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OFFICE OF
CHEMICAL SAFETY AND
POLLUTION PREVENTION

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MEMORANDUM

Subject: Registration Review – Preliminary Ecological Risk Assessment for Glyphosate and Its Salts (PC Codes: 417300, 103601, 103604, 103607, 103608, 103613, 103603, 103605, 128501; DP Barcode: 417701)

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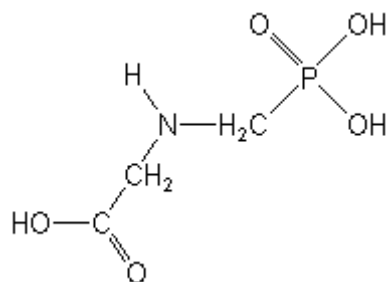
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The Environmental Fate and Effects Division (EFED) has completed a preliminary ecological risk assessment conducted as part of the registration review of glyphosate. The purpose of this assessment was to evaluate the potential risks of glyphosate and its salts (hereafter referred to as glyphosate) to non-target organisms. This risk assessment incorporates the available exposure and effects data, and most current modeling and risk methodologies, some of which may not have been available at the time previous risk assessments were conducted.

Through this assessment, the following conclusions were drawn:

- Exposure to glyphosate residues in water resulting from spray drift is not anticipated to impact survival, growth or reproduction of aquatic invertebrates, fish, aquatic non-vascular plants, or submerged vascular plants in surface waters adjacent to a treated field.
- Exposure to glyphosate residues from its application to aquatic environments is not anticipated to impact survival, growth or reproduction of aquatic invertebrates or fish in treated surface waters.
- Exposure to glyphosate residues in water resulting from spray drift or application to aquatic environments may impact survival and/or biomass of aquatic emergent vascular and non-vascular plants (application to aquatic environments only) in surface waters adjacent to a treated field or in the treated water body.
- While acute adult contact and oral and semi-field honeybee toxicity data are available which suggest toxicity from glyphosate exposure is low, the calculated EECs are greater than highest concentrations tested in honeybee toxicity tests. Due to lack of toxicity data conducted at higher test concentrations, it is unclear if exposure to glyphosate residues on foliage resulting from direct deposition or spray drift at application rates ≥ 1.92 lb a.e./A could impact survival, growth and/or reproduction of honeybee larvae. Also due to lack of toxicity data at higher test concentrations, it is uncertain if there could be potential acute effects to adult honeybee at application rates > 5.7 lb a.e./A. Additional toxicity studies with other types of terrestrial invertebrates (*i.e.*, predatory mites, earthworms, parasitic wasps) are also available, with generally no effects reported up to the highest dose tested. In a study with a predatory mite, the 7-d LD₅₀ value was reported as 1200 g a.e./ha (1.1 lb/A) (MRID 45767105)
- Exposure to glyphosate residues on foliage resulting from direct deposition or spray drift may impact growth of birds for all uses (surrogates to terrestrial-phase amphibian), but may not impact reproductive parameters.
- Exposure to glyphosate residues on foliage resulting from direct deposition or spray drift may impact growth and reproduction to terrestrial mammals for aerial application to sugar cane as well as for most uses generally applied by ground applications up to the combined maximum annual rate.
- Exposure to glyphosate residues on foliage resulting from spray drift may impact survival and/or biomass of upland plants and riparian/wetland plants in areas adjacent to a treated field.

Preliminary Ecological Risk Assessment in Support of the Registration Review of Glyphosate and Its Salts



Glyphosate (CAS 1071-83-6)
N-(phosphonomethyl)glycine

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1. Executive Summary

1.1 Introduction

The purpose of this assessment is to evaluate the potential risks of glyphosate and its salts (hereafter referred to as glyphosate) to non-target organisms. This risk assessment incorporates the available exposure and effects data, and most current modeling and risk methodologies, some of which may not have been available at the time previous risk assessments were conducted. This risk assessment focuses on potential adverse effects to non-listed organisms.

Glyphosate acid (CAS number 1071-83-6) [N-(phosphonomethyl)glycine] is an herbicide belonging to the phosphono amino acid class of pesticides. Glyphosate is an acid which can be associated with different counter cations to form salts. For comparison purposes, in this assessment, each salt is considered in terms of its “glyphosate equivalent,” (acid equivalent; ae) as determined by multiplying the glyphosate salt endpoint value by the acid equivalence ratio (the ratio of the molecular weight of N-(phosphonomethyl)glycine to the molecular weight of the salt). For the assessment of risk to glyphosate, both application rates and the toxicity endpoint values are expressed as acid equivalents.

1.2 Exposure Assessment

Evaluation of potential risk to aquatic non-target organisms was assessed by estimating exposure from:

- Glyphosate only (spray drift, spray drift and runoff, direct application to water)
- Glyphosate formulations (spray drift, direct application to water)
- Surfactant only (POEA) (spray drift)

Exposure to glyphosate formulations was evaluated because some of the formulations are more toxic than the active ingredient alone. Terrestrial uses allow for application of formulations that may contain a surfactant that is toxic to aquatic organisms (polyethoxylated tallow amines (POEA)), whereas the toxic surfactant is not allowed in formulations designated for direct aquatic use. Therefore, in assessing potential risk to aquatic organisms, exposure was estimated from glyphosate formulations that do or do not contain POEA (designation of containing POEA or not based on available information for the formulation tested).

Evaluation of potential risk to terrestrial non-target organisms was assessed by estimating exposure from:

- Glyphosate only (spray drift, direct contact)
- Glyphosate formulations (spray drift, direct contact)

Glyphosate is stable towards abiotic hydrolysis and direct photolysis in water. Its major route of transformation identified in laboratory studies and in the field is microbial degradation, where the major metabolite is aminomethyl phosphonic acid (AMPA). Glyphosate is very soluble in

water. It has low potential to volatilize from soil or water, as suggested by its low vapor pressure and Henry's Law Constant. Glyphosate adsorbs strongly to soils and sediments. Based on its strong adsorption to soil/sediments alone, leaching to ground water or entering surface water dissolved in runoff would be minimized. However, surface water can be contaminated by transport of suspended soil particulates, followed by desorption from the soil particulates and/or from sediments.

Offsite exposure is also possible via spray drift, colloidal transport, inadvertent direct overspray and wind transport of soil particulates loaded with adsorbed glyphosate residues. Glyphosate is very hydrophilic and is unlikely to bioconcentrate in fish ($\log K_{ow} < -3$).

1.3 Dose-Response Assessment

Toxicity data are available for technical glyphosate including its salts, as well as for glyphosate formulations. Toxicity data are also available for certain surfactants contained in some glyphosate formulations, as well as for the major degradate AMPA.

Glyphosate alone is slightly acutely toxic to freshwater fish and invertebrates and estuarine/marine fish, practically non-toxic to estuarine/marine invertebrates and terrestrial invertebrates (honeybee contact), and no more than slightly acutely toxic to birds and mammals. There were no effects reported up to the highest concentration tested in the chronic reproduction avian studies for bobwhite quail (830 mg a.e./kg-diet), but indications of body weight effects in male and offspring mallard ducks at 501 mg a.e./kg-diet. There were no effects in the chronic freshwater fish study (25.7 mg a.e./L). In a chronic mammalian reproduction study, the NOAEL was 408 mg/kg/day based on delayed male offspring maturation and body weight. The NOAEC value for chronic freshwater invertebrates was 9.22 mg a.e./L, based on the use of an acute to chronic ratio, using *Daphnia magna* toxicity data, and the most sensitive acute toxicity value (midge). For terrestrial plants (vegetative vigor), the most sensitive monocot species was sorghum (*Sorghum bicolor*) with a reported IC_{25} value of 0.16 lb a.e./A and a NOAEC of 0.07 lb a.e./A (MRID 44125715). For dicots, the most sensitive species was cucumber (*Cucumis sativus*) with a reported IC_{25} of 0.074 and NOAEC of 0.049 lb a.e./A (MRID 44320636). For aquatic vascular plants, the 14-d EC_{50} is 11.9 mg a.e./L, and for aquatic non-vascular plants, the 4-d EC_{50} is 11.4 mg a.e./L.

1.4 Risk Characterization

The risk conclusions for direct effects to non-listed terrestrial and aquatic organisms are summarized as follows.

1. Freshwater and Estuarine/marine Fish and Aquatic Invertebrates:
 - a. Likelihood of risk from acute and chronic exposure from use of glyphosate anticipated to be low ($RQs < LOC$). Using the LOC and standard exposure methodology, direct effects to listed aquatic vertebrates and invertebrates are not anticipated.

2. Aquatic Plants

- a. Likelihood of risk to aquatic non-vascular and submerged aquatic plants from spray drift and runoff from terrestrial uses anticipated to be low (RQs <LOC);
- b. For emergent aquatic vascular plants, potential for risk from exposure to spray drift from terrestrial uses, and necessary off-site distances to be below toxicity threshold up to over 1000 feet depending on use. Based on available aquatic vascular plant data, LOCs for direct application are not exceeded. However, glyphosate is registered for application to aquatic environments in an effort to control aquatic vegetation, therefore, it is anticipated that emergent aquatic vascular plants could be adversely affected.
- c. For application to aquatic environments, there is a potential for adverse effects to aquatic non-vascular plants at ≥ 8.25 quarts formulation/A (RQ = 1.8; based on the use of the standard farm pond volume). However, there is uncertainty in the toxicity value used for this evaluation as it is not definitively known if the formulation tested is allowed for use in aquatic environments. Additionally, maximum single application volumes for formulated product do not appear to exceed 8 quarts formulation/A.

3. Birds (surrogates for terrestrial-phase amphibians and reptiles)

- a. Likelihood of risk from acute exposure to glyphosate alone at application rates less than 8 lbs. a.e./A is anticipated to be low (LD_{50} > highest concentration tested). For the canary and bobwhite quail, at the application rate of 8 lb a.e./A, the highest EEC is less than the highest dose tested (using the most conservative comparison (20g bird): EEC = 2187 mg ae/kg-bw; Highest Dose = 3139 mg a.e./kg-bw for canary and 2302 mg a.e./kg-bw for bobwhite).
- b. Acute toxicity data from the only available study using a formulation had RQs above the non-listed acute LOC. However, it is uncertain how representative this formulation toxicity is for the large number of registered end-use products.
- c. For chronic exposure, decreases in body weight were observed in the mallard at concentrations down to 501 mg a.e./kg-bw (lowest concentration tested). There is evidence to suggest that reproductive parameters including eggs laid, embryo viability and eggshell thickness may not be impacted by glyphosate exposure (EECs (1920 mg a.e./kg-bw) < NOAEC (2160 mg a.e./kg-diet) from mallard duck reproduction study and no effect up to 830 mg a.e./kg-diet for bobwhite quail).

4. Mammals

- a. Likelihood of risk from acute exposure to glyphosate alone anticipated to be low (LD_{50} > highest concentration tested). For any of the uses at application rates up to the rate of 8 lbs a.e./A, the EEC values are less than half the highest dose tested in the acute oral study.
- b. Acute toxicity data with discrete toxicity values were available from several studies using a formulation (n=4). Results from one study showed an RQ of 2.1. However, the LD_{50} value for the majority of the end-use products was greater than the highest dose tested (limit dose).
- c. For chronic exposure to technical glyphosate, potential risks on a dietary basis is anticipated to be low (RQs <LOC). However, dose-based chronic RQs did

exceed the LOC for small mammals consuming short grass for aerial application to sugar cane as well as for most uses generally applied by ground applications up to the combined maximum annual rate (RQs 1.02-10.2).

- d. Effects on reproductive parameters were observed in a screening mammalian reproduction study for POEA for which EECs were greater than the NOAEL. This may impact risk to mammals following chronic exposure to one of the formulations containing the POEA surfactant.

5. Terrestrial Invertebrates

- a. Acute oral and contact LD₅₀ values for adult honeybees are greater than the highest dose tested (103 (contact) and 182 (oral) µg a.i./bee).
- b. Application rates greater than 5.7 lb a.e./A exceed this highest tested oral concentration, and therefore, there is uncertainty in potential acute risk to adult honeybees at rates above 5.7 lb a.e./A.
- c. No effects on honeybee colony adult and larvae mortality and larvae weight were reported after oral exposure at concentrations based on an application rate of 1.92 lb a.e./A. Larvae were exposed to glyphosate via normal hive activity. Toxicity data to larvae under conditions to evaluate response of individual larvae after exposure to a known concentration of glyphosate are not available.
- d. Additional toxicity studies with other types of terrestrial invertebrates (i.e., predatory mites, earthworms, parasitic wasps) are also available, with generally no effects reported up to the highest dose tested. In a study with a predatory mite, the 7-d LD₅₀ value was reported as 1200 g a.e./ha (1.1 lb/A) (MRID 45767105). Using additional terrestrial invertebrate data, the estimated distance off-field needed to be below the toxicity threshold (1.1 lb a.e./A), is up to 69 feet.

6. Terrestrial Plants

- a. Potential for adverse effects from spray drift, but not anticipated from exposure to runoff. Estimated distance off-field needed to be below toxicity threshold is up to 459 feet for monocots and over 1000 feet for dicots.

2. Problem Formulation

The preliminary problem formulation for this ecological risk assessment was posted in the Registration Review docket for glyphosate on July 22, 2009 [www.regulations.gov, Docket ID http://www.regulations.gov/#!documentDetail;D=EPA-HQ-OPP-2009-0361-0007].

EFED's response to public comments on the preliminary problem formulation was posted on December 30, 2009. [www.regulations.gov, Docket ID EPA-HQ-OPP-2009-0361-0040].

2.1. Introduction

Glyphosate [*N*-(phosphonomethyl)glycine] is an acid, and it can also be associated with different counter cations to form salts. Glyphosate acid will be a zwitterion (presence of both negative (anionic) and positive (cationic) electrostatic charges) in the environment because of the presence of a carboxylate, phosphonate, and amine functional groups. These functional groups allow glyphosate to form metal-ligand complexes with Fe, Cu, Mn, Zn, Al, Ca in soil, sediment, and aquatic environments. (Popvoc, *et al.*, 2001).

Several salts of glyphosate are currently marketed, as well as the acid, and are considered as the active ingredient in end-use products. The parent acid is the chemical species that exhibits herbicidal activity and so is the actual chemical stressor considered in this risk assessment regardless of the salt, unless otherwise specified.

In order to have comparable results, each salt is considered in terms of its glyphosate equivalent, (acid equivalent; a.e.), determined by multiplying the application rate by the acid equivalence ratio, defined as the ratio of the molecular weight of *N*-(phosphonomethyl)glycine to the molecular weight of the salt. Table 1 shows the salts of glyphosate that may be used as the source of the actual herbicide-active chemical species. For the purpose of this assessment, the acid and all salt species are referred to collectively as "glyphosate" throughout this document.

Table 1. Identification of Glyphosate and its Salts

Counter Cation	PC Code	CAS No.	Acid Equivalence Ratio
Glyphosate acid (no counter cation)	417300	1071-83-6	1
Isopropyl amine	103601	38641-94-0	0.74
Monoammonium	103604	114370-14-8	0.94
Diammonium	103607	40465-66-5	0.83
<i>N</i> -methylmethanamine	103608	34494-07-7	0.79
Potassium	103613	39600-42-5; 70901-20-1	0.81

2.1.1 Surfactants and Other Potential Components in Tank Mixtures

Pesticides of high solubility in water, such as glyphosate, do not “wet” (cover) properly the waxy (hydrophobic) surfaces of plants. To attain proper coverage of plant surfaces and distribution of the herbicide, surfactants are added into the formulation of the pesticide. Proper coverage arises from hydrophobic interactions between the surfactant tail (usually long carbon chains) and the waxy surfaces of plants. Therefore, the ecological effects of the pesticide-surfactant combination may differ from that of the single pesticide or the single surfactant. Glyphosate labels also recommend using a nonionic surfactant in the tank mix to further enhance the “wettability” of glyphosate.

Toxicity studies, particularly acute aquatic toxicity studies, show that these formulated products can be more toxic than the glyphosate active ingredient alone and so toxicity studies using formulated products are considered independently of those containing only the active ingredient.

One class of surfactants used in glyphosate formulations are the polyethoxylated tallow amines (POEA) and this class has been shown to be more toxic to aquatic animals than glyphosate alone. However, other formulations may contain a different class of surfactant. The nature of the surfactant included in the formulation is considered to be Confidential Business Information (CBI) and is not included on product labels.

In addition to the use of surfactants, glyphosate use labels generally recommend the addition of ammonium sulfate (AMS) to the spray mixture, particularly in cases when using hard water¹ (Peterson and Thompson 2009). AMS is added to the spray solution in an effort for the sulfate ion to competitively bind with the positively charged elements commonly found in hard water (*i.e.*, calcium, magnesium, and iron) that may otherwise bind to the negatively charged glyphosate ion. The formation of glyphosate-cation complexes may reduce the efficacy of glyphosate by inhibiting adsorption into the leaves. In addition, it is thought that the ammonium ion may combine with the glyphosate ion which may improve movement across the leaf membrane. The potential influence of this chemical in a spray mixture is discussed in the Uncertainty section.

2.1.2 Physical and Chemical Properties of Glyphosate

The physical and chemical properties of glyphosate are shown in Table 2. The formation of glyphosate-metal complexes with iron and aluminum promotes a high sorption affinity of glyphosate on the surfaces of Fe and Al oxides in soils and sediments (McBride, 1994). Glyphosate can form various metal complexes (Popov, *et al.*, 2001).

Based on the physical and chemical properties alone, glyphosate has low potential to volatilize from soils (vapor pressure) or from water (Henry’s Law Constant). It is also unlikely to bioaccumulate in fish given the low value of the Log *n*-octanol/water partition coefficient.

Appendix A provides the structure and further chemical/molecular information on glyphosate. The molecular structure characteristics of glyphosate are important as they help in understanding

1 http://www.monsantoito.com/docs/PROMAX_Amonium_Sulfate_use_Hard_Water_issue_TUG.pdf

its mode of action at a molecular level as well as the binding of glyphosate to soil/sediment particulates.

Table 2. Physical and Chemical Properties of Glyphosate

Physical/Chemical Property	Value
Molecular Formula	C ₃ H ₈ NO ₅ P
Molecular Weight	170.8 g/mole
Melting Point	210-212° C (tech.) 215-219° C (pure)
Solubility in water, 25° C	12,000 mg L ⁻¹
Vapor Pressure, Pa	1.3 x 10 ⁻⁷ (25° C)
Henry's Law Constant, Pa ·m ³ ·mol ⁻¹	2.1 x 10 ⁻⁹
Log K _{ow}	< -3
Dissociation Constants	pK _{a1} = 0.8 pK _{a2} = 2.35 pK _{a3} = 5.84 pK _{a4} = 10.48

2.2. Mechanism of Action

Glyphosate acid (CAS number 1071-83-6) [*N*-(phosphonomethyl)glycine] is an herbicide belonging to the phosphono amino acid class of pesticides. Glyphosate is a foliar, non-selective, systemic herbicide widely used to control weeds in agricultural crops and non-agricultural sites. Glyphosate is a potent and specific inhibitor of the enzyme 5-enolpyruvylshikimate 3-phosphate (ESPS) synthase. This enzyme is the sixth enzyme on the shikimate pathway and it is essential for the biosynthesis of aromatic amino acids (e.g., tyrosine, tryptophan, and phenylalanine) and other aromatic compounds in algae, higher plants, bacteria and fungi. Inhibition of this enzyme leads to plant cell death. The shikimate pathway is absent in mammals.

2.3. Use Statistics

Glyphosate is used as a non-selective foliar systemic herbicide in both aquatic and terrestrial environments on a wide variety of food and feed crops, non-food and non-feed crops and for other uses including forestry, greenhouse, non-crop, and residential. Based on usage data provided by the Biological and Economic Analysis Division (BEAD), on average, roughly 196,355,300 pounds of glyphosate are applied annually to agricultural crops (Table 3). Glyphosate usage is highest on soybeans, with annual average applications of 100,000,000 lbs a.i. applied (representing nearly 51% of the total use on agricultural crops). The crop with the highest average percent crop treated with glyphosate is soybeans (95%), followed by oranges (90%), and then almonds, cotton, grapefruit, and pistachios (85%). No usage data are available on the non-agricultural uses for glyphosate.

Table 3. Screening Level Estimates of Agricultural Uses of Glyphosate
(Source: BEAD SLUA report April 1, 2014)

Crop	Lb. A.I.	Percent Crop Treated	
		Average	Maximum
Alfalfa	400,000	<2.5	5
Almonds	2,100,000	85	95
Apples	400,000	55	70
Apricots	10,000	60	80
Artichokes	1,000	10	15
Asparagus	30,000	55	70
Avocados	80,000	45	65
Barley	600,000	25	40
Beans, Green	70,000	15	25
Blueberries	10,000	20	25
Broccoli	3,000	<2.5	<2.5
Brussels Sprouts *	<500	N/C	N/C
Cabbage	20,000	10	25
Caneberries	3,000	10	25
Canola	500,000	65	80
Cantaloupes	20,000	10	25
Carrots	3,000	5	10
Cauliflower	1,000	<2.5	5
Celery	1,000	5	10
Cherries	200,000	65	85
Chicory*	<500	N/C	N/C
Corn	59,300,000	60	85
Cotton	18,300,000	85	95
Cucumbers	30,000	20	35
Dates	3,000	20	25
Dry Beans/Peas	600,000	25	45
Fallow	8,400,000	55	65
Figs	5,000	40	70
Garlic	4,000	10	25
Grapefruit	400,000	85	95
Grapes	1,400,000	70	80
Hazelnuts	30,000	65	90
Kiwifruit	2,000	30	40
Lemons	200,000	75	90
Lettuce	10,000	<2.5	10
Nectarines	20,000	45	70
Oats	100,000	5	10
Olives	20,000	45	50

Crop	Lb. A.I.	Percent Crop Treated	
		Average	Maximum
Onions	40,000	30	40
Oranges	3,200,000	90	95
Pasture	700,000	<1	<2.5
Peaches	100,000	55	70
Peanuts	300,000	20	35
Pears	100,000	65	90
Peas, Green	20,000	10	20
Pecans	400,000	35	45
Peppers	30,000	20	35
Pistachios	500,000	85	95
Plums/Prunes	200,000	65	80
Pluots*	1,000	N/C	N/C
Pomegranates*	40,000	N/C	N/C
Potatoes	80,000	10	15
Pumpkins	20,000	20	25
Rice	800,000	30	50
Sorghum	2,800,000	40	60
Soybeans	100,000,000	95	100
Spinach	2,000	<2.5	10
Squash	10,000	20	40
Strawberries	10,000	10	20
Sugar Beets	1,200,000	55	100
Sugarcane	300,000	45	50
Sunflowers	1,100,000	55	75
Sweet Corn	100,000	15	25
Tangelos	9,000	55	80
Tangerines	60,000	65	80
Tobacco	9,000	5	10
Tomatoes	100,000	35	45
Walnuts	600,000	75	85
Watermelons	30,000	15	25
Wheat	8,500,000	25	70

All numbers rounded.

<500 indicates less than 500 pounds of active ingredient.

<2.5 indicates less than 2.5 percent of crop is treated.

<1 indicates less than 1 percent of crop is treated.

* Based on CA DPR data only; N/C = not calculated, only lb a.i. available

The survey data included in the SLUA report does not differentiate between which exact chemical code(s) are included from the Case. Data years 2004-2012

SLUA data sources include:

USDA-NASS (United States Department of Agriculture's National Agricultural Statistics Service),

Private Pesticide Market Research, and California Department of Pesticide Regulation data.

These results reflect amalgamated data developed by the Agency and are releasable to the public.

As shown in Figure 1, based on U.S. Geological Survey (USGS) National Water Quality Assessment Program (NAWQA) data from 2011, glyphosate is used on agricultural crops across

most of the U.S., but predominantly in California, Midwestern states, Arkansas, Tennessee, Mississippi, Louisiana, and Southeastern states from Maryland to Florida.

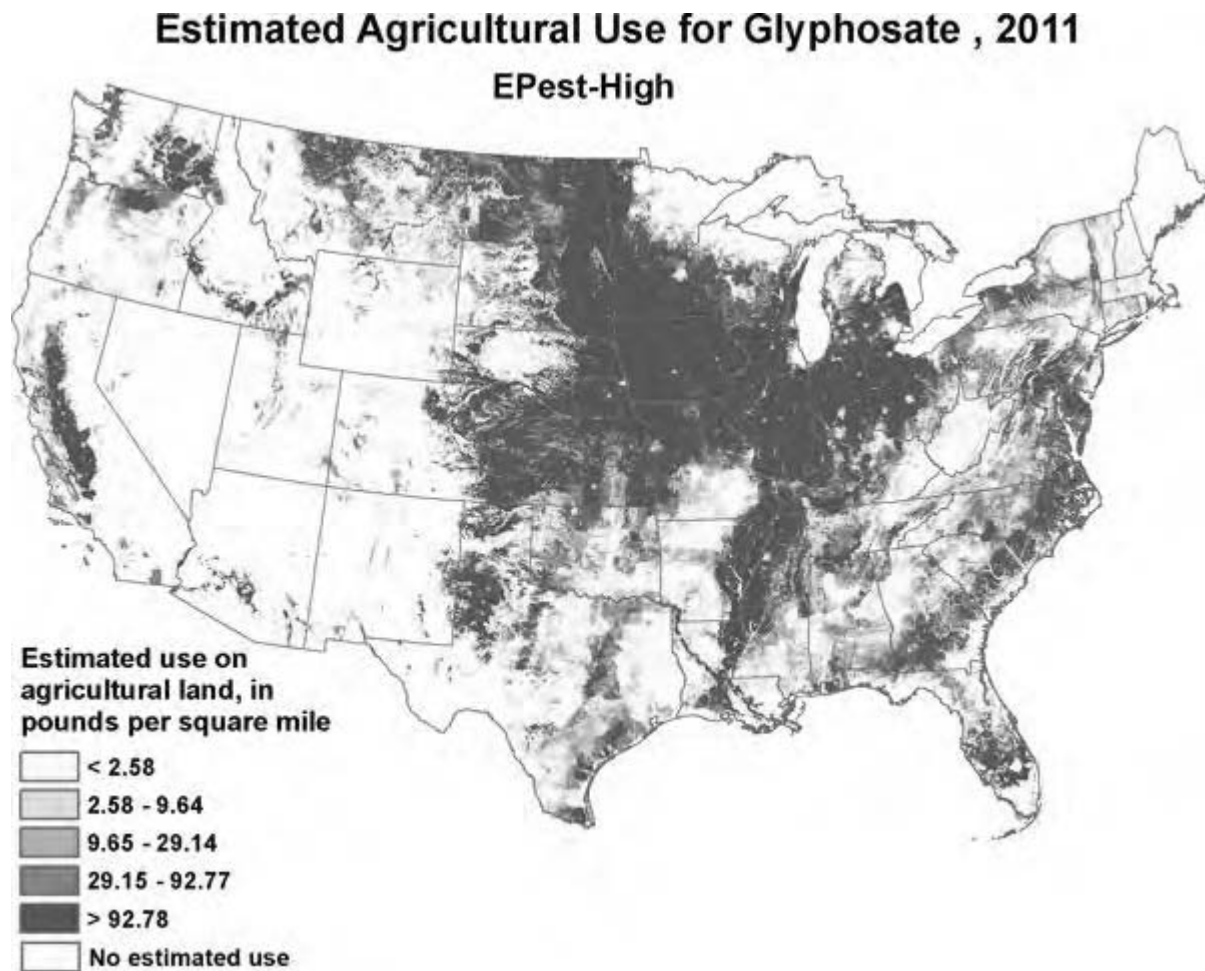


Figure 1. Map of Estimated Annual Agricultural Use of Glyphosate in 2011

(Source: http://water.usgs.gov/nawqa/pnsp/usage/maps/show_map.php?year=2011&map=GLYPHOSATE&hilo=L)

2.4. Application Methods and Rates

Target pests include a broad spectrum of emerged grass and broadleaf weeds, both annual and perennial. Glyphosate is formulated as water-dispersible granules (WG) (80% active ingredient), emulsifiable concentrate (EC) (13.4% - 36.5% active ingredient), water-dispersible liquids (L) (5% - 14.6% active ingredient), ready to use (RTU) (0.81% active ingredient), and soluble concentrate/solid (SC/S) (95.2% - 96.7% active ingredient). Application equipment includes aircraft and various ground equipment (boom sprayer, hand held hydraulic sprayer, hand held sprayer, high volume ground sprayer, hooded sprayer, hose-end sprayer, low volume ground sprayer, low volume sprayer, motor driven sprayer, product container, ready-to-use spray container, shielded applicator, sprayer, tank-type sprayer, wick applicator, and wiper applicator). Application is via band treatment, broadcast, crack and crevice treatment, directed spray, edging treatment, ground spray, high volume spray (dilute), low volume spray (concentrate), perimeter treatment, soil broadcast treatment, spot treatment, spray, strip treatment, stump treatment, and wipe-on/wiper treatment. Single application rates are up to 8 pounds active ingredient (as acid equivalents)/acre (lb a.e./A), but are generally 1.55 lb a.e./A for aerial applications and 3.75 lb a.e./A for ground application. Maximum combined annual application rates are up to generally 6 to 8 lbs a.e./A. For some uses, the single application rates were calculated as up to 40 lbs a.e./A, however, these applications are intended for spot treatment or treatment over areas much smaller than an acre. In these cases the application rate is also expressed in terms of the smaller coverage area.

The label data used in this assessment were derived label and use information compiled by the Joint Glyphosate Task Force (JGTF). The Agency requested that the JGTF submit label information to clarify non-specified information in the LUIS report. The non-specified information clarified included maximum number of applications in a crop cycle, maximum number of applications per year, maximum application rate per year, and the minimum retreatment intervals. Table 4 and Table 5 show the maximum single application rates for glyphosate from the JGTF.

Table 4. Maximum Single Application Rates for Ground Applications of Glyphosate from the JGTF Use Matrix

Crop Group	Max Single App Rate (lb a.e./A)	Max Apps	Min Interval (days)	Max Annual App Rate Crop Cycle (lb a.e./A)	Max Combined Annual App Rate (lb a.e./A)
Round Ready 2 Yield Soybeans	3.75	3	10	3.75	6
Root Tuber Vegetables	3.75	3	7	6	6
Rangelands	0.38	6	7	2.25	2.25
Pome Fruits	3.75	10	7	8	8
Pastures	8	4	7	8	8
Oilseed Crops	3.75	3	7	6	6
Non-Food Tree Crops	8	30	7	8	8
Miscellaneous Tree Crops	3.75	10	7	8	8
Miscellaneous Crops	3.75	3	7	6	6
Legume Vegetables	3.75	6	7	6	6
Leafy Vegetables	3.75	6	7	6	6
Herbs and Spices	3.75	6	7	6	6
Grass/Turfgrass/Sod Production	3.75	3	7	6	6
Grain Sorghum	3.75	3	7	6	6
Fruiting Vegetables	3.75	6	7	6	6
Forestry	8	5	7	8	8
Fallow	3.75	3	7	6	6
Cucurbits Vegetables/Fruit	3.75	6	7	6	6
Cotton	3.75	5	7	6	6
Corn (Field, Seed, Silage, Popcorn)	3.75	3	7	6	6
Conservation Reserve Program	3.75	3	7	6	6
Citrus Fruit Crop	3.75	10	7	8	8
Cereal and Grain Crop	3.75	3	7	6	6
Bulb Vegetables	3.75	6	7	6	6
Brassica Vegetable	3.75	6	7	6	6
Round-up Ready Flex Cotton	3.75	3	10	3.75	6
Round-up Ready Cotton	3.75	3	10	3.75	6
Round-up Ready Corn (GA-21)	3.75	3	10	3.75	6
Round-up Ready Corn 2 (NK603)	3.75	3	10	3.75	6
Round-up Ready Alfalfa	1.55	3	10	4.61	6
Round-up Ready Sugarbeets	3.75	3	10	3.75	6
Tropical/Subtropical Trees/Fruits	3.75	3	10	8	8
Tree Nut Crops	3.75	3	10	8	8
Sweet Corn	3.75	3	7	6	6
Sugar Cane	3.75	3	7	6	6
Stone Fruit	3.75	3	7	8	8

Crop Group	Max Single App Rate (lb a.e./A)	Max Apps	Min Interval (days)	Max Annual App Rate Crop Cycle (lb a.e./A)	Max Combined Annual App Rate (lb a.e./A)
Round-Up Ready Canola(Winter Varieties)	1.55	3	10	1.55	6
Soybeans	3.75	3	7	6	6
Sweet Corn with Round-Up Ready 2 Technology	3.75	3	10	3.75	6
Round-Up Ready Canola (Spring Varieties)	1.55	3	10	1.55	6
Vine Crops	3.75	3	7	8	8
Non Crop	8	10	7	8	8
Aquatic	8	4	1	8	8
Alfalfa, Clover, and Other Forage Legume	3.75	3	7	6	6
Berry and Small Fruit Crops	3.75	3	7	8	8
Residential	40	12	7	40	40

Table 5. Maximum Single Application Rates for Aerial Applications of Glyphosate from the JGTF Use Matrix

Crop Group	Max Single App Rate (lb a.e./A)	Max Apps	Min Interval (days)	Max Annual App Rate Crop Cycle (lb a.e./A)	Max Combined Annual App Rate (lb a.e./A)
Round Ready 2 Yield Soybeans	1.55	3	10	3.75	6
Root Tuber Vegetables	1.55	3	7	4.65	6
Rangelands	0.38	6	7	2.25	2.25
Pome Fruits	1.55	3	7	4.65	8
Pastures	8	4	7	8	8
Oilseed Crops	1.55	3	7	4.65	6
Non-Food Tree Crops	8	3	7	4.65	8
Miscellaneous Tree Crops	1.55	3	7	4.65	8
Miscellaneous Crops	1.55	3	7	4.65	6
Legume Vegetables	1.55	6	7	4.65	6
Leafy Vegetables	1.55	6	7	4.65	6
Herbs and Spices	1.55	6	7	6	6
Grass/Turfgrass/Sod Production	1.55	3	7	4.65	6
Grain Sorghum	1.55	3	7	4.65	6
Fruiting Vegetables	1.55	6	7	4.65	6
Forestry	8	2	7	8	8
Fallow	1.55	3	7	4.65	6
Cucurbits Vegetables/Fruit	1.55	6	7	4.65	6
Cotton	1.55	3	7	4.65	6
Corn (Field, Seed, Silage, Popcorn)	1.55	3	7	4.65	6

Crop Group	Max Single App Rate (lb a.e./A)	Max Apps	Min Interval (days)	Max Annual App Rate Crop Cycle (lb a.e./A)	Max Combined Annual App Rate (lb a.e./A)
Conservation Reserve Program	1.55	3	7	4.65	6
Citrus Fruit Crop	1.55	3	7	4.65	6
Cereal and Grain Crop	1.55	3	7	4.65	6
Bulb Vegetables	1.55	6	7	4.65	6
Brassica Vegetable	1.55	6	7	4.65	6
Round-up Ready Flex Cotton	1.55	3	10	3.75	6
Round-up Ready Flex Cotton	1.125	6	10	4.5	6
Round-up Ready Cotton	1.55	3	10	3.75	6
Round-up Ready Corn (GA-21)	1.55	3	10	3.75	6
Round-up Ready Corn 2 (NK603)	1.55	3	10	3.75	6
Round-up Ready Alfalfa	1.55	3	10	4.61	6
Round-up Ready Sugarbeets	1.55	3	10	3.75	6
Tropical/Subtropical Trees/Fruits	1.55	3	10	4.65	8
Tree Nut Crops	1.55	3	10	4.65	8
Sweet Corn	1.55	3	7	4.65	6
Sugar Cane	2.25	3	7	6	6
Stone Fruit	1.55	3	7	4.65	8
Round-Up Ready Canola (Winter Varieties)	1.55	3	10	1.55	6
Soybeans	1.55	3	7	4.65	6
Sweet Corn with Round-Up Ready 2 Technology	1.55	3	10	3.75	6
Round-Up Ready Canola (Spring Varieties)	1.55	3	10	1.55	6
Vine Crops	1.55	3	7	4.65	8
Non Crop	8	10	7	8	8
Aquatic	8	4	1	8	8
Alfalfa, Clover, and Other Forage Legume	1.55	3	7	4.65	6
Berry and Small Fruit Crops	1.55	3	7	4.65	8

3. Exposure Assessment

3.1. Exposure Assessment Strategy

The aquatic exposure strategy is based on the premise that runoff/erosion and spray drift are important dissipation pathways for terrestrial uses of glyphosate (Figure 2). These dissipation processes were modeled using the Tier 1 GENEEC model (Version 2). Exposure to glyphosate formulations also was evaluated because some of the formulations are more toxic than the active ingredient alone. Terrestrial uses of glyphosate allow for application of formulations that contain a surfactant that is toxic to aquatic organisms (polyethoxylated tallow amines (POEA)), whereas the toxic surfactant is not allowed in formulations designated for direct aquatic use. Because glyphosate formulations with POEA are allowed to be used in terrestrial use patterns and that chemical constituents in glyphosate formulation (*i.e.*, POEA, etc) are expected to rapidly degrade in soil, spray drift is an important off-site dissipation pathway into aquatic environments for glyphosate formulations and the surfactant POEA. The AgDrift model (Version 2.1.1) was used to estimate exposure from off-site movement through spray drift. Direct applications to water were considered for glyphosate and the glyphosate formulations without POEA using a Tier 1 dilution model in the standard pond and the rice paddy. The Tier 1 dilution modeling approach was conducted to provide conservative estimated environmental concentrations in standard water bodies used in ecological risk assessments.

