acre	39.02 46.66	32.24 38.62	0.01	<0.01 <0.01			
Forestry, Tree and Brush	CA Forestry RLF (1-Mar)	G A	1 app @ 4 lb a.e./acre 1 app @ 4 lb a.e./acre	15.92 24.98	13.42 21.03	<0.01	<0.01 <0.01			
Control Ornamental	CA Turf RLF	G	2 apps @ 1.5 lb a.e./acre (21-day interval)	5.55	4.61	<0.01	<0.01			
Turf	(1-Mar)	A	2 apps @ 1.5 lb a.e./acre (21-day interval)	12.96	10.81	< 0.01	< 0.01			
Grass Grown for Seed and	CA Turf RLF	G	2 apps @ 2 lb a.e./acre (21-day interval)	6.17	5.28	< 0.01	<0.01			
Sod	(1-Mar)	A	2 apps @ 2 lb a.e./acre (21-day interval)	14.87	12.06	< 0.01	<0.01			

^{*.} LOC exceedances (acute $RQ \ge 0.05$; chronic $RQ \ge 1.0$) are bolded. Acute RQ = use-specific peak EEC / 24.15 mg a.e./L (E006387). Chronic RQ = use-specific 60-day EEC / 14.2 mg a.e./L (MRID 417677-01). The most sensitive 2,4-D acid and salt toxicity values were bridged for all use scenarios to calculate RQs.

 $^{{}^{1}}G$ = ground application. A = aerial application.

² Although only IPE is labeled for citrus use, EFED is modeling exposure to acid as it is expected that most aquatic exposure will be to the acid, not 2,4-D IPE.

Master Label Use Category (2-EHE, BEE, IPE³) PRZM/EXAMS Scenario (first app date) Method² Application Rate Peak EEC (µg/L) RQ (Table M.2. Acute RQs for represent 2,4-D ester uses		on EECs	for runoff and drift	used to	
Catrus C	Master Label Use Category	PRZM/EXAMS Scenario	Method ²	Application Rate	EEC	
Carried Carr	Orchard Uses		•			
CA Corn OP	Citrus					
Time	Agricultural – Food Crop Uses					
CA Corn OP		CA Corn OP	G	1 app @ 1.5 lb a.e./acre	2.7036	0.01
CA Potato RLF (10-Feb)	Field Corn, Popcorn		A	1 app @ 1.5 lb a.e./acre	4.6609	0.02
CA Potato RLF	Sweet Corn	CA Corn OP	G	1 app @ 1 lb a.e./acre	1.8026	0.01
Careal Grains	Sweet Corn	(15-Mar)	A		3.1072	0.01
Careal Grains	Pototoes	CA Potato RLF	G	* *	0.0390	< 0.01
Carain or Forage Sorghum	lotatoes	(1-Apr)	A		0.1939	< 0.01
CA Wheat RLF	Cereal Grains		G		3.3244	0.01
CA Wheat RLF (10-Feb) CA Row Crop RLF (1-Aug) CA Rangeland Hay RLF (1-Mar) CA Rangeland Hay RLF (1-Mar) CA Right-of-Way RLF (20-Feb) CA Right-of-Way RLF (20-Feb) CA Right-of-Way RLF (1-Mar) CA Forestry, Tree and Brush Control (1-Mar) CA Turf RLF		(10-Feb)	A	1 app @ 1.25 lb a.e./acre	5.0928	0.02
CA Row Crop RLF	Croin or Forago Sarahum	CA Wheat RLF	G	0.5 lb a.e./acre	1.33	< 0.01
CA Rangeland Hay RLF Ca Right-of-Way RLF Ca Forestry, Tree and Brush CA Forestry RLF CA Forestry RLF CA Forestry RLF CA Turf RLF	Grain of Forage Sorgium		A		2.04	< 0.01
CA Rangeland Hay RLF G 1 app @ 4 lb a.e./acre 1.27 0.01		CA Row Crop RLF	G	1 app @ 2 lb a.e./acre	1.103	< 0.01
CA Rangeland Hay RLF	Fallowiand and Crop Stubble	(1-Aug)	A	1 app @ 2 lb a.e./acre	5.504	0.02
CA Rangeland Hay RLF	Agricultural – Non-food Crop U	Vses .	·	l	1	I
Non-cropland CA Right-of-Way RLF (20-Feb) G 1 app @ 4 lb a.e./acre 6.3698 (0.02) Forestry, Tree and Brush Control CA Forestry RLF (1-Mar) G 1 app @ 4 lb a.e./acre 7.1353 (0.03) Control A 1 app @ 4 lb a.e./acre 7.1353 (0.03) Ca Turf RLF (1-Mar) G 1 app @ 4 lb a.e./acre 13.249 (0.05*) Ca Turf RLF (1-Mar) G 1 app @ 1.5 a.e./acre 0.83 (0.01) Grass Grown for Seed and CA Turf RLF G 1 app @ 2 lb a.e./acre 1.1076 (0.01)	Established Grass Pastures, Rangeland, Perennial Grassland Not in Agricultural Production		G	2 app @ 2 lb a.e./acre	1.27	<0.01
CA Turf RLF	Non-agricultural Uses					
CA Forestry, Tree and Brush CA Forestry RLF G 1 app @ 4 lb a.e./acre 7.1353 0.03	Non-cropland					
Control (1-Mar) A 1 app @ 4 lb a.e./acre 13.249 0.05* Ornamental Turf CA Turf RLF (1-Mar) G 1app @ 1.5 a.e./acre 0.83 <0.01						
Ornamental Turf CA Turf RLF (1-Mar) G 1app @ 1.5 a.e./acre 0.83 <0.01 Grass Grown for Seed and CA Turf RLF G 1 app @ 1.5 a.e./acre 4.14 0.02 Grass Grown for Seed and CA Turf RLF G 1 app @ 2 lb a.e./acre 1.1076 <0.01				**		
Ornamental Turf (1-Mar) A 1 app @ 1.5 a.e./acre 4.14 0.02 Grass Grown for Seed and CA Turf RLF G 1 app @ 2 lb a.e./acre 1.1076 <0.01	Control	,	+			
Grass Grown for Seed and CA Turf RLF G 1 app @ 2 lb a.e./acre 1.1076 <0.01	Ornamental Turf					
	Cross Crown for Sood and			**		
	Sod					

^{*}LOC exceedances (acute RQ \geq 0.05) are bolded. Acute RQ = use-specific peak EEC / 0.26 mg a.e./L (MRID 439307-01, 439103-01). The most sensitive 2,4-D ester toxicity values were bridged for all use scenarios to calculate RQs.

¹Chronic EECs are not modeled in this scenario because the hydrolysis soil slurry data indicate that dissipation in a non-sterile water body will occur at all PHs and therefore long-term exposures are unlikely.

 $^{{}^{2}}G$ = ground application. A = aerial application. All applications are liquid unless otherwise specified.

³Esters are not persistent; only one application modeled due to rapid hydrolysis of EHE to the acid form.

