

Appendix O

Supplemental RQ Tables

Table O-1 Acute and chronic RQs for freshwater fish surrogate frog resulting from ground and aerial applications of trifluralin							
Crop Scenario/ Formulation	Application Method	Soil Incorporation	Peak EEC µg/L	60 day EEC µg/L	Acute RQs¹ (fish)	Chronic RQs² (fish)	Acute RQs³ (frog)
Orchard Uses							
CA Almond (including tree nuts)							
Granular	Ground	N	2.23	0.72	0.12*	0.77	0.02
EC	Aerial	Y	5.65	0.6	0.31*	0.65	0.06
	Ground	Y	1.23	0.18	0.07*	0.19	0.01
CA Avocado							
Granular	Ground	N	5.81	0.73	0.31*	0.78	0.06
CA Citrus							
Granular	Ground	N	0.74	0.14	0.04	0.15	0.01
EC	Aerial	Y	5.48	0.54	0.30*	0.58	0.05
	Ground	Y	1.10	0.11	0.06*	0.12	0.01
CA Fruit							
Granular	Ground	N	2.52	0.4	0.14*	0.43	0.03
EC	Aerial	Y	5.51	0.55	0.30*	0.59	0.06
	Ground	Y	1.12	0.13	0.06*	0.14	0.01
CA Grape (including berries)							
Granular	Ground	N	4.0	0.62	0.22*	0.67	0.04
CA Grape							
EC	Aerial	Y	5.5	0.54	0.30*	0.58	0.06
	Ground	Y	1.18	0.12	0.06*	0.13	0.01
CA Olive							
Granular	Ground	N	4.45	0.77	0.24*	0.83	0.04
Agricultural Uses							
CA Alfalfa							
EC	Aerial	N	5.14	0.58	0.28*	0.62	0.05
	Ground	N	1.12	0.17	0.06*	0.18	0.01
Granular	Aerial	Y	0.32	0.07	0.02	0.08	<0.01
	Ground	Y	0.32	0.07	0.02	0.08	<0.01
CA Cole							
EC	Aerial	Y	2.79	0.29	0.15*	0.31	0.03
	Ground	Y	0.59	0.1	0.03	0.11	0.01
CA Corn							
EC	Aerial	Y	2.74	0.26	0.15*	0.28	0.03
	Ground	Y	0.55	0.07	0.03	0.08	0.01
CA Cotton							
EC	Aerial	Y	5.55	0.65	0.30*	0.70	0.06
	Ground	Y	1.48	0.24	0.08*	0.26	0.01
CA Melon							
EC	Ground	Y	0.73	0.13	0.04	0.14	0.01
CA Lettuce							
EC	Aerial	Y	2.77	0.27	0.15*	0.29	0.03
	Ground	Y	0.58	0.08	0.03	0.09	0.01
CA Onion							
EC	Aerial	Y	1.96	0.21	0.11*	0.23	0.02
	Ground	Y	0.39	0.05	0.02	0.05	<0.01