Figure 2 shows the expected exposure pathways and the aquatic modeling strategy for each stressor including glyphosate, glyphosate formulations, and POEA.

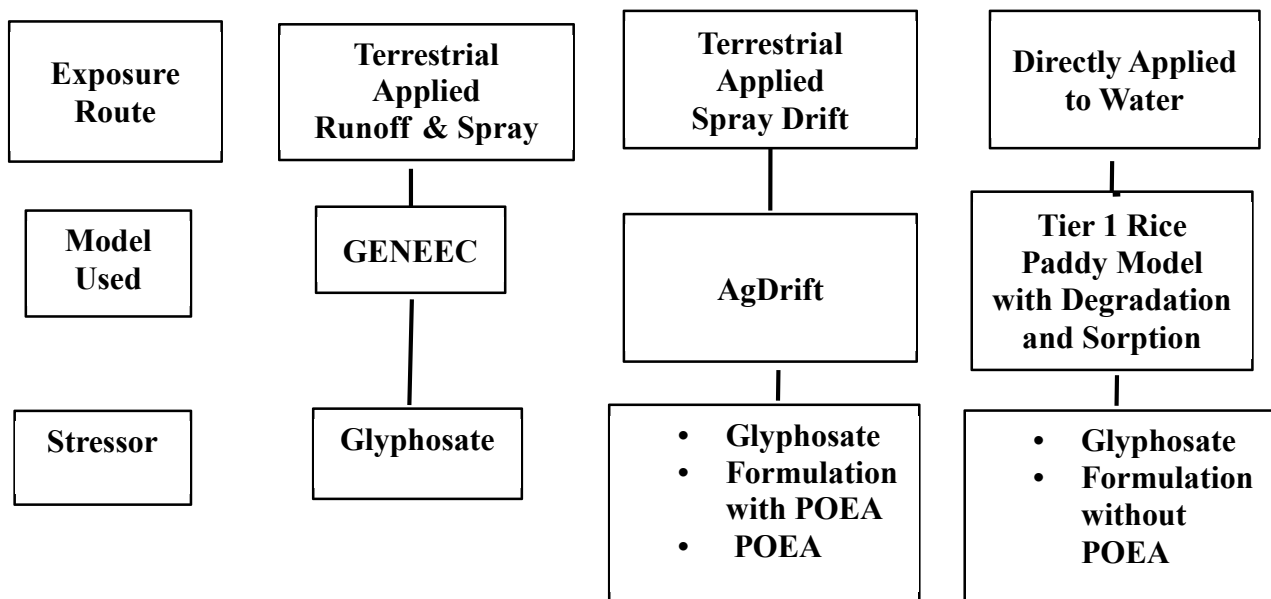


Figure 2: Exposure Pathways for Various Glyphosate Stressors and the Exposure Modeling Strategy

The terrestrial exposure strategy is based on the premise that direct contact and spray drift are important exposure pathways for terrestrial uses of glyphosate and glyphosate formulation with POEA. Direct contact was modeled using the T-REX model (Version 1.5.2). Spray drift exposure was modeled using AgDrift model (Version 2.1).

3.2 Environmental Fate Assessment

It is assumed that the glyphosate salts dissociate rapidly to form glyphosate acid and the counter ion. Because glyphosate acid will be a zwitterion (presence of both negative (anionic) and positive (cationic) electrostatic charges) in the environment, it is expected to speciate into dissociated species of glyphosate acid as well as glyphosate-metal complexes in soil, sediment, and aquatic environments. The environmental fate data for glyphosate, with the exception of a photodegradation study (MRID 44320643), did not address the impact of environmental fate processes on different species of glyphosate acid.

The major route of transformation of glyphosate identified in laboratory studies is microbial degradation (Table 6). In soils incubated under aerobic conditions, the half-life of glyphosate ranges from 1.8 to 109 days and in aerobic water-sediment systems is 14 - 518 days. However, anaerobic conditions limit the metabolism of glyphosate (half-life 199 - 208 days in anaerobic water-sediment systems).

In laboratory studies, glyphosate was not observed to break down by abiotic processes, such as hydrolysis, direct photolysis on soil, or photolysis in water at pH 7. In the field, soil dissipation half-lives for glyphosate were measured to be 1.4 to 142 days. Although the variability in glyphosate dissipation rates cannot be statistically correlated to any specific test site properties, dissipation half-lives tend to be higher at test sites in the central to northern United States. Along with significant mineralization to carbon dioxide, the major metabolite of glyphosate is aminomethylphosphonic acid (AMPA).

The degradation product AMPA is a major degradation product from glyphosate. It was detected in all laboratory studies except for the abiotic hydrolysis studies. This degradation product is ionic because it retains the phosphonate and amine functional groups. Because of these functional groups, AMPA will form metal complexes with Ca^{2+} , Mg^{2+} , Mn^{2+} , Cu^{2+} , and Zn^{2+} (Popov, et al., 2001). Batch equilibrium data for AMPA indicate high sorption to soils. Freundlich sorption coefficients range from 10 to 509 with exponents (1/n) of .78 to 0.98. The laboratory and field dissipation data indicate that AMPA is substantially more persistent than glyphosate.

Table 6. Environmental Fate Data for Glyphosate

Study	Value	Major Degradates ¹ , Comments	MRID #		
Abiotic Hydrolysis Half-life	Stable	None	00108192 44320642		
Direct Aqueous Photolysis	Stable (t1/2=216 days)	AMPA (6.6% of AR)	41689101 44320643		
Soil Photolysis Half-life	Stable (for at least 30 days)	Degradation in dark control was equal to that in irradiated samples	44320645		
Aerobic Soil Metabolism Half-life	1.8 days (sandy loam; 25°C) 2.6 days (silt loam; 25°C) 7.5 days (sandy loam; 25°C) 2.04 days (sandy loam; 25°C) 19.3 days (sandy loam;20°C) 27.4 days (scl loam; 20°C) 7.78 days (clay loam;20°C) 109 days (silt loam;20°C)	AMPA (24-32% of AR) CO2 (53 to >70% of AR)	42372501 44320645 44125718 PMRA1161813 Al-Rajab and Schiavon, 2010		
Anaerobic Aquatic Metabolism Half-life	208 days 203 days 199 days	AMPA (21.9-31.6% of AR) CO2 (23-35% of AR) AMPA and glyphosate were detected in sediment at 1 year posttreatment	41723701 42372502 44125718		
Aerobic Aquatic Metabolism Half-life	14.1 days (25°C) 267 days (20°C) 518 days (20°C)	AMPA (25% of applied AR) CO2 (≥ 23% of applied AR) a	41723601; 42372503 PMRA 161822		
Study	Value				MRID #
Batch Equilibrium	Soil	K _F	1/n	K _{Foc}	44320646
	sand	64	0.75	22,000	
	sandy loam	9.4	0.72	1,600	
	sandy loam	90	0.76	5,000	
	silty clay loam	470	0.93	21,000	
	silty clay loam	700	0.94	33,000	
	Silty clay loam	62	0.90	3,172	00108192
	Silt	90	0.94	13,050	
	Sandy loam	70	0.95	5,075	
	Sandy loam	22	0.78	5,468	
	Sediment	175	1.0		

Study	Value		MRID #
Terrestrial Field Dissipation Half-life	<u>Glyph.</u> <u>AMPA</u> 1.7 d 131 d (TX) 7.3 d 119 d (OH) 8.3 d 958 d (GA) 13 d 896 d (CA) 17 d 142 d (AZ) 25 d 302 d (MN) 114 d 240 d (NY) 142 d no data (IA)	Bare ground studies. Glyphosate and AMPA were found predominantly in the 0 to 6 inch layers	42607501 42765001
	<u>Glyph.</u> <u>AMPA</u> 2.79 d 48d (CA) 31 d ND (NC)	Bareground Studies Glyphosate and AMPA were found predominantly in the surface soil layers	44125719 44422201
	<u>Glyph</u> <u>AMPA</u> 3.9 d ND Bareground 1.4 d ND Turf	Bareground and turf plots in MS Glyphosate and AMPA were found predominantly in the surface soil layers	44320648
	<u>Glyph</u> <u>AMPA</u> 19 d ND Bareground 12 d ND Turf	Bareground and turf plots in CA Glyphosate and AMPA were found predominantly in the surface soil layers	44320649 44320650
Aquatic Field Dissipation Half-life	7.5 d – water 120 d- sediment	In a farm pond in Missouri. At 3 sites (OR, GA, MI), half-lives could not be calculated due to recharging events.	40881601
	Water: Dissipated rapidly immediately after treatment. Sediment: Glyphosate remained in pond sediments at ≥ 1 ppm at 1 year post treatment.	In ponds in Michigan and Oregon and a stream in Georgia Accumulation was higher in the pond than in the stream sediments	41552801
Forestry Dissipation	Foliage: < 1 day Ecosystem: Glyphosate: 100 d AMPA: 118 d	3.75 lb a.e./A, aerial application	41552801
Bioaccumulation in Fish	0.38X in edible tissue 0.63X in nonedible tissue 0.52X in whole fish		41228301

¹ Major degradates are defined as those which reach >10% of the applied.

The available laboratory data indicate that both glyphosate and AMPA sorb strongly to soil. The formation of glyphosate-metal complexes promotes a high sorption affinity of glyphosate to Fe and Al oxide surfaces on soils and sediments (McBride, 1994; Popov, *et al.* 2001). AMPA is also expected to form similar metal-ligand complexes (Popov, *et al.* 2001). Freundlich partitioning coefficients (K_f) for glyphosate ranged from 9.4 to 479 with exponents of 0.72 to 1, which corresponding organic carbon partitioning coefficients (K_{foc}) of 1,600 to 33,000 mL/g_{oc}. Freundlich sorption coefficients for AMPA range from 10 to 509 with exponents (1/n) of .78 to

0.98. Because the Freundlich exponents for glyphosate and AMPA are not equal to 1, the sorption process is non-linear and, therefore, sorption coefficients are dependent on the concentration in soil solution or aquatic environments. Although this non-linearity in sorption is not captured in the exposure modeling, it is expected to reduce the exposure concentrations in aquatic exposure modeling.

Although the coefficient of variation for K_{foc} is less than the coefficient of variation for K_f , indicating that pesticide binding to the organic matter fraction of the soil may explain some of the variability among the adsorption coefficients, the physicochemical properties of glyphosate (ionic) and the propensity for glyphosate and AMPA to form metal-ligand complexes on surfaces of iron and aluminum oxides would suggest the Freundlich model is the most appropriate partitioning model. This model would account for sorption on both mineral and organic constituents in soils and sediments. Based on measured K_{oc} values, glyphosate is classified as slightly mobile to hardly mobile according to the FAO classification scheme and would not be expected to leach to groundwater or to move to surface water at high levels through dissolved runoff. However, glyphosate does have the potential to contaminate surface water from spray drift or transport of residues adsorbed to soil particles suspended in runoff. It is expected to be persistent in anaerobic sediments.

The potential for volatilization of glyphosate from soil and water is expected to be low due to the low vapor pressure and low Henry's Law constant. Several studies have shown both glyphosate and AMPA detections in rainwater near use locations. In most cases, these detections were found during the spraying season in the vicinity of local use areas and can be attributed to spray drift rather than to volatilization or long range transport (Baker *et al.*, 2006; Quaghebeur *et al.*, 2004). The highest concentrations were found in urban locations. At one site in Belgium that was 5 m from a spraying location in an urban parking lot, glyphosate was detected in rainwater for several months following a single application (Quaghebeur *et al.*, 2004). Deposition was measured to be 205 $\mu\text{g a.i./m}^2$ at one week after spraying and 0.829 $\mu\text{g/m}^2$ two months after spraying. These data suggest that volatilization of glyphosate from hard surfaces is possible despite its low vapor pressure.

3.3. Aquatic Exposure

3.3.1. Terrestrial Applications

Surface water modeling was conducted using GENEEC (version 2). Model input parameters for glyphosate are shown in Table 7. Terrestrial uses of glyphosate were modeled using the maximum application rate with minimum application intervals (Table 8). Output files for GENEEC model simulations are shown in Appendix B.

Table 7. GENEEC Modeling Inputs for Glyphosate

PARAMETER	Measured VALUES	VALUE	COMMENT	SOURCE
Spray Drift Fraction	NA	AgDrift Default Spray Drift	Default ground and aerial droplet size spectrum in GENEEC	AgDrift Routines in GENEEC
Aerobic Soil Metabolism Half-life (days)	1.8days 2.6 days 7.5 days 2.0 days 13.6 days ^b 19.4 days ^b 5.5 days ^b 77.1 days ^b	29 days	Upper 90 th percentile confidence bound of the mean half-life= $16.19+(1.415*25.37)/\text{SQR}(8)$ Average=16.19 SD=25.37 $T_{n-1,90}=1.415$ n=8	MRID 44320645 MRID 44125718 MRID 42372501 PMRA 1161813 Al-Rajab and Schiavon, 2010
Organic Carbon Partition Coefficient (K _{oc}) (mL/ g _{oc})		157	Mean K _F ^a	MRID 44320646 MRID 00108192
Aerobic Aquatic Half-Life (days)	14 days 188 days ^b 366 days ^b	381 days	Upper 90 th percentile confidence bound of the mean half-life= $189.7+(1.886*175.8)/\text{SQR}(3)$ Average=189.7 SD=175.8 $T_{n-1,90}=1.886$ n=3	MRID 41723601 PMRA 1161822
Aqueous Photolysis half-life (days)		Stable	Represents photo-degradation rate at pH 7	MRID 41689101, 44320643
Hydrolysis half-life (days)		Stable		MRID 00108192, 44320642
Molecular Weight (g/mole)		169.08		Calculated
Water Solubility @ 25°C (mg/L)		12,000		Product Chemistry

a=Data derived according to Guidance of Selecting Input Parameters in Modeling Environmental Fate and Transport of Pesticides Version 2.1 (10/22/2009)

b=Half-lives corrected from 20°C to 25°C using Q10 temperature correction equation.

Table 8. Maximum Application Rates for Terrestrial Uses of Glyphosate

Application Method	Single Application Rate (lb a.e./A)	Number of Applications	Application Interval (days)	Annual Application Rate (lb a.e./A)
Aerial Spray	3.75	2	7	8
	8	1	NA	8
Ground Spray	8	1	NA	8
	40	1	NA	40

The highest EEC for terrestrial crop uses of glyphosate is associated with residential spot treatments because of the extrapolation of a spot treatment rate to a broadcast application rate (40 lb a.e./A). Estimated environmental concentrations (EECs) from the glyphosate use from residential spot treatments are not expected to exceed 246.4 µg/L for the daily peak, 185.2 µg/L for the 21-day average, and 115.7 µg/L for the 60-day average.

Estimated environmental concentrations from aerial spray applications are not expected to exceed 59.6 µg/L for the daily peak, 45.1 µg/L for the 21-day average, and 28.2 µg/L for the 60-day average.

Estimated environmental concentrations from ground spray applications are not expected to exceed 49.3 µg/L for the daily peak, 37 µg/L for the 21-day average, and 23.1 µg/L for the 60-day average. Glyphosate EECs are shown in Table 9.

Table 9. Tier I GENEEC Estimated Environmental Concentrations of Glyphosate in Surface Water from Terrestrial Uses

Application Method	Spray Drift Buffer (feet)	Single Application Rate (lb a.e./A)	EEC (ug/L)		
			Peak	21-day Average	60- day Average
Aerial Spray	0	3.75 ¹	53.3	40.3	25.2
	0	8	59.6	45.1	28.2
	500 ³	3.75	33.4	25	15.5
	500 ³	8	38.4	28.7	17.9
Ground Spray	0	8	49.3	37	23.1
	0	40 ²	246.4	185.2	115.7

1-2 applications @ 7 day interval

2-Residential Spot Treatment- Application rates are expressed as lbs ae/A.

3-Spray Drift Buffer for CA and AR

3.3.1.1. Spray Drift Transport from Terrestrial Applications

Spray drift from ground and aerial applications may enter aquatic systems. For terrestrial application of end use products, partitioning and degradation properties for each formulation component in runoff suggest that the final proportion of the residues of these components in the receiving surface waters would not represent what was introduced and what was tested in an aquatic organism toxicity study using the formulated product. For this reason, spray drift is assumed to be the only route of aquatic exposure to the formulation as introduced.

Spray deposition curves as calculated by AgDrift are provided in Figure 3 and 4. When multiplied by the appropriate single maximum application rate, these values can be used to determine the distance from the edge of the field where effects to non-target organisms are no longer of concern.

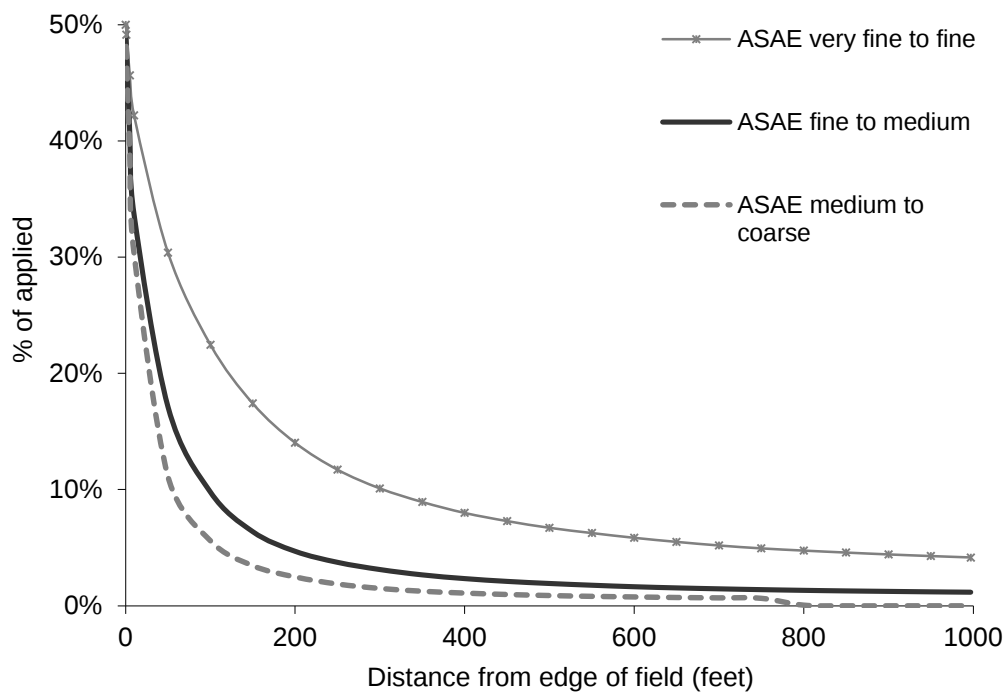


Figure 3. Percent of applied pesticide at different distances from the edge of the field treated by aerial methods (calculated using AgDrift).

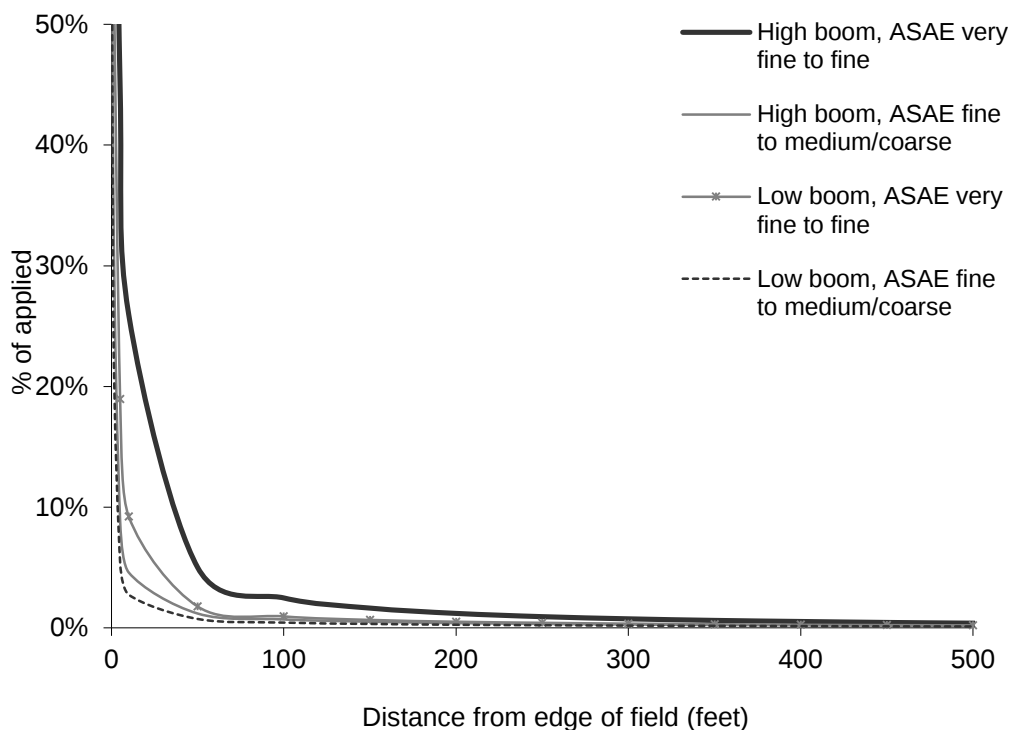


Figure 4. Percent of applied pesticide at different distances from the edge of the field treated by ground methods (calculated using AgDrift).

For the aquatic exposure assessment, the aquatic deposition tool AgDrift was used to estimate the pesticide concentrations in the standard farm pond (immediately adjacent to a treated field) from spray drift only, following aerial and ground foliar spray applications made at the maximum rates and using the default droplet size spectrum in AgDrift. For aerial applications, the maximum rates of 1.55 and 8 lb a.e./A (most crops and forestry, respectively) yielded EECs of 11.0 and 56.7 $\mu\text{g a.e./L}$, respectively. For ground applications, the maximum rates of 3.75 and 8 lb a.e./A (most crops and forestry, respectively) yielded EECs of 13.0 and 27.6 $\mu\text{g a.e./L}$, respectively.

3.3.1.2. Glyphosate Formulated Products

The volume of formulation applied in an application was also determined to help inform the risk assessment by evaluating potential risk on a formulation basis (as oppose to strictly adjusting toxicity and exposure values to acid equivalents). The volume of formulated product applied per acre was provided by the LUIS report. In the LUIS report, some values were reported on a mass of formulated product per area. In an effort to determine volume per area, for purposes of this estimate, the density was assumed to be equal to water (1000 grams per liter). This is recognized as an uncertainty in this calculation. Additionally, the LUIS report calculated the volume or mass per acre for certain uses such as spot treatments, tree injections or stump applications. This reported volume on an acre basis is anticipated to be overestimated, as it is unlikely that the area of an entire acre is treated in a single application. The volume of formulation applied in a single application, using the LUIS reports, resulted in application volumes of < 1 quart up to 10 quarts per application. The yearly or seasonal application volume appeared to have a maximum volume rate of 10.6 quarts per acre. For certain uses such as spot treatments, tree injections, stump applications, sometimes greater application rates were calculated. However, these volumes were extrapolated from uses intended to be spot treatments and therefore, the volumes calculated are likely overestimated as the application rates were calculated as lb/A. Additionally, there are registered uses in which the formulation is applied as a wipe-on or as a wiper application. Spray drift from this use as well as from the spot treatments is anticipated to be limited.

The EECs for the glyphosate formulated products and POEA are shown in Table 10. These EECs were calculated using a range of volumes of formulated product applied for which a few selected volumes are presented in Table 10. The EECs are based on a volume of formulation applied per acre, a spray drift fraction, and the simple dilution equation (using the standard pond scenario). Spray drift EECs were calculated using the spray drift fraction for the default droplet size (EFED off-site transport guidance 2013). Concentrations of formulated product and POEA in the standard farm pond (2×10^7 Liters) were calculated for both aerial and ground applications. Additionally, concentrations of formulated product and POEA were also calculated for a shallower body of water (1×10^6 Liters, which is the depth used when modeling a rice paddy water concentration). It is noted that glyphosate is not currently registered for use on rice, but rather this default water body depth was used to provide results for a shallow body of water. In the table below, the percentage of POEA in the formulated product was taken from a document available in the open literature and was assumed to be 15% (Diamond and Durkin, 1997). These EECs represent the spray drift load from a single aerial or ground spray application. Runoff was not considered because it is assumed the formulated product and the POEA will dissipate in soil and will not reach the aquatic environment as a complete formulation. Although there is limited information on the fate properties of POEA, nonionic

surfactants have been reported to readily biodegrade or sorb in soil (Krogh *et al.*, 2003). Figures 5 and 6 depict the concentration of POEA in the standard pond and shallower water body, respectively. The volume of applied formulation as well as the percentage of POEA necessary to exceed levels of concern is discussed in the Risk Description section.

Table 10. Estimated Environmental Concentration (EEC) of Formulated Product and POEA from Spray Drift.

Application Method / Receiving water body	Spray Drift Fraction	Single Application of Formulated Product (Qts/A)	Peak EEC of Formulated Product (µg/L) ¹	Peak EEC of POEA (µg/L) ²
Aerial / Standard farm pond (2E7 Liters)	0.1266	1	5.98	0.90
		5	29.9	4.49
		10	59.9	8.98
		20	120	18.0
Ground / Standard farm pond	0.0616	1	2.91	0.44
		5	14.6	2.18
		10	29.1	4.37
		20	58.2	8.74
Aerial / Paddy (1E6 Liters)	0.1266	1	120	18.0
		5	598	89.8
		10	1197	180
		20	2394	359
Ground / Paddy (1E6 Liters)	0.0616	1	58.2	8.74
		5	291	43.7
		10	582	87.4
		20	1165	175

1- [qts. formulated product/A* 1 gal/4 qts.*density of formulated product (lbs gal)*0.01*454E6 ug/lb]/2E7 liters (standard pond) or 1E6 liters (shallower body of water); density assumed to be 8.33 lb/gal.

2- Peak EEC for formulated products*percent of POEA

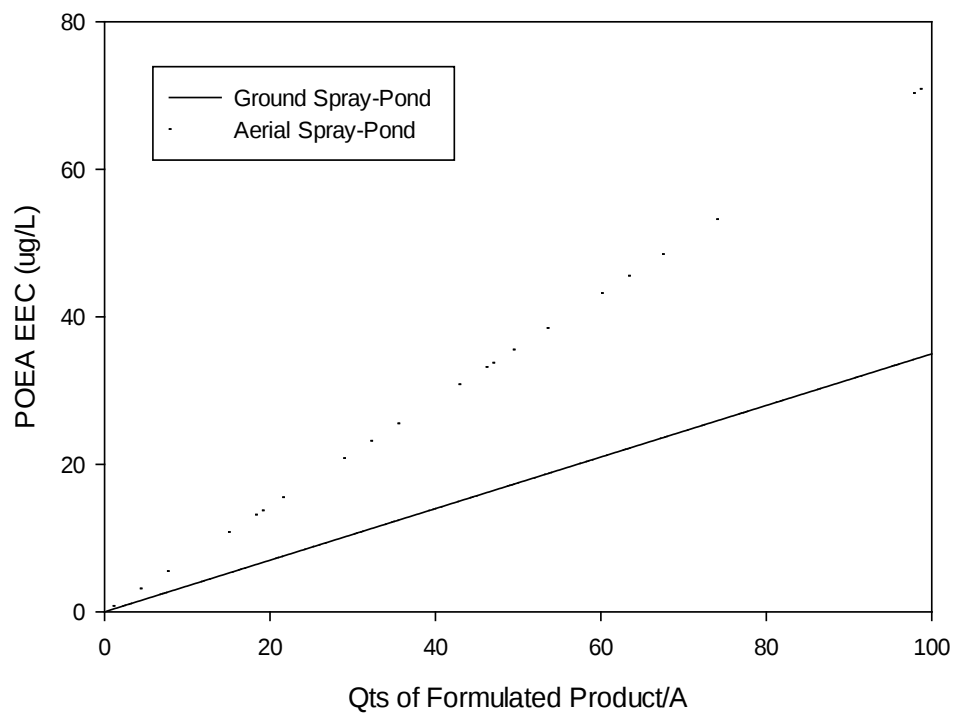


Figure 5. The Concentration of POEA in an Adjacent Water Body (standard pond) Based on Spray Drift and the Volume of a Terrestrial Formulated Product Applied by Either Ground or Aerial Application. Percentage of POEA in formulation assumed to be 15%.

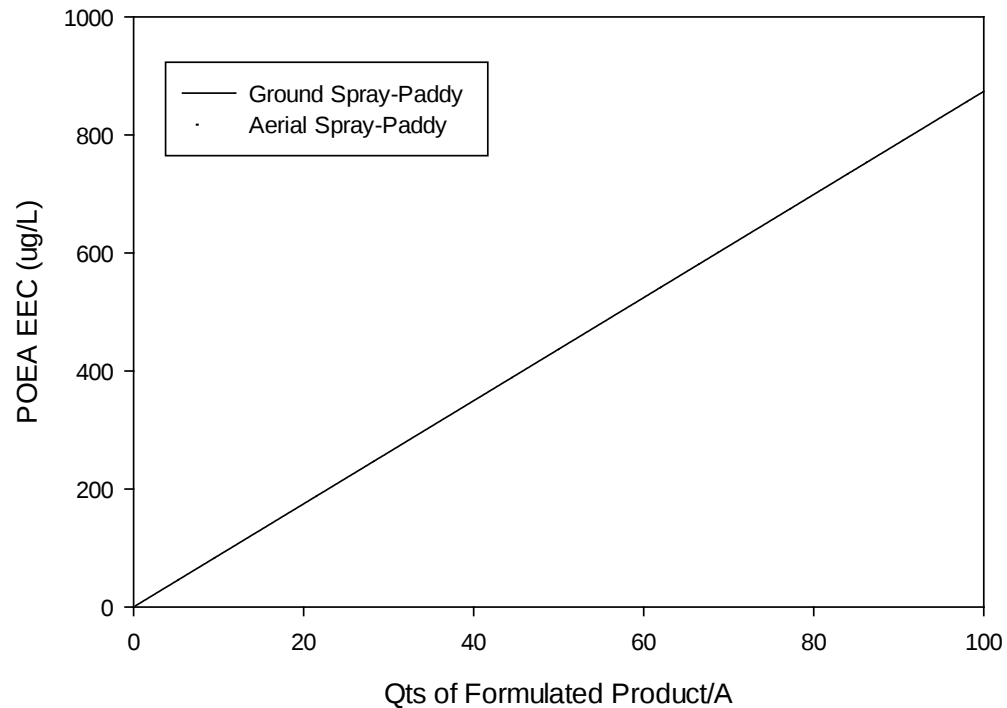


Figure 6. The Concentration of POEA in an Adjacent Water Body (water depth equivalent to default rice paddy depth) Based on Spray Drift and the Volume of a Terrestrial Formulated Product Applied by Either Ground or Aerial Application. Percentage of POEA in formulation assumed to be 15%.

3.3.2. Applications to Aquatic Environments

The glyphosate concentration in surface water from direct aquatic applications was estimated using the standard pond and rice paddy scenario. The Tier 1 rice model with degradation was used to provide conservative estimated environmental concentrations in the standard pond and rice paddy. Aerobic aquatic metabolism and sorption were assumed to control the dissipation rate of glyphosate. The modeling was conducted using maximum broadcast application rates of 3.75 and 8 lb a.e./A. The labels with direct aquatic uses do not specify a target concentrations as the aquatic label application rates are expressed as lbs ae/A. Estimated environmental concentrations of glyphosate from direct surface water applications are shown in Table 11.

Table 11. Predicted Glyphosate Concentrations from Direct Applications into the Standard Pond and Rice Paddy

Application Rate (lb a.e./A)	Waterbody	Concentration (µg/L) ¹		
		Peak ¹	21 day Average	60 day Average
3.75	Standard Pond	103.8	101.8	98.4
8		221.5	217.5	210
3.75	Rice Paddy	195.7	192.2	185.6
8		417.5	410	395.9

$$1\text{-EEC} = (\text{App rate} * 100 / (\text{dw} + (\text{dsed} * (\theta + (\rho * \text{Kd} / 1000)))) * \exp(-\text{day} * \text{K}_{\text{AAM}})$$

Where: App Rate= Application Rate (kg/ha)

Dw = Water Depth (meters) = 2 meters for standard pond or 0.1 meter for rice paddy

Dsed = Sediment Bulk Density = 1300 kg/m³

Θ = Sediment Porosity=0.509

P = organic carbon fraction=0.01

Kd = Soil:water partitioning coefficient

K_{AAM} = aerobic aquatic rate constant (day⁻¹)

Day = time (days after application)

Formulation EECs for application to aquatic environments (mg formulated product/L) were also calculated using the same approach as described above for terrestrial applications and uses the simple dilution model. In Table 12, the EECs for formulated product for a few representative application rates are presented. As the rate of dissipation in the water body for the different components of the formulation in the water body are anticipated to vary, chronic EECs for formulated product are not calculated.

Table 12. Estimated Environmental Concentration (EEC) of Formulated Product from Application to Aquatic Environments

Application Method / Receiving waterbody	Single Application of Formulated Product (Qts/A)	Peak EEC of Formulated Product (µg/L) ¹
Direct Application / Standard farm pond (2E7L)	1	47.3
	5	236
	10	473
	20	945
Direct Application / Paddy (1E6L)	1	945
	5	4727
	10	9455
	20	18909

1- [qts. formulated product/A* 1gal/4 qts.*density of formulated product (lbs gal)*454E6 ug/lb]/2E7 liters (standard pond) or 1E6 liters (shallower body of water); density assumed to be 8.33 lb/gal.

3.4. Surface Water Monitoring Data

A search for available surface water monitoring data for glyphosate and AMPA was conducted in the USGS NAWQA, CADPR SWAMP, USDA PDP, and USGS-EPA Pilot Reservoir Monitoring Program databases. Additionally, open literature was also considered in this analysis. Glyphosate and AMPA concentrations were only measured in the USGS NAWQA and CADPR SWAMP monitoring programs. A summary of monitoring data are shown in Table 13. The maximum concentration of glyphosate and AMPA in surface water was 200 µg/L and 28µg/L, respectively.

Table 13. Summary of Surface Water Monitoring Data for Glyphosate and AMPA (Data extracted from USGS, CADPR on 1/4/2014).

Monitoring Program	Watershed Land Use	Analyte	N	Detection Frequency (%)	Maximum Concentration (µg/L)		Station ID	State
					Daily Peak	Arithmetic Annual Average		
USGS NAWQA	All Land Uses	glyphosate	1903	61	73	4.03	7288650	MS
		AMPA	1903	81	28	4.25	7288650	MS
	Ag	Glyphosate	574	61	73	4.03	7288650	MS
		AMPA	574	61	28	4.25	7288650	MS
	Mixed	glyphosate	677	61	3.08	0.71	5331580	MN
		AMPA	677	88	4.43	1.39	11303500	CA
	Urban	glyphosate	351	54	5.9	0.86	40869415	WI
		AMPA	351	73	3.51	1.53	6713500	CO
	Other	glyphosate	301	72	38	4.95	3.3315E14	MS
		AMPA	301	88	9.74	2.65	3.3315E14	MS
CADPR	Not Specified	Glyphosate	1908	4	200	112.5	03 2 (100)	CA
		AMPA	183	8	4.43	0.54	39 17(103)	CA

In 2002, two USGS studies were conducted to assess glyphosate and AMPA concentrations in surface water as well as wastewater effluent from treatment plants.

A total of 154 water samples were collected by the U.S. Geological Survey during a 2002 study in nine Midwestern States (Illinois, Indiana, Iowa, Kansas, Minnesota, Missouri, Nebraska, Ohio, and Wisconsin) (Scribner *et al.*, 2003 and Lee *et al.*, 2001), where glyphosate is extensively used on corn. Glyphosate was detected in 36 percent of the samples, while its metabolite aminomethylphosphonic acid (AMPA) was detected in 69 percent of the samples. The highest measured concentration of glyphosate was 8.7 µg/L, well below the Maximum Contaminant Level, MCL, of 700 micrograms per liter. The highest AMPA concentration was 3.6 µg/L. There is no MCL for AMPA.

Treated effluent samples were collected from 10 wastewater treatment plants (WWTPs) in Arizona, Colorado, Georgia, Iowa, Minnesota, Nevada, New Jersey, New York, and South Dakota to study the occurrence of glyphosate and AMPA (Kolpin *et al.*, 2006). Stream samples were collected upstream and downstream of the 10 WWTPs. Two reference streams were also sampled. The results document the apparent contribution of WWTP effluent to stream concentrations of glyphosate and AMPA, with roughly a two-fold increase in their frequencies of detection between stream samples collected upstream and those collected downstream of the

WWTPs. Thus, urban use of glyphosate contributes to glyphosate and AMPA concentrations in streams in the United States.

Glyphosate or its degradate AMPA were commonly detected in the stream and WWTP effluent samples, being present in 67.5% of the 40 samples collected. Concentrations were generally low, although nine detections of AMPA (maximum concentration=3.9 µg/L) and three detections of glyphosate (maximum concentration=2.2 µg/L) exceeded 1 µg/L. AMPA was detected much more frequently (67.5%) than glyphosate (17.5%).

Both AMPA and glyphosate had the greatest frequency of detection in the WWTP effluent samples, with roughly a two-fold increase in the frequency of detection for both AMPA and glyphosate between stream samples located upstream and those located downstream of the WWTPs.