Table M.3. Acute RQs for freshwater fish based on EECs for drift only used to represent 2,4-D ester uses ¹						
Master Label Use Category ² (2-EHE, BEE, IPE ³)	PRZM/EXAMS Scenario (first app date)	Method ⁴	Application Rate ⁵	Peak EEC (µg/L)	Acute RQ	
Orchard Uses						
Citrus	CA Citrus STD (1-Mar)	G A	1 app @ 0.1 lb a.e./acre 1 app @ 0.1 lb a.e./acre	0.055 0.28	<0.01 <0.01	
Agricultural – Food Crop	v Uses			1		
		G	1 app @ 1.5 lb a.e./acre	0.825	< 0.01	
Field Corn, Popcorn	CA Corn OP (15-Mar)	A	1 app @ 1.5 lb a.e./acre	4.2	0.02	
Smart Com	CA Corn OP	G	1 app @ 1 lb a.e./acre	0.55	< 0.01	
Sweet Corn	(15-Mar)	A	1 app @ 1 lb a.e./acre	2.8	0.01	
Detetees	CA Potato RLF	G	1 app @ 0.07 lb a.e./acre	0.0385	< 0.01	
Potatoes	(1-Apr)	A	1 app @ 0.07 lb a.e./acre	0.196	< 0.01	
Cereal Grains	CA Wheat RLF	G	1 app @ 1.25 lb a.e./acre	0.6875	< 0.01	
	(10-Feb)	A	1 app @ 1.25 lb a.e./acre	3.5	0.01	
Grain or Forage	CA Wheat RLF	G	1 post-emergence app @ 0.5 lb a.e./acre	0.28	< 0.01	
Sorghum	(10-Feb)	A	1 post-emergence app @ 0.5 lb a.e./acre	1.4	< 0.01	
Fallowland and Crop	CA Row Crop RLF	G	1 app @ 2 lb a.e./acre	1.1	< 0.01	
Stubble	(1-Aug)	A	1 app @ 2 lb a.e./acre	5.6	0.02	
Agricultural – Non-food	Crop Uses	J.				
Established Grass Pastures, Rangeland, Perennial Grassland Not in Agricultural Production	CA Rangeland Hay RLF (1-Mar)	G	1 app @ 2 lb a.e./acre	1.1	<0.01	
Non-agricultural Uses						
Non-cropland	CA Right-of-Way RLF (20-Feb)	G A	1 app @ 4 lb a.e./acre 1 app @ 4 lb a.e./acre	2.2	0.01	
Forestry, Tree and	CA Forestry RLF	G	1 app @ 4 lb a.e./acre	2.2	0.01	
Brush Control	(1-Mar)	A	1 app @ 4 lb a.e./acre	11.2	0.04	
Ornamantal Tunf	CA Turf RLF	G	1app @ 1.5 a.e./acre	0.83	< 0.01	
Ornamental Turf	(1-Mar)	A	1app @ 1.5 a.e./acre	4.2	0.02	
Grass Grown for Seed	CA Turf RLF	G	1 app @ 2 lb a.e./acre	1.1	< 0.01	
and Sod	(1-Mar)	A	1 app @ 2 lb a.e./acre	5.6	0.02	

^{*}LOC exceedances (acute $RQ \ge 0.05$) are bolded. Acute RQ = use-specific peak EEC / 0.26 mg a.e./L (MRID 439307-01, 439103-01). The most sensitive 2,4-D ester toxicity values were bridged for all use scenarios to calculate RQs.

¹Chronic EECs are not modeled in this scenario because the hydrolysis soil slurry data indicate that dissipation in a nonsterile water body will occur at all PHs and therefore long-term exposures are unlikely.

³IPE labeled for citrus use only. 2-EHE and BEE not labeled for citrus use.

 $^{{}^{4}}G$ = ground application. A = aerial application.

⁵Esters are not persistent; only one application modeled due to rapid hydrolysis of EHE to the acid form.

Table M.4. Acute and Chronic RQs for freshwater fish based on EECs for direct application to water to represent 2,4-D acid, salt, and ester uses

Master Label Use Category	Model Scenario	Method ¹	Application Rate	Peak EEC (µg/L)	60-day EEC (µg/L)	Acute RQ	Chronic RQ
Rice (acid and salts)	Direct water applications	G & A	1 app @ 1.5 lb a.e./acre	1486 ²	N/A	0.06*	0.11
Aquatic Weed Control (surface application or subsurface injection) (acid and salts)	Direct water applications	G & A	10.8 lb a.e./acre-ft (to achieve 4 ppm concentration)	4000 ³	2610	0.17*	0.18
Aquatic Weed Control (surface application or subsurface injection) (esters only)	Direct water applications	G & A	10.8 lb a.e./acre-ft (to achieve 4 ppm concentration)	4000 ³	2610	15.38*	NA ⁴
Aquatic Weed Control (acid and salts)	Direct water applications	G & A	2 app @2 lb a.e./acre (30-day interval)	740	483	0.03	0.03
Aquatic Weed Control (esters only)	Direct water applications	G & A	2 app @2 lb a.e./acre (30-day interval)	740	483	2.9*	NA ⁴
Aquatic Weed Control (acid and salts)	Direct water applications	G & A	2 app @ 4 lb a.e./ acre (21-day interval)	1480	966	0.06*	0.07
Aquatic Weed Control (esters only)	Direct water applications	G & A	2 app @ 4 lb a.e./ acre (21-day interval)	1480	966	5.7*	NA ⁴

^{**-}LOC exceedances (acute $RQ \ge 0.05$; chronic $RQ \ge 1.0$) are bolded. Acute RQ (acid and salts) = use-specific peak EEC / 24.15 mg a.e./L (E006387). Chronic RQ (acid and salts) = use-specific 60-day EEC / 14.2 mg a.e./L (MRID 417677-01). Acute RQ (esters) = use-specific peak EEC / 0.26 mg a.e./L (MRID 439307-01, 439103-01).

 $^{{}^{1}}G$ = ground application. A = aerial application.

²Rice Model - the maximum water surface concentration is used to determine both acute and chronic toxicity.

 $^{^3}$ Aquatic weed control-peak water concentration: 4000 μ g/L , 21-day average water concentration: 3417 μ g/L, and 60-day average water concentration: 2610 μ g/L. For ester direct application scenarios, 2,4-D acid input parameters were used to determine EEC. All other runoff and drift application scenarios used 2,4-D ester input parameters to determine EEC. 4 Chronic EECs are not modeled in this scenario because the hydrolysis soil slurry data indicate that dissipation in a non-

sterile water body will occur at all PHs and therefore long-term exposures are unlikely.

Indirect Effects to Aquatic-Phase CRLF via Reduction in Prey (non-vascular aquatic plants, aquatic invertebrates, fish, and frogs)

Non-vascular Aquatic Plants

Indirect effects of 2,4-D to the aquatic-phase CRLF (tadpoles) via reduction in non-vascular aquatic plants in its diet are based on peak EECs from the standard pond and the lowest toxicity value (EC_{50}) for aquatic non-vascular plants.

		ts based or	n EECs for runoff and drift	t used to	
	acid and salt uses				
Master Label Use Category (Acid, DMA, TIPA, IPA, DEA, Na)	PRZM/EXAMS Scenario (first app date)	Method ¹	Application Rate (interval between applications)	Peak EEC (µg/L)	RQ
Orchard Uses		•			
Nut Orchards, Pistachios	CA Almond wirrig STD (10-Feb)	G	2 apps @ 2 lb a.e./acre (30-day interval)	13.69	<0.01
Filberts	CA Almond wirrig STD (10-Feb)	G	4 apps @ 0.5 lb a.e./acre ³ (30-day interval)	4.06	<0.01
Grapes	CA Grapes STD (1-Mar)	G	1 app @ 1.36 lb a.e./acre	4.52	< 0.01
Grapes	CA Wine Grapes RLF (1-Mar)	G	1 app @ 1.36 lb a.e./acre	2.94	< 0.01
Blueberries	CA Wine Grapes RLF (3-Mar)	G	1 post-emergence app @ 1.4 lb a.e./acre and 1 post-harvest app @ 1.4 lb a.e./acre	3.15	<0.01
Stone and Pome Fruits	CA Fruit wirrig STD (1-Mar)	G	2 apps @ 2 lb a.e./acre (75-day interval)	6.98	<0.01
Citrus ²	CA Citrus STD	G	1 app @ 0.1 lb a.e./acre	0.08	< 0.01
Citius		A	1 app @ 0.1 lb a.e./acre	0.32	< 0.01
Agricultural – Foo	od Crop Uses				
Field Corn,	CA Corn OP	G	1 app @ 1.0 lb a.e./acre March 15, 1 app @ 0.5 lb a.e./acre April 29, 1 app @ 1.5 lb a.e./acre August 15 (pre harvest)	9.41	<0.01
Popcorn	(15-Mar)	A	1 app @ 1.0 lb a.e./acre March 15, 1 app @ 0.5 lb a.e./acre April 29, 1 app @ 1.5 lb a.e./acre August 15 (pre harvest)	12.17	<0.01
Sweet Corn	CA Corn OP (15-Mar)	G	1 app @ 1 lb a.e./acre on March 15; 1app @ 0.5 lb a.e./acre on April 29	7.41	<0.01