Table O-1 Acute and chronic RQs for freshwater fish surrogate frog resulting from ground and aerial applications of trifluralin							
Crop Scenario/ Formulation	Application Method	Soil Incorporation	Peak EEC µg/L	60 day EEC µg/L	Acute RQs¹ (fish)	Chronic RQs² (fish)	Acute RQs³ (frog)
CA Potato							
EC	Ground	Y	0.55	0.05	0.03	0.05	0.01
CA Rangeland							
Granular	Ground	N	0.68	0.12	0.04	0.01	0.01
CA Tomato							
EC	Ground	Y	0.56	0.06	0.03	0.06	0.01
CA Row Crop							
EC	Aerial	Y	5.49	0.45	0.30*	0.48	0.05
	Ground	Y	1.01	0.09	0.05*	0.10	0.01
CA Sugar Beet							
EC	Aerial	Y	1.96	0.17	0.11*	0.18	0.02
	Ground	Y	0.39	0.03	0.02	0.03	<0.01
CA Wheat							
EC	Aerial	Y	2.77	0.29	0.15*	0.31	0.03
	Ground	Y	0.57	0.11	0.03	0.12	0.01
Non-agricultural Uses							
CA Nursery							
Granular	Ground	N	6.55	0.86	0.35*	0.92	0.07
EC	Ground	N	6.53	0.87	0.35*	0.94	0.07
CA Residential							
Granular	Ground	N	0.0002	0.00005	<0.01	<0.001	<0.01
CA Right-of-way							
Granular	Ground	N	0.002	0.0005	<0.01	<0.001	<0.01
CA Turf							
Granular	Ground	N	0.16	0.02	<0.01	0.02	<0.01
CA Forestry							
Granular	Ground	N	2.25	0.39	0.12*	0.42	0.02
EC	Aerial	Y	5.5	0.63	0.30*	0.68	0.06
	Ground	Y	1.17	0.19	0.06*	0.20	0.01
^{1, 2} * = LOC exceedences (acute RQ ≥ 0.05; chronic RQ ≥ 1.0) are bolded. Acute RQ = use-specific peak EEC / 96-h LC ₅₀ = 18.5µg/L for bluegill sunfish. Chronic RQ = use-specific 60-day EEC / NOAEC = 0.93 µg/L ACR value (rainbow trout LC50 43.6 µg/L/rainbow trout NOAEC 2.18 µg/L = 20; bluegill sunfish LC 50 18.5 µg/L / 20= ACR 0.93 µg/L) ³ LOC exceedences (acute RQ ≥ 0.05) are bolded. In order to characterize risk, the most sensitive amphibian toxicity value for trifluralin (Fowler's toad with LC ₅₀ = 100 µg/L, Sanders (1970, E2891) was used to calculate RQs							

Table O-2 Acute and Chronic RQs (µg/L) for Aquatic Invertebrates resulting from aerial and ground applications of Trifluralin						
Crop Scenario/ Formulation	Application Method	Soil Incorporation	Peak EEC µg/L	21 day EEC µg/L	Acute RQ¹	Chronic RQ²
Orchard Uses						
CA Almond (including tree nuts)						
Granular	Ground	N	2.23	0.78	0.01	0.33
EC	Aerial	Y	5.65	1.31	0.02	0.55
	Ground	Y	1.23	0.32	<0.001	0.13
CA Avocado						
Granular	Ground	N	5.81	1.45	0.02	0.60
CA Citrus						
Granular	Ground	N	0.74	0.2	<0.001	0.08
EC	Aerial	Y	5.48	1.28	0.02	0.53
	Ground	Y	1.10	0.26	<0.001	0.11
CA Fruit						
Granular	Ground	N	2.52	0.75	0.01	0.31
EC	Aerial	Y	5.51	1.3	0.02	0.54
	Ground	Y	1.12	0.3	<0.001	0.13
CA Grape (including berries)						
Granular	Ground	N	4.0	1.18	0.02	0.49
CA Grape						
EC	Aerial	Y	5.5	1.29	0.02	0.54
	Ground	Y	1.18	0.28	<0.001	0.12
CA Olive						
Granular	Ground	N	4.45	1.35	0.02	0.56
Agricultural Uses						
CA Alfalfa						
EC	Aerial	N	5.14	1.32	0.02	0.55
	Ground	N	1.12	0.32	<0.001	0.13
Granular	Aerial	Y	0.32	0.09	<0.001	0.04
	Ground	Y	0.32	0.09	<0.001	0.04
CA Cole						
EC	Aerial	Y	2.79	0.65	0.01	0.27
	Ground	Y	0.59	0.19	<0.001	0.08
CA Corn						
EC	Aerial	Y	2.74	0.62	0.01	0.26
	Ground	Y	0.55	0.13	<0.001	0.05
CA Cotton						
EC	Aerial	Y	5.55	1.46	0.02	0.61
	Ground	Y	1.48	0.47	0.01	0.20
CA Melon						
EC	Ground	Y	0.73	0.27	<0.001	0.11
CA Lettuce						
EC	Aerial	Y	2.77	0.64	0.01	0.27
	Ground	Y	0.58	0.17	<0.001	0.07
CA Onion						
EC	Aerial	Y	1.96	0.48	0.01	0.20
	Ground	Y	0.39	0.1	<0.001	0.04
CA Potato						
EC	Ground	Y	0.55	0.12	<0.001	0.05