It should be noted, however, that AMPA can also be derived from the degradation of phosphonic acids (such as EDTMP and DTPMP) in detergents. Thus, part of the AMPA detections from this study could be potentially derived from a detergent source. Other components of detergents, such as 4-nonylphenol diethoxylate and 4-nonylphenol monoethoxylate were also measured in the samples collected for this study. However, AMPA was always present in samples that had detections of glyphosate, which suggests that at least part of the AMPA concentrations in this study were derived from the degradation of glyphosate.

From 2003 to 2008, Coupe *et al*, 2011 conducted surface water monitoring of glyphosate and AMPA in agricultural surface waters in MS, IA, IN, and France. This monitoring was targeted to watersheds with a high percentage of agricultural crops (68 to ~100% basin in agriculture). The major crops in the watershed were soybeans, corn, cotton, rice, and grapes (France only). For the larger surface water bodies in the United States, samples were taken bimonthly during most of the year with weekly sampling during the growing season from April to August. Additionally, some samples were collected during selected storm events. Monitoring in France and some smaller basins in the U.S. were taken using an automatic sampler. Filtered water samples were analyzed using HPLC/MS. The reporting levels were 0.02 µg/L for samples from the United States and 0.1 µg/L for the French samples. Detection frequencies of glyphosate and AMPA ranged from 59 to 100% and 92 to 100%, respectively. The maximum concentration of glyphosate was 430 µg/L (median 380 µg/L) at an overland flow site in the Sugar Creek, IN monitoring site from May 19-21, 2004. The maximum concentration of AMPA was 29 µg/L (median 26 µg/L) at the overland flow site.

3.5. Terrestrial Exposure

For glyphosate application to crops, forestry, and other non-crop uses (*i.e.*, rights of way), foliar applications in T-REX was modeled. The input parameters for birds and mammals are presented in Table 14. For the preliminary assessment, terrestrial EECs for glyphosate were derived using the maximum application rates. Application rates are based on acid equivalents for glyphosate (a.e.). Based on the application scenario information presented in Section 2.5, several uses are reported as having the same application pattern. As such, calculations of terrestrial exposure for

terrestrial animals were conducted using generic application patterns which reflect use patterns for one or more registered uses.

For ground application, the maximum annual application rate per crop cycle is the same as the maximum combined annual application rate, except for Roundup Ready crops. However, for aerial applications, the maximum annual application rate per crop cycle is typically lower than the maximum combined annual application rate for most uses, except for rangeland, pastures, forestry, herbs and spices, sugar cane, non-crop and aquatic uses. As such, for aerial applications, EECs were calculated based on the maximum annual application rate per crop cycle and the maximum combined annual application rate using 7 days between applications (minimum re-application interval provided by the JGTF), except for Roundup Ready crops where the reported re-application interval is 10 days. This may be a conservative estimate for aerial application, as subsequent glyphosate applications pre/post crop cycle may be greater than 7 days. This approach was also taken for the ground applications to the Roundup Ready crops. Application via ground application have the higher single maximum application rate compared to aerial application and will result in greater terrestrial EECs for birds and mammals using T-REX.

An evaluation into a potential foliar dissipation half-life rate was conducted. Foliar dissipation data were available for glyphosate use on alfalfa (2 crop residue trials; MRID 45646001) in which the foliar dissipation half-lives for the two trials were 4.1 and 7.5 days. Additionally, in the paper by Willis and McDowell (1987), the reported foliar dissipation half-life based on forest foliage, was 14.4 days. Furthermore, in another paper by Feng and Thompson (1989), foliar dissipation on forestry brush foliage on two shrubs was examined and the calculated (by reviewer) foliar dissipation half-life was 4.9 days for each plant. These five values were used to calculate a 90th percentile upper confidence limit foliar dissipation half-life of 12 days. This foliar dissipation half-life rate was used as the input value for T-REX. A representative output for T-REX is presented in Appendix C.

Table 14. Input Parameters for T-REX Modeling for the Scenarios

INPUT PARAMETERS	CROP		SOURCE
Single Application Rate (lb a.e./A)	Rangeland	0.38	Use tables in Section 2.5
	Most crops using <i>aerial</i> application (e.g., Roundup ready, trees crops, veg., beans)	1.55	
	Sugar cane using <i>aerial</i> application	2.25	
	Most crops using <i>ground</i> application (Roundup ready, nut, fruit trees, veg. beans)	3.75	
	Forestry, pastures, non-crop (rights-of-ways)	8	
Foliar Half-life	12 days		Calculated (see above)
Number of Applications: rates (lb a.e./A) (Interval between Applications, days)	Roundup Ready Crops (aerial – max rate/crop cycle)	3: 1.55, 1.55, 0.65 (10) ¹	Use tables
	Rangeland	6: 0.38 (7)	
	Roundup Ready Crops (aerial-max combined annual rate)	5: 1.55, 1.55, 0.65, 1.55, 0.7 (10)	
	Most crops (aerial- max rate/crop cycle)	3: 1.55 (7)	
	Most crops (aerial- max combined annual rate)	4: 3 @ 1.55, 1.35 (7)	
	Tree crops (aerial- max combined annual rate)	6: 5 @ 1.55, 0.25 (7)	
	Sugarcane (aerial- max rate/crop cycle and max combined annual rate)	3: 2.25, 2.25, 1.5 (7)	
	Roundup Ready Crops (ground – max rate/crop cycle)	1: 3.75 (NA)	
	Roundup Ready Crops (ground-max combined annual rate)	2: 3.75, 2.25 (10)	
	Most crops (ground- max rate/crop cycle and max combined annual rate)	2: 3.75, 2.25 (7)	
	Food tree, vine, berry & small fruit crops (ground- max combined annual rate)	3: 2 @ 3.75, 0.5 (7)	
	Forestry, pastures, non-crop (rights-of-ways)	1: 8 (NA)	

¹ For interpreting this column, for calculating EECs, for example, for Roundup Ready Crops (aerial-max rate/crop cycle), there are 3 applications, with the first and second applications at 1.55 lb a.e./A and the third application at 0.65 lb a.e./A (for a total combined maximum rate per crop cycle of 3.75 lb a.e./A) with 10 days between applications. These rates are based on the single maximum application rate and the maximum annual and/or crop cycle rate.

4. Dose-Response Assessment

4.1. Overview

Both terrestrial and aquatic non-target organisms are ecological receptors that may be at risk from potential exposure to glyphosate. Aquatic ecosystems that may be exposed include ponds, streams, and other water bodies receiving runoff and drift from direct applications to growing crops or aquatic systems. Terrestrial ecosystems include those that receive direct applications to growing crops or drift from those areas.

This risk assessment relies on a surrogate species approach. Toxicological data generated from surrogate test species, which are intended to be representative of broad taxonomic groups, are used to extrapolate to potential effects on a variety of species (receptors) included under these taxonomic groupings.

Acute and chronic toxicity data from studies submitted by pesticide registrants along with the available open literature were used to evaluate the potential direct and indirect effects of glyphosate on aquatic and terrestrial receptors. Toxicity studies for the technical grade active ingredient (TGAI), the typical end-use product (TEP), and the AMPA degradate are all considered in the ecological risk assessment. Open literature studies were identified using EPA's ECOTOX database², which employs a literature search engine for locating chemical toxicity data for aquatic life, terrestrial plants, and wildlife. Research papers accepted into the ECOTOX database were screened using standard procedures to ensure consistent, high quality information; these studies were considered during the 'Analysis' phase of risk assessment process. The Incident Data System (IDS), which tracks incident reports submitted to EPA, was used to identify supportive, line of evidence information on exposure of aquatic and terrestrial receptors. Data from all of these sources can also provide insight into the direct and indirect effects of glyphosate on biotic communities from loss of species that are sensitive to the chemical and from changes in structure and functional characteristics of the affected communities.

This section briefly summarizes the available toxicity data for glyphosate and its salts as well surfactant data. A list of available data for glyphosate and its salts and AMPA and degradate studies are provided in Appendix D. Toxicity data were obtained from registrant-submitted studies and the scientific literature. In addition, the EIS, AIMS and aggregate incident databases were searched for reports. Open scientific literature studies were searched using the ECOTOXicology database (ECOTOX). ECOTOX searches for glyphosate were obtained in August 2013 as well as in October 2008 and prior. The studies discussed in the following paragraph represent studies from post October 2008 to August 2013. Open literature studies prior to those dates are listed in Appendix D and with many discussed in the 2008 risk assessment for the California red-legged frog (USEPA 2008).

For aquatic uses, an attempt was made to select endpoints from studies on formulations that do and do not contain the POEA surfactant to reflect exposure from spray drift (formulations can contain POEA) and from direct application (formulations do not contain POEA).

² <http://www.epa.gov/ecotox>

4.2 Assessment Endpoints

Generally, assessment endpoints include survival, growth, and reproductive success of the surrogate ecological receptors. Toxicity values used to assess survival from short-term (acute) exposures are glyphosate levels associated with statistically estimated 50% survival rates. Toxicity values used to assess potential reproductive effects are the highest levels tested that did not induce reproductive or growth effects (No Observable Adverse Effect Concentration: NOAEC; Lowest Observable Adverse Effect Concentration: LOAEC).

The following paragraphs summarize the assessment endpoints used to assess risk to the organisms within the ecosystems, and the surrogate species and toxicity values used to assess risk. Data were obtained from registrant submitted studies or from literature studies identified by ECOTOX. The ECOTOXicology database (ECOTOX) was searched in order to provide more ecological effects data and in an attempt to bridge existing information gaps. ECOTOX is a source for locating single chemical toxicity data for aquatic life, terrestrial plants, and wildlife. ECOTOX was created and is maintained by the USEPA, Office of Research and Development, and the National Health and Environmental Effects Research Laboratory's Mid-Continent Ecology Division. ECOTOX search results were obtained in October 2008 and August 2013. For additional details on studies used in this assessment, refer to Appendix E. For the results of the ECOTOX search, refer to Appendix E.

The following sections present toxicity data for aquatic and terrestrial organisms for glyphosate, glyphosate end use products, surfactants, and the major degradate AMPA.

4.2.1. Aquatic Organisms

4.2.1.1. Fish and Aquatic-phase Amphibians

Several fish acute toxicity studies are available for glyphosate acid and its salts. These acute LC₅₀ values for freshwater and estuarine/marine fish are classified as slightly toxic to practically non-toxic with values of ≥ 10 mg a.e./L. Additionally, there are acute toxicity studies for many glyphosate formulations (containing POEA or not). Given the potential differential toxicity of the components in the formulations, the range of acute LC₅₀ values varies across studies and species with values of 1 mg a.e./L up to >450 mg a.e./L. Acute toxicity testing with particular surfactants contained in some of the glyphosate formulations has also been conducted for freshwater fish. The toxicity between the surfactants varies with acute LC₅₀ values from 0.65 mg/L up to >100 mg/L. Finally, acute toxicity testing with the major degradate, AMPA, resulted in an acute LC₅₀ value of 499 mg/L using freshwater fish, rainbow trout (MRID 43334713).

In a chronic fish life cycle study conducted with technical glyphosate and fathead minnows, there were no reported effects up to the highest concentration tested, 25.7 mg a.e./L (MRID 00108171). In a study by Le Mer *et al.*, 2013, the effects of technical glyphosate exposure on estuarine/marine threespine stickleback larvae (*Gasterosteus aculeatus*) was examined in two consecutive years. In this study, there was $<11\%$ mortality in the fish exposed to glyphosate over the 42-day exposure period, and there were no significant differences in wet weight, body length, sex ratio, or condition of juvenile fish between glyphosate-exposed fish and control in either test

year at concentrations up to 0.100 mg/L. Given that the Le Mer study only tested up to 0.1 mg/L with no effects, an acute to chronic ratio using acute and chronic fathead minnow and acute sheepshead minnow data were used to derive a chronic NOAEC value for estuarine/marine fish. As there were no reported effects in the chronic fathead minnow study, the NOAEC reported was the highest concentration tested. There is uncertainty in using the non-definitive NOAEC value in the ACR calculation and is discussed in the Assumptions and Limitations section.

Acute and chronic studies have been conducted with glyphosate, both technical and formulations on various aquatic-phase amphibian species. These studies indicate that amphibians have similar toxicity values for glyphosate compared to fish. Acute toxicity tests with glyphosate and its salts indicate that the acute LC₅₀ values range of ≥ 75 mg a.e./L. For technical glyphosate, the acute toxicity LC₅₀ value of 103 mg a.e./L, *Litoria moorei* tadpoles, was used in the risk quotient calculation (MRID 43839601; Bidwell and Gorrie, 1995). While there was a more sensitive acute endpoint of 75 mg a.e./L (adjusted for 96% purity) reported for adult *Crinia insignifera* frogs in this study, there was 20% control mortality at the end of 96 hours, which is greater than the performance criteria of no more than 10% control mortality in the draft OCSPP 850.1075 fish acute toxicity test guideline. Additional acute toxicity testing with these species was reported in Mann and Bidwell, 1999, in which the most sensitive 48-hr LC₅₀ value for technical glyphosate was 81.2 mg a.e./L for *L. moorei* tadpoles. However, since raw data were provided in MRID 43839601, the toxicity value of 103 mg a.e./L was used in the risk estimation but this additional study was also considered in the risk characterization.

Additionally, acute aquatic-phase amphibian toxicity data for formulations are similar to fish with acute LC₅₀ values ranging from 1 mg a.e./L up to >450 mg a.e./L. Data are also available on the surfactant, POEA. Submitted study (MRID 46650501) tested the green frog (*Rana clamitans*, Gosner stage 25) with technical glyphosate (isopropylamine salt (IPA)), an IPA formulation with 15% POEA, and POEA. The acute LC₅₀'s were >17.9, 2.0 and 2.2 mg/L, respectively, with technical IPA and the IPA formulation expressed in terms of glyphosate acid equivalents. This study indicates that aquatic amphibians are also susceptible to POEA toxicity.

Open literature studies on fish and aquatic-phase amphibians provide additional information for the risk characterization. These studies are summarized in Table 15.

Wan *et al.*, 1989 (ECOTOX 924), examined acute toxicity to four species of juvenile Pacific salmonids and rainbow trout to technical glyphosate, glyphosate formulations (Roundup, MON 8709), and MON 0818 using various dilution water sources (*i.e.*, varying water hardness levels). For technical glyphosate, the lowest 96-hr LC₅₀ value was 10 mg a.i./L for chum (species name not given, assumed to be *Oncorhynchus keta*) tested in city (soft) water (range 10 – 211 mg/L). Acute 96-hr LC₅₀ values for the two formulations ranged from 11 and 67 mg formulation/L, and the toxicity values for MON 0818 ranged from 1.4 – 4.6 mg MON 0818/L. While this study likely used controls based on referenced protocols, no discussion of control mortality across the studies was reported.

In the acute toxicity to larval amphibian species collected as embryos in the Pacific Northwest (King and Wagner 2010), 24 hour to 15 day toxicity values, using a formulation, ranged from 0.32 to 2.6 mg a.i./L (0.23 – 1.9 mg a.e./L – reviewer calculated). In this study, while control

treatments were used in the study, control performance was not reported; therefore, there is uncertainty in the performance of the control animals.

Ninety day body weight gain and body length in fish, *Leporinus obtusidens*, were significantly decreased (approximately 10-15% decrease in body length and 44-65% decrease in body weight gain) at glyphosate formulation concentrations of ≥ 1 mg/L (reviewer unsure if reported concentrations reflect concentration of formulation or adjusted to glyphosate) which was the lowest concentration tested (Salbego *et al.* 2010; E161803). Food consumption and condition factor (weight/length) were not affected by glyphosate exposure. Also in this study, the degradate AMPA was measured and the reported concentrations of AMPA were equivalent to the glyphosate concentrations (unsure if based on formulation or glyphosate). Therefore, there is uncertainty in the exposure concentrations for this study.

Effects to wild caught aquatic-phase amphibians (previous exposure history unknown) were reported in Williams and Semlitsch, 2010, using glyphosate formulations in that delays in time to metamorphosis were reported at concentrations of 0.572 mg a.e./L (based on nominal concentrations; concentrations did not appear to be measured). Eighty percent mortality was also observed in the western chorus frog larvae after exposure to Roundup Weathermax at 0.572 mg a.e./L.

Table 15. Open Literature Glyphosate Toxicity Studies on Fish and Aquatic-phase Amphibians

Species	Chemical Form	Endpoint(s)	ECOTOX Ref. No.
4 species juvenile Pacific salmonids (coho, chum, chinook, and pink) and rainbow trout	Glyphosate (tech); Roundup (41% GLY-IPA); MON 8709 (41% GLY-IPA); MON 0818 (75% POEA)	96-hr LC50 range: GLY: 10-211 mg ai/L; Roundup: 11-33 mg form/L; MON 8709: 17-67 mg form/L; MON 0818: 1.4-4.6 mg ai/L	E924/ Wan <i>et al.</i> 1989
Piava (<i>Leporinus obtusidens</i>)	Roundup (48% glyphosate acid)	90-d LOAEC = 1 mg/L NOAEC < 1 mg/L Based on reduced body length & weight gain	E161803 / Salbego <i>et al.</i> 2010
6 amphibian species endemic to the Pacific Northwest (2 salamanders, 1 toad, 3 frogs)	Roundup Regular (50.2% GLY-IPA)	24-h LC ₅₀ = 0.43 – 2.6 mg ai/L 7-d LC ₅₀ = 0.32 – 2.08 15-d LC ₅₀ = 0.30-1.95	E161728 / King and Wagner 2010
Western chorus frog (<i>Pseudoacris triseriata</i>)	Roundup WeatherMax (48.8% glyphosate potassium salt)	Chronic exposure LOAEC = 0.572 mg a.e./L NOAEC = 0.0005 mg a.e./L based on decreased survival	E153825 / Williams and Semlitsch 2010; only two concentrations tested (1000X difference in conc)
American Toad (<i>Bufo americanus</i>)	Roundup WeatherMax (48.8% glyphosate potassium salt) & Roundup Original (48.7% glyphosate potassium salt)	LOAEC = 0.572 mg a.e./L NOAEC = 0.0005 mg a.e./L based on delayed time to metamorphosis for both formulations	

4.2.1.2. Aquatic Invertebrates

The acute toxicity endpoint for freshwater aquatic invertebrates in the Risk Estimation section is from the study on early fourth instar midge larvae with and EC₅₀ value of 53.2 mg a.e./L (MRID 00162296). As with freshwater fish, many studies are available on formulations. One study (MRID 00162296) tested glyphosate technical, a glyphosate IPA formulation and the surfactant, POEA on the midge. The EC₅₀'s were: 53.2 mg a.e./L, 13.3 mg a.e./L and 13 mg/L. As with freshwater fish and amphibians, this study indicates that the increased toxicity of the formulations with the surfactant, POEA are probably due to the surfactant.

An acute toxicity test with *Daphnia magna* and the degradate, AMPA, reported an acute EC₅₀ value of 683 mg/L. In a chronic toxicity test with *Daphnia magna* and technical glyphosate IPA salt, the reported NOAEC/LOAEC is 49.9 and 95.7 mg a.e./L, respectively. However, as the acute toxicity test with the midge was the most sensitive, the acute to chronic ratio approach was used using acute and chronic *Daphnia magna* data and acute midge toxicity data. As there were two reliable acute toxicity values for *Daphnia*, the geometric mean of the two values were used to derive a single acute toxicity value (based on EFED guidance on acute to chronic ratios). The calculated chronic NOAEC for freshwater invertebrates was 9.22 mg a.e./L.

For estuarine/marine invertebrates, acute toxicity testing with technical glyphosate and the Pacific oyster embryos (*Crassostrea gigas*) reported an acute toxicity EC₅₀ value of 40 mg a.e./L. Acute toxicity testing with several estuarine/marine invertebrates and glyphosate formulations assumed to contain POEA reported acute LC/EC₅₀ values of ≥ 0.765 mg a.e./L, with the most sensitive value for the mysid shrimp (MRID 4893402). Testing of formulations assumed not to contain POEA reported an acute EC₅₀ value of 23.2 mg a.e./L using the Pacific oyster (MRID 45374006). Chronic toxicity data for estuarine/marine invertebrates for use in the risk estimation are not available. Therefore, a chronic toxicity value was calculated using the acute to chronic ratio approach using acute and chronic *Daphnia magna* data and acute amphipod data. Acute toxicity data using estuarine/marine mollusks was not used as these endpoint incorporated normal larvae development as oppose to strictly mortality. The calculated chronic NOAEC for estuarine/marine invertebrates was 6.11 mg a.e./L.

Open literature studies on aquatic invertebrates provide additional qualitative information for the risk characterization for glyphosate. These studies are summarized in Table 16.

For the estuarine/marine copepod, *Acartia tonsa*, 48 hr acute LC₅₀ toxicity values of 35.5 and 1.77 mg a.e./L were reported for glyphosate acid and Roundup, respectively (Tsui and Chu, 2003); it is noted that analytical recovery was reported as approximately 53% in the saltwater media and test concentrations corrected for percent recovery. Additionally, Tsui and Chu, 2003, examined the effects of environmental conditions on *Ceriodaphnia dubia* in which increases in suspended particles and pH appeared to increase acute toxicity (immobility), whereas increases in temperature and feeding rates did not substantially alter toxicity.

A 48-hr toxicity test by Bringolf *et al.*, 2007, with GLY-IPA using early life-stages of the freshwater mussel, *Lampsilis siliquioda*, reported a 48-hr EC₅₀ value of 5.0 mg a.e./L (based on shell closure and initial measured concentrations). In this study, the acute EC₅₀ value for

glyphosate with no counter ion and the formulation Aqua Star (for which glyphosate IPA is the active ingredient) were greater than 200 and 148 mg a.e./L, respectively, but the EC₅₀ value for IPA (4.6 mg a.e./L) was close to value reported for GLY-IPA. The study authors hypothesized that the observed toxicity was due to the release of ammonia from the amine group in IPA, whereby, other components in Aqua Star may have altered the release of ammonia.

In a study by Mottier *et al.*, 2013, the 48-hr EC₅₀ value, based on abnormality rates, for Pacific oyster larvae was reported as 28.3 mg a.e./L (based on nominal) with EC₅₀ values of >100 mg a.e./L for mortality and metamorphosis rates (ECOTOX # 161544). Furthermore, for different clones of juvenile *Daphnia magna*, 48-hr EC₅₀ values for technical glyphosate (GLY-IPA) ranged from 1.4 to 7.2 mg a.i./L (1.0 – 5.3 mg a.e./L (reviewer calculated)) (Cuhra *et al.*, 2013; ECOTOX # 161204). In this study with the *Daphnia magna*, the same daphnid clones were also exposed to a glyphosate formulation (Roundup Weed and Grass Killer Concentrate Plus® which was reported to also contain 0.73% diquat-dibromide) which was assumed to contain the surfactant POEA. The acute toxicity values in this study using the technical glyphosate were slightly lower than with the formulation which is generally not observed in other studies whereas the POEA containing formulations are more toxic. Therefore, there is uncertainty in these values for the technical glyphosate.

In addition to the acute toxicity testing described above, Cuhra *et al.*, 2013, report a 55-d chronic toxicity test with *Daphnia magna* with technical glyphosate, and the reported NOAEC was 0.45 mg a.i./L (0.33 mg a.e./L- reviewer calculated), based on reduction in fecundity. In this study, the size of the second offspring clutch were significantly smaller than the control at all concentrations tested for technical glyphosate, NOAEC<0.05 mg ae/L; however, offspring size in the first clutch were not significantly smaller. Additionally, significantly reduced fecundity was reported at 0.45 mg a.e./L with a NOAEC of 0.15 mg ae/L when testing the formulation. Additionally, in the chronic test, while not for all endpoints, the reported effects between the technical material and the formulation were similar, based on mg ai/L. Given the variability in the offspring growth, the NOAEC for fecundity was used in this assessment.

There were also studies examining effects to freshwater snails from exposure to glyphosate formulations. Effects on weight gain were examined in Coler *et al.*, 2005, with effects at 0.12 mg/L in one study and at 1.2 mg/L in another study (unsure if units were adjusted for glyphosate). It was noted that there was variability in the weight gain in the controls between the two studies (2X), and there is some uncertainty regarding the test design in the first study. In the other study using freshwater snails, effects on mortality, reproduction, and biochemical endpoints at 0.85 mg/L (unsure if units adjusted for glyphosate). However, environmental conditions in the study were not reported and unsure if there were significant effects on mortality in the study examining biochemical markers.

Acute water column toxicity data to both *Ceriodaphnia dubia* and a sediment-dwelling amphipod, *Hyalella azteca*, exposed to three different glyphosate formulation were available (Tsui and Chu 2004). Based on the available data, two of the formulations do not appear to contain POEA, however, the third formulation, Roundup, was reported to contain POEA. The 48-hr LC₅₀ values for *H. Azteca* ranged from 1.5 to 225 mg a.e./L (based on study report, study

deemed valid if control mortality <20%, generally control mortality ≤ 105 for acute studies is preferred). Toxicity values for *C. dubia* ranged from 5.7-415 mg a.e./L.

A water column exposure bioconcentration study with sediment-dwelling *Lumbriculus variegatus* was available (Contardo-Jara *et al.*, 2009). The study was conducted over a range of concentrations for both technical glyphosate and Roundup Ultra, 0.05-5 mg ae/L, and reported 96-hr BCF values ranged from 1.2 – 2.8 for technical glyphosate and 1.4-5.9 for the formulation. While not reported explicitly in the report, based on the reported data, there did not appear to be any effects on survival at these test concentrations.

In an acute study with oyster embryo-larvae (species not identified) testing glyphosate only, increases in the percent of abnormal D-larvae were observed at 2.5 and 5 $\mu\text{g/L}$ in only 1 of 3 trials; however, in this trial there was also a greater percentage of abnormalities in control larvae (30%), therefore, there are uncertainties in these results (Akcha *et al.* 2012). No significant embryo-larval developmental effects were observed for Roundup Express at concentrations up to 5 μg glyphosate/L.

Table 16. Open Literature Glyphosate Toxicity Studies on Aquatic Invertebrates

Species	Chemical Form	Endpoint(s)	ECOTOX Ref. No.
Freshwater mussel (<i>Lampsilis siliquioda</i>)	Glyphosate acid; Glyphosate IPA; IPA; Aqua Star; Roundup	48-hr EC ₅₀ (mg a.e./L (95% CI) GLY: >200; GLY-IPA: 5.0 (3.3-7.6); IPA: 4.6 (1.9-11.1); Aqua Star: >148 Roundup: 2.9 (2.1-3.9)	E100687 / Bringolf <i>et al.</i> 2007
Copepod (<i>Acartia tonsa</i>)	Glyphosate acid; Glyphosate IPA; Roundup	48-hr LC ₅₀ (mg ae/L) (95% CI) GLY acid: 35.3 (30.9-40.3); GLY-IPA: 49.3 (38.4-63.1); Roundup: 1.77 (1.33-2.34)	Tsui and Chu 2003
Pacific oyster (<i>Crassostrea gigas</i>)	Glyphosate acid (97%); Roundup Express (7.2 g ae/L); AMPA (97.5%)	48 hr EC ₅₀ mollusk abnormality rates, mortality rates, metamorphosis rate (GLY, AMPA, and GLY-express formulation) All values based on nominal GLY = 28.3 mg ae/L (abnorm), >100 mg ae/L (mort, meta) AMPA = 40.6 mg ae/L (abnorm), >100 mg ae/L (mort, meta) GLY-express = 1.13 (abnorm), 8.5 (mort;), 6.37 (meta) mg a.e./L	E161544 / Mottier <i>et al.</i> 2013
Freshwater snail (<i>Pomaecia lineatua</i>)	Roundup (480 g/L glyphosate monoisopropylamine gly-IPA)	Weight gain – two studies ; 1 st = 8 day LOEC/NOEC 0.12/<0.12 mg formulation/L ; 2 nd = 16 day LOEC/NOEC = 2.4/1.2 mg formulation/L (6 reps w/15/rep)	E107038 / Coler <i>et al.</i> 2005
Freshwater snail (<i>Biomphalaria alexandrina</i>)	Roundup (120 g ae/L)	3 different studies: 1 – 24-hr LC ₅₀ = 3.15 mg formulation/L;	E161199 / Barky <i>et al.</i> 2012

		2 – At 0.85 mg formulation/L, after 5 weeks 100% mortality, effects on # eggs, hatchability, and Increased abnormal eggs, no eggs after 4 weeks; 3 – after 4 weeks changes in glycogen, AchE, ALP, GOT and others at 0.85 mg formulation/L	
<i>Daphnia magna</i>	Glyphosate monoisopropylamine (GYL-IPA) (40%); Roundup Weed & Grass Killer concentrate Plus (18% ae; 0.73% diquat-dibromide)	48-h EC ₅₀ 1.4 – 7.2 mg ai/L (tech); 3.7-10.6 mg ai/L (form) Chronic: technical GYL fecundity NOAEC = 0.45 mg ai/L; Formulation fecundity NOAEC = 0.15 mg a.i./L (<0.05 mg ai/L (F1 growth) (form)	E161204 / Cuhra <i>et al.</i> 2013
Sediment-dwelling amphipod (<i>Hyalella azteca</i>)	Rodeo (GLY-IPA; % ae NR); Roundup (% ae NR); Roundup Biactive (% ae NR)	Water column 48-hr LC ₅₀ (mg a.e./L) (95% CI): Rodeo: 225 (151-336); Roundup Biactive: 120 (80.6-180) Roundup: 1.5 (1.0-2.3)	E74234/Tsui and Chu 2004
<i>Ceriodaphnia dubia</i>	Rodeo (GLY-IPA; % ae NR); Roundup (% ae NR); Roundup Biactive (% ae NR)	Water column 48-hr LC ₅₀ (mg a.e./L) (95% CI): Rodeo: 415 (339-508); Roundup Biactive: 81.5 (67.1-99.2) Roundup: 5.7 (could not be calculated)	E74234/ Tsui and Chu 2004
Sediment-dwelling blackworm (<i>Lumbriculus variegatus</i>)	Glyphosate acid (98%); Roundup Ultra (GLY-IPA, 360 g/L)	96-hr Water column BCF: worms exposed to 0.05 – 5 mg ae/L for both technical and formulation; Tech BCFs: 1.2 – 2.8 Roundup BCFs: 1.4-5.9	E115572 Contardo-Jara <i>et al.</i> 2009

4.2.1.3. Aquatic Plants

For aquatic vascular plants, the endpoint of 14-d EC₅₀ of 11.9 mg a.e./L was selected for technical glyphosate for use in Risk Estimation is from a duckweed study (MRID 44320638). This study is classified as supplemental as it did not report phytotoxicity data but is adequate for quantitative use in the risk assessment. For aquatic non-vascular plants, the endpoint of 4-d EC₅₀ of 11.4 mg a.e./L is selected from a toxicity study on green algae (MRID 40236904). Again, as with other aquatic species, some of the formulations appear to be more toxic than the technical material, with a 14-d EC₅₀ for vascular plants for a formulation assumed to contain POEA and one assumed to not contain POEA of 1.5 and 7.7 mg a.e./L, respectively. For non-vascular plant, the lowest reported 96-hr IC₅₀ was 0.12 mg a.e./L, for which it is uncertain as to whether or not it contains POEA.

Toxicity studies for three species of emergent aquatic plants were available which evaluated survival and growth. Studies were conducted either in a greenhouse or outdoors using a glyphosate formulation (MON 78087; 31.2% glyphosate acid equivalent) in which plants were

over-sprayed. In the freshwater sedge (*Carex comosa*) study, the most sensitive endpoint was fresh weight with an EC₂₅ value of 0.26 kg a.e./ha (0.23 lb a.e./A) (PMRA DER 49440). For the pickerel weed (*Pontederia cordata*), the most sensitive endpoint was also fresh weight with an EC₂₅ value of 0.53 kg a.e./ha (0.47 lb a.e./A) (PMRA DER 49445). The third species, *Nymphaea odorata*, fresh weight was again the most sensitive endpoint (EC₂₅ 0.044 kg a.e./ha (0.039 lb a.e./A)) (PMRA 494460). In these studies, variability was observed in both measured test concentrations (in some cases, due to malfunctioning spray equipment) and in plant size and shoot number between replicates (possibly due to using non-domesticated plant species and/or variable exposure). Open literature studies on aquatic plants provide additional qualitative information for the risk characterization for glyphosate. These studies are summarized in Table 17.

For the aquatic vascular plant, *Lemna minor*, growth rate was calculated using an applied coefficient, based on maturation stage, therefore, there is uncertainty in the actual growth rate (absent of a subjective coefficient) in this study (Dosnon-Olette *et al.* 2011). Additionally, in this study, for other photosynthetic parameters (changes in chlorophyll and photochemical quenching), it appears that the study was able to detect about a 1 - 4% difference. These parameters are sensitive and changes in these parameters are not unanticipated. For the aquatic rooted vascular plant, *Myriophyllum aquaticum*, the most sensitive endpoint reported was a 14-day EC₅₀ value of 0.222 mg/L (unsure if adjusted for glyphosate), based on the area under the growth curve (Turgut *et al.* 2002), when testing a glyphosate formulation (exact formulation not reported; 35.6% EC formulation). For other endpoints measured in study, the EC₅₀ values are approximately 2 mg/L, which is similar to lowest toxicity endpoint from submitted data (duckweed).

For aquatic non-vascular plants, 21-d EC₅₀ values for technical glyphosate acid and glyphosate IPA were 249 - >169,000 mg ae/L and 7.1 – 233 mg a.i./L (5.3 – 172 mg a.e./L (reviewer calculated), respectively (Lipok *et al.* 2010).

Table 17. Open Literature Glyphosate Toxicity Studies on Aquatic Plants

Species	Chemical Form	Endpoint(s)	ECOTOX Ref. No.
8 non-vascular species	Roundup 360 SL (% ai NR); Glyphosate acid (% ae NR); Glyphosate isopropylamine (40%)	21-d EC ₅₀ (growth rate) Roundup = 2.9-118 mg formulation/L Glyphosate acid = 246 - >169,000 mg ae/L GLY-IPA = 7.1-233 mg ai/L	E161695 / Lipok <i>et al.</i> 2010
<i>Lemna minor</i>	Sting Pro 2 (400 g a.i./L; glyphosate acid)	96-hr Growth rate inhibition compared to control significant ≥ 20 uL ae/L, inhibition did not exceed 25%; photosynthetic parameters inhibited at ≥20 uL ae/L, inhibition did not exceed 10%, no NOAEC	E156171 / Dosnon-Olette <i>et al.</i> 2011
Rooted vascular plant <i>Myriophyllum aquaticum</i>	Glyphosate (35.6% emulsifiable concentrate)	14-d EC ₅₀ Most sensitive endpoint = 0.221 mg/L (area under growth curve); fresh wt, shoot length and root length EC ₅₀ all about 2 mg/L	E150059 / Turgut <i>et al.</i> 2002

4.2.1.4. Freshwater Field/Mesocosm Studies

Several studies under field or mesocosm conditions have been conducted using glyphosate formulations (many reported previously in USEPA 2008).

A study was conducted to examine the effects of glyphosate on the biomass of predators, tadpoles/small herbivores, zooplankton and periphyton, the survival of predators, the abundance of zooplankton, and survival of tadpole species in mesocosm study units (1200L tanks (Relyea, 2005a; ECOTOX ref. 89112)). A simulated application rate of 6.4 mL/m² with a 25.2% formulation was used, providing a nominal concentration of 3.8 mg a.i./L. Species used in the mesocosms were reported to be naturally co-occurring and at loading rates similar to what are found in the field. The study was conducted for 13 days under static conditions following a single spray application. Under the conditions tested, species richness was reduced by 22% with Roundup®. Roundup® completely eliminated two species of tadpoles (leopard frogs and gray tree frogs) and nearly eliminated wood frogs (98% mortality), resulting in a 70% decline in the species richness of tadpoles. It is not clear from the methods section which specific formulation of the pesticide was used; however, the study authors state that the formulation of glyphosate (Roundup) contains polyethoxylated tallowamine (POEA). Although Roundup appeared to be associated with a high mortality rate in amphibian larvae, amphibian mortality in controls ranged from approximately 30 to 80%. The relatively high mortality rate with control tadpole species was likely due to predation from spotted salamanders and predacious beetles; however, it is difficult to interpret glyphosate-related mortality given the extent of mortality in controls for some tadpole species. It is noteworthy that while increased mortality of amphibian larvae appeared to be associated with glyphosate treatment, red-spotted salamanders were not affected.

A study was conducted with glyphosate to determine whether or not glyphosate plus the surfactant, polyethoxylated tallow amine (POEA) affects survival of anurans, either in aquatic environments (mesocosms) and/or terrestrial environments (semi-dry tanks; Relyea, 2005b ECOTOX Ref. 86885). The pesticide was applied by a direct overspray. In an aquatic larvae study, a factorial combination of glyphosate present or absent with three different soil treatments (no soil, sand, and loam) was tested. The concentration of glyphosate was reportedly based on the label recommended application rate (*i.e.*, a nominal concentration of 3.8 mg a.i./L (simulated application rate of 1.6 mL a.i./m²)). Roundup® Weed and Grass Killer was tested (25.2% active ingredient plus POEA surfactant). For the terrestrial juvenile study, glyphosate with POEA surfactant was tested in comparison to a control. The nominal amount tested was 6.5 mL at a rate of 1.6 mg a.i./m². There were three replicates, each time with a different amphibian species.