_	Table M.5. RQs for non-vascular plants based on EECs for runoff and drift used to represent 2,4-D acid and salt uses								
Master Label Use Category (Acid, DMA, TIPA, IPA, DEA, Na)	PRZM/EXAMS Scenario (first app date)	Method ¹	Application Rate (interval between applications)	Peak EEC (µg/L)	RQ				
		A	1 app @ 1 lb a.e./acre on March 15; 1app @ 0.5 lb a.e./acre on April 29	9.57	<0.01				
Potatoes	CA Potato RLF	G	2 apps @ 0.07 lb a.e./acre (10-day interval)	0.1190	<0.01				
	(1-Apr)	A	2 apps @ 0.07 lb a.e./acre (10-day interval)	0.4175	< 0.01				
Sugarcane	CA Sugarbeet wirrig OP	G	1 pre-emergence and 1 post- emergence app @ 2 lb a.e./acre	25.85	0.01				
	(20-Jan)	A	1 pre-emergence and 1 post- emergence app @ 2 lb a.e./acre	33.31	0.01				
Cereal Grains	CA Wheat RLF (10-Feb)	G	1 post-emergence app @ 1.25 lb a.e./acre; 1 pre-harvest app @ 0.5 lb a.e./acre (90-day interval)	21.39	0.01				
		A	1 post-emergence app @ 1.25 lb a.e./acre; 1 pre-harvest app @ 0.5 lb a.e./acre (90-day interval)	23.43	0.01				
Grain or Forage	CA Wheat RLF (10-Feb)	G	1 post-emergence app @ 1.0 lb a.e./acre	17.00	< 0.01				
Sorghum		A	1 post-emergence app @ 1.0 lb a.e./acre	18.61	< 0.01				
Asparagus	CA Row Crop RLF	G	2 apps @ 2 lb a.e./acre (30-day interval)	12.62	< 0.01				
Asparagus	(1-Apr)	A	2 apps @ 2 lb a.e./acre (30-day interval)	20.14	0.01				
Hops	OR hops STD	G	3 apps @ 0.5 lb a.e./acre (30-day interval)	1.73	< 0.01				
	(10-Apr)	A	3 apps @ 0.5 lb a.e./acre (30-day interval)	4.62	< 0.01				
Fallowland and	CA Row Crop RLF	G	2 apps @ 2 lb a.e./acre (30-day interval)	2.16	< 0.01				
Crop Stubble	(1-Aug)	A	2 apps @ 2 lb a.e./acre (30-day interval)	10.70	<0.01				
Agricultural – Non	t-food Crop Uses								
Established Grass Pastures, Rangeland, Perennial Grassland Not in Agricultural Production	CA Rangeland Hay RLF (1-Mar)	G	2 apps @ 2 lb a.e./acre (30-day interval)	13.021	<0.01				
Non-agricultural U									
Non-cropland	CA Right-of-Way RLF (20-Feb)	G A	1 app @ 4 lb a.e./acre 1 app @ 4 lb a.e./acre	39.02 46.66	0.01 0.01				
Forestry, Tree	CA Forestry RLF	G	1 app @ 4 lb a.e./acre	15.92	< 0.01				

Table M.5. RQs for non-vascular plants based on EECs for runoff and drift used to								
represent 2,4-D	acid and salt uses							
Master Label Use Category (Acid, DMA, TIPA, IPA, DEA, Na)	PRZM/EXAMS Scenario (first app date)	Method ¹	Application Rate (interval between applications)	Peak EEC (µg/L)	RQ			
and Brush Control	(1-Mar)	A	1 app @ 4 lb a.e./acre	24.98	0.01			
Ornamental Turf	CA Turf RLF	G	2 apps @ 1.5 lb a.e./acre (21-day interval)	5.55	< 0.01			
	(1-Mar)	A	2 apps @ 1.5 lb a.e./acre (21-day interval)	12.96	< 0.01			
Grass Grown for	CA Turf RLF	G	2 apps @ 2 lb a.e./acre (21-day interval)	6.17	< 0.01			
Seed and Sod	(1-Mar)	A	2 apps @ 2 lb a.e./acre (21-day interval)	14.87	< 0.01			

^{*}LOC exceedances (acute $RQ \ge 1.0$) are bolded. Acute RQ = use-specific peak EEC / 3.88 mg a.e./L (MRID 415059-03). The most sensitive 2,4-D acid and salt toxicity values were bridged for all use scenarios to calculate RQs.

~	Table M.6. RQs for non-vascular plants based on EECs for runoff and drift used to represent 2,4-D ester uses							
Master Label Use Category (2-EHE, BEE, IPE ¹)	PRZM/EXAMS Scenario (first app date)	Method ²	Application Rate ³	Peak EEC (µg/L)	RQ			
Orchard Uses		•		•				
Citrus	CA Citrus STD (1-Mar)	G A	1 app @ 0.1 lb a.e./acre 1 app @ 0.1 lb a.e./acre	0.0554 0.2768	<0.01 <0.01			
Agricultural – Food Ci	rop Uses							
Field Corn, Popcorn	CA Corn OP (15-Mar)	G A	1 app @ 1.5 lb a.e./acre 1 app @ 1.5 lb a.e./acre	2.7036 4.6609	0.04 0.07			
Sweet Corn	CA Corn OP (15-Mar)	G A	1 app @ 1 lb a.e./acre 1 app @ 1 lb a.e./acre	1.8026 3.1072	0.05			
Potatoes	CA Potato RLF (1-Apr)	G A	1 app @ 0.07 lb a.e./acre 1 app @ 0.07 lb a.e./acre	0.0390	<0.01			
Cereal Grains	CA Wheat RLF (10-Feb)	G A	1 app @ 1.25 lb a.e./acre 1 app @ 1.25 lb a.e./acre	3.3244 5.0928	0.05			
Grain or Forage	CA Wheat RLF	G	1 post-emergence app @ 0.5 lb a.e./acre	1.33	0.02			
Sorghum	(10-Feb)	A	1 post-emergence app @ 0.5 lb a.e./acre	2.04	0.03			
Fallowland and Crop	CA Row Crop RLF	G	1 app @ 2 lb a.e./acre	1.103	0.02			

 $^{{}^{1}}G$ = ground application. A = aerial application.

²Although only IPE is labeled for citrus use, EFED is modeling exposure to acid as it is expected that most aquatic exposure will be to the acid, not 2,4-D IPE.

Table M.6. RQs for non-vascular plants based on EECs for runoff and drift used to represent 2,4-D ester uses						
Master Label Use Category (2-EHE, BEE, IPE ¹)	PRZM/EXAMS Scenario (first app date)	Method ²	Application Rate ³	Peak EEC (µg/L)	RQ	
Stubble	(1-Aug)	A	1 app @ 2 lb a.e./acre	5.504	0.08	
Agricultural – Non-foo	d Crop Uses					
Established Grass Pastures, Rangeland, Perennial Grassland Not in Agricultural Production	CA Rangeland Hay RLF (1-Mar)	G	1 app @ 2 lb a.e./acre	1.27	0.02	
Non-agricultural Uses						
Non-cropland	CA Right-of-Way RLF (20-Feb)	G A	1 app @ 4 lb a.e./acre 1 app @ 4 lb a.e./acre	6.3698 11.128	0.10 0.17	
Forestry, Tree and Brush Control	CA Forestry RLF (1-Mar)	G A	1 app @ 4 lb a.e./acre 1 app @ 4 lb a.e./acre	7.1353 13.249	0.11 0.20	
Ornamental Turf	CA Turf RLF (1-Mar)	G A	1 app @ 1.5 lb a.e./acre 1 app @ 1.5 lb a.e./acre	0.83 4.14	0.01 0.06	
Grass Grown for Seed and Sod	CA Turf RLF (1-Mar)	G A	1 app @ 2 lb a.e./acre 1 app @ 2 lb a.e./acre	1.1076 5.5147	0.02 0.08	

^{* =} LOC exceedances (RQ \geq 1.0) are bolded. RQ = use-specific peak EEC / 0.066 mg a.e./L (MRID 417352-04).