Table O-2 Acute and Chronic RQs (µg/L) for Aquatic Invertebrates resulting from aerial and ground applications of Trifluralin						
Crop Scenario/ Formulation	Application Method	Soil Incorporation	Peak EEC µg/L	21 day EEC µg/L	Acute RQ¹	Chronic RQ²
CA Rangeland						
Granular	Ground	N	0.68	0.23	<0.001	0.10
CA Tomato						
EC	Ground	Y	0.56	0.13	<0.001	0.05
CA Row Crop						
EC	Aerial	Y	5.49	1.09	0.02	0.45
	Ground	Y	1.01	0.22	<0.001	0.09
CA Sugar Beet						
EC	Aerial	Y	1.96	0.42	0.01	0.18
	Ground	Y	0.39	0.08	<0.001	0.03
CA Wheat						
EC	Aerial	Y	2.77	0.78	0.01	0.33
	Ground	Y	0.57	0.18	<0.001	0.08
Non-agricultural Uses						
CA Nursery						
Granular	Ground	N	6.55	1.80	0.03	0.75
EC	Ground	N	6.53	1.83	0.03	0.76
CA Residential						
Granular	Ground	N	0.0002	0.0001	<0.001	0.00004
CA Right-of-way						
Granular	Ground	N	0.002	0.0007	<0.001	0.0003
CA Turf						
Granular	Ground	N	0.16	0.05	<0.001	0.02
CA Forestry						
Granular	Ground	N	2.25	0.77	0.01	0.32
EC	Aerial	Y	5.5	1.39	0.02	0.58
	Ground	Y	1.17	0.35	<0.001	0.15
*= LOC exceedances (acute RQ ≥ 0.05; chronic RQ ≥ 1.0) are bolded. ¹ Acute RQ = use-specific peak EEC / 48-h EC ₅₀ = 251 µg/L for daphnid. ² Chronic RQ = use-specific 21-day EEC / NOAEC = 2.4 µg/L for daphnid.						

Table O-3 Acute RQs for Aquatic Vascular and Non-vascular Plants Resulting from Ground and Aerial Applications of Trifluralin

Crop Scenario/ Formulation	Application Method	Soil Incorporation	Peak EEC µg/L	Vascular Plant RQs¹	Non-vascular Plant RQs²
Orchard Uses					
CA Almond (including tree nuts)					
Granular	Ground	N	2.23	0.0449	0.1018
EC	Aerial	Y	5.65	0.1137	0.2580
	Ground	Y	1.23	0.0247	0.0562
CA Avocado					
Granular	Ground	N	5.81	0.1169	0.2653
CA Citrus					
Granular	Ground	N	0.74	0.0149	0.0338
EC	Aerial	Y	5.48	0.1103	0.2502
	Ground	Y	1.10	0.0221	0.0502
CA Fruit					
Granular	Ground	N	2.52	0.0507	0.1151
EC	Aerial	Y	5.51	0.1109	0.2516
	Ground	Y	1.12	0.0225	0.0511
CA Grape (including berries)					
Granular	Ground	N	4.00	0.0805	0.1826
CA Grape					
EC	Aerial	Y	5.5	0.1107	0.2511
	Ground	Y	1.18	0.0237	0.0539
CA Olive					
Granular	Ground	N	4.45	0.0895	0.2032
Agricultural Uses					
CA Alfalfa					
EC	Aerial	N	5.14	0.1034	0.2347
	Ground	N	1.12	0.0225	0.0511
Granular	Aerial	Y	0.32	0.0064	0.0146
	Ground	Y	0.32	0.0064	0.0146
CA Cole					
EC	Aerial	Y	2.79	0.0561	0.1274
	Ground	Y	0.59	0.0119	0.0269
CA Corn					
EC	Aerial	Y	2.74	0.0551	0.1251
	Ground	Y	0.55	0.0111	0.0251
CA Cotton					
EC	Aerial	Y	5.55	0.1117	0.2534
	Ground	Y	1.48	0.0298	0.0676
CA Melon					
EC	Ground	Y	0.73	0.0147	0.0333
CA Lettuce					
EC	Aerial	Y	2.77	0.0557	0.1265
	Ground	Y	0.58	0.0117	0.0265
CA Onion					
EC	Aerial	Y	1.96	0.0394	0.0895
	Ground	Y	0.39	0.0078	0.0178
CA Potato					
EC	Ground	Y	0.55	0.0111	0.0251