The results of the study suggested that exposure to nominal concentrations of Roundup® Weed and Grass Killer at a rate equivalent to 1.6 mg a.i./m² (3.8 mg a.i./L) for 20 days, decreased survival of leopard frogs, American toads and gray tree frogs [aquatic phase] larvae by over 73%. American toad larvae were the most sensitive with only 20% survival followed by gray tree frog (50% survival) and leopard frog (75%) survival compared to controls with >80% survival. It is not clear whether the toxicity can be attributed to glyphosate alone, the surfactant polyethoxylated tallowamine (POEA) alone, or to the combination of glyphosate and POEA. Although the study suggests that presence of soil did not decrease the toxicity of Roundup®, it is also not clear whether the amount of soil added to each of the study units was adequate to test this hypothesis. Exposure of juvenile [terrestrial phase] wood frogs, tree frogs and American

toads to Roundup at a rate of 1.6 mg a.i./m² resulted in over 64% decrease in survival across species after 24 hours. It is not clear how the terrestrial exposure of Roundup[®] to terrestrial-phase juvenile frogs relates to conditions that may exist in the field. The moist paper towel would likely prolong exposure beyond what may typically be encountered in the field.

A mesocosm study was conducted with a glyphosate formulation (13% a.i.) applied to 1,200L outdoor cattle troughs containing three aquatic-phase amphibian species (leopard frog, gray tree frog and the American toad) with and without predators (red-spotted newt or *Dytiscus* beetles). Exposure was static for 23 days (Relyea *et. al*, 2005 ECOTOX Ref. 86886). Although there was uncertainty associated with the application rates and the specific formulation used, study units were apparently treated at a nominal concentration of 1.3 mg glyphosate/L. Glyphosate treatment reduced overall tadpole survival and biomass. American toad larvae were the most sensitive with only 20% survival followed by gray tree frog (50% survival) and leopard frog (75%) survival compared to controls with >80% survival). Glyphosate had no effect on the survival of red-spotted newts. The study design is not sufficient to determine whether the decreased survival/biomass associated with exposure to Roundup is due to glyphosate or to some other component of the formulated product. While the study authors speculate on the potential role of the surfactant, polyethoxylated tallowamine (POEA), in causing the observed effects on anuran larvae, the study does not test this potential relationship.

Chemical and biological monitoring studies were conducted in 51 different wetlands to quantify the magnitude of contamination by glyphosate formulation Vision[®] (Thompson *et. al*, 2004; ECOTOX Ref. 72797). Wetlands were classified as over-sprayed, adjacent, or buffered in relation to the operational target spray blocks. Aqueous concentrations of glyphosate in buffered wetlands were below the level of detection (<0.02 mg a.i./L) in 14 of the 16 buffered wetlands. Mean glyphosate concentrations in the buffered wetlands (0.03 mg a.i./L) were significantly ($p < 0.05$) less than that of either adjacent (0.18 mg a.i./L) or over-sprayed wetlands (0.33 mg a.i./L). Biomonitoring of caged amphibian larvae showed no significant effect on mean 48-hr mortality of either green leopard frogs (*Rana pipiens*) or green frogs (*R. clamitans*) exposed *in situ*. Percent mortality was not significantly correlated with exposure concentrations. The authors conclude that there were no statistically significant differences in mortality between treatment sites; however, leopard frog and green frog larvae had 14.2% and 35.6% mortality in over-sprayed areas. Buffered areas with the lowest mean concentrations (0.03 mg a.i./L) of glyphosate had larval mortality for leopard frog larvae (15%) and green frog larvae (25.7%) roughly similar to over-sprayed areas. The authors conclude that glyphosate exposures typically occurring in forest wetlands are insufficient to induce significant acute mortality in native amphibian larvae. No raw data were included in the study; however, the results suggest that there was a large amount of variability that could have obscured detecting treatment effects especially given that these were naturally occurring wetlands that represented a range of environmental conditions. Additionally, since concentrations of the surfactant (MON 0818) were not measured, it is uncertain as to the extent that this co-formulant was present in any of the aquatic habitats studied.

Two tadpole species (*Rana sylvatica* and *Bufo americanus*) were exposed to Roundup Original MAX in outdoor mesocosms up to concentrations of 3 mg a.e./L under three different exposure scenarios in which glyphosate was applied as a single larger applications or in multiple smaller

application throughout study duration (Jones *et al.* 2010). In this study, the single applications at early or mid-test duration had lower survival (18-d LC₅₀ values ranged from 2.10-2.44 mg a.e./L) than the smaller, multiple applications (survival >80% at 3 applications of 0.33 or 1.0 mg a.e./L); the late single application LC₅₀ values also were greater than 3 mg a.e./L. Stratification of test chemical was observed in this study with higher concentrations measured closer to water surface. In Jones *et al.* 2011 (ECOTOX# 156497), three different tadpole species in outdoor mesocosms were exposed to glyphosate (Roundup Original MAX) up to 3 mg a.e./L at three different tadpole densities. The 23-d LC₅₀ values were similar (ranged from 1.71-2.58 mg a.e./L) across densities for the gray tree frog (*Hyla versicolor*) and green frog (*Rana clamitans*) (84% confidence intervals (CI) overlapped), and were marginally lower at the high density treatment for the bullfrog (*R. catesbeiana*) (medium and high density 84% confidence intervals both reported 1.70 mg a.e./L as lower or upper value, respectively, and at low density the lower CI value was 1.77 mg a.e./L). Additionally, Relyea 2005c (ECOTOX# 80961), tested six species of amphibians using Roundup (25% glyphosate IPA) either in the presence or absence of a predator cue (*i.e.*, red-spotted newts), and the reported 16-d LC₅₀ values ranged from 1.32 to 2.52 mg a.i./L, with the exception of 0.55 mg a.i./L for the wood frog in the presence of the caged predator. No interactions of Roundup-by-predator were observed for the other five species.

4.2.1.5. Summary of Aquatic Endpoints

Table 18 summarizes the aquatic toxicity endpoints of technical glyphosate and/or its salts that were used quantitatively in the risk assessment. Uncertainties for glyphosate include chronic marine/estuarine fish and invertebrate toxicity. A chronic toxicity value (NOAEC) was estimated for both marine/estuarine fish and invertebrates using an acute to chronic ratio. For fish, the estimate was calculated from the acute and chronic freshwater fish data and the acute marine/estuarine fish data. For invertebrates, the estimate was calculated from the acute and chronic freshwater invertebrate data and the acute marine/estuarine invertebrate data.

Table 18. Aquatic Toxicity Profile for Glyphosate and/or Its Salts used in Risk Estimation

Assessment Endpoint	Species	Toxicity Values (mg a.e./L)*	Toxicity Category ¹	Citation MRID # /Date	Comment
Acute Toxicity to Freshwater Fish	Bluegill sunfish (<i>Lepomis macrochirus</i>)	96-hr. LC ₅₀ : 43 Slope: NA	Slightly toxic	44320630 /1995 Acceptable	NOAEC = 30.6 mg a.e./L (based on mortalities at 56 mg a.e./L)
Chronic Toxicity to Freshwater Fish	Fathead minnow (<i>Pimephales promelas</i>)	NOAEC: 25.7	NA	00108171 /1975 Acceptable	highest concentration tested
Acute Toxicity to Aquatic-phase Amphibians	Australian tree frog (<i>Litoria moorei</i>)	96-hr LC ₅₀ : 103.2 Slope: NR	Practically non-toxic	43839601 / 1995 Supplemental	NOAEC: NR
Chronic Toxicity to Aquatic-phase Amphibians	Leopard frog (<i>Rana pipiens</i>)	NOAEC: 1.8	NA	46650501/ 2004 Supplemental	Highest concentration tested

Assessment Endpoint	Species	Toxicity Values (mg a.e./L)*	Toxicity Category ¹	Citation MRID # /Date	Comment
Acute Toxicity to Freshwater Invertebrates	Midge (<i>Chironomus plumosus</i>)	48-hr EC ₅₀ : 53.2 Slope: NR	Slightly toxic	00162296 /1979 Acceptable	NOAEC: NR
Chronic Toxicity to Freshwater Invertebrates	Midge (<i>Chironomus plumosus</i>)	NOAEC (calculated): 9.22	NA	NA	Based on acute-to-chronic ratio ²
Acute Toxicity to Estuarine/marine Fish	Sheepshead minnow (<i>Cyprinodon variegatus</i>)	96-hr. LC ₅₀ : 240	Practically nontoxic	44320632 /1996 Acceptable	NOAEC = 100 mg a.e./L (based on quiescent fish in 180 mg a.e./L)
Chronic Toxicity to Estuarine/marine Fish	Sheepshead minnow (<i>Cyprinodon variegatus</i>)	NOAEC (calculated): 88.9	NA	NA	Based on acute-to-chronic ratio ³
Acute Toxicity to Estuarine/marine Invertebrates	Mollusk - Pacific oyster (<i>Crassostrea gigas</i>)	48-hr EC ₅₀ : 40 Slope: NA	Slightly toxic	44320634 /1996 Acceptable	NOAEC = 32 mg a.e./L (based on % normal larvae at 56 mg a.e./L)
Chronic Toxicity to Estuarine/marine Invertebrates	Amphipod (<i>Acartia tonsa</i>)	NOAEC (calculated): 6.11	NA	NA	Based on acute-to-chronic ratio ²
Acute Toxicity to Non-vascular Aquatic Plants	Bluegreen algae (<i>Anabaena flos-aquae</i>)	4-day EC ₅₀ : 11.4 Slope: 3.53	NA	40236904 /1987 Acceptable	NOAEC: NR
Acute Toxicity to Toxicity to Vascular Aquatic Plants	Duckweed (<i>Lemna gibba</i>)	14-day EC ₅₀ : 11.9 Slope: NR	NA	44320638 /1996 Supplemental	NOAEC: 1.3
*a.e. = expressed in terms of acid equivalents for glyphosate; NA = not available; NR = not reported ¹Categories of acute toxicity for aquatic organisms (U.S. EPA, 2004) based on LC₅₀ (mg/L): < 0.1 very highly toxic; 0.1-1 highly toxic; >1-10 moderately toxic; >10-100 slightly toxic; >100 practically nontoxic. Toxicity categories for aquatic plants have not been defined. ²Chronic NOAEC value calculated using acute to chronic ratio (ACR) using the following data: chronic <i>Daphnia magna</i> NOAEC of 49.9 mg a.e./L (MRID 0124763) and geometric mean of 2 acute <i>Daphnia magna</i> EC₅₀s: 128.1 mg a.e./L (MRID 44320631; static test system; 95.6% a.e.; EC₅₀ based on measured concentrations) and 647.4 mg a.e./L (based on nominal test concentrations; static test system; 83% a.e.) which results in geometric mean acute value of 288 mg a.e./L. ACR = 288/49.9 = 5.77; acute midge LC₅₀ = 53.2 mg a.e./L; chronic freshwater NOAEC = 53.2/5.77 = 9.22 mg a.e./L; acute amphipod LC₅₀ = 35.3 mg a.e./L; chronic amphipod NOAEC = 35.3/5.77 = 6.11 mg a.e./L. ³Chronic NOAEC value calculated using acute to chronic ratio (ACR) using the following data: acute fathead minnow LC₅₀ = 69.4 mg a.e./L (MRID 00162296) and chronic fathead minnow NOAEC = 25.7 mg a.e./L; ACR = 69.4/25.7 = 2.7; chronic sheepshead minnow NOAEC = 240/2.7 = 88.9 mg a.e./L.					

Table 19 summarizes the aquatic toxicity endpoints of glyphosate formulations that will be used in risk estimation. Some glyphosate formulations have been found to be more toxic to aquatic organisms than technical glyphosate. Formulations containing one class of surfactants, polyethoxylated tallow amines (POEA) tend to be the most toxic to aquatic organisms. Ecological effects studies have been conducted with formulations containing POEA as well as for formulations containing surfactants other than POEA. The toxicities of some of these formulations appear to be either similar to or less toxic than the technical material.

Currently, formulations registered for aquatic uses do not contain POEA surfactants. Therefore, for aquatic organisms, separate endpoints were selected for terrestrial uses where the POEA surfactant is allowed and for aquatic uses where this surfactant is not allowed. For aquatic animals, significant differences in toxicities between the formulations containing POEA and those that do not contain the surfactant are observed.

Table 19. Aquatic Toxicity Profile for Glyphosate Formulations

Assessment Endpoint	Species	Toxicity Value (mg formulation/L)	Toxicity Category ¹	Citation MRID # /Date	Comment
Acute Toxicity to Freshwater Fish	Rainbow trout (<i>Oncorhynchus mykiss</i>)	96-hr LC ₅₀ : 3.17 ² Slope: NR NOAEC: NR	Moderately toxic	40098001/1986 Supplemental	Roundup: 41% a.i. (GLY-IPA); 96-hr LC ₅₀ : 1 mg a.e./L
		96-hr LC ₅₀ : 750 ³ Slope: NR NOAEC: 341	Practically non-toxic	40579303/1985 Supplemental	Rodeo/X-77; 96-hr LC ₅₀ : 103 mg a.e./L ⁴
Acute Toxicity to Aquatic-phase Amphibians	Spring peeper (<i>Pseudacris crucifer</i>) larvae	96-hr LC ₅₀ : 1.64 ² Slope: NA NOAEC: <2.3	Moderately toxic	E153679 / Relyea and Jones 2009	Roundup Original Max (48.7%); 96-hr LC ₅₀ : 0.8 mg a.e./L ⁵
	Australian frog (<i>Crinia insignifera</i>) tadpole	96-hr LC ₅₀ : 911 ³ Slope: NR NOAEC: NR	Practically non-toxic	E71857 / Mann and Bidwell 1999	Roundup Biactive: 36% (GLY-IPA) ai; 96-hr LC ₅₀ : 328 mg a.e./L
Acute Toxicity to Freshwater Invertebrates	Water flea (<i>Daphnia magna</i>)	48-hr EC ₅₀ : 5.3 ² Slope: 5.4 NOAEC: 1.45	Moderately toxic	00070893/1980 Acceptable	Roundup: Glyphosate IPA salt (41.36% a.e.); 48-hr EC ₅₀ : 1.6 mg a.e./L
		48-hr EC ₅₀ : 164 ³ Slope: 7.6 NOAEC: 96	Practically non-toxic	45374003/1999 Acceptable	Glyphosate (360 g/L SL) 27.25% a.e.; 48-hr EC ₅₀ : 44.8 mg a.e./L
Acute Toxicity to Marine/Estuarine Fish	Sheepshead minnow (<i>Cyprinodon variegatus</i>)	96-hr LC ₅₀ : 8.8 ² Slope: NA NOAEC: 6.8	Moderately toxic	48934205/2012 Acceptable	Glyphosate (MON 2139) 30.75% a.e.; 96-hr LC ₅₀ = 2.7 mg a.e./L
		96-hr. LC ₅₀ : >180.2 ³ NOAEC = 180.2	Practically nontoxic	45374005/2000 Supplemental	Glyphosate SL formulation (28.3% a.e.); limit test no mortality noted; 96-hr LC ₅₀ : >50.9 mg a.e./L
Acute Toxicity to Marine/Estuarine Invertebrates	Mysid shrimp (<i>Americamys bahia</i>)	96-hr LC ₅₀ : 2.45 ² Slope: 10.4 NOAEC: 1.66	Moderately toxic	48934002/2012 Acceptable	Glyphosate (MON 2139) 30.75% a.e.; 96-hr LC ₅₀ : 0.765 mg a.e./L

Assessment Endpoint	Species	Toxicity Value (mg formulation/L)	Toxicity Category ¹	Citation MRID # /Date	Comment
	Pacific oyster (<i>Crassostrea gigas</i>)	48-hr. EC ₅₀ : 82 ³ Slope: NR NOAEC: 28.6	Slightly toxic	45374006/2000 Acceptable	Glyphosate SL formulation (28.3% a.e.); 48-hr LC ₅₀ : 23.2 mg a.e./L
Acute Toxicity to Non-vascular Aquatic Plants	Freshwater diatom (<i>Navicula pelliculosa</i>)	96-hr IC ₅₀ : 0.39 ⁶ Slope: 8.78 NOAEC: 0.27	NA	45666701/2001 Acceptable	Glyphosate (glyphos) 31.0% a.e.; 96-hr IC ₅₀ : 0.12 mg a.e./L
Acute Toxicity to Vascular Aquatic Plants	Duckweed (<i>Lemna minor</i>)	14-day EC ₅₀ : 4.9 ² Slope: NR NOAEC: NR	NA	44125714/1984 Supplemental	Roundup: Glyphosate IPA salt (41% a.i.); 14-d IC ₅₀ : 1.5 mg a.e./L
	Duckweed (<i>Lemna gibba</i>)	7-day EC ₅₀ : 25 ³ Slope: 4.69 NOAEC: 7.9	NA	45666704/2001 Acceptable	Glyphosate (Glyphos) (31% a.e.); Based on plant number; 7-d IC ₅₀ : 7.7 mg a.e./L
¹ Categories of acute toxicity for aquatic organisms (U.S. EPA, 2004) based on EC ₅₀ /LC ₅₀ (ppm): < 0.1 very highly toxic; 0.1-1 highly toxic; >1-10 moderately toxic; >10-100 slightly toxic; >100 practically nontoxic. Toxicity classifications in this table based on formulation values, not % a.e. Toxicity categories for aquatic plants have not been defined. ² Formulation assumed to contain POEA surfactant ³ Formulation assumed to not contain POEA surfactants ⁴ In this study, it is noted that the pH ranged from 5.5-5.8 in control and 4.4-4.7 in treatments with 100% mortality. ⁵ In this study, there were two species with the same LC50 value (bullfrog and spring peeper). The spring peeper was reported in table given tighter 95% CI range. ⁶ There are at least two labels with this formulation name. Because the formulations differ, it could not be determined if the formula used in the study was a POEA or non-POEA formulation					

Table 20 summarizes submitted acute toxicity studies on freshwater fish and invertebrates with two surfactants, POEA and geronol, an alkyl polyoxy ethylene phosphoric acid ester.

Table 20. Freshwater Fish, Aquatic-phase amphibian, and Invertebrate Acute Toxicity for Surfactants Used with Glyphosate Formulations

Chemical	Species	% a.i. ¹	LC/EC ₅₀ (mg/L)	Toxicity Category ²	MRID #/Year; Comment
Polyoxy ethylene fatty amine (POEA) (MON 0818)	Fathead minnow (<i>Pimephales promelas</i>)	70 ⁴	96-hr LC ₅₀ : 0.7 (0.84 - 1.19) ³ NOAEC and slope not reported	Highly toxic	00162296/1979; MON 0818 LC ₅₀ : 1 mg/L
Polyoxy ethylene fatty amine (POEA) (MON 0818)	Rainbow trout (<i>Oncorhynchus mykiss</i>)	70 ⁴	96-hr LC ₅₀ : 1.4 (1.05 – 1.89) NOAEC and slope not reported	Moderately toxic	00162296/1979; MON 0818 LC ₅₀ : 2mg/L ⁵
Polyoxy ethylene fatty amine (POEA) (MON 0818)	Bluegill sunfish (<i>Lepomis macrochirus</i>)	70 ⁴	96-hr LC ₅₀ : 2.1 (1.75 – 2.59) NOAEC and slope not reported	Moderately toxic	00162296/1979; MON 0818 LC ₅₀ : 3 mg/L

Polyoxy ethylene fatty amine (POEA) (MON 0818)	Channel catfish (<i>Ictalurus punctatus</i>)	70 ⁴	96-hr LC ₅₀ : 9.1 (7.0 – 11.9) NOAEC and slope not reported	Slightly toxic	00162296/1979; MON 0818 LC ₅₀ : 13 mg/L
Surfactant Geronol CF/AR (alkyl polyoxy ethylene phosphoric acid ester)	Zebra fish (<i>Brachydanio rerio</i>)	100	96-hr LC ₅₀ : >100 (N.A.) NOAEC and slope not reported	Practically non-toxic	44738201/ Summary from another study
Polyoxy ethylene fatty amine (POEA) (MON 0818)	Green Frog (<i>Rana clamitans</i>) Gosner Stg 25	69-73	LC ₅₀ : 2.2 (2.1-2.4) NOAEC: NR Slope: NR	Moderately toxic	46650501/2001
Surfactant Geronol CF/AR (alkyl polyoxy ethylene phosphoric acid)	Daphnia (<i>Daphnia magna</i>)	Tech.	48-hr EC ₅₀ : 48	Slightly toxic	44738201/1996
Polyoxy ethylene fatty amine (POEA) (MON 0818)	Midge (<i>Chironomus plumosus</i>)	70 ⁴	48-hr LC ₅₀ : 9.1 (4.97-16.8)	Slightly toxic	00162296/1979; MON 0818 LC ₅₀ : 13 mg/L
¹ a.i. = active ingredient, assumed 100% for technical material ² Based on LC ₅₀ (mg/L): < 0.1 very highly toxic; 0.1-1 highly toxic; >1-10 moderately toxic; >10-100 slightly toxic; >100 practically nontoxic ³ Range is 95% confidence interval for endpoint. ⁴ Based on information provided by Registrant, the test material, MON 0818, contains 70% POEA; (comment from Monsanto Co. September 21, 2009; http://www.regulations.gov/#!documentDetail;D=EPA-HQ-OPP-2009-0361-0013) ⁵ In 00162296 (Folmer 1979), for MON 0818, a reported acute 96-hr LC ₅₀ toxicity value of 0.65 mg/L was reported for rainbow trout, however, this study was conducted at a pH of 9.5 and therefore, was not used quantitatively					

Additional studies testing POEA (or MON 0818) were also available in the open literature. For example, five species of North American anurans were exposed to MON 0818 (69.4% POEA) (E161671; Moore *et al.* 2012). Acute 96-hr LC₅₀ values in that study ranged from 0.68 to >1.25 mg MON 0818/L (dose-response data reported in study), with the most sensitive species being *Rana pipiens* (0.68 mg MON 0818/L; 0.47 mg POEA/L). Additionally, in Bringolf *et al.* 2007, 48-hr EC₅₀ value of 0.5 mg/L (MON 0818; no dose-response data reported) was reported for the glochidia life-stage of the freshwater mussel, *Lampsilis siliquioda* (a 48-hr and 28-d EC₅₀ value of 3.8 and 1.7 mg/L, respectively, reported for juvenile stage). For *Daphnia magna*, Wang *et al.* 2005 reported an 48-hr EC₅₀ value of 2.9 mg/L (MON 0818), and Brausch *et al.* 2007, reported 48-hr EC₅₀ values of 0.097-0.894 mg/L depending on the oxide:tallow ratio of POEA (dose-response data not reported in either study). Tatum *et al.* 2011, reported an acute 48-hr EC₅₀ value of 0.42 mg/L for *Ceriodaphnia dubia* using the surfactant Entry II which was reported as being similar to POEA (only EC₅₀ value reported). While Tsui and Chu, 2003, reported acute LC/IC₅₀ values for several taxa for POEA, the endpoints were reported in units of mg acid equivalents/L. Finally, acute toxicity values were also reported for fairy shrimp (*Thamnocephalus platyurus*) for different oxide:tallow ratios of POEA (Brasch and Smith, 2007). The reported 48-hr EC₅₀ values ranged from 2.01-5.17 µg/L POEA which were mean toxicity values calculated using LC₅₀ values from different strains of fairy shrimp. Brausch *et al.*, 2006, also tested fairy shrimp using Roundup Super Concentrate, in which the 48-hr LC₅₀ was reported as 1243 µg/L. It was not reported if this toxicity value represented the formulation, active ingredient (glyphosate IPA) or acid equivalents. In an effort to better understand the reported toxicity values for the Roundup Super Concentrate and the POEA-only for the fairy

shrimp, assuming the formulation toxicity value represents mg formulation/L and 15% POEA (the most conservative approach for converting to units in POEA/L), then the LC₅₀ value in Brausch *et al.* 2006, based on POEA concentrations, would be 186 µg/L, which is 36 times greater than the POEA-only values in Brausch and Smith 2007; therefore, there is uncertainty in the POEA-only toxicity values with the fairy shrimp. It is acknowledged that it is possible that there could be other factors in the formulation affecting the overall toxicity in the formulation testing. However, the toxicity value reported using the formulation (either as total formulation or adjusted for active ingredient), while on the lower end of the toxicity spectrum, is still in the same relative toxicity range for other aquatic invertebrates suggesting similar sensitivity.

Table 21 shows the acute aquatic toxicity endpoints for the degradate, aminomethylphosphonic acid (AMPA). Based on this data, AMPA appears to be less acutely toxic to aquatic organisms than the parent, glyphosate.

Table 21. Freshwater Acute Toxicity for Aminomethylphosphonic Acid (AMPA) Degradate of Glyphosate

Chemical	Species	% a.i. ¹	96-hour LC ₅₀ / EC ₅₀ (mg/L)	Toxicity Category ²	MRID #/Year
AMPA	Rainbow trout (<i>Oncorhynchus mykiss</i>)	94.38	LC ₅₀ : 499 (391 - 647)	Practically nontoxic	43334713/1991
AMPA	Water flea (<i>Daphnia magna</i>)	94.38	EC ₅₀ : 683 (553 - 1010)	Practically nontoxic	43334715/1991
¹ a.i. = active ingredient, assumed 100% for technical material ² Based on LC ₅₀ (mg/L): < 0.1 very highly toxic; 0.1-1 highly toxic; >1-10 moderately toxic; >10-100 slightly toxic; >100 practically nontoxic ³ Range is 95% confidence interval for endpoint.					

4.2.2. Terrestrial Organisms

4.2.2.1. Birds and Terrestrial-phase Amphibians

Acute toxicity data on selected avian species are available for technical glyphosate, several formulations and the AMPA degradate. Based on these studies, glyphosate is, at the most, only slightly toxic on an acute/sub-acute basis, with acute oral LD₅₀ values of >3196 mg a.e./kg-bw for bobwhite quail and >2000 mg a.e./kg-bw for the canary and acute dietary LC₅₀ values up to >4971 mg a.e./kg-diet for mallard ducks and bobwhite quail. There was one acute oral toxicity study with a formulation that had a definitive LD₅₀ value of 1131 mg a.e./kg-bw using bobwhite quail (MRID 45777402). The AMPA degradate is not more toxic than the parent with acute oral and dietary LD/LC₅₀ values of >1976 mg/kg-bw and >4934 mg/kg-diet, respectively. Several avian reproduction studies are available for bobwhite quail and mallard duck. In two studies, treatment-related effects on reproduction or growth were not reported following chronic exposure to either mallards or bobwhite quail up to concentrations of 830 mg a.e./kg-diet (MRID 00111953 and 00108207). However, in an additional mallard duck reproduction study that tested up to 2160 mg a.e./kg, treatment-related decreases were observed for male body weight at all concentrations tested (NOAEC <501 mg a.e./kg; MRID 48876602). Additionally, treatment-related decreases in hatchling and 14-day body weights were observed at the high test concentration; significant decreases in 14-day body weights were also observed at the low treatment, but not at the mid concentration. There were no treatment-related effects on eggs laid,

embryo viability, or eggshell thickness in this study. An additional bobwhite quail reproduction study (MRID 48876601) was not acceptable as control mortality was 19%.

Open literature studies on birds and terrestrial-phase amphibians provide additional qualitative information for the risk characterization for glyphosate. These studies are summarized in Table 22.

In an acute oral study by McComb *et al.* 2008 (E162011), the 96-hr LD₅₀ value for field-collected (prior exposure history unknown) rough-skinned newts (*Taricha granulosa*) exposed to glyphosate isopropylamine was greater than 2,600 mg/kg-bw (unsure if adjusted to acid equivalents). Control mortality was not reported in study.

Effects on male and female body weights for domesticated chickens were reported at glyphosate concentrations of 6080 mg/kg-diet (unsure if adjusted for acid equivalents; purity not reported; assumed to be based on nominal concentrations) (Kubena *et al.* 1981).

In a field study (Bernal *et al.* 2009, E11766) where eight species of juvenile frogs (in Columbia) received a direct spray of a mixture of glyphosate formulations Glyphos and Cosmo-flux reported a range of 96-hr LC₅₀ values from 4.0 – 20.3 lb a.e./A (reviewer calculated; study author values reported in kg/ha).

Table 22. Open Literature Studies for Glyphosate for Birds and Terrestrial-phase Amphibians

Species	Chemical Form	Endpoint(s)	ECOTOX Ref. No.
Rough-skinned newt (<i>Taricha granulosa</i>)	Glyphosate isopropylamine (45.5% solution)	96-h LD ₅₀ > 2,600 mg/kg-bw	E162011 / McComb <i>et al.</i> 2008
8 species frogs in Columbia – juvenile phase	Mixture Glyphos and Cosmo-Flux	96-h LC ₅₀ : 4.5-22.8 kg ae/ha (direct spray on frogs)	E11766 / Bernal <i>et al.</i> 2009
Chicken (<i>Gallus gallus domesticus</i>)	Glyphosate isopropylamine (purity not reported)	Significant 50% reduction in male and female body wt by day 7 at 6080 mg/kg-diet, no effect at 608 mg/kg-diet; 21-d exposure; did not evaluate reproductive parameters	E162010 / Kubena <i>et al.</i> 1981

4.2.2.2. Mammals

The acute toxicity studies on the technical material indicate that glyphosate is practically non-toxic to mammals on an acute exposure basis with resulting LD₅₀ values greater than the highest concentration tested up to 4,800 mg a.e./kg-bw (MRID 43728003). Many acute toxicity studies are available on formulations for mammals with most of the LD₅₀'s greater than the highest dose tested. The lowest reported LD₅₀ acute oral toxicity study using a formulation is 357 mg a.e./kg-bw, which is classified as moderately toxic due in part to the low percentage of a.e. (11.4%) (MRID 46714802).

Two 2-generation mammalian reproduction studies with the rat are available for glyphosate. In the first study (MRID 41621501, 1990), the parental/systemic NOAEL is 500 mg/kg/day in both sexes and the LOAEL is 1,500 mg/kg/day based on soft stools, decreased body weight gain and food consumption. The reproductive NOAEL is 1,500 mg/kg/day in both sexes. The offspring

NOAEL is 500 mg/kg/day in both sexes with a LOAEL of 1,500 mg/kg/day based on decreased body weight gain during lactation. In the second 2-generation reproduction study using the rat (MRID 48865101-48865105, 2007/2012), the parental/systemic NOAEL is 15,000 mg/kg-diet in both sexes (equivalent to 1,234/1,273 mg/kg/day in males/females, respectively) as parental toxicity was not observed. The reproductive NOAEL is 15,000 mg/kg-diet in both sexes; no reproductive toxicity was observed in study. The offspring NOAEL is 5,000 mg/kg-diet (equivalent to 408/423 mg/kg/day in males/females, respectively) with a LOAEL of 15,000 mg/kg-diet based on delayed age at sexual maturation.

Open literature studies on mammals provide additional qualitative information for the risk characterization for glyphosate. These studies are summarized in Table 23.

Two reproduction studies by Romano et al. (2010 and 2012) using Wistar rats reported reproductive effects on male rats. In one study (2010; E155939), newly weaned male rats were orally gavaged with Roundup Transorb from post-natal day 23 to 53. Significant effects on sexual development (increase in age of sexual maturity and hormone changes) were reported at 50 mg a.i./kg-bw (NOAEL = 5 mg a.i./kg-bw). In the other study (E161810), parental females were orally dosed with Roundup Transorb from gestational day 18 to post natal day (PND) 5. Significant sexual development effects at 50 mg a.i./kg-bw were reported in male offspring (decrease in age of sexual maturity, changes in hormone and sexual behavior). It is noted that in the study with the newly weaned rats there was a delay in the age to sexual maturity whereas in the other study, the male offspring were observed to have a decrease in the age to sexual maturity.

In a study using field collected deer mice (prior exposure history unknown), the reported 96-hr LD₅₀ value was > 6,000 mg/kg-bw (unknown if adjusted for purity).

Table 23. Open Literature Studies for Glyphosate on Mammals

Species	Chemical Form	Endpoint(s)	ECOTOX Ref. No.
Deer Mouse (<i>Peromyscus maniculatus</i>)	Glyphosate isopropylamine (45.5% solution)	96-h LD ₅₀ > 6000 mg/kg-bw	E162011 / McComb <i>et al.</i> 2008
Rat (male Wistar)	Roundup Transorb (480 g glyphosate acid/L)	Significant sexual development effects at 50 mg a.i./kg-bw (NOAEL = 5 mg a.e./kg-bw) increase in age of sexual development, hormone changes Newly weaned male rats oral gavage from post natal day (PND) 23 to PND53	E155939 / Romano <i>et al.</i> 2010
Rat (Wistar)	Roundup Transorb (480 g glyphosate acid/L)	Significant sexual development effects at 50 mg a.i./kg-bw for male offspring (decrease in age of sexual development, changes in hormone and sexual behavior) Parental females oral gavage and then offspring observed, females dosed from gestational day 18 to PND 5	E161810 / Romano <i>et al.</i> 2012

4.2.2.3. Terrestrial Invertebrates

Acute oral and contact studies are available for technical glyphosate, technical glyphosate with an adjuvant, and for glyphosate formulations for the honeybee. The acute oral and contact LD₅₀ values for technical glyphosate as well as the acute contact LD₅₀ value for a formulation (MON78568) were generally reported as >100 µg/bee. At test termination in the acute contact study with technical glyphosate (LD₅₀ >100 µg/bee), there was 38% mortality (27% after correcting for control mortality) at the limit dose (MRID 00026489). The acute oral LD₅₀ value for the formulation, MON78568, was reported as >76.33 µg a.e./bee (MRID 4576104). Twenty percent mortality at the limit dose was observed at test termination. The acute contact and oral toxicity studies using technical glyphosate with an adjuvant (Agral 90), reported 48-hour LD₅₀ values of >103 and >182 µg a.e./bee. No mortality or clinical signs of toxicity were observed in either study (MRID 48876603). Acute and chronic laboratory-based toxicity data (*i.e.*, mortality and emergence data) for honeybee larvae are not available.

In addition to the acute contact and oral toxicity studies for honeybees, a semi-field study (conducted in greenhouses) is also available (Thompson et al. 2014; also referenced in EFSA 2014 report). A glyphosate formulation (MON 52276; 30.68% a.e. as GLY-IPA), was applied to flowering *Phacelia tanacetifolia* at 1.92 lb a.e./A (2.88 kg a.e./ha nominal, 2.16 kg a.e./ha measured), and pollen and nectar were collected for 7 days; the plants started to show effects from the application after 4 days. Residues in honeybee larvae were also analyzed on days 4 and 7 post-application. Additionally, honeybee colonies were fed treated sucrose (technical GLY-IPA) with test concentrations based on the mean residue concentration after 3 days, (75 mg a.e./L nominal; 73 mg a.e./L measured), the highest residue concentration (150 mg a.e./L nominal; 138 mg a.e./L measured), and twice the highest residue concentration (301 mg a.e./L nominal; 255 mg a.e./L measured); the concentrations were also reported as mg a.e./kg. Evaluation of mortality/morbidity, appearance, larval weight and residue were conducted (16 day test duration). There was no significant effect on survival of eggs, young or old larvae or on larvae weight.

Additional toxicity studies with other types of terrestrial invertebrates (*i.e.*, predatory mites, earthworms, parasitic wasps) are also available, with generally no effects reported up to the highest dose tested. In a study with a predatory mite, the 7-day LD₅₀ value was reported as 1200 g a.e./ha (1.1 lb/A) (MRID 45767105).

Open literature studies on terrestrial invertebrates provide additional qualitative information used in the risk characterization for glyphosate. These studies are summarized in Table 24. Note that studies from open literature that did not provide sufficient information to allow for conversion of exposure values to lb a.i./A were not included in this table.

Table 24. Open Literature Studies for Glyphosate for Terrestrial Invertebrates

Species	Chemical Form	Endpoint(s)	ECOTOX Ref. No.
Earthworm (<i>Eisenia fetida andrei</i>)	Roundup Ready	56-d sign decrease at 1440 g ai/ha (Roundup applied to soybean field and soil samples collected) in % hatchability of cocoons, # of juveniles, # juv/hatched cocoons Earthworms also sign avoided GLY treated soil in avoidance test; had reduced feeding activity	E160273 / Casabe <i>et al.</i> 2007

Parasitoid Wasp (<i>Trichogramma pretiosum</i>)	Roundup Ready (972 g glyphosate /ha); Roundup Original (960 g glyphosate/ha)	Roundup Ready at 972 mg a.e./ha - 100% decrease egg viability; Roundup original at 960 mg ae/ha decreased egg (37%) and larvae viability (32%); No effects using Roundup Transorb or Gliz; No effect on pupae stage for all 4 formulations; based on categories of effect (% effect) Only one concentration tested	E110225 / De Freitas Bueno <i>et al.</i> 2008
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4.2.2.4. Terrestrial Plants

Vegetative vigor and seedling emergence studies were conducted using two glyphosate formulations. Additionally, a vegetative vigor study was conducted using technical glyphosate. For the vegetative vigor studies, the most sensitive monocot species was sorghum (*Sorghum bicolor*) with a reported IC₂₅ value of 0.16 lb a.e./A (95% CI 0.126-0.194) and a NOAEC of 0.07 lb a.e./A (MRID 44125715/45045101). For dicots, the most sensitive species was cucumber (*Cucumis sativus*) with a reported IC₂₅ of 0.074 and NOAEC of 0.049 lb a.e./A (MRID 44320636). For seedling emergence the IC₂₅ values were greater than the highest concentrations tested (up to 5 lb a.e./A), and the corresponding NOAECs were reported as the highest concentration tested or were not reported.