Table M.7. RQs for non-vascular plants based on EECs for drift only used to represent 2,4-D ester uses							
Master Label Use Category ¹ (2-EHE, BEE, IPE ¹)	PRZM/EXAMS Scenario (first app date)	Method ²	Application Rate ³	Peak EEC (µg/L)	RQ		
Orchard Uses							
Citrus	CA Citrus STD (1-Mar)	G A	1 app @ 0.1 lb a.e./acre 1 app @ 0.1 lb a.e./acre	0.055 0.28	<0.01 <0.01		
Agricultural – Food Cro	op Uses		<u> </u>				
Field Corn, Popcorn	CA Corn OP (15-Mar)	G A	1 app @ 1.5 lb a.e./acre 1 app @ 1.5 lb a.e./acre	0.825 4.2	0.01 0.06		
Sweet Corn	CA Corn OP (15-Mar)	G A	1 app @ 1 lb a.e./acre 1 app @ 1 lb a.e./acre	0.55 2.8	0.01 0.04		
Potatoes	CA Potato RLF (1-Apr)	G A	1 app @ 0.07 lb a.e./acre 1 app @ 0.07 lb a.e./acre	0.0385 0.196	<0.01 <0.01		
Cereal Grains	CA Wheat RLF (10-Feb)	G A	1 app @ 1.25 lb a.e./acre 1 app @ 1.25 lb a.e./acre	0.6875 3.5	0.01 0.05		
Grain or Forage	CA Wheat RLF	G	1 post-emergence app @ 0.5 lb a.e./acre	0.28	<0.01		
Sorghum	(10-Feb)	A	1 post-emergence app @ 0.5 lb a.e./acre	1.4	0.02		
Fallowland and Crop	CA Row Crop RLF	G	1 app @ 2 lb a.e./acre	1.1	0.02		

The most sensitive 2,4-D ester toxicity values were bridged for all use scenarios to calculate RQs.

¹IPE labeled for citrus use only. 2-EHE and BEE not labeled for citrus use.

 $^{{}^{2}}G$ = ground application. A = aerial application.

³Esters are not persistent; only one application modeled due to rapid hydrolysis of EHE to the acid form.

Table M.7. RQs for non-vascular plants based on EECs for drift only used to represent 2,4- D ester uses										
Master Label Use Category ¹ (2-EHE, BEE, IPE ¹)	PRZM/EXAMS Scenario (first app date)	Method ²	Application Rate ³	Peak EEC (µg/L)	RQ					
Stubble	(1-Aug)	A	1 app @ 2 lb a.e./acre	5.6	0.08					
Agricultural – Non-food	Crop Uses									
Established Grass Pastures, Rangeland, Perennial Grassland Not in Agricultural Production	CA Rangeland Hay RLF (1-Mar)	G	1 app @ 2 lb a.e./acre	1.1	0.02					
Non-agricultural Uses										
Non-cropland	CA Right-of-Way RLF (20-Feb)	G A	1 app @ 4 lb a.e./acre 1 app @ 4 lb a.e./acre	2.2 11.2	0.03 0.17					
Forestry, Tree and	CA Forestry RLF	G	1 app @ 4 lb a.e./acre	2.2	0.03					
Brush Control	(1-Mar)	A	1 app @ 4 lb a.e./acre	11.2	0.17					
Ornamental Turf	CA Turf RLF (1-Mar)	G A	1 app @ 1.5 lb a.e./acre 1 app @ 1.5 lb a.e./acre	0.83 4.2	0.01 0.06					
Grass Grown for Seed an Sod	CA Turf RLF (1-Mar)	G A	1 app @ 2 lb a.e./acre 1 app @ 2 lb a.e./acre	1.1 5.6	0.02 0.08					

^{*}LOC exceedances (RQ \geq 1.0) are bolded. RQ = use-specific peak EEC / 0.066 mg a.e./L (MRID 417352-04). The most sensitive 2,4-D ester toxicity values were bridged for all use scenarios to calculate RQs. ¹IPE labeled for citrus use only. 2-EHE and BEE not labeled for citrus use.

³Esters are not persistent; only one application modeled due to rapid hydrolysis of EHE to the acid form

Table M.8. RQs for non-vascular plants based on EECs for direct application to water to represent 2,4-D acid, salt, and ester uses										
Master Label Use Category ¹	Model Scenario	Method ¹	Application Rate	Peak EEC (µg/L)	RQ					
Rice (acid and salts)	Direct water applications	G & A	1 app @ 1.5 lb a.e./acre	1486	0.38					
Aquatic Weed Control (surface application or subsurface injection for submersed weeds) (acid and salts)	Direct water applications	G & A	10.8 lb a.e./acre-ft (to achieve 4 ppm concentration)	4000 ²	1.03*					
Aquatic Weed Control (surface application or subsurface injection for submersed weeds) (esters only)	Direct water applications	G & A	10.8 lb a.e./acre-ft (to achieve 4 ppm concentration)	4000 ²	60.61*					
Aquatic Weed Control (acid and salts)	Direct water applications	G & A	2 app @2 lb a.e./acre (30-day interval)	740	0.19					

 $^{{}^{2}}G$ = ground application. A = aerial application.

	Table M.8. RQs for non-vascular plants based on EECs for direct application to water to
ı	represent 2.4-D acid, salt, and ester uses

Master Label Use Category ¹	Model Scenario	Method ¹	Application Rate	Peak EEC (µg/L)	RQ
Aquatic Weed Control (esters only)	Direct water applications	G & A	2 app @2 lb a.e./acre (30-day interval)	740	11.21*
Aquatic Weed Control (acid and salts)	Direct water applications	G & A	2 app @ 4 lb a.e./ acre (21-day interval)	1480	0.38
Aquatic Weed Control (esters only)	Direct water applications	G & A	2 app @ 4 lb a.e./ acre (21-day interval)	1480	22.42*

^{*}LOC exceedances (RQ \geq 1.0) are bolded. RQ (acid and amine salts) = use-specific peak EEC / 3.88 mg a.e/L (MRID 415059-03). RQ (esters) = use-specific peak EEC / 0.066 mg a.e/L (MRID 417352-04).

Aquatic Invertebrates

Indirect acute effects to the aquatic-phase CRLF via effects to prey (invertebrates) in aquatic habitats are based on peak EECs in the standard pond and the lowest acute toxicity value for freshwater invertebrates. Separate RQs were calculated for the acid/salts (runoff and drift) and the esters (runoff and drift and drift only). In addition, indirect risks to the aquatic-phase CRLF were estimated for direct applications to water. For chronic risks, 21-day EECs and the lowest chronic toxicity value for invertebrates were used to derive RQs for acid/salt uses. Due to the unlikelihood of long-term exposures, chronic risks of exposure to esters were not estimated.

Table M.9. Acute and chronic RQs for freshwater invertebrates based on EECs for runoff and drift used to represent 2,4-D acid and salt uses										
Master Label Use Category (Acid, DMA, TIPA, IPA, DEA, Na)	PRZM/EXAMS Scenario (first app date)	Method ¹	Application Rate (interval between applications)	Peak EEC (µg/L)	21-day EEC (µg/L)	Acute RQ	Chronic RQ			
Orchard Uses										
Nut Orchards, Pistachios	CA Almond wirrig STD (10-Feb)	G	2 apps @ 2 lb a.e./acre (30-day interval)	13.69	12.71	<0.01	<0.01			
Filberts	CA Almond wirrig STD	G	4 apps @ 0.5 lb a.e./acre ³ (30-day interval)	4.06	3.77	< 0.01	< 0.01			

 $^{{}^{1}}G$ = ground application. A = aerial application.

 $^{^2}$ Aquatic weed control-peak water concentration: 4000 μ g/L , 21-day average water concentration: 3417 μ g/L, and 60-day average water concentration: 2610 μ g/L. For ester direct application scenarios, 2,4-D acid input parameters were used to determine EEC. All other runoff and drift application scenarios used 2,4-D ester input parameters to determine EEC.