Table O-3 Acute RQs for Aquatic Vascular and Non-vascular Plants Resulting from Ground and Aerial Applications of Trifluralin

Crop Scenario/ Formulation	Application Method	Soil Incorporation	Peak EEC $\mu\text{g/L}$	Vascular Plant RQs¹	Non-vascular Plant RQs²
CA Rangeland					
Granular	Ground	N	0.68	0.0137	0.0311
CA Tomato					
EC	Ground	Y	0.56	0.0113	0.0256
CA Row Crop					
EC	Aerial	Y	5.49	0.1105	0.2507
	Ground	Y	1.01	0.0203	0.0461
CA Sugar Beet					
EC	Aerial	Y	1.96	0.0394	0.0895
	Ground	Y	0.39	0.0078	0.0178
CA Wheat					
EC	Aerial	Y	2.77	0.0557	0.1265
	Ground	Y	0.57	0.0115	0.0260
Non-agricultural Uses					
CA Nursery					
Granular	Ground	N	6.55	0.1318	0.2991
EC	Ground	N	6.5300	0.1314	0.2982
CA Residential					
Granular	Ground	N	0.0002	0.0000	0.0000
CA Right-of-way					
Granular	Ground	N	0.002	0.0000	0.0001
CA Turf					
Granular	Ground	N	0.16	0.0032	0.0073
CA Forestry					
Granular	Ground	N	2.25	0.0453	0.1027
EC	Aerial	Y	5.5	0.1107	0.2511
	Ground	Y	1.17	0.0235	0.0534
= LOC exceedances (acute RQ ≥ 1.0) are bolded.					
¹ Acute RQ = use-specific peak EEC / IC ₅₀ = 49.7 $\mu\text{g/L}$ vascular plant <i>Lemna gibba</i>					
² Acute RQ = use-specific peak EEC / IC ₅₀ = 21.9 $\mu\text{g/L}$ non vascular plant <i>Skeletonema costatum</i>					

Table O-4 Summary of Chronic Dietary- and Dose-based RQs Used to Estimate Direct/Indirect Effects of Liquid Applications of Trifluralin on the CRLF, SFGS and SJKE

Use Category	Application Rate (Interval days) non-incorporated	Dietary Category	Mammalian Chronic Dosed based RQS			Mammalian Chronic Dietary based RQS	Avian Chronic Dietary based RQS
			15	35	1000		
Alfalfa	1 app @ 2 lb a.i./acre	Short Grass	20.82	17.79	9.53	2.40	0.96
		Tall Grass	9.54	8.15	4.37	1.10	0.44
		Broadleaf Plants/ Small Insects	11.71	10.00	5.36	1.35	0.54
		Fruits/Pods/ Seeds/ Large Insects	1.30	1.11	0.60	0.15	0.06
		Granivore*	0.29	0.25	0.13	N/A	N/A
Nursery	3 app @ 4 lb a.i./acre (60 days)	Short Grass	58.20	49.72	26.65	6.71	2.68
		Tall Grass	26.68	22.79	12.21	3.07	1.23
		Broadleaf Plants/ Small Insects	32.74	27.97	14.99	3.77	1.51
		Fruits/Pods/ Seeds/ Large Insects	3.64	3.11	1.67	0.42	0.17
		Granivore*	0.81	0.69	0.37	N/A	N/A

¹ Chronic RQ ≥ 1.0 exceeds chronic level of concern (LOC) for birds and mammals are bolded.