As discussed in Section 2.1.1, registered glyphosate labels may recommend the addition of ammonium sulfate in situations when hard water is used in the spray mixture. This is to allow the sulfate ion to competitively bind to the cations typically present in hard water, and thus increase the efficacy of glyphosate.

With regard to the vegetative vigor studies using a formulation (studies with the lowest toxicity values), the stock solutions used in the foliar application were reported to be prepared with deionized water, which should have limited the development of the glyphosate-cation complex. In one study (MRID 44125715/ 45045101), the stock solution volume was reported to be sufficient to allow for foliar treatment without further dilution of the stock. For the other registrant study (MRID 44320636), while further dilution was not discussed in the report, it was not clear if the stock solution volume was sufficient for application. While the hardness content of water source(s) used for stock preparation/foliar application in the open literature studies was not reported, the collective response between the registrant vegetative vigor studies and the open literature studies is similar. Therefore, it is considered that there is sufficient confidence in the toxicity values used in the assessment to adequately evaluate potential effects of glyphosate exposure for terrestrial plants. The toxicity values from species tested in each of the different vegetative vigor studies are presented in Table 25 for a comparison across the studies.

Table 25. A Comparison of Glyphosate Toxicity Values from Vegetative Vigor Studies

Test Compound (MRID)	Monocot		Dicot	
	IC ₂₅ (lb a.e./A)	NOAEC (lb a.e./A)	IC ₂₅ (lb a.e./A)	NOAEC (lb a.e./A)
	Corn		Cucumber	
Tech. glyphosate (43088701)	0.43 (dry wt)	0.07	0.46 (dry wt)	0.14
Glygan 80WDG Formulation (44125715/ 45045101)	0.35 (phytotoxicity)	0.18	0.45 (phytotoxicity)	0.16
80WDG Formulation (44320636)	0.227 (phytotoxicity)	0.148	0.074 (phytotoxicity)	0.049

Open literature studies on terrestrial plants provide additional qualitative information used in the risk characterization for glyphosate. These studies are summarized in Table 26 and reflect foliar exposure to glyphosate formulations from overspray. The toxicity values reported in the open literature studies are similar to the most sensitive toxicity value reported from the registrant's vegetative vigor study (IC₂₅ 0.074 lb a.e./A). While the reported EC₅₀ value from Boutin *et al.*, 2004 is lower than the most sensitive value from the registrant's vegetative vigor study, based on the open literature studies, it appears that the study was essentially conducted again at a later date (Boutin *et al.*, 2010), and the lowest IC₂₅ from that study was similar to the lowest toxicity value from the submitted data. It is noted that in both Boutin *et al.* 2004 and 2010, the same species, *Bellis perennis* (English daisy), was reported to be the most sensitive species tested. It is noted that in White and Boutin, 2007, the most sensitive species, based on dry weight, was wheat (*Triticum aestivum*) with a 28-d IC₅₀ of 20 g a.i./ha (95% CI: 15-28) [0.0178 lb a.i./A (0.013-0.025)].

In addition to evaluating growth parameters, studies examining reproductive parameters are also available (Table 26). In a study evaluating pea seed production using Roundup Original®, Olszyk *et al.* 2009, the EC₂₅, based on pea seed weight was 0.0074 lb a.i./A (0.0096 x 833 g a.i./ha), but the reported NOEC (0.01 x 833 g a.i./ha) for the same endpoint was very close to the EC₂₅ value. These endpoints appear to be from a combination of four independent studies (two study designs repeated). Healthy leaf area were also affected with EC₂₅s of 0.063 or 0.137 x 833 g a.i./ha. In an additional study comparing the effects of greenhouse versus field grown potatoes (Pfleger *et al.* 2011), generally most endpoints were affected at 0.1 x 832 g/ha and the most sensitive endpoint was above biomass with an EC₂₅ of 0.004 x 832 [0.003 lb/A] using plants that were grown in the greenhouse and exposed at tuber initiation; the study author reported that the study results were similar between plants grown inside or outside in pots.

Table 26. Open Literature Studies for Glyphosate for Terrestrial Plants

Species	Chemical Form	Endpoint(s)	ECOTOX Ref. No.
<i>Bellis perennis</i> (most sensitive species; multiple species tested)	Roundup Original or Vision (both containing 356 g glyphosate acid/L)	Biomass (dry wt) 28-d IC ₂₅ = 0.053 lb a.i./A	E152615 / Boutin <i>et al</i> 2010
<i>Bellis perennis</i> (most sensitive species; multiple species tested)	Roundup Bio (360 g/l glyphosate with 480 g glyphosate- isopropylamine salt)	Biomass (dry wt) 28-d EC ₅₀ = 0.013 lb a.i./A	E87923 / Boutin <i>et al</i> 2004

<i>Brassica oleracea</i> (most sensitive species; multiple species tested)	Roundup Original (356 g glyphosate acid/L)	Biomass (dry wt) (assumed to be 28-d) IC ₂₅ = 0.038 lb a.i./A	E159072 / Boutin <i>et al.</i> 2012
<i>Pisum sativum</i> (Garden pea)	Roundup Original	Seed wt EC ₂₅ = 0.0074 lb ai/A [0.0096 x 833 g ai/ha], NOEC [0.01 x 833]	Rec#8500 / Olszyk <i>et al.</i> 2009
<i>Solanum Tuberosum L</i> (Potatoes)	Roundup	Most endpoints (growth and reproductive) affected at 0.1 x 832 g/ha, most sensitive endpoint was above biomass with EC ₂₅ of 0.004 x 832 [0.003 lb/A]	Rec# 5780 / Pfleege <i>et al.</i> 2011
<i>Triticum aestivum</i> (most sensitive species; multiple species tested)	Roundup Original	Biomass (dry wt) (assumed to be 28-d) IC ₂₅ = 0.0178 lb a.i./A	White and Boutin 2007

4.2.2.5. Summary of Terrestrial Endpoints

Table 27 summarizes the terrestrial toxicity endpoints for glyphosate that were considered to be sufficient for quantitative use in the risk assessment.

Table 27. Terrestrial Toxicity Profile for Glyphosate and/or Its Salts

Endpoint	Species	Toxicity Value	Toxicity Category ¹	Citation MRID#/Date	Comment
Acute Avian Oral Toxicity	Bobwhite quail (<i>Colinus virginianus</i>)	LD ₅₀ : >3196 mg a.e./kg bw NOAEL (observed) 1481 mg a.e./kg bw	Practically non-toxic	00108204/1978	Reported slight reduction in body weight gain at 3196 mg a.e./kg bw.
	Canary (<i>Serinus canaria</i>)	LD ₅₀ : > 2000 mg a.e./kg bw NOAEL (observed) 2000 mg a.e./kg bw	Practically non-toxic	48934206/2012	No frank effects up to highest dose tested
Acute Avian Dietary Toxicity	Bobwhite quail (<i>Colinus virginianus</i>)	LC ₅₀ : >4971 mg a.e./kg diet NOAEC (observed): 4971mg a.e./kg diet	Slightly toxic	44320628/1997	No effects reported
Chronic Avian	Mallard duck (<i>Anas platyrhynchos</i>)	Reproduction study NOAEC: <501 mg a.e./kg diet	NA	48876602 / 1999	LOAEC: 501 mg a.e./kg diet (lowest concentration tested), based on effects to male weight gain offspring weight.
	Bobwhite quail (<i>Colinus virginianus</i>)	Reproduction study NOAEC: 830 mg a.e./kg diet	NA	108207/1978	LOAEC: >830 mg a.e./kg diet (highest concentration tested).

Endpoint	Species	Toxicity Value	Toxicity Category ¹	Citation MRID#/Date	Comment
Acute mammalian	Rat (<i>rattus norvegicus</i>)	LD ₅₀ >4800 mg/kg bw (limit test)	Practically non-toxic	43728003/1989	No mortalities at limit dose; reduced activity observed in males and females first 9-days of study (14-d duration)
Chronic mammalian	Rat (<i>rattus norvegicus</i>)	NOAEL: 408/422 mg/kg bw/day (males/females); NOAEC: 5000 mg/kg-diet Used the lower dose-based value (408 mg/kg bw/day) for risk estimation	NA	48865101-48865105 /2007 & 2012	Reproduction study Offspring toxicity LOAEL: 1234/1273 (males/female) mg/kg bw/day; LOAEC: 15000 ppm (delayed age and increased weight at male sexual development). No observed effects on parental or reproductive toxicity (LOAEL >15000 ppm)
Acute terrestrial invertebrate	Honey bee (<i>Apis mellifera</i>)	48 hr LD ₅₀ (Oral and Contact): >100 µg/bee (>781.25 µg a.i./g bee)	NA	00026489/1972	38% mortality reported at limit dose in acute contact study (27% after control correction)
Terrestrial Plants	<u>Seedling Emergence</u> Monocots	EC ₂₅ : >5 lb a.e./A	NA	40159301/1987	NA
	<u>Seedling Emergence</u> Dicots	EC ₂₅ : > 5 lb a.e./A	NA	40159301/1987	NA
	<u>Vegetative Vigor</u> Monocots	EC ₂₅ : 0.16 lb a.e./A NOAEC: 0.07 lb a.e./A (sorghum)	NA	44125715/45045 101/1995	NA
	<u>Vegetative Vigor</u> Dicots	EC ₂₅ : 0.074 lb a.e./A NOAEC: 0.049 lb a.e./A (cucumber)	NA	44320636/1996	NA

For birds and mammals, the endpoints following acute exposure to glyphosate are not discrete and a quantitative estimate of risk cannot be done. However, for registered end-use products, there is at least one avian study and one mammalian study with discrete values. For estimation

of risk, these studies can be matched with the specific labeled rates and uses. Endpoints for the most sensitive studies are summarized in Table 28.

Table 28. Terrestrial Toxicity Profile for Glyphosate Formulations

Endpoint	Species	Toxicity Value	Toxicity Category ¹	Citation MRID#/Date	Comment
Acute Avian Oral Toxicity	Bobwhite quail (<i>Colinus virginianus</i>)	LD ₅₀ : 1651mg formulation/kg bw (1131 mg a.e./kg bw)	Slightly toxic	45777402/1999	Glyphosate monoammonium salt (MON 14420)
Acute Mammalian Toxicity	Rat (<i>rattus norvegicus</i>)	LD ₅₀ : 3132 mg formulation/kg bw (357 mg a.e./kg bw)	Moderately toxic when reported as a.e.	46714802/2003	HM-2028 (Glyphosate 11.4%)
¹ Categories of acute toxicity to terrestrial animals, avian and mammalian (U.S. EPA, 2004). LC ₅₀ (ppm): < 50 very highly toxic; 50 - 500 highly toxic; 501 - 1000 moderately toxic; 1001-5000 slightly toxic; >5000 practically non-toxic. LD ₅₀ (mg/kg bw): < 10 very highly toxic; 10 - 50 highly toxic; 51 - 500 moderately toxic; 501-2000 slightly toxic; >2000 practically non-toxic. Toxicity categories for terrestrial plants have not been defined.					

Based on the available avian toxicity studies, glyphosate is, at most, only slightly toxic on an acute exposure basis. The AMPA degradate is no more toxic than the parent, glyphosate. Table 29 summarizes these studies.

Table 29. Avian Acute Toxicity for Aminomethylphosphonic Acid (AMPA) Degradate of Glyphosate

Chemical	Species	% a.i. ¹	LD ₅₀ / LC ₅₀ NOAEL/ NOAEC (mg a.e./kg bw or ppm a.e.) ¹	Toxicity Category ²	MRID #/Year
AMPA	Bobwhite quail (<i>Colinus virginianus</i>)	87.8	LD ₅₀ : >1976 (N.A.) mg/kg NOAEL: 1185	Slightly toxic	43334709/1991
AMPA	Bobwhite quail (<i>Colinus virginianus</i>)	87.8	LC ₅₀ : >4934 (N.A.) PPM NOAEC: 4934	Slightly toxic	43334710/1994
AMPA	Mallard duck (<i>Anas platyrhynchos</i>)	87.8	LC ₅₀ : >4934 (N.A.) PPM NOAEC: 4934	Slightly toxic	43334711/1994
¹ a.i. = active ingredient; a.e. = acid equivalent ² Based on LC ₅₀ (ppm): < 50 very highly toxic; 50 - 500 highly toxic; 501 - 1000 moderately toxic; 1001-5000 slightly toxic; >5000 practically non-toxic; based on LD ₅₀ (mg/kg bw): < 10 very highly toxic; 10 - 50 highly toxic; 51 - 500 moderately toxic; 501-2000 slightly toxic; >2000 practically non-toxic ⁴ Range is 95% confidence interval for endpoint, N.A. = not available					

4.3. Adverse Ecological Incidents

A review on February 21, 2014, of the Ecological Incident Information System (EIIIS, version 2.1), which is maintained by the Agency's Office of Pesticide Programs, and the Avian Monitoring Information System (AIMS), which is maintained by the American Bird Conservancy, indicates a total of approximately 600 reported ecological incidents associated with the use of glyphosate and its salts (PC Codes 417300, 103601, 103604, 103607 and 103608 and

103613 (all active registrations)). This total excludes incidents classified as ‘unlikely’ or ‘unrelated’ and only includes those incidents with certainty categories of ‘possible’, ‘probable’ and ‘highly probable’ (for EIIS) and ‘possible’, ‘probable’, ‘likely’, ‘highly likely’ and ‘certain’ (for AIMS). Incidents classified as ‘unlikely’ the result of or ‘unrelated’ to glyphosate are not included in this ecological risk assessment conducted for Registration Review.

In addition to the incidents recorded in EIIS and AIMS, additional incidents have been reported to the Agency in aggregated incident reports. Pesticide registrants report certain types of incidents to the Agency as aggregate counts of incidents occurring per product per quarter. Ecological incidents reported in aggregate reports include those categorized as ‘minor fish and wildlife’ (W-B), ‘minor plant’ (P-B), and ‘other non-target’ (ONT) incidents. ‘Other non-target’ incidents include reports of adverse effects to insects and other terrestrial invertebrates. Unless additional information on these aggregated incidents become available, they are assumed to be representative of registered uses of glyphosate and its salts in the risk assessment. A review of the Office of Pesticide Incident Data System (IDS) for aggregate incident summaries was conducted on February 27, 2014. A total of 269 separate aggregate incident reports were returned which included reports for glyphosate (PC Code 417300; 34 reports), glyphosate IPA (PC Code 103601; 226 reports) and glyphosate ammonium salt (PC Code 103608; 9 reports). However, multiple reports of injury to plants, wildlife or other non-target organisms were sometimes contained within each separate report. It is anticipated that incident reports captured in the IDS may also be captured in the EIIS system.

4.3.1 Animal Incidents

Terrestrial

For glyphosate, in the aggregate database, seven reports of wildlife incidents (unknown if terrestrial animal or fish) were reported for glyphosate.

Five incident reports for glyphosate isopropylamine salt were filed, two in 1993, one in 1996, one in 2004, and one in 2009 for uses on rangeland/pasture, home/lawn and a tree farm. One report did not file a specific use. The certainty indices were from possible to probable. One reported an accidental misuse on corn in which an unknown bird was reported as dead. The incidents considered possibly due to glyphosate were mortality to three birds from drift and mortality to several dogs from runoff. No additional details were provided in the report for the mortality of the dogs, and in the case of the bird mortalities, other chemicals were applied at the same time including atrazine, S-metolachlor and permethrin. The other possible incident was for honeybees in which adult bee mortality by ingestion was reported (number of mortalities not reported but affected three hives). In this incident, it was reported that a herbicide formulation containing sulfometuron methyl (75%) as well as a glyphosate IPA herbicide formulation was applied near flowering areas. Within two days of application, twitching or dead bees were observed near three hives. The probable incident was incapacitation (displayed signs of shock, tremors and depression) of two iguanas following ingestion of dandelions sprayed with glyphosate. In the aggregate database, 37 reports of wildlife incidents (unknown if terrestrial

animal or fish) were reported for glyphosate isopropylamine salt. Additionally, there was one reported incident to other non-target organisms for the glyphosate IPA salt.

Aquatic

For glyphosate, one incident report filed in 2003 was filed in which one carp and one catfish were incapacitated and ten goldfish were killed. Other fish were observed ‘gasping’ at the surface of the water. The certainty index was possible. Dissolved oxygen concentrations in the water were not measured, however water was collected for chemical analysis. Investigators stated it was not possible to determine a reason for the fish kill based on analytical results and a lack of dissolved oxygen measurements.

For the isopropylamine salt of glyphosate, 11 incident reports were filed from 1990 – 2003. The certainty indices ranged from possible to highly probable. There was one accidental misuse in which thousands of shad were killed upon ingestion. It was not stated what the application method was, but this was the one report that was rated highly probable. Four other misuses were reported and the remainder was either registered uses (majority) or unknown. All of the reports were on fish. The numbers of fish affected ranged from unknown to thousands. In two of the reports that were not reported as misuses, the compound was applied directly to the fish pond. In both cases, report indicated poor water quality may have been reason for fish kills (elevated ammonia, reduced dissolved oxygen due to plant die-off). Additionally, in another incident reported as a registered use, glyphosate was applied at the perimeter of a pond and fish kills were reported two months later. The report indicated overstocking and improper dissolved oxygen may have been the reason for the fish deaths. In two additional incidents which use was reported as undetermined, one report indicated that while glyphosate was applied adjacent to a pond, additional chemicals were also applied and suggested that diuron was reason for fish kill. In the other incident, it was unknown if glyphosate was actually used. In the last incident reporting a registered use, glyphosate was applied to 80 acres next to a fish pond for which it rained the next day. Seven hundred fish were subsequently found dead, and no other details were reported.

4.3.2 Plant Incidents

For glyphosate, 153 incidents were reported for mostly plant damage to a wide variety of plants from either direct treatment or spray drift. The reports were filed from 1992 – 2013 with the certainty code ranging from possible to highly probable. In the aggregate database, 86 reports of plant injury were reported for glyphosate.

For the isopropylamine salt of glyphosate, 449 incident reports (reported as highly probable, probable, and possible) were filed for a wide variety of terrestrial plants, particularly agricultural crops and grass. There were a few incidents of trees being damaged or killed. The reports were filed from 1990 – 2013. Plant damage and mortality were the main effects reported with drift as the main exposure route. For the potassium salt, there was one report for 2005 for plants from a registered use on a right-of-way with a certainty category of highly probable. In the aggregate database, 619 reports of plant injury were reported for glyphosate isopropylamine salt. Nineteen

reports of plant injury were reported for glyphosate dimethylammonium salt were reported in the aggregate database.

5. Risk Characterization

5.1. Risk Hypothesis

Based on the available toxicity data, it appears that the degradate, AMPA, is less toxic than glyphosate and therefore, will not be considered further in this assessment. As certain glyphosate formulations appear to be more toxic than glyphosate technical, which is believed to be due to certain surfactants, potential exposure from glyphosate formulations (from spray drift for terrestrial use formulations and from direct application for aquatic uses) as well as potential exposure using surfactant specific data are evaluated in this assessment. It is noted that glyphosate formulations that are registered for direct aquatic use do not contain POEA, which is a surfactant known to be more toxic to aquatic organisms than technical glyphosate. The following risk hypothesis is presumed for this screening-level assessment:

When used in accordance with current labels for terrestrial and aquatic use patterns, glyphosate can move off-site via runoff (both dissolved phase and with eroded sediment) and spray-drift and expose non-target organisms. Polyoxyethylene tallow amine (POEA), a surfactant in some glyphosate formulations, can also move off-site via spray drift and runoff. Application to foliar surfaces and soil may also result in exposure to non-target organisms. Monitoring data indicate detections of glyphosate in surface waters and near field sites from use areas presumably due to current uses. These potential exposure pathways may result in adverse effects on the survival, growth, and/or reproduction of non-target terrestrial and aquatic organisms.

5.2 Risk Estimation Overview

For this preliminary assessment of glyphosate and its salts, the deterministic risk quotient (RQ) method was used to provide a metric of potential risks. The RQ is a comparison of exposure estimates to toxicity endpoints (i.e., $RQ = EEC/\text{toxicity endpoint}$). The resulting RQs are compared to the Agency's risk levels of concern (LOC), which are the Agency's interpretive policy such that when risk LOCs are exceeded, the need for regulatory action may be considered. These criteria are used to indicate when the use of a pesticide, as directed on the label, has the potential to cause adverse effects to non-target organisms. For acute and chronic exposures to non-listed animals (except for honeybees), the LOCs are 0.5 and 1.0, respectively and for non-listed and listed plants, the LOC is 1.0. For honeybees, the acute non-listed LOC is 0.4 and the chronic LOC is 1. For acute and chronic exposure to listed aquatic animals, the LOCs are 0.05 and 1.0, respectively. For acute and chronic exposure to listed terrestrial vertebrates, the LOCs are 0.1 and 1.0, respectively. For each taxa, RQs are generated.

5.2.1 Aquatic Organisms

5.2.1.1 Terrestrial Uses

5.2.1.1.1 Exposure from Runoff and Spray Drift Concurrently

Risk quotients were calculated by evaluating exposure from terrestrial applications that incorporated both runoff and spray drift. The EECs were calculated using GENEEC and were compared to the toxicity data from studies that used only the active ingredient glyphosate (no formulation data).

Table 30 indicates that neither the acute nor chronic LOCs are exceeded for aquatic plants, freshwater fish or invertebrates, aquatic-phase amphibians, or estuarine/marine fish or invertebrates compared with the highest estimated peak and 21 or 60-day average EEC values (RQs ≤ 0.06 for animals and RQs ≤ 0.19 for plants).

Table 30. Acute and Chronic RQs for Aquatic Organisms for Technical Glyphosate and its Salts

Duration	Taxa	EEC (mg a.e./L)	Toxicity Endpoint (mg a.e./L) ²	RQ
Acute	Freshwater fish	0.246 ¹ (peak)	43	<0.01
	Aquatic-phase amphibians		103	<0.01
	Estuarine/marine fish		240	<0.01
	Freshwater invertebrates		53.2	<0.01
	Estuarine/marine invertebrates		40	<0.01
	Aquatic non-vascular plants		11.4 / NR	0.022 / NA
	Aquatic vascular plants		11.9 / 1.3	0.021 / 0.19
Chronic	Freshwater fish	0.116 (60-d average)	25.7	<0.01
	Aquatic-phase amphibians		1.8	0.06
	Estuarine/marine fish		88.9	<0.01
	Freshwater invertebrates	0.185 (21-d average)	9.22	0.02
	Estuarine/marine invertebrates		13.7	0.03

¹ The peak, 21-d and 60-d EECs were the maximum EECs calculated using GENEEC (which incorporates both runoff and spray drift) based on the application rate for spot treatment which was converted into a lb a.e./A basis (40 lb a.e./A) and is assumed to be conservative as treatment of an entire acre at one time is not anticipated.

² All toxicity endpoints were adjusted to acid equivalents; acute endpoints refer to LC/EC₅₀ values and chronic endpoints refer to NOAEC values for aquatic animals. For aquatic plants, the first toxicity value is the EC₅₀ value (non-listed plants) and the second value is the NOAEC/EC₀₅ (listed plants). NR= not reported; NA = not applicable

5.2.1.1.2 Exposure from Spray Drift

Technical Glyphosate

Risk quotients were calculated by evaluating exposure from spray drift (alone) from terrestrial applications. EECs were calculated using AgDrift and reported in acid equivalents and were compared to the toxicity data from studies that used only the active ingredient glyphosate (no formulation data).

Table 31 indicates the acute LOCs are not exceeded for aquatic plants, freshwater fish or invertebrates or aquatic-phase amphibians or estuarine/marine fish or invertebrates with the peak EEC value (RQs ≤ 0.04).

Table 31. Acute RQs for Aquatic Organisms for Glyphosate Formulations (using Spray Drift EECs and Toxicity Data Adjusted to Acid Equivalents)

Duration	Taxa	EEC (mg a.e./L)	Toxicity Endpoint (mg a.e./L) ²	RQ
Acute	Freshwater fish	0.0567 ¹ (peak)	43	<0.01
	Aquatic-phase amphibians		103	<0.01
	Estuarine/marine fish		240	<0.01
	Freshwater invertebrates		53.2	<0.01
	Estuarine/marine invertebrates		40	<0.01
	Aquatic non-vascular plants		11.4 / NR	<0.01 / NA
	Aquatic vascular plants		11.9 / 1.3	<0.01 / 0.04

¹ The peak EEC was the maximum EECs calculated based on the application rate for aerial application of a single application of 8 lb a.e./A using the default AgDrift parameters with the receiving body of water as the standard pond.

² All toxicity endpoints were adjusted to acid equivalents. For aquatic plants, the first toxicity value is the EC₅₀ value (non-listed plants) and the second value is the NOAEC/EC₀₅ (listed plants). NR= not reported; NA = not applicable

Glyphosate Formulations

Formulations assumed to contain POEA: Risk quotients were calculated by evaluating exposure from spray drift from terrestrial applications. EECs were calculated using AgDrift and reported in acid equivalents and were compared to acute formulation toxicity values for aquatic organisms. The toxicity values used were for formulations assumed to contain POEA (allowed for terrestrial uses).

Table 32 indicates that the acute non-listed LOCs are not exceeded for either fish or aquatic-phase amphibians, invertebrates or aquatic plants following acute exposure to the formulation through spray drift. However, using a single maximum application rate of 8 lb a.e./A (non-ag uses) with an aerial application scenario, the RQs slightly exceeded the acute endangered species LOC for freshwater fish, aquatic-phase amphibians and estuarine/marine invertebrates (RQs = 0.06-0.07). With 8 lb a.e./A applied by ground application, the spray drift EEC (0.0276 mg a.e./L) result in RQs that are below the acute endangered species LOC for all taxa. The single maximum application rates for all uses other uses (<8 lb a.e./A) results in spray drift EECs for which RQ values are less than the acute endangered species LOC.

Table 32. Acute RQs for Aquatic Organisms for Glyphosate Formulations Assumed to Contain POEA (using Spray Drift EECs and Toxicity Data Adjusted to Acid Equivalents)

Duration	Taxa	EEC (mg a.e./L)	Toxicity Endpoint (mg a.e./L) ²	RQ
Acute	Freshwater fish	0.0567 ¹ (peak)	1	0.06
	Aquatic-phase amphibians		0.8	0.07
	Estuarine/marine fish		2.7	0.02
	Freshwater invertebrates		1.6	0.03
	Estuarine/marine invertebrates		0.765	0.07
	Aquatic non-vascular plants		0.12 / 0.084 ³	0.47 / 0.68
	Aquatic vascular plants		1.5 / NR	0.04 / NA

¹ The peak EEC was the maximum EECs calculated based on the application rate for aerial application of a single application of 8 lb a.e./A using the default AgDrift parameters with the receiving body of water as the standard pond.

² All toxicity endpoints were adjusted to acid equivalents; data were from formulations assumed to contain POEA. Acute endpoints refer to LC/EC₅₀ values for aquatic animals. For aquatic plants, the first toxicity value is the EC₅₀ value (non-listed plants) and the second value is the NOAEC/EC₀₅ (listed plants). NR= not reported; NA = not applicable

³ There are at least two labels with this formulation name. Because the formulations differ, it could not be determined if the formula used in the study was a POEA or non-POEA formulation

Formulations assumed to not contain POEA: Risk quotients were calculated by evaluating exposure from spray drift from terrestrial applications. EECs were calculated using AgDrift and reported in acid equivalents and were compared to acute formulation toxicity values for aquatic organisms. The toxicity values used were for formulations assumed to not contain POEA.

Table 33 indicates that the acute non-listed and listed LOCs are not exceeded for either fish or aquatic-phase amphibians, aquatic invertebrates or aquatic plants following acute exposure to the formulation through spray drift using a single maximum application rate of 8 lb a.e./A (non-ag uses) with an aerial application scenario (RQs < 0.01 for animals and ≤0.68 for plants).

Table 33. Acute RQs for Aquatic Organisms for Glyphosate Formulations Assumed to Not Contain POEA (using Spray Drift EECs and Toxicity Data Adjusted to Acid Equivalents)

Duration	Taxa	EEC (mg a.e./L)	Toxicity Endpoint (mg a.e./L) ²	RQ
Acute	Freshwater fish	0.0567 ¹ (peak)	103	<0.01
	Aquatic-phase amphibians		328	<0.01
	Estuarine/marine fish		>50.9	<0.01
	Freshwater invertebrates		44.8	<0.01
	Estuarine/marine invertebrates		23.2	<0.01
	Aquatic non-vascular plants		0.12 / 0.084 ³	0.47 / 0.68
	Aquatic vascular plants		7.7 / 2.4	<0.01 / 0.02

¹ The peak EEC was the maximum EECs calculated based on the application rate for aerial application of a single application of 8 lb a.e./A using the default AgDrift parameters with the receiving body of water as the standard pond.

² All toxicity endpoints were adjusted to acid equivalents; data were from formulations assumed to not contain POEA. Acute endpoints refer to LC/EC₅₀ values for aquatic animals. For aquatic plants, the first toxicity value is the EC₅₀ value (non-listed plants) and the second value is the NOAEC/EC₀₅ (listed plants). NR= not reported; NA = not applicable

³ There are at least two labels with this formulation name. Because the formulations differ, it could not be determined if the formula used in the study was a POEA or non-POEA formulation

POEA Only

Risk quotients were calculated by evaluating exposure from spray drift from terrestrial applications. EECs were calculated using a volume of formulation applied per acre, a spray drift fraction, and the simple dilution equation (using the standard pond scenario) and reported in mg POEA per liter. EECs were compared to acute toxicity values for aquatic organisms tested with only POEA.

Table 34 indicates that the acute non-listed LOCs are not exceeded for freshwater animals following acute exposure to the surfactant through spray drift, using an assumed percentage of POEA of 15%, until the single aerial application rate of >260 quarts formulation per acre is applied. For listed animals, the acute LOC is reached when 26 quarts formulation per acre is applied. An evaluation of the volume of formulation applied in a single application, using the LUIS reports, resulted in application volumes of < 1 quart up to 10 quarts per application.

Table 34. Acute RQs for Aquatic Organisms for POEA (using Spray Drift EECs and Toxicity Data Based on mg POEA/L)

Scenario ¹	EEC (mg POEA/L) ²	Taxa (acute toxicity value (mg POEA/L)) ³		
		FW fish (0.7) (MRID 00162296)	Amphibian (0.47) (ECOTOX# 161671)	FW invert (9.1) (MRID 00162296)
		RQ		
		RQ		
Aerial - Standard Pond / (Qt formulate product/A)				
262	0.235	0.34	0.50	0.026
26.25	0.0236	0.034	0.05	<0.01
10	0.009	<0.01	<0.01	<0.01
5	0.0045	<0.01	<0.01	<0.01
Ground - Standard Pond / (Qt formulate product/A)				
540	0.236	0.34	0.50	0.026
53.75	0.0235	0.034	0.05	<0.01
10	0.004	<0.01	<0.01	<0.01
5	0.002	<0.01	<0.01	<0.01
¹ The scenario refers to the either aerial or ground application and the application rate of the formulation (quarts of formulation per acre).				
² The peak spray drift EEC was the maximum EECs calculated based on the application rate for aerial/ground application using the defined application rate (Qt product/A) using the default AgDrift parameters with the receiving body of water as the standard pond.				
³ All toxicity endpoints were reported as mg POEA/L. Toxicity tested conducted using only surfactant. Acute endpoints refer to LC/EC ₅₀ values				
Bold values are RQ values that have exceeded listed animal acute LOC (0.05); bold and italicized values are RQ values that exceed the non-listed acute LOC (0.5).				

5.2.1.2 Exposure from Application to Aquatic Environments

5.2.1.2.1 Technical Glyphosate

Risk quotients were calculated by evaluating exposure from application to aquatic environments. EECs were calculated using a Tier 1 dilution model in the standard pond and reported in acid equivalents and were compared to the toxicity data from studies that used only the active ingredient glyphosate (no formulation data)

Table 35 indicates that neither the acute nor chronic LOCs are exceeded for aquatic plants, freshwater fish or invertebrates or aquatic-phase amphibians or estuarine/marine fish or invertebrates with the highest estimated peak and 21 or 60-day average EEC values (acute animal RQs ≤0.01; chronic animal RQs ≤0.12; plant RQs ≤0.17).

Table 35. Acute and Chronic RQs for Aquatic Organisms for Technical Glyphosate and its Salts from Application to Aquatic Environments

Duration	Taxa	EEC (mg a.e./L)	Toxicity Endpoint (mg a.e./L) ²	RQ
Acute	Freshwater fish	0.222 ¹ (peak)	43	<0.01
	Aquatic-phase amphibians		103	<0.01
	Estuarine/marine fish		240	<0.01
	Freshwater invertebrates		53.2	<0.01
	Estuarine/marine invertebrates		40	<0.01
	Aquatic non-vascular plants		11.4 / NR	0.019 / NA
	Aquatic vascular plants		11.9 / 1.3	0.019 / 0.17
Chronic	Freshwater fish	0.210 (60-d average)	25.7	<0.01
	Aquatic-phase amphibians		1.8	0.12
	Estuarine/marine fish		88.9	<0.01
	Freshwater invertebrates	0.218 (21-d average)	9.22	0.02
	Estuarine/marine invertebrates		13.7	<0.01

¹ The peak, 21-d and 60-d EECs were calculated using a Tier 1 dilution model in the standard pond based on the application rate for a single application of 8 lb a.e./A.

² All toxicity endpoints were adjusted to acid equivalents; acute endpoints refer to LC/EC₅₀ values and chronic endpoints refer to NOAEC values for aquatic animals. For aquatic plants, the first toxicity value is the EC₅₀ value (non-listed plants) and the second value is the NOAEC/EC₀₅ (listed plants). NR= not reported; NA = not applicable.

5.2.1.2.2 Formulations assumed to not contain POEA

Risk quotients were calculated by evaluating exposure from application to aquatic environments. EECs were calculated using a Tier 1 dilution model in the standard pond and reported in acid equivalents and were compared to the formulation toxicity values for aquatic organisms. The toxicity values used were for formulations assumed to not contain POEA.

Table 36 indicates that the acute non-listed and listed LOCs are not exceeded for either fish or aquatic-phase amphibians, aquatic invertebrates and aquatic vascular plants following acute exposure to the formulation through aquatic application using a single maximum application rate of 8 lb a.e./A (RQs < 0.01 for animals). However, the LOC for non-listed and listed plants were exceeded (RQs 1.9 & 2.6, respectively).

Table 36. Acute and Chronic RQs for Aquatic Organisms for Formulations Assumed to Not Contain POEA from Application to Aquatic Environments (Toxicity Data Adjusted to Acid Equivalents)

From Application to Aquatic Environments (Toxicity Data Adjusted to Acid Equivalents)				
Duration	Taxa	EEC (mg a.e./L)	Toxicity Endpoint (mg a.e./L) ²	RQ
Acute	Freshwater fish	0.222 ¹ (peak)	103	<0.01
	Aquatic-phase amphibians		328	<0.01
	Estuarine/marine fish		>50.9	<0.01
	Freshwater invertebrates		44.8	<0.01
	Estuarine/marine invertebrates		23.2	<0.01
	Aquatic non-vascular plants		0.12 / 0.084 ³	1.9 / 2.6
	Aquatic vascular plants		7.7 / 2.4	0.03 / 0.09
¹ The peak EEC was calculated using a Tier 1 dilution model in the standard pond based on the application rate for a single application of 8 lb a.e./A. ² All toxicity endpoints were adjusted to acid equivalents; data were from formulations assumed to not contain POEA. Acute endpoints refer to LC/EC ₅₀ values for aquatic animals. For aquatic plants, the first toxicity value is the EC ₅₀ value (non-listed plants) and the second value is the NOAEC/EC ₀₅ (listed plants). ³ There are at least two labels with this formulation name. Because the formulations differ, it could not be determined if the formula used in the study was a POEA or non-POEA formulation NR= not reported; NA = not applicable Bolded values exceed the non-listed and listed plant LOC of 1				

5.2.2. Terrestrial Organisms

5.2.2.1 Birds

There were no mortalities in any of the acute avian studies with technical glyphosate. Therefore, no RQs were calculated. Additionally, for chronic exposure, the most sensitive endpoint was a non-definitive value from the mallard reproduction study (NOAEC <501 mg a.e./kg-diet). Therefore, chronic RQs using the most sensitive endpoint were not also not calculated in the Risk Estimation section. Potential acute and chronic risk to birds (surrogates for terrestrial-phase amphibians) from exposure to glyphosate is discussed in the Risk Description section.

However, there was one avian study that had a definitive acute toxicity value (LD₅₀: 1651 mg formulation/kg-bw (1131 mg a.e./kg-bw); MRID 45777402). The application rates from the specific label for which this study was submitted indicate an exceedance of the acute avian listed LOC for all use rates, including the highest rate (5.5 lbs formulation/A (industrial outdoors)) to the lowest rate (1.1 lbs formulation/A (ornamental lawns and turf)) (Table 37). The dose-based acute RQs range from <0.01 to 0.25 for the 1.1 lbs formulation/A rate to <0.01-1.26 for the 5.5 lb formulation/A. Single application rates of ≥2.2 and 0.5 lbs formulation/A results in acute non-listed and listed LOC exceedances, respectively (Table 37).