Table M.9. Acute and chronic RQs for freshwater invertebrates based on EECs for runoff and drift used to represent 2,4-D acid and salt uses								
Master Label Use Category (Acid, DMA, TIPA, IPA, DEA, Na)	PRZM/EXAMS Scenario (first app date)	Method ¹	Application Rate (interval between applications)	Peak EEC (µg/L)	21-day EEC (µg/L)	Acute RQ	Chronic RQ	
,,	(10-Feb)							
Grapes	CA Grapes STD (1-Mar)	G	1 app @ 1.36 lb a.e/acre	4.52	4.16	< 0.01	<0.01	
Grapes	CA Wine Grapes RLF (1-Mar)	G	1 app @ 1.36 lb a.e./acre	2.94	2.70	< 0.01	< 0.01	
Blueberries	CA Wine Grapes RLF (5-Mar)	G	1 post-emergence app @ 1.4 lb a.e./acre and 1 post-harvest app @ 1.4 lb a.e./acre	3.15	2.93	<0.01	<0.01	
Stone and Pome Fruits	CA Fruit wirrig STD (1-Mar)	G	2 apps @ 2 lb a.e./acre (75-day interval)	6.98	6.35	< 0.01	<0.01	
Citrus ²	CA citrus STD	G	1 app @ 0.1 lb a.e./acre	0.08	0.08	< 0.01	< 0.01	
		A	1 app @ 0.1 lb a.e./acre	0.32	0.28	< 0.01	< 0.01	
Agricultural – Fo	CA Corn OP	G	1 app @ 1.0 lb a.e./acre March 15, 1 app @ 0.5 lb a.e./acre April 29, 1 app @ 1.5 lb a.e./acre August 15 (pre harvest)	9.41	8.60	<0.01	<0.01	
Popcorn	(15-Mar)	A	1 app @ 1.0 lb a.e./acre March 15, 1 app @ 0.5 lb a.e./acre April 29, 1 app @ 1.5 lb a.e./acre August 15 (pre harvest)	12.17	11.13	<0.01	<0.01	
Sweet Corn	CA Corn OP (15-Mar)	G	1 app @ 1 lb a.e./acre March 15; 1 app @ 0.5 lb a.e./acre April 29	7.41	6.90	< 0.01	< 0.01	
Sweet Corn		A	1 app @ 1 lb a.e./acre March 15; 1 app @ 0.5 lb a.e./acre April 29	9.57	8.91	< 0.01	< 0.01	
Potatoes	CA Potato RLF	G	2 apps @ 0.07 lb a.e./acre (10-day interval)	0.1190	0.1083	< 0.01	< 0.01	
1 otatoes	(1-Apr)	A	2 apps @ 0.07 lb a.e./acre (10-day interval)	0.4175	0.3788	< 0.01	< 0.01	
Sugarcane	CA Sugarbeet wirrig OP	G	1 pre-emergence and 1 post- emergence app @ 2 lb a.e./acre	25.85	24.25	< 0.01	< 0.01	
	(20-Jan)	A	1 pre-emergence and 1 post- emergence app @ 2 lb a.e./acre	33.31	31.28	< 0.01	<0.01	
Cereal Grains	CA Wheat RLF	G	1 post-emergence app @ 1.25 lb a.e./acre and 1 pre-harvest app @ 0.5 lb a.e./acre (90-day interval)	21.39	19.89	<0.01	<0.01	
Cereai Grains	(10-Feb)	A	1 post-emergence app @ 1.25 lb a.e./acre and 1 pre-harvest app @ 0.5 lb a.e./acre (90-day interval)	23.43	21.82	<0.01	<0.01	
Grain or Forage	CA Wheat RLF	G	1 post-emergence app @ 1.0 lb a.e./acre	17.00	15.82	< 0.01	<0.01	
Sorghum	(10-Feb)	A	1 post-emergence app @ 1.0 lb a.e./acre	18.61	17.33	< 0.01	<0.01	
Hops	OR hops STD (10-Apr)	G	3 apps @ 0.5 lb a.e./acre (30-day interval)	1.73	1.55	< 0.01	< 0.01	

		-	shwater invertebrates based	on EE	Cs for r	runoff ar	nd drift
Used to represe Master Label Use Category (Acid, DMA, TIPA, IPA, DEA, Na)	PRZM/EXAMS Scenario (first app date)	Method ¹	Application Rate (interval between applications)	Peak EEC (µg/L)	21-day EEC (µg/L)	Acute RQ	Chronic RQ
		A	3 apps @ 0.5 lb a.e./acre (30-day interval)	4.62	4.19	< 0.01	< 0.01
Agnavagus	CA Row Crop RLF	G	2 apps @ 2 lb a.e./acre (30-day interval)	12.62	11.77	< 0.01	< 0.01
Asparagus	(1-Apr)	A	2 apps @ 2 lb a.e./acre (30-day interval)	20.14	18.51	< 0.01	< 0.01
Fallowland and	CA Row Crop RLF	G	2 apps @ 2 lb a.e./acre (30-day interval)	2.16	1.95	< 0.01	<0.01
Crop Stubble	(1-Aug)	A	2 apps @ 2 lb a.e./acre (30-day interval)	10.7	9.7	< 0.01	<0.01
Agricultural – No	on-food Crop Uses						
Established Grass Pastures, Rangeland, Perennial Grassland Not in Agricultural Production	CA Rangeland Hay RLF (1-Mar)	G	2 apps @ 2 lb a.e./acre (30-day interval)	13.021	12.099	<0.01	<0.01
Non-agricultural	Uses						
Non-cropland	CA Right-of-Way RLF (20-Feb)	G A	1 app @ 4 lb a.e./acre 1 app @ 4 lb a.e./acre	39.02 46.66	36.54 43.76	<0.01 <0.01	<0.01 <0.01
Forestry, Tree	CA Forestry RLF	G	1 app @ 4 lb a.e./acre	15.92	14.99	< 0.01	< 0.01
and Brush Control	(1-Mar)	A	1 app @ 4 lb a.e./acre	24.98	23.49	< 0.01	< 0.01
Ornamental	CA Turf RLF	G	2 apps @ 1.5 lb a.e./acre (21-day interval)	5.55	5.17	< 0.01	<0.01
Turf	(1-Mar)	A	2 apps @ 1.5 lb a.e./acre (21-day interval)	12.96	12.12	< 0.01	<0.01
Grass Grown	CA Turf RLF	G	2 apps @ 2 lb a.e./acre (21-day interval)	6.17	5.72	< 0.01	<0.01
for Seed	(1-Mar)	A	2 apps @ 2 lb a.e./acre (21-day interval)	14.87	13.81	< 0.01	<0.01

^{**+ =} LOC exceedances (acute RQ \geq 0.05; chronic RQ \geq 1.0) are bolded. Acute RQ = use-specific peak EEC / 25 mg a.e./L (MRID 411583-01). Chronic RQ = use-specific 60-day EEC / 16.05 mg a.e./L (MRID 420183-03). The most sensitive 2,4-D acid and salt toxicity values were bridged for all use scenarios to calculate RQs.

 $^{{}^{1}}G$ = ground application. A = aerial application.

²Although only IPE is labeled for citrus use, EFED is modeling exposure to acid as it is expected that most aquatic exposure will be to the acid, not 2,4-D IPE.

	~	ertebrates	s based on EECs for ru	ınoff and	l drift
used to represent 2,4- Master Label Use Category (2-EHE, BEE, IPE ²)	PRZM/EXAMS Scenario (first app date)	Method ³	Application Rate ⁴	Peak EEC (µg/L)	Acute RQ
Orchard Uses					
Citrus	CA Citrus STD (1-Mar)	G A	1 app @ 0.1 lb a.e./acre 1 app @ 0.1 lb a.e./acre	0.0554 0.2768	<0.01 <0.01
Agricultural – Food Crop	` ′		1 upp © 0.1 10 u.e., uere	0.2700	10.01
Field Corn, Popcorn	CA Corn OP (15-Mar)	G A	1 app @ 1.5 lb a.e./acre 1 app @ 1.5 lb a.e./acre	2.7036 4.6609	<0.01
Sweet Corn	CA Corn OP (15-Mar)	G A	1 app @ 1 lb a.e./acre 1 app @ 1 lb a.e./acre	1.8026 3.1072	<0.01
Potatoes	CA Potato RLF (1-Apr)	G A	1 app @ 0.07 lb a.e./acre 1 app @ 0.07 lb a.e./acre	0.0390 0.1939	<0.01
Cereal Grains	CA Wheat RLF (10-Feb)	G A	1 app @ 1.25 lb a.e./acre 1 app @ 1.25 lb a.e./acre	3.3244 5.0928	<0.01 <0.01
Grain or Forage	CA Wheat RLF	G	1 post-emergence app @ 0.5 lb a.e./acre	1.33	<0.01
Sorghum	(10-Feb)	A	1 post-emergence app @ 0.5 lb a.e./acre	2.04	< 0.01
Fallowland and Crop Stubble	CA Row Crop RLF (1-Aug)	G A	1 app @ 2 lb a.e./acre 1 app @ 2 lb a.e./acre	1.103 5.504	<0.01 <0.01
Agricultural – Non-food C	_		Tupp © 2 to die, dete	3.501	10.01
Established Grass Pastures, Rangeland, Perennial Grassland Not in Agricultural Production	CA Rangeland Hay RLF (1-Mar)	G	1 app @ 2 lb a.e./acre	1.27	<0.01
Non-agricultural Uses					
Non-cropland	CA Right-of-Way RLF (20-Feb)	G A	1 app @ 4 lb a.e./acre 1 app @ 4 lb a.e./acre	6.3698 11.128	<0.01 0.01
Forestry, Tree and Brush Control	CA Forestry RLF (1-Mar)	G A	1 app @ 4 lb a.e./acre 1 app @ 4 lb a.e./acre	7.1353 13.249	<0.01 0.01
Ornamental Turf	CA Turf RLF (1-Mar)	G A	1 app @ 1.5 lb a.e./acre 1 app @ 1.5 lb a.e./acre	0.83 4.14	<0.01 <0.01
Grass Grown for Seed and Sod	CA Turf RLF (1-Mar)	G A	1 app @ 2 lb a.e./acre 1 app @ 2 lb a.e./acre	1.1076 5.5147	<0.01 <0.01

^{*}LOC exceedances (acute RQ \geq 0.05) are bolded. Acute RQ = use-specific peak EEC / 2.2 mg a.e./L (MRID 439306-01). The most sensitive 2,4-D ester toxicity values were bridged for all use scenarios to calculate RQs.