No exceedences occurred for granivore dietary category

*indirect effects only occur for granivore dietary category all other dietary categories include both direct/indirect effects

Table O-5 TerrPlant RQs for Monocots Inhabiting Dry and Semi-aquatic Areas Exposed to Trifluralin via Runoff and Drift from liquid and granular applications (single application only)

Scenario	Formulation ¹	Method ^{1*}	Application Rate (lb/acre)	Drift Value (%)	Dry Area RQ	Semi-aquatic Area RQ	Spray Drift RQ
Avocado Citrus Grapes and berries Olive Stone and Pome fruit Tree nuts Nursery Right of way Forestry	G	Ground	4	0	0.44	4.44	N/A
Alfalfa	G	Aerial * Ground *	2	0	0.11	1.11	N/A
Citrus Grapes Stone and Pome fruit Tree nuts Cotton Row crop Forestry	EC	Aerial* Ground*	2	5 1	1.22 0.33	2.22 1.33	1.11 0.22
Alfalfa	EC	Aerial Ground	2	5 1	1.33 0.44	3.33 2.44	1.11 0.22
Corn Cole Lettuce Wheat	EC	Aerial *	1	5	0.61	1.11	0.56
Corn Lettuce Melon Cole Tomato Potato Wheat	EC	Ground *	1	1	0.17	0.67	0.11
Onion	EC	Aerial * Ground *	0.8	5 1	0.49 0.13	0.89 0.53	0.44 <0.1
Sugar beet	EC	Aerial * Ground *	0.75	5 1	0.46 0.13	0.83 0.50	0.42 <0.1
Rangeland Hay	G	Ground	2	0	0.22	2.22	N/A
Turf Residential	G	Ground	1.5	0	0.17	1.67	N/A
Nursery	EC	Ground	4	1	0.89	4.89	0.44
* 2 inch incorporation ¹ G = Granular application. EC = Emulsifiable Concentrate LOC exceedances (RQ ≥ 1) are bolded							

Table O-6 TerrPlant RQs for Dicots Inhabiting Dry and Semi-aquatic Areas Exposed to Trifluralin via Runoff and Drift from liquid and granular applications (single application only)

Scenario	Formulation ¹	Method ^{1*}	Application Rate (lb a.i./acre)	Drift Value (%)	Dry Area EEC (lb a.i./acre)	Semi-aquatic Area EEC (lb a.i./acre)	Spray Drift EEC (lb a.i./acre)
Avocado Citrus Grapes and berries Olive Stone and Pome fruit Tree nuts Nursery Right of way Forestry	G	Ground	4	0	0.21	2.11	N/A
Alfalfa	G	Aerial * Ground *	2	0	< 0.1	0.53	N/A
Citrus Grapes Stone and Pome fruit Tree nuts Cotton Row crop Forestry	EC	Aerial* Ground*	2	5 1	0.58 0.16	1.05 0.63	0.53 0.11
Alfalfa	EC	Aerial Ground	2	5 1	0.63 0.21	1.58 1.16	0.53 0.11
Corn Cole Lettuce Wheat	EC	Aerial *	1	5	0.29	0.53	0.26
Corn Lettuce Melon Cole Tomato Potato Wheat	EC	Ground *	1	1	<0.1	0.32	<0.1
Onion	EC	Aerial * Ground *	0.8	5 1	0.23 <0.1	0.42 0.25	0.21 <0.1
Sugar beet	EC	Aerial * Ground *	0.75	5 1	0.22 <0.1	0.39 0.24	0.20 <0.1
Rangeland Hay	G	Ground	2	0	0.11	1.05	N/A
Turf Residential	G	Ground	1.5	0	< 0.1	0.79	N/A
Nursery	EC	Ground	4	1	0.42	2.32	0.21

* 2 inch incorporation

¹G = Granular application. EC = Emulsifiable Concentrate

Bolded numbers exceed LOC=1