Table 37. Acute Avian RQs for Glyphosate Formulation

Dose-based RQs (Dose-based EEC/adjusted LD ₅₀)	Avian Acute RQs Size Class (grams)					
	1.1 lb formulation/A			5.5 lb formulation/A		
	20	100	1000	20	100	1000
Short Grass	0.25	0.11	0.04	1.26	0.57	0.18
Tall Grass	0.12	0.05	0.02	0.58	0.26	0.08
Broadleaf plants	0.14	0.06	0.02	0.71	0.32	0.10
Fruits/pods	0.02	0.01	0.00	0.08	0.04	0.01
Arthropods	0.10	0.04	0.01	0.50	0.22	0.07
Seeds	0.00	0.00	0.00	0.02	0.01	0.00
Bolded values exceed the acute non-listed LOC; bolded and italicized values exceed the acute listed LOC						

5.2.2.2 Mammals

As with birds, there were no definitive acute mammalian toxicity data available for technical glyphosate (LD₅₀ > 4800 mg a.e./kg-bw). Therefore, RQ values were not calculated.

Many acute oral toxicity studies with the rat have been conducted with formulations. As with the technical material, most of the LD₅₀'s are higher than the highest dose/concentrations tested. However, there were studies in which there are definitive LD₅₀'s where glyphosate is the only active ingredient. Label matches were conducted for each of these products to ensure they were still active registrations and had foliar uses. The highest application rate, in terms of pounds of formulated product was modeled and compared to the toxicity value (Table 38). Given that the dissipation rate for the different components in the formulation may differ over time, a single application was modeled to better represent the bolus dose of formulated product the animals received in the toxicity tests. For the formulation with the lowest LD₅₀ value (357 mg a.e./kg-bw) along with the highest application rate of 7.2 lbs formulation/A, RQ values were calculated. The acute dose-based RQs for this acute toxicity value ranged from 0.03 to 2.10.

Table 38. Acute Dose-based RQs for Acute Toxicity tests with Formulations with Definitive LD₅₀ values

Acute Mammalian LD ₅₀ mg formulation/kg bw / LD ₅₀ mg ae./kg bw (MRID No.)	Highest Labeled Use / Rate (lb a.e./A)	Acute RQs ¹ (dose-based)		
		15g	35g	1000g
3803 / 1175 (44918601)	Broadcast Bermuda grass, blueweed / 3.7 lb a.e./A	<0.01- 0.33	<0.01- 0.28	<0.01- 0.15
5827 / 3811 (44615502)	Industrial / 7.53 lb a.e./A	<0.01- 0.21	<0.01- 0.18	<0.01- 0.09
2686 / 1886 (40853903)	Broadcast perennials / 3.86 lb a.e./A	<0.01- 0.21	<0.01- 0.18	<0.01- 0.10
3132 / 357 (46714802)	Broadcast brush / 7.2 lb a.e./A	0.03- 2.10	0.02- 1.79	0.01- 0.96
1 LOC exceedances (acute listed LOC= 0.1; acute non-listed LOC=0.5)				
2 Modeled a single application due to potential differences in dissipation rates of the various components in the formulation.				

Chronic mammalian RQs were calculated using the 2-generation mammalian reproduction data and the upper bound EECs. Dietary-based RQ values did not exceed the chronic LOC for any use pattern, except for the spot treatment use for the short grass and broadleaf plants dietary items (RQs = 1.92 and 1.08, respectively). Additionally, dose-based chronic RQs for large mammals did not exceed the LOC, except for the spot treatment use. However, dose-based chronic RQs did exceed the LOC for small mammals consuming short grass for aerial application to sugar cane as well as for most uses generally applied by ground applications up to the combined maximum annual rate (RQs 1.02-10.2). Additionally, for use on forests, pastures and other non-crop uses (rights-of-way), the RQ was exceeded for small mammals consuming broadleaf plants (RQ 1.15). For medium-sized mammals consuming short grass, again the RQs exceeded the LOC for most uses that for which glyphosate is applied by ground application up to the combined maximum annual rate (RQs 1.04-8.72). The RQs are presented in Table 39.

Table 39. Chronic Mammalian Dose-Based RQs for Foliar Application of Glyphosate

Food Item	Rangeland	Roundup ready-aerial, max combined annual	Roundup ready-aerial max rate/crop cycle	Most Crops-aerial max rate/crop cycle	Most crops-aerial max combined annual	Roundup ready ground max rate/crop cycle	Sugar cane-aerial max crop & annual	Tree crops-aerial max combined annual	Roundup ready ground max combined annual	Most crops-ground max crop & annual	Food tree, vine, berry, small fruit ground max combined annual	Forestry, pastures, non-crop	Spot Treatment
15 g Mammal													
Short Grass	0.27	0.68	0.62	0.84	0.90	0.96	1.02	1.03	1.11	1.21	1.60	2.04	10.2
Tall Grass	0.12	0.31	0.28	0.38	0.41	0.44	0.47	0.47	0.51	0.56	0.73	0.94	4.68
Broadleaf plants	0.15	0.38	0.35	0.47	0.51	0.54	0.57	0.58	0.63	0.68	0.90	1.15	5.74
Fruits/pods	0.02	0.04	0.04	0.05	0.06	0.06	0.06	0.06	0.07	0.08	0.10	0.13	0.64
Arthropods	0.10	0.27	0.24	0.33	0.35	0.37	0.40	0.40	0.44	0.48	0.62	0.80	4.00
Seeds	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.03	0.14
35 g Mammal													
Short Grass	0.23	0.58	0.53	0.71	0.77	0.82	0.87	0.88	0.95	1.04	1.36	1.74	8.72
Tall Grass	0.10	0.27	0.24	0.33	0.35	0.37	0.40	0.40	0.44	0.47	0.62	0.80	4.00
Broadleaf plants	0.13	0.33	0.30	0.40	0.43	0.46	0.49	0.50	0.53	0.58	0.77	0.98	4.90
Fruits/pods	0.01	0.04	0.03	0.04	0.05	0.05	0.05	0.06	0.06	0.06	0.09	0.11	0.54
Arthropods	0.09	0.23	0.21	0.28	0.30	0.32	0.34	0.35	0.37	0.41	0.53	0.68	3.41
Seeds	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.12
1000 g Mammal													

Short Grass	0.12	0.31	0.28	0.38	0.41	0.44	0.47	0.47	0.51	0.56	0.73	0.93	4.67
Tall Grass	0.06	0.14	0.13	0.18	0.19	0.20	0.21	0.22	0.23	0.25	0.33	0.43	2.14
Broadleaf plants	0.07	0.18	0.16	0.22	0.23	0.25	0.26	0.27	0.29	0.31	0.41	0.53	2.63
Fruits/pods	0.01	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.05	0.06	0.29
Arthropods	0.05	0.12	0.11	0.15	0.16	0.17	0.18	0.19	0.20	0.22	0.29	0.37	1.83
Seeds	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.06

5.2.2.3 Terrestrial Invertebrates

Definitive acute contact and oral honeybee LD₅₀ toxicity values were not available (LD₅₀s >100 µg/bee). Therefore, RQ values were not calculated in the Risk Estimation section. Evaluation of potential risk to terrestrial invertebrates/pollinators is discussed in the Risk Description section.

5.2.2.4 Terrestrial Plants

No effects on seedling emergence greater than 25% was observed after exposure to glyphosate formulations (IC₂₅ > 5 lb a.e./A). Therefore, RQs for non-listed terrestrial plants using the seedling emergence data were not calculated. Additionally, NOAECs were reported as the highest concentration tested or were not reported. Potential risks to vegetative vigor were examined using AgDrift to calculate EECs from spray drift. Spray drift EECs were calculated using AgDrift and compared to the most sensitive vegetative vigor endpoint (IC₂₅ for non-listed species and NOAEC for listed species) for both dicots and monocots (Table 40). As droplet size is not specified on the labels for all uses, spray drift EECs were calculated using AgDrift (v2.1.1), using the default droplet size, fine to medium for aerial and very fine to fine for ground (USEPA 2013).

Table 40. Ratio of Spray Drift Loading to Terrestrial Plant Vegetative Vigor Toxicity Endpoints

No. of application and app. rate (lb a.e./A)	Initial Deposition Fraction (lb a.e./A)	Dicot (VV) ^a		Monocot (VV) ^b		Spray Method
		IC ₂₅	NOAEC	IC ₂₅	NOAEC	
Ratio of the loading at the edge of field to non-listed (IC ₂₅) or listed (NOAEC/IC ₀₅) toxicity value						
1 @ 3.75	1.87	25.3	38.2	11.7	26.7	Aerial
1 @ 8	4	54.0	81.6	25.0	57.1	
1 @ 3.75	3.75	50.7	76.5	23.4	53.5	Ground
1 @ 8	8	108	163	50.0	114	

^a Based on reported toxicity in dicot species cucumber, *Cucumis sativus*, at IC₂₅ of 0.074 lb a.e./A and NOAEC of 0.049 lb a.e./A in the vegetative vigor test.

^b Based on reported phytotoxicity in monocot species sorghum, *Sorghum bicolor*, at IC₂₅ of 0.16 lb a.e./A and NOAEC of 0.07 lb a.e./A in the vegetative vigor test.

Drift values based on: aerial - droplet size ASA.E. Fine to medium, ground – droplet size ASA.E. very fine to fine, high boom, 90th percentile

5.3 Risk Description

The risk description synthesizes an overall conclusion regarding the likelihood of adverse impacts to non-target taxa. The discussions below for each taxa includes discussion of RQs as well as consideration of additional data and lines of evidence with an overall conclusion of the likelihood of potential adverse effects for non-listed species.

5.3.1. Aquatic Organisms

5.3.1.1 Technical Glyphosate

Based on the lines of evidence for aquatic organisms, using standard screening methodology, the likelihood of direct effects to non-listed species from exposure to *technical glyphosate* based on the registered uses is anticipated to be low.

The RQ values from exposure from both runoff and spray drift and using glyphosate only toxicity data, were below the acute and chronic LOC for non-listed and listed aquatic species (acute animal RQs <0.01 ; chronic animal RQs ≤ 0.06 ; aquatic plant RQs ≤ 0.19). These RQs were calculated using modeled Tier 1 screening water concentrations. Targeted surface water monitoring data were available for glyphosate for which the highest reported concentration was 0.430 mg a.e./L. When this measured concentration is compared to the toxicity data above, the RQs are below the listed LOC for all taxa for both acute and chronic exposure (RQs: acute ≤ 0.01 for aquatic animal; chronic ≤ 0.24 for aquatic animals; aquatic plants ≤ 0.33).

For exposure from spray drift only, the RQs did not exceed the LOC for all aquatic organisms. While the available toxicity data for aquatic vascular plants do not indicate LOC exceedances, in general, the aquatic vascular plant toxicity studies are conducted with glyphosate exposure in the water column as oppose to overspray. As it is anticipated that emergent aquatic vegetation could be exposed to glyphosate via spray drift in the same manner as terrestrial plants and therefore, there may be potential risk. Toxicity data for three species of emergent aquatic plants using a glyphosate formulation were available and are discussed in the section below pertaining to risk from glyphosate formulations. Additionally, evaluation of glyphosate formulations to terrestrial plants is described in the terrestrial plant section below, and the calculated distances off-site of application would apply to emergent aquatic vegetation as well as terrestrial plants. As there are reported differential sensitivities between terrestrial plant species, as well as for other taxa, it is anticipated that not all emergent aquatic plants may be affected equally following spray drift alone. Based on the terrestrial plant toxicity data and spray drift analysis using AgDrift, off-site distances required to be below toxicity thresholds could be over 1000 feet based on the most sensitive endpoint (cucumber, vegetative vigor).

For application to aquatic environments, neither the acute nor chronic LOCs are exceeded for aquatic plants, freshwater fish or invertebrates or aquatic-phase amphibians or estuarine/marine fish or invertebrates with the highest estimated peak and 21 or 60-day average EEC values (acute animal RQs ≤ 0.01 ; chronic animal RQs ≤ 0.12 ; plant RQs ≤ 0.17). However, as discussed above, glyphosate is registered for use to control emergent aquatic vegetation, it is presumed that target and non-target aquatic emerged vegetation may be affected by application to aquatic

environments. Aquatic vegetation is an important component of an aquatic ecosystem, as it provides food and habitat for other aquatic organisms.

Toxicity data using technical glyphosate were available in the open literature. While they were not used in the risk quotient calculations, some of the uncertainties in the studies discussed in the Dose-Response section, they were used to further characterize potential risk. The toxicity values for these studies included acute EC/LC₅₀ values for fish (4 species Pacific salmonids 96-hr LC₅₀s 10-211 mg a.i./L); freshwater mussels (48-hr EC₅₀ of 5.0 mg a.e./L); estuarine/marine mollusks (Pacific oyster 48 hr EC₅₀ of 28.3 mg a.e./L); aquatic non-vascular species (EC₅₀s 7.1->169,000 mg a.e./L); copepods (*Acartia tonsa* 48-hr LC₅₀ of 35.3 mg a.e./L); crustaceans (*Daphnia magna* 48 hr EC₅₀s 1.4 – 7.2 mg a.i./L (unsure if adjusted for acid equivalents) and chronic toxicity data for *Daphnia magna*. In Cuhra *et al.* 2013, a 55-d chronic toxicity test with technical glyphosate, the reported NOAEC was 0.45 mg a.i./L (0.33 mg a.e./L- reviewer calculated), based on reduction in fecundity. Comparing this toxicity value to the chronic 60-d EEC (0.116 mg a.e./L; spot treatment), the toxicity value is greater than the EEC. In regards to acute toxicity, one-twentieth of the reported acute toxicity values (1/20th correlates to acute listed LOC of 0.05) are greater than the calculated EEC for an aerial application of 8 lb a.e./A (1.4/20 = 0.07 mg/L compared to EEC of 0.0596 mg a.e./L). While this 1/20th acute toxicity value is lower than the peak EEC for the spot treatment (0.246 mg a.e./L based on 40 lb a.e./A), given the extrapolation from a spot treatment to an acre application, the EECs are anticipated to be lower than calculated. Therefore, these data are consistent with the data presented above in that it suggests that potential risk to non-listed and listed aquatic animals and aquatic non-vascular plants is low from exposure to glyphosate alone.

Incident data for glyphosate for fish are available. In some of the incidences, concerns with water quality (low dissolved oxygen) or overcrowding were reported as potential reasons for the observed mortalities. It is noted that current glyphosate formulations that are registered for direct application to water do not contain the surfactant POEA, which is known to enhance toxicity in aquatic ecosystems. With regard to potential runoff of POEA from a terrestrial application site, it is anticipated to dissipate quickly and may not be available during runoff events, but it may be available in aquatic systems via spray drift from terrestrial applications. It is unknown to what extent POEA may have been present in the water for the reported incidences, but at least for some of the reports, it appears that stressors other than glyphosate may have contributed to the observed toxicity

5.3.1.2 Glyphosate Formulations

1) Terrestrial Applications

For exposure from spray drift from terrestrial formulations (that may or may not contain POEA; toxicity data adjusted to acid equivalents), the likelihood of direct effects to non-listed aquatic animals and aquatic non-vascular and submerged aquatic vascular plants is anticipated to be low (acute RQs ≤0.07 for animals and RQs ≤0.68 for plants). However, for emergent vascular plants, there is a potential for risk based on toxicity data for both emergent aquatic plant and terrestrial plants and anticipated use profile of glyphosate. Toxicity studies evaluating effects of overspray exposure to three species of emergent aquatic plant species indicated effects on fresh weight for

all three species (most sensitive EC₂₅ values for the three species ranged from 0.039-0.47 lb a.e./A). Assuming an application of 8 lb a.e./A, the AgDrift EEC at the edge of field (using default parameters) is approximately 4 lb a.e./A, which is substantially greater than the reported EC₂₅ values for the emergent aquatic plants. With respect to the terrestrial plant toxicity data, off-site distances required to be below toxicity thresholds could be over 1000 feet based on the most sensitive endpoint (cucumber, vegetative vigor).

As mentioned above, at the maximum application use rate (8 lb a.e./A aerial application scenario), the acute endangered species LOC is exceeded slightly (0.06-0.07) for freshwater fish, aquatic-phase amphibians and estuarine/marine invertebrates. However, for the ground application scenario, the acute endangered species LOC is not exceeded for any taxa. If applying by air, then application rates of 5.4 lb a.e./A and lower will result in RQs less than the acute endangered species LOCs.

The previous RQs were based on toxicity values for glyphosate formulations that were adjusted to acid equivalents. Calculations of RQs were also conducted for glyphosate formulations calculated using toxicity and spray drift EEC values based on mg formulation/L. RQs for acute exposure for a sub-set of formulation application volumes, application methods and receiving water bodies are presented in Table 41. The application rates presented in the table represent the application rate necessary to exceed the acute listed, non-listed LOC and the non-listed aquatic plant LOC. Based on the amount of formulation necessary to exceed the non-listed LOC, the likelihood of potential risk from spray drift exposure is anticipated to be low. The amount of formulation applied in a single application would need to exceed 13 quarts/A for aerial and 28 for ground application in order to exceed the endangered species LOC. Based on the application volumes derived from the LUIS report, the maximum single application volume was 10 quarts per acre.

Table 41. Acute RQs for Aquatic Organisms for Glyphosate Formulations (using Spray Drift EECs and Toxicity Data Based on mg Formulation/L)

Scenario ¹	Peak EEC (mg form/L) ²	Taxa (acute toxicity value (mg formulation/L)) ³						
		FW fish (3.17)	Amph. (1.64)	EM fish (8.8)	FW invert (5.3)	EM invert (2.45)	Non-Vasc plant (0.39 / 0.27)	Vas plant (4.9 / NR)
		RQ						
Aerial - Standard Pond /(Qt formulated product/A)								
137	0.82	0.26	0.5	0.09	0.15	0.33	2.1 /3.0	0.17
66	0.395	0.12	0.24	0.04	0.07	0.16	1.01 /1.5	0.08
45	0.269	0.08	0.16	0.03	0.05	0.11	0.69 / 1.0	0.05
13.75	0.082	0.026	0.05	0.009	0.015	0.03	0.21 /0.3	0.017
Ground - Standard Pond /(Qt formulated product/A)								
282	0.82	0.26	0.5	0.09	0.15	0.33	2.1 /3.0	0.17
135	0.393	0.12	0.24	0.04	0.07	0.16	1.01 /1.5	0.08
93	0.271	0.09	0.16	0.03	0.05	0.11	0.69 / 1.0	0.06
28.25	0.082	0.026	0.05	0.009	0.015	0.03	0.21 / 0.3	0.017
¹ The scenario refer to the either aerial or ground application and the application rate of the formulation (quarts of formulation per acre). ² The peak spray drift EEC was the maximum EECs calculated based on the application rate for aerial/ground application using the defined application rate (Qt product/A) using the default AgDrift parameters with the receiving body of water as the standard pond. ³ All toxicity endpoints were reported as mg formulation/L; data were from formulations assumed to contain POEA. Acute endpoints refer to LC/EC ₅₀ values for aquatic animals. For aquatic plants, the first toxicity value is the EC ₅₀ value (non-listed plants) and the second value is the NOAEC/EC05 (listed plants). NR= not reported; NA = not applicable Bold values are RQ values that have exceeded the non-listed aquatic animal LOC (0.5) or the non-listed aquatic plant LOC (1); the bold and italicized value is the RO that exceeds the listed animal LOC (0.05).								

As with technical glyphosate, additional glyphosate formulation toxicity data were reported in the open literature that, while not used for calculation in the RQs, were used to characterize risk to aquatic animals and plants. The toxicity values for these studies included acute mortality values for aquatic vertebrates and invertebrates and chronic toxicity data for growth and development of amphibians and invertebrates. Chronic EECs for spray drift were not calculated as the drift event is anticipated to be short in duration (shortly after application), and the peak EEC (0.0567 mg a.e./L based on 8 lb a.e./A) was used as a conservative estimation when comparing to the reported chronic toxicity values. The reported toxicity values for aquatic animals are greater than one-half the calculated EEC, and therefore, these data are consistent with the data presented above in that it suggests that potential risk to non-listed aquatic animals is low from exposure to glyphosate.

Wan *et al.*, 1989, reported acute LC₅₀ values of ≥ 11 mg formulation/L (41% glyphosate IPA) for glyphosate formulations for fish, which are substantially greater than the EEC value. Significant decreases in growth (body length and body weight gain) were reported for fish, *Leporinus obtusidens*, at glyphosate formulation concentrations of 1 mg/L which was the lowest concentration tested (Salbego *et al.* 2010). Food consumption and condition factor (weight/length) were not affected by glyphosate exposure. The peak EEC for spray drift was 0.0567 mg a.e./L, which is approximately 18 times lower than the lowest concentration tested in the chronic fish study. For the acute toxicity to larval amphibian species collected as embryos in

the Pacific Northwest (E161728, King and Wagner 2010), the most sensitive LC₅₀ values (LC₅₀s 0.30-2.6 mg a.i./L; unsure if adjusted for acid) were greater than one-twentieth the spray drift EEC (corresponds to the acute LOC of 0.05 for listed aquatic animals). While control treatments were used in the study, control performance was not reported; therefore, there is uncertainty in the performance of the control animals. Decreased survival and/or delayed metamorphosis in two amphibian species exposed to glyphosate formulations was reported at a test concentration of 0.572 mg a.e./L (approximately 10X greater than EEC) (E153825, Williams and Semlitsch 2010). Several mesocosm studies which included aquatic-phase amphibians were conducted using glyphosate formulations with reported LC₅₀ values ranging around 1 to 3 mg a.i./L, with the exception of 0.55 mg a.i./L for the wood frog in the presence of the caged predator (approximately 10X greater than EEC) (Relyea 2005).

Acute toxicity values were available for different aquatic invertebrates (mussels, copepods, crustaceans, amphipods) with EC/LC₅₀ values of ≥ 1.5 mg a.e./L which are greater than the EEC. Additionally, for the Pacific oyster (E16155, Mottier *et al.* 2013), the toxicity value for the abnormality rate (48-hr EC₅₀ 1.13 mg a.e./L) was one-twentieth the spray drift EEC, however, the mortality and metamorphosis endpoints were greater than one-twentieth the EEC. In a chronic study with *Daphnia magna* (Cuhra *et al.* 2013), the NOAEC, based on fecundity, was 0.15 mg/L with testing with a formulation and this NOAEC is less than the peak spray drift EEC. The reported effect levels on metamorphosis development in two species of frogs were greater than the EEC.

For the aquatic vascular plant, *Lemna minor*, the reported toxicity values (LOAEC/NOAEC; 0.020 mg/L) are less than the EEC. In this study, growth rate inhibition compared to control did not exceed 25% and the photosynthetic endpoint inhibition did not exceed 10% compared to the control. The growth rate was calculated using an applied coefficient, based on maturation stage, therefore, there is uncertainty in the actual growth rate (absent of a subjective coefficient) in this study. Another study with a rooted macrophyte was available, whereas glyphosate was exposed in the water column (E161695). In this study, it is not known if the formulation contained POEA or not, but the reported toxicity values for growth are similar to other formulations that contain POEA. The lowest toxicity value (14-d EC₅₀ of 0.22 mg/L) in this study was higher than the spray drift EEC. However, there is concern for potential risk to emergent aquatic vascular plants as discussed in the above sections.

Sediment toxicity data were not available for glyphosate. However, given the fate properties of glyphosate, it is anticipated that it may bind to soil particles and partition to the sediment from runoff and/or spray drift. Acute water column toxicity data to a sediment-dwelling amphipod, *Hyalella azteca*, exposed to three different glyphosate formulations were available (Tsui and Chu 2004). Based on the available data, two of the formulations do not appear to contain POEA, however, the third formulation, Roundup, was reported to contain POEA. Based on the reported acute toxicity value for *Hyalella*, it appears to be of similar sensitivity to glyphosate formulations as other aquatic animals. Therefore, based on available data indicating relatively similar sensitivity across taxa to glyphosate and glyphosate formulations, the lack of benthic toxicity data is not anticipated to impact the overall risk conclusions for aquatic invertebrates.

While the reported Log K_{ow} value for glyphosate does not suggest that glyphosate would bioaccumulate, a water column exposure bioconcentration study with sediment-dwelling *Lumbriculus variegatus* was available. The reported 96-hr BCF values ranged from 1.2 – 2.8 for technical glyphosate and 1.4-5.9 for the formulation. While not reported explicitly in the report, based on the reported data, there did not appear to be any effects on survival at these test concentrations.

2) Aquatic Applications

For application to aquatic environments, the acute non-listed and listed LOCs are not exceeded for either fish or aquatic-phase amphibians, aquatic invertebrates and aquatic vascular plants following acute exposure to the formulation through aquatic application using a single maximum application rate of 8 lb a.e./A (RQs < 0.01 for animals). However, the LOC for non-listed and listed aquatic non-vascular plants were exceeded (RQs 1.9 and 2.6, respectively). For the toxicity value for the non-vascular aquatic plant, it is noted that due to the available formulation information, it is not definitively known whether or not the test material contained POEA. The next lowest toxicity formulation toxicity value for the non-vascular plants was for green algae with an EC_{50} value of 0.68 mg a.e./L (NOAEC 0.43 mg/L) which is greater than the peak EEC (0.210 mg a.e./L). Additionally, while the available toxicity data for aquatic vascular plants do not indicate LOC exceedances, toxicity value for emergent aquatic plants indicate potential effects at application rates of 0.039 to 0.47 lb a.e./A. The maximum single application rate to aquatic environments (direct application to water in an effort to control emergent aquatic vegetation) is 8 lb a.e./A, therefore, non-target aquatic vegetation may be affected. Aquatic vegetation is an important component of an aquatic ecosystem, as it provides food and habitat for other aquatic and other organisms.

Calculations of RQs were also conducted for glyphosate formulations calculated using toxicity and EEC values based on mg formulation/L. RQs for acute exposure for a sub-set of formulation application volumes are presented in Table 42. The acute toxicity values presented in the table are from formulations assumed to not contain POEA, as registrations for direct application to aquatic environments do not contain POEA. The application rates presented in the table represent the application rate necessary to exceed the acute listed, non-listed LOC and the non-listed aquatic plant LOC. For direct application to water, there is a potential for direct effects to non-listed aquatic non-vascular plants for direct applications of 8.25 quarts formulation/A or greater. Based on the LUIS report, the single application volume for the registered labels did not exceed 8 quarts except for one label which was registered for use in aquatic environments. However, the maximum single application volume for aquatic environments is 5 quarts per acre with a product seasonal maximum application rate of 10 quarts per acre.

Table 42. Acute RQs for Aquatic Organisms for Glyphosate Formulations (Using Direct Application EECs and Toxicity Data Based on mg Formulation/L)

Scenario ¹	EEC (mg form/L) ²	Taxa (acute toxicity value (mg formulation/L)) ³						
		FW fish (750)	Amphib (911)	EM fish (>180)	FW invert (164)	EM invert (82)	Non-Vasc plant (0.39 / 0.27) ³	Vas plant (25 / 7.9)
		RQ						
Direct application - Standard Pond / (Qt formulated product/A)								
1	0.047	<0.01	<0.01	<0.01	<0.01	<0.01	0.12	<0.01
5.7	0.270	<0.01	<0.01	<0.01	<0.01	<0.01	0.69 / 1.0	<0.01
8.25	0.390	<0.01	<0.01	<0.01	<0.01	<0.01	1.0 / 1.4	0.016 / 0.05
19.5	0.922	<0.01	<0.01	<0.01	<0.01	0.011	2.4 / 3.4	0.037 / 0.12
86.75	4.1	<0.01	<0.01	<0.01	<0.01	0.05	10.5 / 15	0.16 / 0.52

¹ The scenario refer to direct application and the application rate of the formulation (quarts of formulation per acre).

¹ The peak EEC was the maximum EECs calculated based on the application rate for direct application using the defined application rate (Qt product/A) using the simple dilution model with the receiving body of water as the standard pond.

² All toxicity endpoints were reported as mg formulation/L; data were from formulations assumed to not contain POEA. Acute endpoints refer to LC/EC₅₀ values for aquatic animals. For aquatic plants, the first toxicity value is the EC₅₀ value (non-listed plants) and the second value is the NOAEC/EC05 (listed plants).

³There are at least two labels with this formulation name. Because the formulations differ, it could not be determined if the formula used in the study was a POEA or non-POEA formulation

NR= not reported; NA = not applicable

Bold values are RQ values that have exceeded the non-listed aquatic animal LOC (0.5) or the non-listed aquatic plant LOC (1); the bold and italicized value is the RQ that exceeds the listed animal LOC (0.05).

5.3.1.3 POEA

The acute LOCs are not exceeded for freshwater animals following acute exposure to the surfactant through spray drift, using an assumed percentage of POEA of 15%, until the single aerial application rate of 26 quarts formulation per acre is applied. Based on an evaluation of the potential volume of formulation applied, volumes of 26 quarts or larger are not expected in a single application.

The calculations above for POEA are based on an assumed percentage of POEA in a formulation of 15%. An evaluation was conducting to consider if the actual percentage of POEA in a formulation is different than 15%. Using the acute toxicity value for amphibians (0.47 mg POEA/L), the percentage of POEA in a formulation applied to exceed the non-listed (EEC of 0.235 mg/L corresponds to a LOC of 0.5) and listed (EEC of 0.0235 mg/L; LOC of 0.05) LOC was calculated. These percentages were calculated for both aerial and ground applications using AgDrift to estimate the concentration in an adjacent water body (standard pond) (Table 43). Based on aerial application, a formulated product volume of 8.25 quarts/A (applied as a single application), would require a POEA percentage of 47% to exceed the listed LOC. For ground application, a volume of 8 quarts/A would require 100% POEA to exceed the listed LOC. For non-listed animals, 39 quarts/A would need to be applied for aerial application and 81 quarts/A for ground application with POEA percentages of 100%. While the calculations were based on a single application, given that the allowed re-application interval for most crops is 7 days, there is a possibility of overlap between resident times of the formulation in the aquatic systems.

Therefore, total amount of formulation applied should be considered when consulting this table. However, based on the necessary volume of formulated product needed to exceed the LOC, the likelihood of potential risk to from POEA exposure via spray drift is anticipated to be low based on the parameters used in the analysis.

Table 43. The Percentage of POEA in Terrestrial Formulations to Exceed the Non-listed and Listed LOC for animals.

Quart formulated product/A Applied (as a single application)	Conc in pond (µg formulated product/L)	% of POEA needed to exceed non-listed LOC for animals based on lowest acute tox value (0.47 mg/L, Amphibian (470 ug/L)) ¹	% of POEA needed to exceed listed LOC for animals based on lowest acute tox value	Qt formulated product/A	Conc in pond (ug formulated product/L)	% of POEA needed to exceed non-listed LOC for animals based on lowest acute tox value (0.47 mg/L, Amphibian (470 ug/L))	% of POEA needed to exceed listed LOC for animals based on lowest acute tox value
Aerial Applications (12.66% spray drift fraction)				Ground Applications (6.16% spray drift fraction)			
39	235	100	15.7	80.75	235	100	10
20	120	>100	19.6	20	58.2	>100	40.3
10	59.8	>100	39.3	8	23.3	>100	100
8.25	49.4	>100	47.6	--	--	--	--
¹ Example calculations: [EEC/0.47 = 0.5] EEC=235; % POEA = (235/Conc formulation in pond) * 100							

5.3.1.4 Characterization for Non-Standard Adjacent Waterbodies

The discussions above for technical, formulated product, and POEA are based on EECs using the standard pond scenario. It is possible that shallower bodies of water may also be exposed to glyphosate via spray drift, runoff, or direct application. As such, for characterization purposes, additional formulated product and POEA spray drift EECs were calculated to represent a shallower body of water (1,000,000 liters) than the pond (20,000,000 liters). Again, the assumption was a 15% POEA concentration. For glyphosate formulations assumed to contain POEA, application rates of 0.69 and 1.4 quarts/A for aerial and ground application, respectively, would result in RQ values that exceed the listed aquatic animal LOC (Table 44). For non-listed animals, application rates of 6.9 and 14.1 quarts/A for aerial and ground application, respectively, would exceed the non-listed acute LOC. For aquatic plants, application rates of around 3 and 7 quarts/A (aerial and ground, respectively) would exceed the non-listed LOC. Based on the evaluation of possible formulation application volumes, volumes of 1 to 2 quarts are possible for a single application. The total applied volumes for some uses on a yearly basis can also reach 10 quarts.

Table 44. Comparisons of Shallow Waterbody EECs to Toxicity Data for Aquatic Organisms for Glyphosate Formulations (using Spray Drift EECs and Toxicity Data Based on mg Formulation/L)

Scenario ¹	EEC (mg form/L) ²	Taxa (acute toxicity value (mg formulation/L)) ³						
		FW fish (3.17)	Amphib (1.64)	EM fish (8.8)	FW invert (5.3)	EM invert (2.45)	Non-Vasc plant (0.39 / 0.27)	Vas plant (4.9 / NR)
		Comparison of EEC/toxicity value						
Aerial - Shallow Water Body / (Qt formulated product/A)								
6.9	0.826	0.26	0.5	0.09	0.16	0.34	2.1 / 3.1	0.17
3.3	0.395	0.12	0.24	0.04	0.07	0.16	1.01 / 1.5	0.08
2.25	0.269	0.08	0.16	0.03	0.05	0.11	0.69 / 1.0	0.05
0.69	0.0826	0.026	0.05	0.009	0.016	0.034	0.21/ 0.31	0.017
Ground - Shallow Water Body / (Qt formulated product/A)								
14.1	0.82	0.26	0.5	0.09	0.16	0.34	2.1 / 3.1	0.17
6.75	0.393	0.12	0.24	0.04	0.07	0.16	1.01 / 1.5	0.08
4.65	0.271	0.09	0.16	0.03	0.05	0.11	0.69 / 1.0	0.06
1.4	0.082	0.026	0.05	0.009	0.016	0.034	0.21/0.31	0.017

¹ The scenario refer to the either aerial or ground application and the application rate of the formulation (quarts of formulation per acre).

² The peak spray drift EEC was the maximum EECs calculated based on the application rate for aerial/ground application using the defined application rate (Qt product/A) using the default AgDrift parameters with the receiving body of water as a shallower body of water (10E5L).

³ All toxicity endpoints were reported as mg formulation/L; data were from formulations assumed to contain POEA. Acute endpoints refer to LC/EC₅₀ values for aquatic animals. For aquatic plants, the first toxicity value is the EC₅₀ value (non-listed plants) and the second value is the NOAEC/EC05 (listed plants). NR= not reported; NA = not applicable

Bold values are values that have exceeded the non-listed aquatic animal LOC (0.5) or the non-listed aquatic plant LOC (1); the bold and italicized value is the value that exceeds the listed animal LOC (0.05).

Comparisons for the POEA toxicity data, based on an assumption of 15% POEA in a formulation, were also calculated. Therefore, the amount of formulation applied that would be required to exceed the endangered species LOC is much lower and would be reasonable for a single application (Table 45).

Table 45. Comparisons of Shallow Waterbody EECs to Toxicity Data for Aquatic Organisms for POEA in Glyphosate Formulations (using Spray Drift EECs and Toxicity Data Based on mg POEA/L)

Glyphosate Formulations (using Spray Drift EECs and Toxicity Data Based on mg POEA/L)

Scenario ¹	EEC (mg POEA/L) ²	Taxa (acute toxicity value (mg POEA/L)) ³		
		FW fish (0.7)	Amphibian (0.47)	FW invert (9.1)
		Comparison of EEC/toxicity value		
Aerial - Standard Pond / (Qt formulated product/A)				
13.1	0.235	0.34	0.5	0.03
1.3	0.0233	0.03	0.05	0.003
Ground - Standard Pond / (Qt formulated product/A)				
27	0.235	0.34	0.5	0.03
2.7	0.0236	0.03	0.05	0.003

¹ The scenario refers to the either aerial or ground application and the application rate of the formulation (quarts of formulation per acre).

² The peak spray drift EEC was the maximum EECs calculated based on the application rate for aerial/ground application using the defined application rate (Qt product/A) using the default AgDrift parameters with the receiving body of water as the shallower water body (10E5L).

² All toxicity endpoints were reported as mg POEA/L. Acute endpoints refer to LC/EC₅₀ values

Bold values are values that have exceeded non-listed animal acute LOC (0.5); bold and italicized value is the value that exceeds the listed animal LOC (0.05).

Toxicity data are not currently available for estuarine/marine animals for POEA (Tsui and Chu 2003 tested POEA with the estuarine/marine amphipod, *Acartia tonsa*, but reported toxicity values in terms of mg a.e/L). However, based on reported similar sensitivities to technical glyphosate between freshwater and estuarine/marine fish and invertebrates, differential sensitivity is not anticipated. Other toxicity data for POEA and/or MON 0818 were available, primarily for aquatic invertebrates, in which acute toxicity values were generally similar to the lowest toxicity values used in the evaluations in the Risk Estimation section (approximately 0.5 mg/L or greater). Lower toxicity values were reported for the fairy shrimp (Brausch and Smith, 2007); however, there is uncertainty in these values based on other toxicity data for the fairy shrimp. Therefore, comparing these toxicity values for aquatic invertebrates results in similar conclusions when utilizing the toxicity data for aquatic-phase amphibians.