¹Chronic EECs are not modeled in this scenario because the hydrolysis soil slurry data indicate that dissipation in a non-sterile water body will occur at all PHs and therefore long-term exposures are unlikely.

²IPE labeled for citrus use only. 2-EHE and BEE not labeled for citrus use.

 $^{{}^{3}}G$ = ground application. A = aerial application.

⁴Esters are not persistent; only one application modeled due to rapid hydrolysis of EHE to the acid form.

Qs for freshwater inve	ertebrates	based on EECs for drift	only used	l to
uses ¹				
PRZM/EXAMS Scenario (first app date)	Method ³	Application Rate ⁴	Peak EEC (µg/L)	Acute RQ
CA Citrus STD (1-Mar)	G A	1 app @ 0.1 lb a.e./acre 1 app @ 0.1 lb a.e./acre	0.055 0.28	<0.01 <0.01
Uses	1	••	l	
CA Corn OP (15-Mar)	G A	1 app @ 1.5 lb a.e./acre 1 app @ 1.5 lb a.e./acre	0.825 4.2	<0.01 <0.01
CA Corn OP (15-Mar)	G	1 app @ 1 lb a.e./acre 1 app @ 1 lb a.e./acre	0.55 2.8	<0.01 <0.01
CA Potato RLF (1-Apr)	G A	1 app @ 0.07 lb a.e./acre	0.0385 0.196	<0.01
CA Wheat RLF	G A	1 app @ 1.25 lb a.e./acre	0.6875	<0.01 <0.01
CA Wheat RLF	G	1 post-emergence app @ 0.5 lb a.e./acre	0.28	<0.01
(10-Feb)	A	1 post-emergence app @ 0.5 lb a.e./acre	1.4	< 0.01
CA Row Crop RLF	G	1 app @ 2 lb a.e./acre	1.1	<0.01 <0.01
, 6,		r upp © 2 to u.e., uere	3.0	10.01
CA Rangeland Hay RLF (1-Mar)	G	1 app @ 2 lb a.e./acre	1.1	<0.01
			ı	
(20-Feb)	A	1 app @ 4 lb a.e./acre	11.2	<0.01 0.01
(1-Mar)	A	1 app @ 4 lb a.e./acre	11.2	<0.01 0.01
(1-Mar)	A	1 app @ 1.5 lb a.e./acre	4.2	<0.01 <0.01
CA Turf RLF (1-Mar)	G A	1 app @ 2 lb a.e./acre 1 app @ 2 lb a.e./acre	1.1 5.6	<0.01 <0.01
	PRZM/EXAMS Scenario (first app date) CA Citrus STD (1-Mar) Uses CA Corn OP (15-Mar) CA Corn OP (15-Mar) CA Potato RLF (1-Apr) CA Wheat RLF (10-Feb) CA Row Crop RLF (1-Aug) Top Uses CA Rangeland Hay RLF (1-Mar) CA Forestry RLF (1-Mar) CA Turf RLF (1-Mar) CA Turf RLF (1-Mar) CA Turf RLF	PRZM/EXAMS Scenario (first app date)	PRZM/EXAMS Scenario (first app date) Method3	PRZM/EXAMS Scenario (first app date) Method³ Application Rate⁴ Peak EEC (μg/L) CA Citrus STD (1-Mar) G

^{* =} LOC exceedances (acute $RQ \ge 0.05$) are bolded. Acute RQ = use-specific peak EEC / 2.2 mg a.e./L (MRID 439306-

^{01).} The most sensitive 2,4-D ester toxicity values were bridged for all use scenarios to calculate RQs.

¹Chronic EECs are not modeled in this scenario because the hydrolysis soil slurry data indicate that dissipation in a nonsterile water body will occur at all PHs and therefore long-term exposures are unlikely.

²IPE labeled for citrus use only. 2-EHE and BEE not labeled for citrus use.

 $^{{}^{3}}G$ = ground application. A = aerial application.

⁴Esters are not persistent; only one application modeled due to rapid hydrolysis of EHE to the acid form.

Table M.11. Acute and chronic RQs for freshwater invertebrates based on EECs for direct
application to water to represent 2,4-D acid, salt, and ester uses

Master Label Use Category	Model Scenario	Method ¹	Application Rate	Peak EEC (µg/L)	21-day EEC (µg/L)	Acute RQ	Chronic RQ
Rice Model (acid and salts)	Direct water applications	G & A	1 app @ 1.5 lb a.e./acre	1486 ²	N/A	0.06*	0.09
Aquatic Weed Control (surface application or subsurface injection) (acid and salts)	Direct water applications	G & A	10.8 lb a.e./acre-ft (to achieve 4 ppm concentration)	4000 ³	3417	0.16*	0.21
Aquatic Weed Control (surface application or subsurface injection) (esters only)	Direct water applications	G & A	10.8 lb a.e./acre-ft (to achieve 4 ppm concentration)	4000 ³	3417	1.82*	NA ⁴
Aquatic Weed Control (acid and salts)	Direct water applications	G & A	2 app @2 lb a.e./acre (30-day interval)	740	632	0.03	0.04
Aquatic Weed Control (esters only)	Direct water applications	G & A	2 app @2 lb a.e./acre (30-day interval)	740	632	0.34*	NA ⁴
Aquatic Weed Control (acid and salts)	Direct water applications	G & A	2 app @ 4 lb a.e./ acre (21-day interval)	1480	1264	0.05*	0.07
Aquatic Weed Control (esters only)	Direct water applications	G & A	2 app @ 4 lb a.e./ acre (21-day interval)	1480	1264	0.67*	NA ⁴

^{*.*}LOC exceedances (acute $RQ \ge 0.05$; chronic $RQ \ge 1.0$) are bolded. Acute RQ (acid and salts) = use-specific peak EEC / 25 mg a.e./L (MRID 411583-01). Chronic RQ (acid and salts) = use-specific 21-day EEC / 16.05 mg a.e./L (MRID 420183-03). Acute RQ (esters) = use-specific peak EEC / 2.2 mg a.e./L (MRID 439306-01).

 $^{{}^{1}}G$ = ground application. A = aerial application.

²Rice Model - the maximum water surface concentration is used to determine both acute and chronic toxicity.

 $^{^3}$ Aquatic weed control-peak water concentration: $4000 \,\mu\text{g/L}$, 21-day average water concentration: $3417 \,\mu\text{g/L}$, and 60-day average water concentration: $2610 \,\mu\text{g/L}$. For ester direct application scenarios, 2,4-D acid input parameters were used to determine EEC. All other runoff and drift application scenarios used 2,4-D ester input parameters to determine EEC. 4 Chronic EECs are not modeled in this scenario because the hydrolysis soil slurry data indicate that dissipation in a non-sterile water body will occur at all PHs and therefore long-term exposures are unlikely.

Fish and Frogs

Fish and frogs also represent potential prey items of adult aquatic-phase CRLFs. RQs associated with acute and chronic direct toxicity to the CRLF (**Tables M.9.** through **M.11.**) are used to assess potential indirect effects to the CRLF based on a reduction in freshwater fish and frogs as food items.