In regards to direct application to water, the peak EEC for a single application of 1 quart per acre is 0.945 mg formulation/L (Table 12), which is greater than the acute toxicity value for non-listed non-vascular aquatic plants (EC₅₀ = 0.39 mg formulation/L). For 10 quarts/A, the EEC (9.45 mg formulation/L) is less than the acute toxicity value for other taxa (based on formulations assumed to not contain POEA).

5.3.2. Terrestrial Organisms

5.3.2.1. Birds (surrogates for terrestrial-phase amphibians)

Acute Exposure

There were no mortalities in any of the acute avian studies with technical glyphosate with the bobwhite quail or mallard duck. A definitive LD or LC₅₀ value was not determined for studies using technical glyphosate, therefore, no RQs were calculated. The highest dose/concentrations tested in the acute avian studies were >3196.3 mg a.e./kg bodyweight (83% technical) and >4971.2 mg a.e./kg diet (95.6% technical); both with bobwhite quail. For the bobwhite and mallard toxicity studies using technical material, there were no sublethal effects, except for a slight reduction in body weight gain at the highest dose in acute oral bobwhite quail study (observed NOAEL = 1481 mg a.e./kg-bw). Additionally, for the passerine species, canary, the acute LD₅₀ was >2000 mg a.e./kg bodyweight. In this study, there were no mortalities at 2,000 mg a.e./kg-bw with one mortality observed at 3,300 mg a.e./kg-bw (observed NOAEL = 2000 mg a.e./kg-bw). In the study with the canary, regurgitation was observed at 3300 mg a.e./kg-bw (only observed at this dose in the definitive test with almost all the birds exhibiting this effect, however, no birds were observed regurgitating at this dose in rangefinder). An effective dose (ED₅₀), based on regurgitation, was calculated to be 2819 mg ae/kg-bw. The ability to retain food, due to regurgitation, may be an adverse effect, if other uncontaminated food sources are not readily available and/or the bird is unwilling to leave the area due to territorial or reproduction behavior. Additionally, the energetic resources in locating other amendable food sources may have a negative impact on the overall fitness of the bird.

For the canary and bobwhite quail, at the application rate of 8 lb a.e./A, the short grass EEC is less than the highest dose tested (for 20g bird: EEC = 2187 mg ae/kg-bw; Highest Dose= 3139 mg ae/kg-bw for canary and 2302 mg a.e./kg-bw for bobwhite). This EEC (adjusted for a 20g bird) is greater than the observed NOAEL for the bobwhite quail (1067 mg a.e./kg-bw; adjusted for a 20 g bird), and just slightly above the NOAEL for the canary (1902 mg a.e.kg-bw adjusted for a 20 g bird). For the spot treatment application, which was adjusted to a per acre basis of 40 lb a.e./A, the EEC is greater than the highest dose tested (adjusted for 20g bird: EEC = 10,933 mg a.e./kg-bw; Highest dose= 2302 mg ae/kg-bw). However, as it is not expected that an entire acre will be treated using spot treatment methods, this comparison is conservative. If using the ED₅₀ value based on regurgitation as a definitive endpoint for calculating RQs using T-REX, at a single application of 8 lb a.e./A, all RQs are <0.5 (LOC for non-listed birds), except for a small exceedance for small birds consuming short grass (RQ=0.82 based on upper bound EECs). The RQs are less than the LOC based on mean EECs. For all other uses (except for extrapolated spot treatment), the RQs are less than the LOC. For the subacute dietary based study, the highest EEC (short grass) from a single application rate of 8 lb a.e./A (1920 mg a.e./kg-diet) is less than the highest concentration tested (4971 mg a.e./kg-diet). Overall, based on this analysis, it appears that the likelihood of acute risk from exposure to glyphosate alone is anticipated to be low.

There was one avian study that had a definitive acute toxicity value (MRID 45777402). The application rates from the specific label for which this study was submitted indicate an

exceedance of the acute avian listed LOC for all use rates (acute RQs <0.01 to 1.26). Single application rates of ≥ 2.2 and 0.5 lbs formulation/A results in acute non-listed and listed LOC exceedances, respectively.

Chronic exposure

Given that the most sensitive endpoint in an avian reproduction study resulted in a non-definitive NOAEC (effects on mallard duck male ($\downarrow 127\%$) and offspring body weight ($\downarrow 11\%$) at 501 mg a.e./kg-diet; NOAEC <501 mg a.e./kg; MRID 48876602), chronic avian RQs were not presented in the Risk Estimation section. There were no treatment-related effects on eggs laid, embryo viability, or eggshell thickness in this study up to 2160 mg a.e./kg-diet. In an additional mallard duck reproduction study, there were no reported treatment-related effects on reproduction or growth up to concentrations of 830 mg a.e./kg-diet (MRID 00111953). In this study, body weights were not examined by sex, rather an overall treatment group mean body weight of the exposure birds was reported (5 pens each containing 5 males and 2 females). At 830 mg a.e./kg-diet, body weight gain between test initiation and termination was decreased 25% compared to the control; however, one mortality occurred at this treatment level whereas there were no mortalities in the control (reviewer visual assessment of data; not enough data reported for statistical analysis). In the bobwhite mallard reproduction study, there were also no reported treatment-related effects up to 830 mg a.e./kg-diet (MRID 00108207).

In a study by Kubena *et al.* 1981 (E162010), chickens were exposed to Roundup® in their diet for 21 days. A significant (50%) reduction in male and female body weight by day 7 of the test was reported at 6080 mg/kg-diet which is greater than the highest EEC. No effects were reported at 608 mg/kg-diet, however, it is noted that there was a 10-fold difference in test concentration between the NOAEC and LOAEC therefore, there is uncertainty in where the threshold for an adverse effect may occur.

When modeling the exposure scenario for the forest, pasture and non-crop uses (8 lb a.e./A, the highest single application rate), the EECs (short grass) are greater than the bobwhite NOAEC, which is the highest concentration tested, for a period of about 3 weeks for which the EECs do drop below the NOAEC (Figure 7). The EECs are greater than the non-definitive NOAEC in the mallard study for male and offspring body weights (501 mg a.e./kg-diet) for about 4 weeks. The EECs are less than the highest concentration tested in the mallard (2160 mg a.e./kg-diet) where there were no treatment-related effects on the reproductive parameters including eggs laid, embryo viability or eggshell thickness.

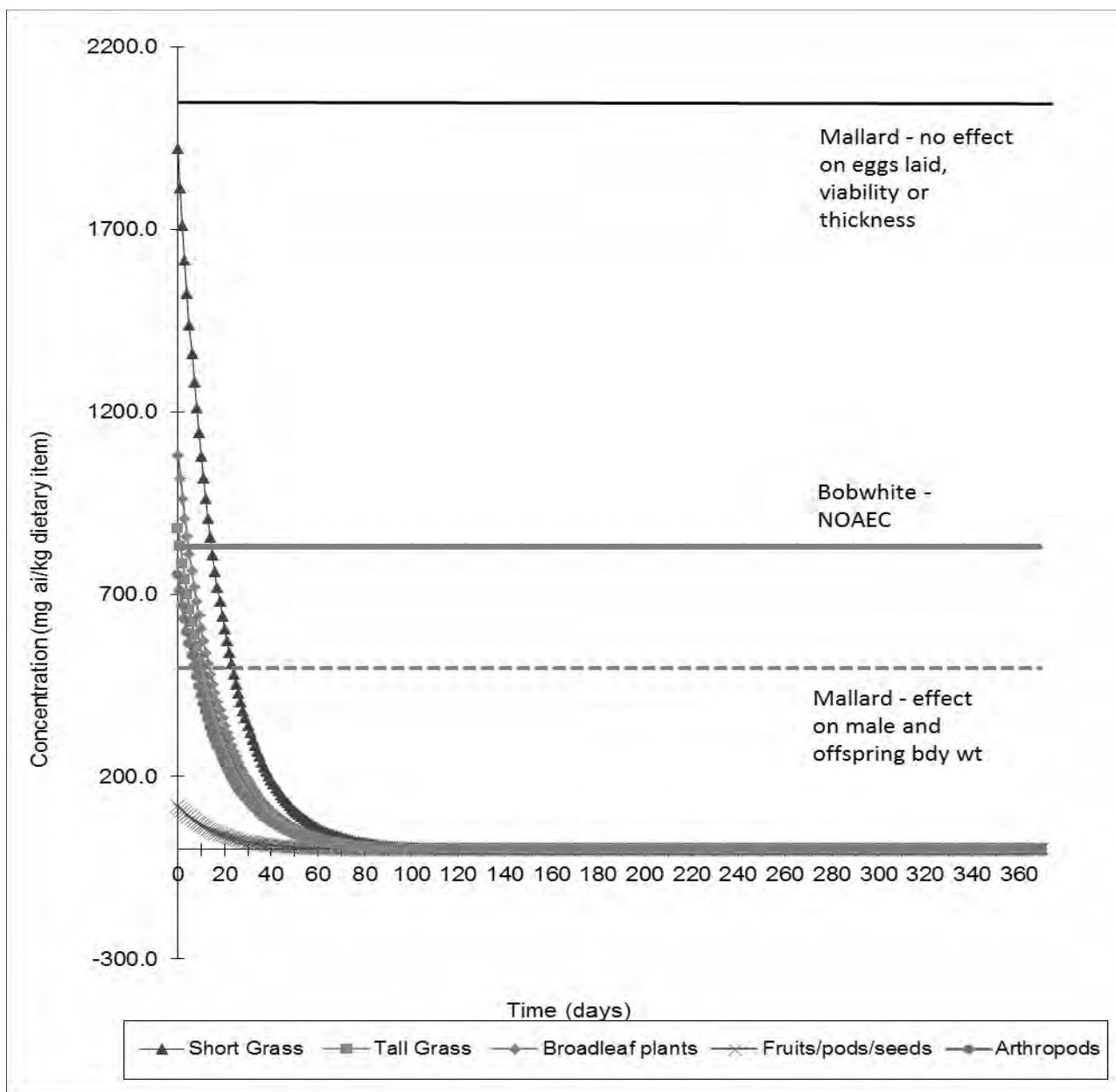


Figure 7. Terrestrial Residues (upper bound estimates) vs Chronic Avian NOAEC/LOAECs (as dietary concentrations) for a single application rate of 8 lb a.i./A.

A similar graph (Figure 8) using a lower application rate (1.55 lb a.e./A application rates used for Roundup-Ready crops), indicates that the short grass EECs exceeds the concentration where effects on mallard body weight were observed for less than one week, and the EECs do not exceed the bobwhite NOAEC nor the concentration where no effects on mallard reproductive parameters were observed.

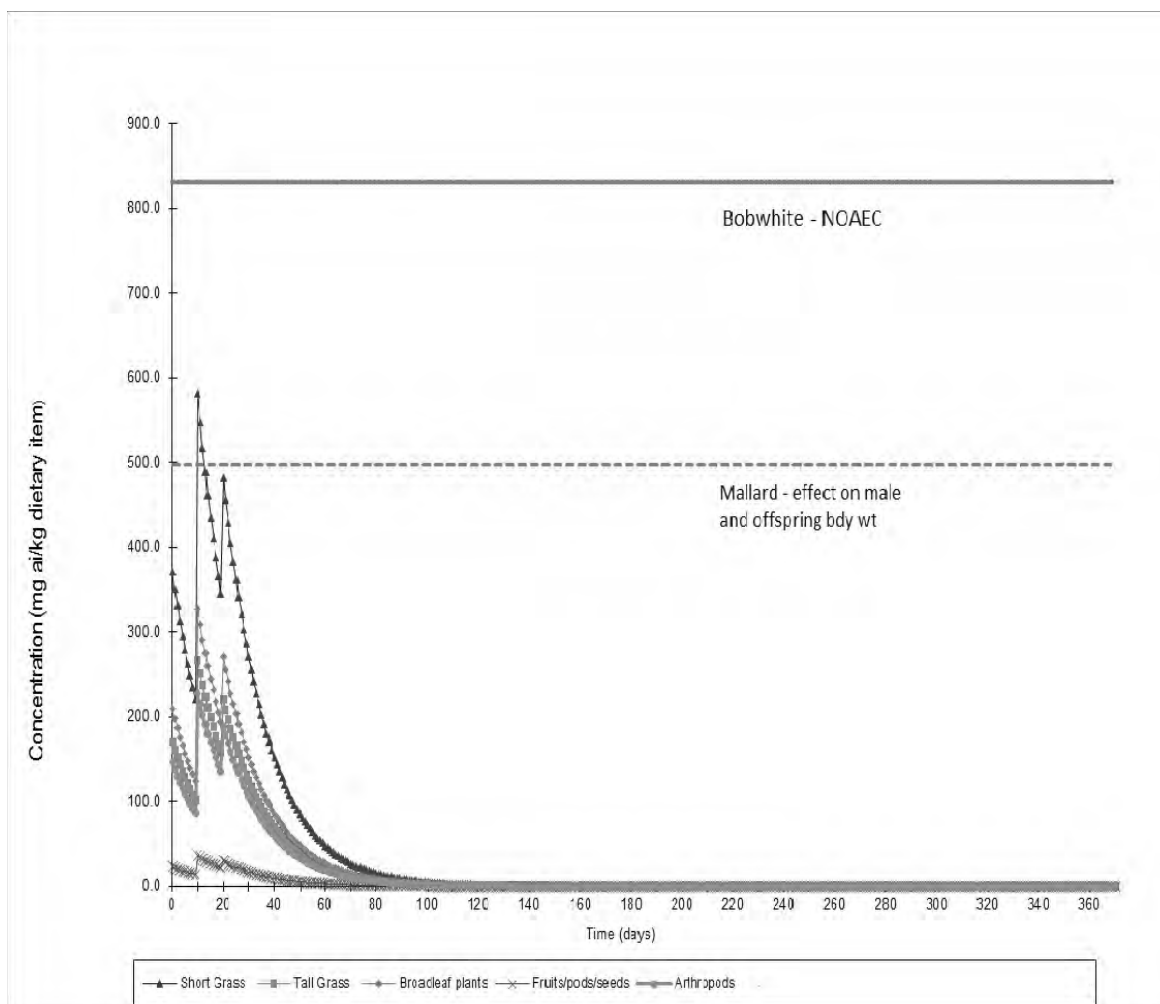


Figure 8. Terrestrial Residues (upper bound estimates) vs Chronic Avian NOAEC/LOAECs (as dietary concentrations) for an application rate of 1.55 lb a.e./A (2 apps of 1.55 and 1 application at 0.65 lb a.e./A)

Although it is noted RQs were not reported in the Risk Estimation section, to further evaluate potential risk to birds, RQs were calculated using the NOAEC from the bobwhite quail study (no reported effects up to and including the highest concentration tested (830 mg a.e./kg-diet)) (Figure 9). For most use patterns, the RQs for the short grass dietary item slightly exceed the chronic LOC of 1, with use on forests, pastures and non-crop area uses with the highest RQs (RQ range 1.02-2.31). Additionally, RQs associated with tall grass and broadleaf plants exceeded the LOC for the forestry, pastures, and non-crop use patterns. The spot treatment use RQs also exceeded the LOC for all dietary items except fruits/pods/seeds (RQs 0.72-11.6). The RQs for a single application of 3.75 lb a.e./A (typical single maximum application rate for most crops using ground application; short grass EEC = 900 mg a.e./kg-diet) just exceeded the LOC for short grass (RQ=1.08). Given that there were no reported effects up to the highest concentration tested, these RQs may be conservative, particularly for most uses, but to a lesser extent for use on forests, pastures and non-crop. While the RQs exceeded the LOC for the spot treatment use, as this application rate was adjusted to a per acre basis, is anticipated to be conservative and may not reflect actual use patterns.

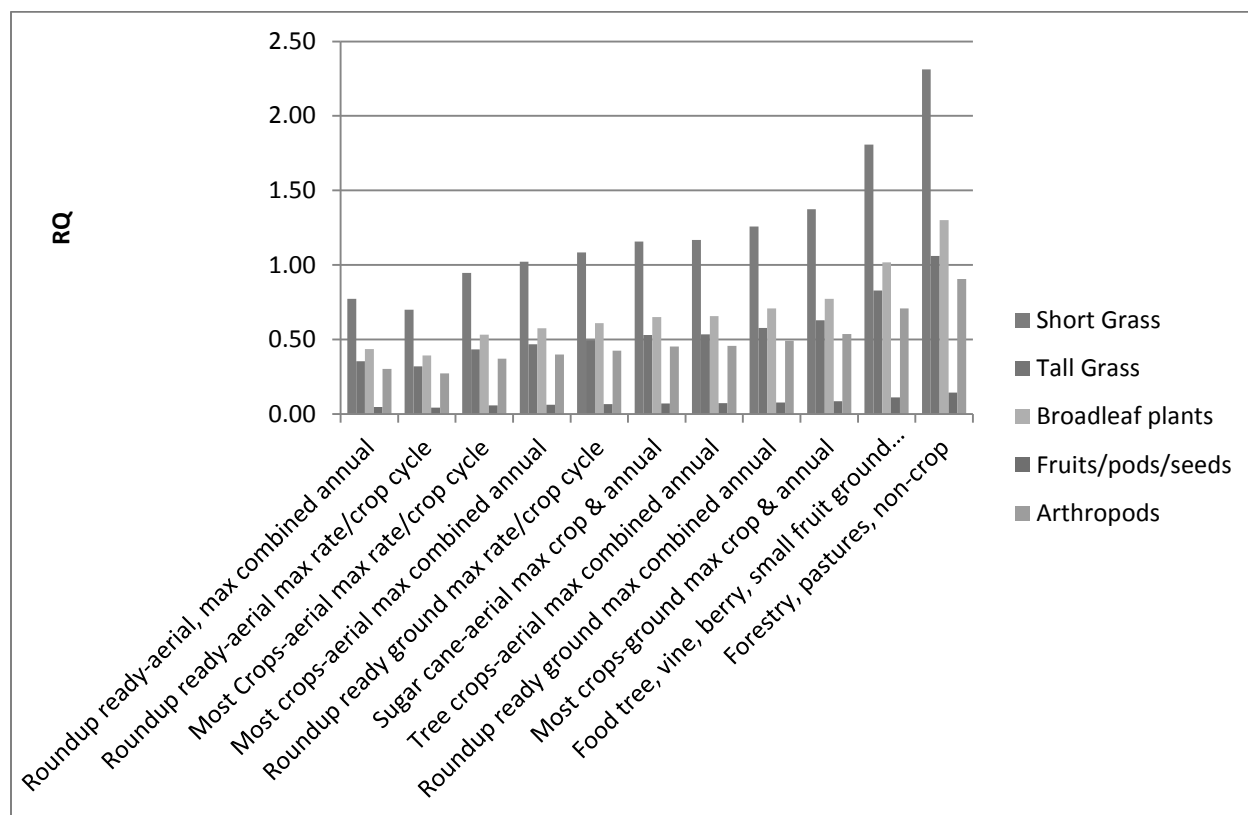


Figure 9. Chronic Avian RQs for Glyphosate (except for the spot treatment use)

In regards to incident reports for the glyphosate isopropylamine, there was a report of mortality to three birds from drift (incident considered possible); however, other chemicals were applied at the same time including atrazine, S-metolachlor and permethrin, therefore, it is unknown if glyphosate was the source of the mortality. There was an additional incident (classified as probable) in which two iguanas were reported as incapacitated (displayed signs of shock, tremors and depression) following ingestion of dandelions sprayed with glyphosate. Other details of the incident are not available. In the aggregate database, wildlife incidents were reported (a total of 44 reports), but it is unknown if these were for terrestrial animal or fish and no other details are available.

Overall, given that decreases in body weight were observed in the mallard at concentrations down to 501 mg a.e./kg-bw, there is concern for potential impacts on growth for exposure to glyphosate, however, there is evidence to suggest that reproductive parameters including eggs laid, embryo viability and eggshell thickness may not be impacted by glyphosate exposure (EECs (1920 mg a.e./kg-bw) < NOAEC (2160 mg a.e./kg-diet) from mallard duck reproduction study and no effect up to 830 mg a.e./kg-diet for bobwhite quail).

5.3.2.2 Terrestrial-phase Amphibians

In the study where juvenile frogs received a direct spray of a glyphosate formulation, 96-hr LC₅₀ values ranged from 4.0 – 20.3 lb a.e./A (Bernal *et al.* 2009, E11766). For application rate of 8 lb ae/A, applied by ground, the initial average deposition rate at 6.6 feet would be 4 lb a.e./A using

AgDrift (default drop size distribution, very fine to fine). For aerial application of 8 lb a.e./A, the necessary distance to reach a deposition rate of 4 lb a.e./A would be at the edge of the field (0 feet). The application use for spot treatment is anticipated to result in little spray drift off-site, so the 8 lb a.e./A application rate is anticipated to represent the highest application rate for spray drift.

5.3.2.3. Mammals

Acute exposure

As with birds, there were no definitive acute mammalian toxicity data available for technical glyphosate ($LD_{50} > 4800$ mg a.e./kg-bw). Therefore, RQ values were not calculated. Reduced activity in the rats for the first nine days was reported in this study at 4800 mg a.e./kg-bw. As was done for the avian acute studies, if comparisons are made between the terrestrial EECs estimated from T-REX and the highest dose tested in the rat acute oral study, the results indicate that all of the EEC values are lower, except for the spot treatment use in which the EECs for short grass and broadleaf plants are greater (EECs 9153 and 5148 mg/kg-diet). For any of the uses at application rates up to the rate of 8 lbs a.e./A, the EEC values (except for spot treatment) are less than half the highest dose tested in the acute oral study.

Many acute oral toxicity studies with the rat have been conducted with formulations. As with the technical material, most of the LD_{50} 's are higher than the highest dose/concentrations tested. The acute dose-based RQs for formulations ($n=4$) with a definitive LD_{50} , values ranged from <0.01 to 0.33 for three of the labels ($RQs < \text{acute non-listed LOC}$) and 0.03 to 2.1 for one label.

Chronic exposure

Chronic mammalian RQs were calculated using the 2-generation mammalian reproduction data and the upper bound EECs. Dietary-based RQ values did not exceed the chronic LOC for any use pattern, except for the spot treatment use for the short grass and broadleaf plants dietary items ($RQs = 1.92$ and 1.08 , respectively). Additionally, dose-based chronic RQs for large mammals did not exceed the LOC, except for the spot treatment use. However, dose-based chronic RQs did exceed the LOC for small mammals consuming short grass for aerial application to sugar cane as well as for most uses generally applied by ground applications up to the combined maximum annual rate ($RQs 1.02-10.2$). Additionally, for use on forests, pastures and other non-crop uses (rights-of-way), the RQ was exceeded for small mammals consuming broadleaf plants (1.15). For medium-sized mammals consuming short grass, again the RQs exceeded the LOC for most uses that for which glyphosate is applied by ground application up to the combined maximum annual rate ($RQs 1.04-8.72$). For a single application rate of 3.75 lb a.e./A (typical single maximum application rate for most crops using ground application) the LOC is just barely not exceeded ($RQ=0.96$). None of the EECs exceed the reported chronic LOAEL (1234 mg/kg/day for males). Additionally, none of the RQs exceed the LOC when the mean Kenaga EECs values are used.

In an additional 2-generation reproduction study in the rat, conducted earlier than the one used for RQ calculations (MRID 41621501), the parental/systemic NOAEL is 500 mg/kg/day in both

sexes and the LOAEL is 1500 mg/kg/day based on soft stools, decreased body weight gain and food consumption. The reproductive NOAEL is ≥ 1500 mg/kg/day (HDT) in both sexes. The offspring NOAEL is 500 mg/kg/day in both sexes with a LOAEL of 1500 mg/kg/day based on decreased body weight gain during lactation. The lowest dose-based NOAEL in this study 500 mg/kg/day is similar to the lowest NOAEL from the other study (408 mg/kg/day) used in the RQ calculations.

Two reproduction studies by Romano et al. (2010 and 2012) using Wistar rats reported reproductive effects on male rats. It is noted that in the study with the newly weaned rats there was a delay in the age to sexual maturity (50 mg a.i./kg-bw) whereas in the other study, the male offspring were observed to have a decrease in the age to sexual maturity. In the registrant's 2-generation rat reproduction study (MRID 48864101-05), the offspring LOAEL (1234 mg/kg/day for males) is based on delayed age to sexual maturity and increased weight at male sexual development.

There is a reproduction/developmental screening study on POEA (MRID 47097401). This has a lower endpoint than the reproduction study on glyphosate (NOAEL: 300 ppm ((14.9 - 16.6 mg/kg bw/day (M) and 18.9 - 19.5 mg/kg bw/day (F)) and LOAEL 1000 ppm (52.8 – 56.1 mg/kg bw/day (M) and 64.9 – 66.6 mg/kg bw/day (F) based on increased mean number of unaccounted-for sites, litter loss, decreased mean number of pups born live, litter size and postnatal survival from birth to post-natal day (PND) 4. The effects were not reproducible in second generation. If a 15% POEA concentration is assumed with a single application rate of 10 qts formulation/A, using the chronic NOAEL values above, the chronic dietary-based and dose-based RQs exceed the LOC (dietary-based RQs ≤ 2.48 ; dose-based RQs ≤ 21.7)³. Single application rates of 4 quarts/A or less results in dietary-based RQs below the LOC. However, assuming a POEA concentration of 15%, a single application rate of <1 quart/A and above would result in chronic dose-based RQ values that exceed the chronic LOC. The LOC based on the LOAEL is not exceeded using the dietary-based EECs, but is exceeded based on the dose-based EECs.

For the incident reports for glyphosate isopropylamine salt was mortality to several dogs from runoff; no additional details were provided in the report. As mentioned above for birds, additional incidences are available for wildlife, but no additional details are available.

Overall, it is anticipated that the risk following acute exposure to technical glyphosate is low. For chronic exposure to technical glyphosate, potential risks on a dietary basis is anticipated to be low (RQs <LOC). For chronic risk on a dose-basis, the RQs are < LOC or just exceed for small mammals eating short grass (RQs 1.0-1.2); however, RQs are greater than 1.5 for the following uses: food tree, vine, berry, small fruit (ground application, maximum combined annual) and for the non-agricultural uses (non-crop, pastures, forests). Therefore, there is a concern for potential risk for those uses. In regards to POEA and the screening mammalian reproduction study for POEA, based on LOC exceedances, this may impact risk to mammals following chronic exposure to one of the formulations containing the POEA surfactant.

3 10 quarts/A x [1 gal/4 quarts x 8.33 lb/gal] = 20 lb/A x 0.15 = 3.1 lb/A. Assumed density of 8.33 lb/gal

5.3.2.4. Terrestrial Invertebrates

The acute contact LD₅₀ value for the honeybee is >100 µg a.e./bee. However, in the study using technical glyphosate only, there was 38% mortality (27% when corrected for control mortality) reported at this dose level (MRID 00026489). The acute oral 96 h LD₅₀ for technical glyphosate with an adjuvant was >182 µg a.e./bee (MRID 48876603). Using the exposure methodology for foliar sprays in the Pollinator Risk Assessment Guidance⁴ and the maximum single application rate of 8 lb a.e./A, the exposure estimates for both the contact and dietary exposure route are 21.6 and 257 µg a.e./bee, respectively. The exposure concentration for the acute oral is greater than the highest concentration tested (182 µg a.e./bee); an application rate of 5.69 lb a.e./A equates to an acute oral exposure concentration of 182 µg a.e./bee.

A study examining honeybee colony adult and larvae mortality and larvae weight was available (Thompson et al. 2014). In that study, honeybee colonies were fed a treated sucrose solution at concentrations ranging from 73-255 mg a.e./L (also reported as 73-255 mg a.e./kg and based on residues from an application rate of 1.92 lb a.e./A). In that study, there were no reported effects on adult or larvae survival or larvae weight (the larvae received the glyphosate residues through normal hive activity). While the highest concentration was twice the maximum mean residue, given that the actual application rate was approximately one-fourth of the maximum single application rate allowed (8 lb a.e./A), there is concern that these results may not reflect maximum environmentally relevant concentrations.

In addition to the uncertainty discussed above, there were two incident reports with a possible certainty index. The first was for glyphosate acid, in which mortality to 48 colonies of bees was reported from an undetermined use; analysis of pesticide residues in the bee tissue/ and or pollen included a variety of pesticides including: clothianidin, cyprodinil, ethofumesate, fenbuconazole, methoxyfenozide, thiacloprid, phosmet, captan, and cyhalothrin. For glyphosate isopropylamine salt, a possible incident in which adult bee mortality by ingestion was reported (number of mortalities not reported however incident involved 3 hives); the mortalities were observed within two days of concurrently spraying two herbicides (*i.e.*, a glyphosate herbicide as well as a herbicide containing sulfometuron methyl).

In another terrestrial invertebrate toxicity study with a predatory mite, for which the exposure was via contact, the 7-d LD₅₀ value was reported as 1200 g a.e./ha (1.1 lb/A) (MRID 45767105). AgDrift model estimates of how far risks from spray drift exposure extend from the edge of the field for the application rate of 1.1 lb/A are provided in Table 46. These estimates were calculated using default AgDrift parameters for droplet spectrum. For ground application, the distance off-field is 20 feet or less, with effects up to 69 feet for aerial application for uses up to 8 lb a.e./A. For the spot treatment use, drift off-site is anticipated to be limited.

4 United States Environmental Protection Agency, Office of Pesticide Programs, Washington DC. Memorandum for Guidance for Assessing Pesticide Risks to Bees. June 23, 2014.

Table 46. Distances Off-Site of Application to Terrestrial Invertebrate Endpoint.

Application rate (lb a.e./A)	Application method	Distance from edge of field to endpoint (1.1 lb/A) in feet
0.38	Ground	0
1.13		3.3
1.55		3.3
2.25		6.6
3.75		9.8
8		19.7
0.38	Aerial	0
1.55		0
2.25		3.3
3.75		16.4
8		68.9

5.3.2.5 Terrestrial Plants

No effects on seedling emergence greater than 25% was observed after exposure to glyphosate formulations ($IC_{25} > 5$ lb a.e./A). Therefore, RQs for non-listed terrestrial plants using the seedling emergence data were not calculated. Additionally, NOAECs were reported as the highest concentration tested or were not reported.

Runoff EECs were calculated using TerrPlant (v1.2.2), and at the highest single application rate of 8 lb a.e./A, the estimated EEC for runoff to dry areas is 0.4 lb a.e./A, whereas the EEC for runoff to semi-aquatic areas is 4 lb a.e./A. Therefore, as the EECs are less than the non-definitive IC_{25} or NOAEC for monocots and dicots, the likelihood of adverse effects to terrestrial plants from runoff is anticipated to be low.

However, as may be expected for glyphosate, vegetative vigor was affected when plants were exposed to both technical glyphosate only and glyphosate formulations. The ratio of glyphosate loading at edge of field from spray drift loading to the most sensitive endpoints ranged from 11.7 to 163. Additionally, the necessary distance off-field to be below the toxicity value for both non-listed and listed plants (IC_{25} for non-listed species and NOAEC for listed species) for both dicots and monocots was calculated for different single application rates. As droplet size is not specified on the labels for all uses, spray drift EECs were calculated using AgDrift (v2.1.1), using the default droplet size, fine to medium for aerial and very fine to fine for ground (USEPA 2013) (Table 47). For monocots, the overlap between EECs and the non-listed toxicity values was 7 feet for rangeland use and 459 feet for the highest application of 8 lb a.e./A for forestry, pasture and non-crop (e.g., rights-of-way) uses. For dicots, which had the more sensitive endpoint, the distance for the non-listed endpoint ranged from 16 to greater than 997 feet. For listed species, the distance is up to over 997 feet for dicots and monocots.

Table 47. Spray Drift (Terrestrial) Assessment for Terrestrial Plant Species

No. of application and app. rate (lb a.e./A)	Dicot (VV) ^a		Monocot (VV) ^b		Spray Method
	IC ₂₅	NOAEC	IC ₂₅	NOAEC	
distance from edge of field to reach non-listed (IC ₂₅) or listed (NOAEC/IC ₀₅) toxicity value					
1 @ 0.38	33	72	6.6	42.7	Aerial
1 @ 1.13	144	217	66	154	
1 @ 1.55	190	292	95	203	
1 @ 2.25	282	420	131	295	
1 @ 3.75	466	817	220	495	
1 @ 8	>997	>997	459	>997	
1 @ 0.38	16	23	6.6	16.4	Ground
1 @ 1.55	52	79	26	55.8	
1 @ 2.25	79	115	36	82.0	
1 @ 3.75	128	187	59	135	
1 @ 8	253	358	125	266	

^a Based on reported toxicity in dicot species cucumber, *Cucumis sativus*, at IC₂₅ of 0.074 lb a.e./A and NOAEC of 0.049 lb a.e./A in the vegetative vigor test.

^b Based on reported phytotoxicity in monocot species sorghum, *Sorghum bicolor*, at IC₂₅ of 0.16 lb a.e./A and NOAEC of 0.07 lb a.e./A in the vegetative vigor test.

Drift values based on: aerial - droplet size ASA.E. Fine to medium, ground – droplet size ASA.E. very fine to fine, high boom, 90th percentile

In the previous table, the most sensitive species were used to calculate off-field distances. However, it is noted that not all species have the same sensitivity when exposed to glyphosate. Off-field distances using the tested species in the vegetative vigor toxicity study along with the maximum single application rate (8 lb a.e./A) were calculated to evaluate the range of necessary distances from the edge of the application area where the RQ for that endpoint falls below the risk to terrestrial plant LOCs (Table 48). For monocots, the distances range from 98 to 459 feet for non-listed species and from 171 to over 997 feet for listed monocots. Similarly for the dicots, the distance ranges are 86 to >997 feet and 171 to >997 feet for non-listed and listed species, respectively.

Table 48. Distance (feet) from the edge of field where the RQ falls below the risk to terrestrial plant LOC for vegetative vigor endpoints for aerial application of 8 lb a.e./A, based on AgDrift EECs.

Vegetative Vigor*					
Monocots			Dicots		
Species	Non-listed	Listed	Species	Non-listed	Listed
Onion	266	535	Garden pea	86	171
Sorghum	459	>997	Sugarbeet	269, 348	502, 656
Wheat	331, 413	886, >1000	Sunflower	459	>997
Corn	213, 325	407, 502	Radish	312, >997	502, >997
Purple nutsedge	98	171	Soybean	233, 614	656, >997
Oat	364	502	Cucumber	171	459
			Lettuce	335, >997	502, >997
			Rape	992	>997
			Okra	427	>997

*These values are based on toxicity values reported in MRID 44125715/45045101 and 44320636. In cases where there are two distances reported, there were two different toxicity values available for the same species.

The distance estimates are derived using EFED's AgDrift default values, which include the use of an ASAE droplet size spectrum 'fine to medium.' However, if glyphosate was applied using larger droplets sizes, then the distances off-field would be lower. AgDrift modeling was conducted using an ASAE droplet size spectrum 'medium to coarse.' Using these parameters, the longest distance to an exposure value equal to the most sensitive vegetative vigor IC₂₅ and its associated NOAEC is 459 and 791 feet, respectively. While this is still a considerable distance from the edge of the application area, it is appreciably less than the undefined >997 ft distance predicted using the default parameters.

Toxicity data in the open literature suggest that in addition to effects on vegetative vigor, exposure to glyphosate formulations may impact reproductive parameters. In a study evaluating pea seed production the EC₂₅, based on pea seed weight was 0.0074 lb a.i./A using Roundup Original®, Olszyk *et al.* 2009; however, the associated NOEC values was close to the EC₂₅ value. In an additional study evaluating growth and reproductive parameters for field grown potatoes (Pfleger *et al.* 2011), generally most endpoints were affected at 0.074 lb a.e./A and the most sensitive endpoint was above biomass with an EC₂₅ 0.003 lb/A.

The incident data discussed earlier suggest that, at least for plants, exposure pathways for glyphosate are complete and that exposure levels are sufficient to result in field-observable effects. Therefore, based on the lines of evidence, there is a potential for adverse effects to terrestrial plants.

As there are potential adverse effects to terrestrial plants, potential indirect effects may occur to other taxa that rely on terrestrial plants as a resource for food and/or habitat. This may include both aquatic and terrestrial organisms, including pollinators.

5.3.3 Effects on the Terrestrial Plant, Common Milkweed, and the Impact to the Monarch Butterfly

Publications have highlighted the importance of the common milkweed (*Asclepias syriaca* L.) as critical food resource for monarch butterfly larvae (*Danaus plexippus* L.), with an emphasis on conservation of milkweed to preserve monarch butterfly populations⁵. The agency is initiating efforts to contribute to current efforts to protect the monarch butterfly and its resources⁶ and has identified an approach to describe in general terms, how it intends to engage with the public and proceed with the larger government-wide efforts to protect the monarch butterfly⁷.

Milkweed is a dicotyledonous perennial plant and is a target weed on glyphosate product labels and as such, may be exposed to glyphosate from direct applications as well as from spray drift and/or runoff. Regarding potential toxicity to milkweed from glyphosate exposure, in a paper by Egan *et al.*, 2014, the 28-day ED₂₅ value (effective dose), based on biomass, for common milkweed from foliar exposure to Roundup Powermax (540 g a.e./L) in greenhouse experiments

5 Pleasants and Oberhauser (2012); Hartzler, 2010.

6 <http://www.trilat.org/>

7 EPA's Risk Management Approach to Identifying Options for Protecting the Monarch Butterfly http://www.epa.gov/oppfead1/cb/csb_page/updates/2015/protecting-monarch-butterfly.html (posted June 24, 2015)

was reported as 141 g a.e./ha (0.126 lb a.e./A, 95% CI of -0.036-0.29). In another study by White and Boutin, 2007, a 28-d IC₂₅ value of 46 g a.i./ha (0.04 lb a.i./A, 95% CI of 0.03-0.07), based on biomass) was reported for milkweed after exposure to Round-Up Original. The adsorption, translocation and metabolism of glyphosate in common milkweed were also examined and results indicated that an insignificant amount of metabolism of glyphosate occurred after 20 days in both milkweed roots and leaves above the treated leaves (Wyrill *et al.* 1976).