Indirect Effects to CRLF via Reduction in Habitat and/or Primary Productivity (Freshwater Aquatic Plants)

Indirect effects to the CRLF via direct toxicity to aquatic plants are estimated using the most sensitive non-vascular and vascular plant toxicity endpoints. Because there are no obligate relationships between the CRLF and any aquatic plant species, the most sensitive EC_{50} values, rather than NOAEC values, were used to derive RQs.

Table M.12. RQs 2,4-D acid and sal	-	sed on E	ECs for runoff and drift	used to rep	resent
Master Label Use Category (Acid, DMA, TIPA, IPA, DEA, Na)	Master Label Use Category Acid, DMA, TIPA, Circt ann date		Application Rate (interval between applications)	Peak EEC (μg/L)	RQ
Orchard Uses					
Nut Orchards, Pistachios	CA Almond wirrig STD (10-Feb)	G	2 apps @ 2 lb a.e./acre (30-day interval)	13.69	1.05*
Filberts	CA Almond wirrig STD (10-Feb)	G	4 apps @ 0.5 lb a.e./acre ³ (30-day interval)	3.46	0.26
Grapes	CA Grapes STD (1-Mar)	G	1 app @ 1.36 lb a.e./acre	4.52	0.35
Grapes	CA Wine Grapes RLF (1-Mar)	G	1 app @ 1.36 lb a.e./acre	2.94	0.22
Blueberries	CA Wine Grapes RLF (5-Mar)	G	1 post-emergence app @ 1.4 lb a.e./acre; 1 post-harvest app @ 1.4 lb a.e./acre	3.15	0.24
Stone and Pome Fruits	CA Fruit wirrig STD (1-Mar)	G	2 apps @ 2 lb a.e./acre (75-day interval)	6.98	0.53
Citrus ²	CA citrus STD	G	1 app @ 0.1 lb a.e./acre	0.08	< 0.01
Citius	CA cluus STD	A	1 app @ 0.1 lb a.e./acre	0.32	0.02
Agricultural – Food C	rop Uses				
Field Corn, Popcorn	CA Corn OP	G	2 apps @ 1.5 lb a.e./acre March 15, April 29	9.41	0.72
rieid Corn, i opcorn	(15-Mar)	A	2 apps @ 1.5 lb a.e./acre March 15, April 29	12.17	0.93
Sweet Corn	CA Corn OP	G	1 app @ 1 lb a.e./acre on March 15; 1 app @ 0.5 lb a.e./acre on April 29	7.41	0.57
Sweet Corn	(15-Mar)	A	1 app @ 1 lb a.e./acre on March 15; 1 app @ 0.5 lb a.e./acre on April 29	9.57	0.73
Potatoes	CA Potato RLF (1-Apr)	G	2 apps @ 0.07 lb a.e./acre (10-day interval)	0.1190	0.01

Table M.12. RQs 2,4-D acid and sal	-	sed on E	ECs for runoff and drift	used to rep	resent	
Master Label Use Category (Acid, DMA, TIPA, IPA, DEA, Na)	PRZM/EXAMS Scenario (first app date)	Method ¹	Application Rate (interval between applications)	Peak EEC (µg/L)	RQ	
		A	2 apps @ 0.07 lb a.e./acre (10-day interval)	0.4175	0.03	
Sugarcana	CA Sugarbeet wirrig OP	G	1 pre-emergence and 1 post- emergence app @ 2 lb a.e./acre	25.85	1.97*	
Sugarcane	(20-Jan)	A	1 pre-emergence and 1 post- emergence app @ 2 lb a.e./acre	33.31	2.54*	
Cereal Grains	CA Wheat RLF	G	1 post-emergence app @ 1.25 lb a.e./acre; 1 pre-harvest app @ 0.5 lb a.e./acre (90-day interval)	21.39	1.63*	
Cereal Grains	(10-Feb)	A	1 post-emergence app @ 1.25 lb a.e./acre; 1 pre-harvest app @ 0.5 lb a.e./acre (90-day interval)	23.43	RQ 0.03 1.97* 2.54*	
Grain or Forage	CA Wheat RLF	G	1 post-emergence app @ 1.0 lb a.e./acre	17.00	1.30*	
Sorghum	(10-Feb)	A	1 post-emergence app @ 1.0 lb a.e./acre	18.61	1.42*	
	OR hops STD	G	3 apps @ 0.5 lb a.e./acre (30-day interval)	1.73	0.13	
Hops	(10-Apr)	A	3 apps @ 0.5 lb a.e./acre (30-day interval)	4.62	0.35	
Agnoragus	CA Row Crop RLF	G	2 apps @ 2 lb a.e./acre (30-day interval)	12.62	0.96	
Asparagus	(1-Apr)	A	2 apps @ 2 lb a.e./acre (30-day interval)	20.14		
Fallowland and	CA Row Crop RLF	G	2 apps @ 2 lb a.e./acre (30-day interval)	2.16	6 0.16	
Crop Stubble	(1-Aug)	A	2 apps @ 2 lb a.e./acre (30-day interval)	10.70	0.82	
Agricultural – Non - fo	od Crop Uses	T		,		
Established Grass Pastures, Rangeland, and Perennial Grassland Not in Agricultural Production	CA Rangeland Hay RLF (1-Mar)	G	2 apps @ 2 lb a.e./acre (30-day interval)	13.021	0.99	
Non-agricultural Uses					· 	
Non-cropland	CA Right-of-Way RLF (20-Feb)	G A	1 app @ 4 lb a.e./acre 1 app @ 4 lb a.e./acre	39.02 46.66		
Forestry, Tree and	CA Forestry RLF	G	1 app @ 4 lb a.e./acre	15.92		
Brush Control	(1-Mar)	A	1 app @ 4 lb a.e./acre	24.98		
Ornamental Turf	CA Turf RLF	G	2 apps @ 1.5 lb a.e./acre (21-day interval)	5.55	0.42	
	(1-Mar)	A	2 apps @ 1.5 lb a.e./acre (21-day interval)	12.96	0.98	

Table M.12. RQs for vascular plants based on EECs for runoff and drift used to represent 2,4-D acid and salt uses								
Master Label Use Category (Acid, DMA, TIPA, IPA, DEA, Na) PRZM/EXAMS Scenario (first app date) PRZM/EXAMS Method¹ Application Rate (interval between applications) RQ RQ								
Grass Grown for	CA Turf RLF	G	2 apps @ 2 lb a.e./acre (21-day interval)	6.17	0.47			
Seed and Sod	(1-Mar)	A	2 apps @ 2 lb a.e./acre (21-day interval)	14.87	1.14*			

^{*}LOC exceedances (RQ \geq 1.0) are bolded. RQ = use-specific peak EEC / 0.0131 mg a.e./L (E74985). The most sensitive 2,4-D acid and salt toxicity values were bridged for all use scenarios to calculate RQs.

Table M.13. RQs for vascular plants based on EECs for runoff and drift used to represent 2,4-D ester uses							
Master Label Use Category (2-EHE, BEE, IPE ¹)	PRZM/EXAMS Scenario (first app date)	Method ²	Application Rate ³	Peak EEC (µg/L)	Acute RQ		
Orchard Uses							
Citrus	CA Citrus STD (1-Mar)	G A	1 app @ 0.1 lb a.e./acre 1 app @ 0.1 lb a.e./acre	0.0554 0.2768	<0.01		
Agricultural – Food Cro	p Uses						
Field Corn, Popcorn	CA Corn OP (15-Mar)	G A	1 app @ 1.5 lb a.e./acre 1 app @ 1.5 lb a.e./acre	2.7036 4.6609	0.01 0.01		
Sweet Corn	CA Corn OP (15-Mar)	G A	1 app @ 1 lb a.e./acre 1 app @ 1 lb a.e./acre	1.8026 3.1072	0.01		
Potatoes	CA Potato RLF (1-Apr)	G A	1 app @ 0.07 lb a.e./acre 1 app @ 0.07 lb a.e./acre	0.0390 0.1939	<0.01 <0.01		
Cereal Grains	CA Wheat RLF (10-Feb)	G A	1 app @ 1.25 lb a.e./acre 1 app @ 1.25 lb a.e./acre	3.3244 5.0928	0.01 0.02		
Grain or Forage	CA Wheat RLF	G	1 post-emergence app @ 0.5 lb a.e./acre	1.33	<0.01		
Sorghum	(10-Feb)	A	1 post-emergence app @ 0.5 lb a.e./acre	2.04	< 0.01		
Fallowland and Crop	CA Row Crop RLF	G	1 app @ 2 lb a.e./acre	1.103	< 0.01		
Stubble	(1-Aug)	A	1 app @ 2 lb a.e./acre	5.504	0.02		
Agricultural – Non-food	Crop Uses	1					
Established Grass Pastures, Rangeland, Perennial Grassland Not in Agricultural Production	CA Rangeland Hay RLF (1-Mar)	G	1 app @ 2 lb a.e./acre	1.27	<0.01		
Non-agricultural Uses							
Non-cropland	CA Right-of-Way RLF (20-Feb)	G A	1 app @ 4 lb a.e./acre 1 app @ 4 lb a.e./acre	6.3698 11.128	0.02 0.03		

 $^{{}^{1}}G$ = ground application. A = aerial application.

²Although only IPE is labeled for citrus use, EFED is modeling exposure to acid as it is expected that most aquatic exposure will be to the acid, not 2,4-D IPE.

2,4-D ester uses								
Master Label Use Category (2-EHE, BEE, IPE ¹)	PRZM/EXAMS Scenario (first app date)	Method ²	Application Rate ³	Peak EEC (µg/L)	Acute RQ			
Forestry, Tree and	CA Forestry RLF	G	1 app @ 4 lb a.e./acre	7.1353	0.02			
Brush Control	(1-Mar)	A	1 app @ 4 lb a.e./acre	13.249	0.04			

CA Turf RLF G 1 app @ 1.5 lb a.e./acre 0.83 < 0.01 **Ornamental Turf** (1-Mar) A 1 app @ 1.5 lb a.e./acre 4.14 0.01 Grass Grown for Seed | CA Turf RLF 1 app @ 2 lb a.e./acre G 1.1076 < 0.01 and Sod (1-Mar) A 1 app @ 2 lb a.e./acre 5.5147 0.02

Table M.14. RQs for vascular plants based on EECs for drift only used to represent 2,4-D						
Master Label Use Category (2-EHE, BEE, IPE¹)	PRZM/EXAMS Scenario (first app date)	Method ²	Application Rate ³	Peak EEC (µg/L)	RQ	
Orchard Uses			•			
Citrus	CA Citrus STD (1-Mar)	G A	1 app @ 1 lb a.e./acre 1 app @ 1 lb a.e./acre	0.055 0.28	<0.01 <0.01	
Agricultural – Food Crop Us	ses					
Field Corn, Popcorn	CA Corn OP (15-Mar)	G A	1 app @ 1.5 lb a.e./acre 1 app @ 1.5 lb a.e./acre	0.825 4.2	<0.01	
Sweet Corn	CA Corn OP (15-Mar)	G A	1 app @ 1 lb a.e./acre 1 app @ 1 lb a.e./acre	0.55 2.8	<0.01	
Potatoes	CA Potato RLF (1-Apr)	G A	1 app @ 0.07 lb a.e./acre 1 app @ 0.07 lb a.e./acre	0.0385 0.196	<0.01	
Cereal Grains	CA Wheat RLF (10-Feb)	G A	1 app @ 1.25 lb a.e./acre 1 app @ 1.25 lb a.e./acre	0.6875 3.5	<0.01	
Continue Fores Constant	CA Wheat RLF	G	1 nost-emergence ann @		<0.01	
Grain or Forage Sorghum	(10-Feb)	A	1 post-emergence app @ 0.5 lb a.e./acre	1.4	<0.01	
Fallowland and Crop	CA Row Crop RLF	G	1 app @ 2 lb a.e./acre	1.1	< 0.01	
Stubble	(1-Aug)	Α	1 app @ 2 lb a.e./acre	5.6	0.02	
Agricultural – Non-food Cro	p Uses					
Established Grass Pastures, Rangeland, Perennial Grassland Not in Agricultural Production	CA Rangeland Hay RLF (1-Mar)	G	1 app @ 2 lb a.e./acre	1.1	<0.01	
Non-agricultural Uses						

^{*}LOC exceedances (RQ \geq 1.0) are bolded. RQ = use-specific peak EEC / 0.33 mg a.e/L (MRID 417352-03). The most sensitive 2,4-D ester toxicity values were bridged for all use scenarios to calculate RQs.

¹IPE labeled for citrus use only. 2-EHE and BEE not labeled for citrus use.

 $^{{}^{2}}G$ = ground application. A = aerial application.

³Esters are not persistent; only one application modeled due to rapid hydrolysis of EHE to the acid form.

Table M.14. RQs for vascular plants based on EECs for drift only used to represent 2,4-D ester uses								
Master Label Use Category (2-EHE, BEE, IPE ¹)	PRZM/EXAMS Scenario (first app date)	Method ²	Application Rate ³	Peak EEC (µg/L)	RQ			
Non grapland	CA Right-of-Way RLF	G	1 app @ 4 lb a.e./acre	2.2	0.01			
Non-cropland (20-Feb) A 1 app @ 4 lb a.e./acre 11.2								
Forestry, Tree and Brush	CA Forestry RLF	G	1 app @ 4 lb a.e./acre	2.2	0.01			
Control	(1-Mar)	A	1 app @ 4 lb a.e./acre	11.2	0.03			

G

A

G

A

1 app @ 4 lb a.e./acre

1 app @ 1.5 lb a.e./acre

1 app @ 1.5 lb a.e./acre

1 app @ 2 lb a.e./acre

0.83

4.2

1.1

5.6

< 0.01

0.01

< 0.01

0.02

CA Turf RLF

(1-Mar)

(1-Mar)

Grass Grown for Seed and CA Turf RLF

Ornamental Turf

Sod

Table M.15. RQs for vascular plants based on EECs for direct application to water to represent 2,4-D acid, salt, and ester uses							
Master Label Use Category	Model Scenario	Scenario Method ¹ Application Rate		Peak EEC (µg/L)	RQ		
Rice (acid and salts)	Direct water applications	G & A	1 app @ 1.5 lb a.e./acre	1486	113*		
Aquatic Weed Control (surface application or subsurface injection) (acid and salts	Direct water applications	G & A	10.8 lb a.e./acre-ft (to achieve 4 ppm concentration)	4000 ²	305.34*		
Aquatic Weed Control (surface application or subsurface injection) (esters only)	Direct water applications	G & A	10.8 lb a.e./acre-ft (to achieve 4 ppm concentration)	4000 ²	12.12*		
Aquatic Weed Control (acid and salts)	Direct water applications	G & A	2 app @2 lb a.e./acre (30-day interval)	740	56.49*		
Aquatic Weed Control (esters only)	Direct water applications	G & A	2 app @2 lb a.e./acre (30-day interval)	740	2.2*		
Aquatic Weed Control (acid and salts)	Direct water applications	G & A	2 app @ 4 lb a.e./ acre (21-day interval)	1480	112.98*		

¹ app @ 2 lb a.e./acre *LOC exceedances (RQ \geq 1.0) are bolded. RQ = use-specific peak EEC / 0.33 mg a.e./L (MRID 417352-03). The most sensitive 2,4-D ester toxicity values were bridged for all use scenarios to calculate RQs.

¹IPE labeled for citrus use only. 2-EHE and BEE not labeled for citrus use.

 $^{{}^{2}}G$ = ground application. A = aerial application.

³Esters are not persistent; only one application modeled due to rapid hydrolysis of EHE to the acid form.

Table M.15.	RQs for vascula	r plants based on	EECs for	direct application to v	vater to
represent 2.4	4-D acid, salt, and	l ester uses			

Master Label Use Category	Model Scenario	Method ¹	Application Rate	Peak EEC (µg/L)	RQ
Aquatic Weed Control (esters only)	Direct water applications	G & A	2 app @ 4 lb a.e./ acre (21-day interval)	1480	4.48*

^{*}LOC exceedances (RQ \geq 1.0) are bolded. RQ (acid and salts) = use-specific peak EEC / 0.0131 mg a.e./L (E74985). RQ (esters) = use-specific peak EEC / 0.33 mg a.e./L (MRID 417352-03).

 $^{^{1}}G$ = ground application. A = aerial application.

 $^{^2}$ Aquatic weed control-peak water concentration: 4000 $\mu g/L$, 21-day average water concentration: 3417 $\mu g/L$, and 60-day average water concentration: 2610 $\mu g/L$. For ester direct application scenarios, 2,4-D acid input parameters were used to determine EEC. All other runoff and drift application scenarios used 2,4-D ester input parameters to determine EEC.