The reported 28-d IC(ED)₂₅ values for milkweed are similar to the most sensitive vegetative vigor terrestrial plant IC₂₅ value of 0.074 lb a.e./A for the dicot cucumber. Therefore, the toxicity data used to evaluate potential risk to terrestrial plants in general may be representative for potential adverse effects to common milkweed. Based on the observed toxicity to the vegetative vigor for terrestrial plants and the label application rates, there is overlap between potential exposure rates and toxicity values. As such, the necessary distances off-field required to be below toxicity thresholds were calculated for various labeled single maximum application rates and are presented in Table 49.

Table 49. Spray Drift (Terrestrial) Assessment for Terrestrial Plant Species

No. of application and app. rate (lb a.e./A)	Species		Spray Method
	Most Sensitive Dicot (VV) ^a IC ₂₅ (0.074 lb a.e./A)	Common milkweed IC ₂₅ (0.126 lb a.e./A)	
distance from edge of field to reach non-listed (EC ₂₅) toxicity value			
1 @ 0.38	33	13	Aerial
1 @ 1.13	144	89	
1 @ 1.55	190	118	
1 @ 2.25	282	171	
1 @ 3.75	466	279	
1 @ 8	>1000	620	
1 @ 0.38	16	10	Ground
1 @ 1.55	52	33	
1 @ 2.25	79	46	
1 @ 3.75	128	75	
1 @ 8	253	157	

^a Based on reported toxicity in dicot species cucumber, *Cucumis sativus*, at IC₂₅ of 0.074 lb a.e./A and NOAEC of 0.049 lb a.e./A in the vegetative vigor test.

Drift values based on: aerial - droplet size ASAE, Fine to medium, ground – droplet size ASAE, very fine to fine, high boom, 90th percentile

6. Endocrine Disruptor Screening Program

As required by FIFRA and FFDCA, EPA reviews numerous studies to assess potential adverse outcomes from exposure to chemicals. Collectively, these studies include acute, subchronic and chronic toxicity, including assessments of carcinogenicity, neurotoxicity, developmental, reproductive, and general or systemic toxicity. These studies include endpoints which may be susceptible to endocrine influence, including effects on endocrine target organ histopathology, organ weights, estrus cyclicity, sexual maturation, fertility, pregnancy rates, reproductive loss, and sex ratios in offspring. For ecological hazard assessments, EPA evaluates acute tests and

chronic studies that assess growth, developmental and reproductive effects in different taxonomic groups. As part of registration review for glyphosate, EPA reviewed these data and selected the most sensitive endpoints for relevant risk assessment scenarios from the existing hazard database. However, as required by FFDCA section 408(p), glyphosate is subject to the endocrine screening part of the Endocrine Disruptor Screening Program (EDSP).

EPA has developed the EDSP to determine whether certain substances (including pesticide active and other ingredients) may have an effect in humans or wildlife similar to an effect produced by a “naturally occurring estrogen, or other such endocrine effects as the Administrator may designate.” The EDSP employs a two-tiered approach to making the statutorily required determinations. Tier 1 consists of a battery of 11 screening assays to identify the potential of a chemical substance to interact with the estrogen, androgen, or thyroid (E, A, or T) hormonal systems. Chemicals that go through Tier 1 screening and are found to have the potential to interact with E, A, or T hormonal systems will proceed to the next stage of the EDSP where EPA will determine which, if any, of the Tier 2 tests are necessary based on the available data. Tier 2 testing is designed to identify any adverse endocrine-related effects caused by the substance, and establish a dose-response relationship between the dose and the E, A, or T effect.

Under FFDCA section 408(p), the Agency must screen all pesticide chemicals. Between October 2009 and February 2010, EPA issued test orders/data call-ins for the first group of 67 chemicals, which contains 58 pesticide active ingredients and 9 inert ingredients. A second list of chemicals identified for EDSP screening was published on June 14, 2013⁸ and includes some pesticides scheduled for registration review and chemicals found in water. Neither of these lists should be construed as a list of known or likely endocrine disruptors.

Glyphosate is on List 1 for which EPA has received all of the required Tier 1 assay data. The Agency has reviewed all of the assay data received for the appropriate List 1 chemicals and the conclusions of those reviews are available in the chemical-specific public dockets (see EPA-HQ-OPP-2009-0361 for glyphosate). The conclusion of the weight of evidence (WoE) evaluation is that glyphosate demonstrates no convincing evidence of potential interaction with the estrogen, androgen or thyroid pathways in mammals or non-mammalian wildlife. Based on weight of evidence considerations, mammalian or wildlife EDSP Tier 2 testing is not recommended for glyphosate. For further information on the status of the EDSP, the policies and procedures, the lists of chemicals, future lists, the test guidelines and Tier 1 screening battery, please visit our website <http://www.epa.gov/endo/>.

7. Federally Threatened and Endangered (Listed) Species Concerns

In November 2013, the EPA, along with the U.S. Fish & Wildlife Service (USFWS), the National Marine Fisheries Service (NMFS) (collectively, the Services), and the U.S. Department of Agriculture (USDA) released a summary of their joint Interim Approaches for assessing risks to listed species from pesticides. The Interim Approaches were developed jointly by the agencies in response to the National Academy of Sciences’ (NAS) recommendations and reflect a common approach to risk assessment shared by the agencies as a way of addressing scientific

⁸ See <http://www.regulations.gov/#!documentDetail;D=EPA-HQ-OPPT-2009-0477-0074> for the final second list of chemicals.

differences between the EPA and the Services. The NAS report outlines recommendations on specific scientific and technical issues related to the development of pesticide risk assessments that EPA and the Services must conduct in connection with their obligations under the Endangered Species Act (ESA) and FIFRA.

The joint Interim Approaches were released prior to a stakeholder workshop held on November 15, 2013. In addition, the EPA presented the joint Interim Approaches at the December 2013 Pesticide Program Dialogue Committee (PPDC) and State-FIFRA Issues Research and Evaluation Group (SFIREG) meetings, and held a stakeholder workshop in April 2014, allowing additional opportunities for stakeholders to comment on the Interim Approaches. As part of a phased, iterative process for developing the Interim Approaches, the agencies will also consider public comments on the Interim Approaches in connection with the development of upcoming Registration Review decisions. The details of the joint Interim Approaches are contained in the white paper “Interim Approaches for National-Level Pesticide Endangered Species Act Assessments Based on the Recommendations of the National Academy of Sciences April 2013 Report,” dated November 1, 2013.

Given that the agencies are continuing to develop and work toward implementation of the Interim Approaches to assess the potential risks of pesticides to listed species and their designated critical habitat, this preliminary risk assessment for glyphosate does not contain a complete ESA analysis that includes effects determinations for specific listed species or designated critical habitat. Although EPA has not yet completed effects determinations for specific species or habitats, for this preliminary assessment EPA conducted a screening-level assessment for all taxa of non-target wildlife and plants that assumes for the sake of the assessment that listed species and designated critical habitats may be present in the vicinity of the application of glyphosate. This screening level assessment will allow EPA to focus its future evaluations on the types of species where the potential for effects exists once the scientific methods being developed by the agencies have been fully vetted. This screening-level risk assessment for glyphosate indicates potential risks of direct effects to listed birds (surrogates for aquatic-phase amphibians and reptiles), mammals, terrestrial invertebrates, terrestrial and aquatic vascular plants on some of its registered use sites. Listed species of aquatic animal taxa may also be affected through indirect effects because of the potential for direct effects on listed and non-listed species upon which such species may rely. Potential direct effects on listed birds (surrogates for aquatic-phase amphibians and reptiles), mammals, terrestrial invertebrates, terrestrial and aquatic vascular plants from the use of glyphosate may be associated with modification of Primary Constituent Elements (PCEs) of designated critical habitats, where such designations have been made. Once the agencies have fully developed and implemented the scientific methods necessary to complete risk assessments for endangered and threatened (listed) species and their designated critical habitats, these methods will be applied to subsequent analyses for glyphosate as part of completing this registration review.

8. Assumptions and Limitations

- a) An evaluation into the potential foliar dissipation rate for dietary items that were exposed to glyphosate was conducted for this assessment. Based on the available information, it

appears that glyphosate can dissipate on some types of foliage (i.e., alfalfa and forestry brush foliage, which may be similar to the grasses and broadleaf plant category in T-REX, respectively) with calculated half-lives between 4 and 7.5 days (based on magnitude of residue studies; MRID 45646001 and open literature studies). An evaluation of potential dissipation for all dietary item categories in T-REX (i.e., other types of broadleaf plants and fruits/pods/seeds) could not be completed due to unavailable data. Therefore, there is uncertainty in the potential dissipation rate for these other dietary groups. For a single application of 3.75 lb a.e./A that is not influenced by the foliar dissipation rate, the RQ for chronic dietary exposure for birds just exceeded the LOC for short grass (RQ=1.08). For mammals, using the same single application rate, the LOC is not exceeded (RQ=0.96) on a chronic dose-basis.

- b) The avian chronic dietary RQ values exceed the chronic LOC. In the available avian reproduction toxicity studies, there were no reported effects on eggs laid, embryo viability and eggshell thickness up to the highest concentration tested. However, the data do suggest that male body weight and offspring weight may be affected in at least one study, therefore, there is uncertainty in the potential chronic effects of glyphosate on birds.
- c) Honeybee larvae were exposed to glyphosate in the available semi-field study through normal hive activity, but the concentrations used in the study may not reflect environmental concentrations (test concentrations based on field application of 1.92 lb a.e./A). Toxicity data to larvae under conditions to evaluate response of individual larvae after exposure to a known concentration of glyphosate is not available. There is uncertainty in the available terrestrial invertebrate data providing an adequate understanding of the potential risk to non-adult life stages for terrestrial invertebrates at currently registered application rates.
- d) Chronic toxicity data were not available for estuarine-marine organisms. Risk conclusions were made using an ACR approach. At this time, additional chronic data for estuarine/marine animals is not anticipated to impact the overall risk conclusion for those taxa, as the toxicity data from freshwater animals is considered adequate for evaluating risk to those taxa.
- e) To increase efficacy, glyphosate labels may recommend the addition of ammonium sulfate in situations when hard water is used in the spray mixture. This is to allow the sulfate ion to competitively bind to the cations typically present in hard water. It is not known how this phenomenon may impact glyphosate availability for animals, particularly aquatic animals. For terrestrial plants, between the information presented in the registrant's vegetative vigor studies and the collective response between the registrant's vegetative vigor studies and the open literature studies, which are similar, it is considered that there is sufficient confidence in the toxicity values used in the assessment to adequately evaluate potential effects of glyphosate exposure for terrestrial plants.

With regard to aquatic organisms and glyphosate toxicity, the large number of acute toxicity studies is anticipated to represent a spectrum of different water sources and

environmental attributes (*i.e.*, hardness). These studies should provide an adequate understanding of potential glyphosate toxicity. It is noted that for some aquatic invertebrates (*e.g.*, *Daphnia magna*), sufficient water hardness is needed to ensure adequate growth and development. Overall, in environmental situations where the water is characterized as hard, glyphosate-cation complexes may occur which may influence the availability of glyphosate exposure to aquatic organisms, which may alter toxicity.

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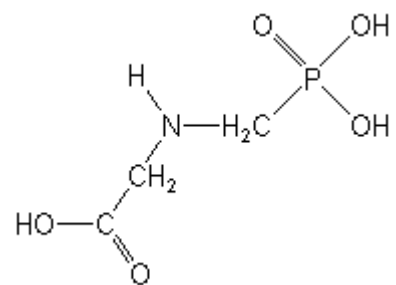
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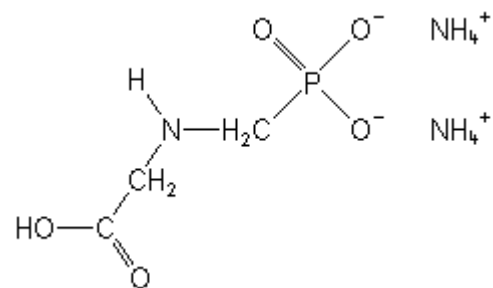
Appendix A

Structures of Glyphosate and AMPA

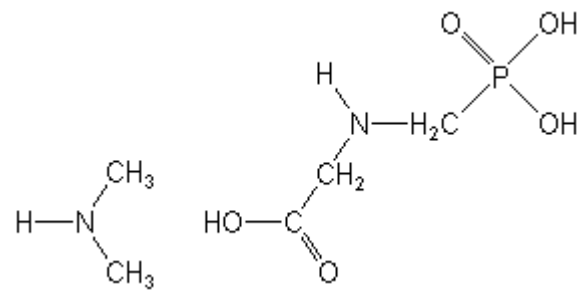
Glyphosate Acid



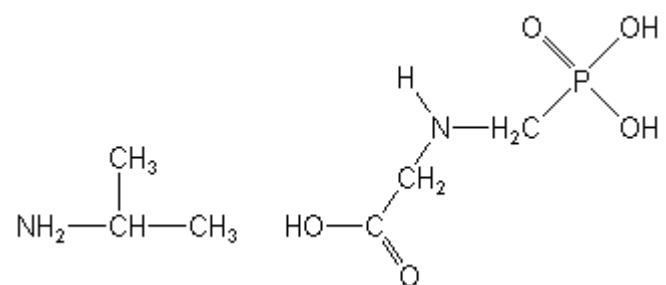
Diammonium salt glyphosate



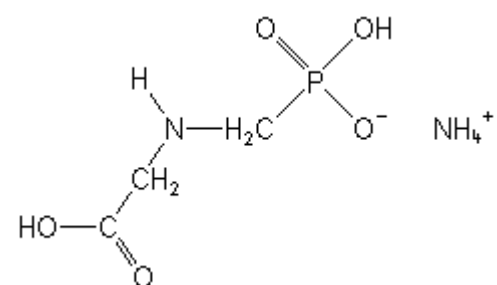
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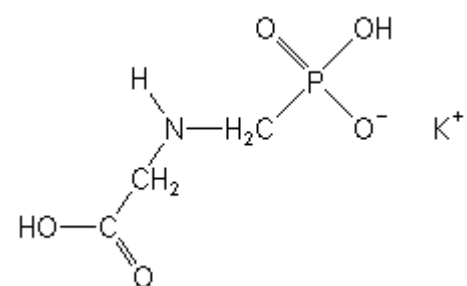
Isopropyl ammonium glyphosate



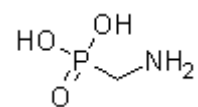
Monoammonium salt glyphosate



Potassium salt glyphosate



AMPA-Degradation Product



Appendix B

GEENEC OUTPUT

```

RUN No.    1 FOR glyphosate          ON    3.75airnob    * INPUT VALUES *
-----
RATE (#/AC)  No.APPS &    SOIL  SOLUBIL    APPL TYPE  NO-SPRAY INCORP
ONE(MULT)    INTERVAL    Kd   (PPM )    (%DRIFT)  ZONE(FT)  (IN)
-----
3.750(  6.922)  2    7    157.012000.0  AERL_B( 13.0)  0.0    0.0

```

FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)

```

-----
METABOLIC  DAYS UNTIL  HYDROLYSIS  PHOTOLYSIS  METABOLIC  COMBINED
(FIELD)    RAIN/RUNOFF  (POND)      (POND-EFF)  (POND)      (POND)
-----
29.00      2          0.00      0.00-      0.00    381.00    381.00

```

GENERIC EECs (IN MICROGRAMS/LITER (PPB)) Version 2.0 Aug 1, 2001

```

-----
PEAK      MAX 4 DAY    MAX 21 DAY    MAX 60 DAY    MAX 90 DAY
GEEC      AVG GEEC      AVG GEEC      AVG GEEC      AVG GEEC
-----
53.26     51.36         40.27         25.23         19.07

```

```

RUN No.    2 FOR glyphosate          ON    8airnobuf    * INPUT VALUES *
-----
RATE (#/AC)  No.APPS &    SOIL  SOLUBIL    APPL TYPE  NO-SPRAY INCORP
ONE(MULT)    INTERVAL    Kd   (PPM )    (%DRIFT)  ZONE(FT)  (IN)
-----
8.000(  8.000)  1    1    157.012000.0  AERL_B( 13.0)  0.0    0.0

```

FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)

```

-----
METABOLIC  DAYS UNTIL  HYDROLYSIS  PHOTOLYSIS  METABOLIC  COMBINED
(FIELD)    RAIN/RUNOFF  (POND)      (POND-EFF)  (POND)      (POND)
-----
29.00      2          N/A       0.00-      0.00    381.00    381.00

```

GENERIC EECs (IN MICROGRAMS/LITER (PPB)) Version 2.0 Aug 1, 2001

```

-----
PEAK      MAX 4 DAY    MAX 21 DAY    MAX 60 DAY    MAX 90 DAY
GEEC      AVG GEEC      AVG GEEC      AVG GEEC      AVG GEEC
-----
59.63     57.48         45.06         28.22         21.32

```

RUN No.	3 FOR glyphosate	ON	3.75airbuf	* INPUT VALUES *		
RATE (#/AC)	No.APPS &	SOIL	SOLUBIL	APPL TYPE	NO-SPRAY	INCORP
ONE(MULT)	INTERVAL	Kd	(PPM)	(%DRIFT)	ZONE(FT)	(IN)
3.750(6.922)	2 7	157.012000.0	AERL_B(1.5)	500.0	0.0	

FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)

METABOLIC	DAYS UNTIL	HYDROLYSIS	PHOTOLYSIS	METABOLIC	COMBINED
(FIELD)	RAIN/RUNOFF	(POND)	(POND-EFF)	(POND)	(POND)
29.00	2	N/A	0.00-	0.00	381.00
					381.00

GENERIC EECs (IN MICROGRAMS/LITER (PPB)) Version 2.0 Aug 1, 2001

PEAK	MAX 4 DAY	MAX 21 DAY	MAX 60 DAY	MAX 90 DAY
GEEC	AVG GEEC	AVG GEEC	AVG GEEC	AVG GEEC
33.39	31.94	24.95	15.54	11.67

RUN No.	4 FOR glyphosate	ON	8airbuf500	* INPUT VALUES *		
RATE (#/AC)	No.APPS &	SOIL	SOLUBIL	APPL TYPE	NO-SPRAY	INCORP
ONE(MULT)	INTERVAL	Kd	(PPM)	(%DRIFT)	ZONE(FT)	(IN)
8.000(8.000)	1 1	157.012000.0	AERL_B(1.5)	500.0	0.0	

FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)

METABOLIC	DAYS UNTIL	HYDROLYSIS	PHOTOLYSIS	METABOLIC	COMBINED
(FIELD)	RAIN/RUNOFF	(POND)	(POND-EFF)	(POND)	(POND)
29.00	2	N/A	0.00-	0.00	381.00
					381.00

GENERIC EECs (IN MICROGRAMS/LITER (PPB)) Version 2.0 Aug 1, 2001

PEAK	MAX 4 DAY	MAX 21 DAY	MAX 60 DAY	MAX 90 DAY
GEEC	AVG GEEC	AVG GEEC	AVG GEEC	AVG GEEC
38.37	36.69	28.66	17.85	13.40

RUN No.	5 FOR glyphosate	ON	8grdnobuff	* INPUT VALUES *		
RATE (#/AC)	No.APPS &	SOIL	SOLUBIL	APPL TYPE	NO-SPRAY	INCORP
ONE(MULT)	INTERVAL	Kd	(PPM)	(%DRIFT)	ZONE(FT)	(IN)

8.000(8.000) 1 1 157.012000.0 GRHIFI(6.6) 0.0 0.0

FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)

METABOLIC (FIELD)	DAYS UNTIL RAIN/RUNOFF	HYDROLYSIS (POND)	PHOTOLYSIS (POND-EFF)	METABOLIC (POND)	COMBINED (POND)
29.00	2	N/A	0.00-	0.00	381.00
				381.00	381.00

GENERIC EECs (IN MICROGRAMS/LITER (PPB)) Version 2.0 Aug 1, 2001

PEAK GEEC	MAX 4 DAY AVG GEEC	MAX 21 DAY AVG GEEC	MAX 60 DAY AVG GEEC	MAX 90 DAY AVG GEEC
49.28	47.32	37.04	23.13	17.43

RUN No. 6 FOR glyphosate ON 40grdnobuf * INPUT VALUES *

RATE (#/AC) ONE(MULT)	No.APPS & INTERVAL	SOIL Kd	SOLUBIL (PPM)	APPL TYPE (%DRIFT)	NO-SPRAY ZONE(FT)	INCRP (IN)
40.000(40.000)	1 1	157.012000.0	GRHIFI(6.6)	0.0	0.0	

FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)

METABOLIC (FIELD)	DAYS UNTIL RAIN/RUNOFF	HYDROLYSIS (POND)	PHOTOLYSIS (POND-EFF)	METABOLIC (POND)	COMBINED (POND)
29.00	2	N/A	0.00-	0.00	381.00
				381.00	381.00

GENERIC EECs (IN MICROGRAMS/LITER (PPB)) Version 2.0 Aug 1, 2001

PEAK GEEC	MAX 4 DAY AVG GEEC	MAX 21 DAY AVG GEEC	MAX 60 DAY AVG GEEC	MAX 90 DAY AVG GEEC
246.39	236.61	185.19	115.67	87.13

Appendix C

T-REX Output

Chemical Name:

glyphosate

Use:

nuts, pome, citrus, misc)-ground max comb

Formulation:

0

Half-life:

12 days

Length of Simulation:

1 year

Variable application rates?

yes

Endpoints

Avian

Bobwhite quail

LD50 (mg/kg-bw)

3196.00

Bobwhite quail

LC50 (mg/kg-diet)

4971.00

Bobwhite quail

NOAEL(mg/kg-bw)

0.00

Bobwhite quail

NOAEC (mg/kg-diet)

830.00

Mammals

LD50 (mg/kg-bw)

4800.00

LC50 (mg/kg-diet)

0.00

NOAEL (mg/kg-bw)

500.00

NOAEC (mg/kg-diet)

10000.00

Dietary-based EECs (ppm)

Kenaga Values

Short Grass

1500.68

Tall Grass

687.81

Broadleaf plants

844.13

Fruits/pods/seeds

93.79

Arthropods

587.77

Avian Results

Avian Class

Body Weight (g)

Ingestion (Fdry) (g bw/day)

Ingestion (Fwet) (g/day)

% body wgt consumed

FI (kg-diet/day)

Small

20

5

23

114

2.28E-02

Mid

100

13

65

65

6.49E-02

Large

1000

58

291

29

2.91E-01

Granivores

20

5

5

25

5.06E-03

100

13

14

14

1.44E-02

1000

58

65

6

6.46E-02

Avian Body Weight (g)

Adjusted LD50 (mg/kg-bw)

20

2302.49

100

2931.19

1000

4140.41

Dose-based EECs (mg/kg-bw)

Avian Classes and Body Weights (grams)

small

mid

large

20

100

1000

Short Grass

1709.12

974.61

436.35

Tall Grass

783.35

446.70

199.99

Broadleaf plants

961.38

548.22

245.45

Fruits/pods

106.82

60.91

27.27

Arthropods

669.41

381.72

170.90

Seeds

23.74

13.54

6.06

Acute and Chronic RQs are based on the Upper Bound Kenaga Residues.

The maximum single day residue estimation is based on both the acute and reproduction RQs.

RQs reported as "0.00" in the RQ tables are less than or equal to 0.01 in your assessment. This is due to rounding figure issues in Excel.

Dose-based RQs (Dose-based EEC/adjusted LD50)	Avian Acute RQs Size Class (grams)		
	20	100	1000
Short Grass	0.74	0.33	0.11
Tall Grass	0.34	0.15	0.05
Broadleaf plants	0.42	0.19	0.06
Fruits/pods	0.05	0.02	0.01
Arthropods	0.29	0.13	0.04
Seeds	0.01	0.00	0.00

Dietary-based RQs (Dietary-based EEC/LC50 or NOAEC)	RQs	
	Acute	Chronic
Short Grass	0.30	1.81
Tall Grass	0.14	0.83
Broadleaf plants	0.17	1.02
Fruits/pods/seeds	0.02	0.11
Arthropods	0.12	0.71

Note: To provide risk management with the maximum possible information, it is recommended that both the dose-based and concentration-based RQs be calculated when data are available

glyphosate tree crops (nuts, pome, citrus, misc)-ground max combined Upper bound Kenaga Residues

Mammalian Results

Mammalian Class	Body Weight	Ingestion (Fdry) (g bwt/day)	Ingestion (Fwet) (g/day)	% body wgt consumed	FI (kg-diet/day)
Herbivores/ insectivores	15	3	14	95	1.43E-02
	35	5	23	66	2.31E-02
	1000	31	153	15	1.53E-01
Grainvores	15	3	3	21	3.18E-03
	35	5	5	15	5.13E-03
	1000	31	34	3	3.40E-02

Mammalian Class	Body Weight	Adjusted LD50	Adjusted NOAEL
Herbivores/ insectivores	15	10549.59	1098.92
	35	8535.74	889.14
	1000	3691.97	384.58
Granivores	15	10549.59	1098.92
	35	8535.74	889.14
	1000	3691.97	384.58

Dose-Based EECs (mg/kg-bw)	Mammalian Classes and Body weight (grams)		
	15	35	1000
Short Grass	1430.78	988.86	229.27
Tall Grass	655.77	453.23	105.08
Broadleaf plants	804.81	556.23	128.96
Fruits/pods	89.42	61.80	14.33
Arthropods	560.39	387.30	89.80
Seeds	19.87	13.73	3.18

Dose-based RQs (Dose-based EEC/LD50 or	Small mammal 15 grams		Medium mammal 35 grams		Large mammal 1000 grams	
	Acute	Chronic	Acute	Chronic	Acute	Chronic
Short Grass	0.14	1.30	0.12	1.11	0.06	0.60
Tall Grass	0.06	0.60	0.05	0.51	0.03	0.27
Broadleaf plants	0.08	0.73	0.07	0.63	0.03	0.34
Fruits/pods	0.01	0.08	0.01	0.07	0.00	0.04
Arthropods	0.05	0.51	0.05	0.44	0.02	0.23
Seeds	0.00	0.02	0.00	0.02	0.00	0.01

Dietary-based RQs (Dietary-based EEC/LC50 or NOAEC)	Mammal RQs	
	Acute	Chronic
Short Grass	#DIV/0!	0.15
Tall Grass	#DIV/0!	0.07
Broadleaf plants	#DIV/0!	0.08
Fruits/pods/seeds	#DIV/0!	0.01
Arthropods	#DIV/0!	0.06

Note: To provide risk management with the maximum possible information, it is recommended that both the dose-based and concentration-based RQs be calculated when data are available

Appendix D

ECOLOGICAL EFFECTS DATA

Note: These tables are in large part extracted from the USEPA 2008 California red-legged frog risk assessment.

Table D-1. Freshwater Fish Acute Toxicity for Technical Glyphosate and Its Salts					
Species	% Active Ingredient *	96-hour LC₅₀ NOAEC (mg a.e./L)*/ Slope	Toxicity Category²	MRID #/Year	Study Classification
Bluegill sunfish (<i>Lepomis macrochirus</i>)	83	LC ₅₀ : 99.6 (92.1 - 107.9) ¹ NOAEC: 83 Slope: Not available	Slightly toxic	00108205/1978	Acceptable
Rainbow trout (<i>Oncorhynchus mykiss</i>)	83	LC ₅₀ : 71.4 (58.1-84.8) NOAEC: 34.9 Slope: Not available	Slightly toxic	00136339/1978	Acceptable
Rainbow trout (<i>Oncorhynchus mykiss</i>)	95.6	LC ₅₀ : 128.1 (95.6 - 172.1) NOAEC: 30.6 Slope: Not available	Practically nontoxic	44320629/1995	Acceptable
Bluegill sunfish (<i>Lepomis macrochirus</i>)	95.6	LC ₅₀ : 43 (30.6 - 53.5) NOAEC: 30.6 Slope: Not available	Slightly toxic	44320630/1995	Acceptable
Fathead minnow (<i>Pimephales promelas</i>)	96.7	LC ₅₀ : 69.4 (56.5 - 85.9) ³ NOAEC not reported Slope: Not available	Slightly toxic	00162296/1979	Acceptable
Channel catfish (<i>Ictalurus punctatus</i>)	96.7	LC ₅₀ : 93 (78.7 - 114.5) ³ NOAEC not reported Slope: Not available	Slightly toxic	00162296/1979	Acceptable
Rainbow trout (<i>Oncorhynchus mykiss</i>)	96.7	LC ₅₀ : 100.2 (85.9 - 121.6) ³ NOAEC not reported Slope: Not available	Practically nontoxic	00162296/1979	Acceptable
Bluegill sunfish (<i>Lepomis macrochirus</i>)	96.7	LC ₅₀ : 100.2 (78.7 - 114.5) ³ NOAEC not reported Slope: Not available	Practically nontoxic	00162296/1979	Acceptable
* a.i. = active ingredient; a.e. = acid equivalent ¹ Range is 95% confidence interval for endpoint ²Based on LC₅₀ (mg/L): < 0.1 very highly toxic; 0.1-1 highly toxic; >1-10 moderately toxic; >10-100 slightly toxic; >100 practically nontoxic ³ Study conducted with the isopropylamine salt					

Table D-2. Freshwater Fish Acute Toxicity for Glyphosate Formulations

Chemical	Species	% a.i. *	96-hour LC ₅₀ / NOAEC (mg a.e.*/L)/ Slope	Toxicity Category ¹	MRID #/Year	Study Classification
Glyphosate IPA*	Rainbow trout (<i>Oncorhynchus mykiss</i>)	30	LC ₅₀ : 1 (0.8 - 1.2) ² (3.17 mg formulation/L) NOAEC: N.R.* Slope:N.R.	Highly toxic	40098001/1986	Supplemental
Glyphosate IPA (MON 77360)	Rainbow trout (<i>Oncorhynchus mykiss</i>)	30	LC ₅₀ : 1.6 (1.3 - 2.1) NOAEC: 1.3 Slope:NA*	Moderately toxic	45365003/2000	Supplemental
Glyphosate IPA	Fathead minnow (<i>Pimephales promelas</i>)	30	LC ₅₀ : 1.7 (1.4 - 2.1) NOAEC: N.R. Slope:N.R.	Moderately toxic	00162296/1979	Supplemental
Glyphosate IPA (Roundup)	Bluegill sunfish (<i>Lepomis macrochirus</i>)	31	LC ₅₀ : 1.8 (1.4 - 2.6) NOAEC: 0.7 Slope:N.R.	Moderately toxic	00124760/1982	Acceptable
Glyphosate monoammonium salt (MON78568)	Rainbow trout (<i>Oncorhynchus mykiss</i>)	66	LC ₅₀ : 1.9 (1.04 - 2.31) NOAEC: 1.04 Slope:N.R.	Moderately toxic	45767101/2002	Not classified
Glyphosate IPA (MON 77360)	Bluegill sunfish (<i>Lepomis macrochirus</i>)	30	LC ₅₀ : 2.2 (1.3 - 3.3) NOAEC: 1.3 Slope:NA	Moderately toxic	45365002/2000	Acceptable
Glyphosate IPA (MON65005)	Bluegill sunfish (<i>Lepomis macrochirus</i>)	31	LC ₅₀ : 2.4 (2.0 - 3.5) NOAEC: 1.2 Slope:N.R.	Moderately toxic	44538203/1998	Acceptable
Glyphosate IPA (Roundup)	Rainbow trout (<i>Oncorhynchus mykiss</i>)	31	LC ₅₀ : 2.5 (2.0 - 3.1) NOAEC: 1.8 Slope:N.R.	Moderately toxic	00124761/1982	Supplemental
Glyphosate IPA (MON65005)	Rainbow trout (<i>Oncorhynchus mykiss</i>)	31	LC ₅₀ : 2.5 (1.9 - 3.1) NOAEC: 1.9 Slope:N.R.	Moderately toxic	44538202/1998	Acceptable
Glyphosate IPA (Roundup)	Fathead minnow (<i>Pimephales promelas</i>)	41	LC ₅₀ : 2.9 (1.7 - 4.9) NOAEC: 1.7 Slope:N.R.	Moderately toxic	00070896/1980	Acceptable
Glyphosate IPA	Bluegill sunfish (<i>Lepomis macrochirus</i>)	30	LC ₅₀ : 3 (2.4 - 3.7) NOAEC: N.R. Slope:N.R.	Moderately toxic	40098001/1986	Supplemental
Glyphosate IPA	Rainbow trout (<i>Oncorhynchus mykiss</i>)	30	LC ₅₀ : 3.4 (5.2 - 7.3) NOAEC: N.R. Slope:N.R.	Moderately toxic	00162296/1979	Supplemental

Table D-2. Freshwater Fish Acute Toxicity for Glyphosate Formulations

Chemical	Species	% a.i. *	96-hour LC ₅₀ /NOAEC (mg a.e.*/L)/Slope	Toxicity Category ¹	MRID #/Year	Study Classification
Glyphosate IPA(MON 2139, Roundup)	Rainbow trout (<i>Oncorhynchus mykiss</i>)	41	LC ₅₀ : 3.4 (2.7 - 4.3) NOAEC: 2.7 Slope:N.R.	Moderately toxic	00070895/1980	Acceptable
Glyphosate IPA	Bluegill sunfish (<i>Lepomis macrochirus</i>)	30	LC ₅₀ : 3.7 (2.8 - 4.9) NOAEC: N.R. Slope:N.R.	Moderately toxic	00162296/1979	Supplemental
Glyphosate IPA (Roundup)	Bluegill sunfish (<i>Lepomis macrochirus</i>)	41	LC ₅₀ : 4.3 (2.7 - 7.3) NOAEC: 2.7 Slope:N.R.	Moderately toxic	00070897/1980	Acceptable
Glyphosate IPA (Roundup)	Channel catfish (<i>Ictalurus punctatus</i>)	41	LC ₅₀ : 4.9 (2.9 - 8.0) NOAEC: 2.9 Slope:N.R.	Moderately toxic	00070894/1980	Supplemental
Glyphosate IPA (Roundup)	Rainbow trout ((<i>Salmo gairdneri</i>))	36	LC ₅₀ : 5.5 - 9.2 (4.2 - 13) NOAEC: 4.2 Slope:N.R.	Moderately toxic	40579203/1986	Supplemental
Glyphosate IPA (Roundup)	Chinook Salmon (<i>Oncorhynchus tshawytscha</i>)	36	LC ₅₀ : 7.0 (5.4 - 9.9) NOAEC: <1.3 Slope:N.R.	Moderately toxic	40579201/1986	Not classified
Glyphosate IPA (Roundup)	Coho Salmon (<i>Oncorhynchus kisutch</i>)	36	LC ₅₀ : 8.2 (4.2 - 13.4) NOAEC: 3.42 Slope:N.R.	Moderately toxic	40579202/1986	Not classified
Glyphosate IPA with 0.5% "X-77"	Rainbow trout (<i>Oncorhynchus mykiss</i>)	5	LC ₅₀ : 9.4 (7.0 - 12.4) NOAEC: 7 Slope:N.R.	Moderately toxic	00078664/1980	Acceptable
Glyphosate IPA	Channel catfish (<i>Ictalurus punctatus</i>)	30	LC ₅₀ : 9.6 (8.1 - 11.8) NOAEC: N.R. Slope:N.R.	Moderately toxic	00162296/1979	Acceptable
Glyphosate IPA (Roundup with 15 % "W")	Bluegill sunfish (<i>Lepomis macrochirus</i>)	41	LC ₅₀ : >30 (30 - 96.4.) NOAEC: 30 Slope:N.R.	Slightly toxic	00078656/1980	Supplemental
Glyphosate IPA with 0.5% "X-77"	Bluegill sunfish (<i>Lepomis macrochirus</i>)	5.3	LC ₅₀ : 32.4 (24.2 - 62.4) NOAEC: 7.1 Slope:4.2	Slightly toxic	00078665/1980	Acceptable
Glyphosate IPA (Roundup with 15.3 % "AA")	Rainbow trout (<i>Oncorhynchus mykiss</i>)	41	LC ₅₀ : 36.6 (17.1 - 54.9) NOAEC: N.R. Slope:N.R.	Slightly toxic	00078658/1980	Acceptable

Table D-2. Freshwater Fish Acute Toxicity for Glyphosate Formulations

Chemical	Species	% a.i. *	96-hour LC ₅₀ /NOAEC (mg a.e.*/L)/Slope	Toxicity Category ¹	MRID #/Year	Study Classification
Glyphosate IPA (Roundup with 15 % "W")	Rainbow trout (<i>Oncorhynchus mykiss</i>)	41	LC ₅₀ : 45.2 (30.1 - 96.4) NOAEC: 30.1 Slope:N.R.	Slightly toxic	00078655/1980	Acceptable
Glyphosate (360 g/L SL)	Bluegill sunfish (<i>Lepomis macrochirus</i>)	28	LC ₅₀ : >52 (N.A.) NOAEC: 52 Slope:N.A.	Slightly toxic	45374002/2000	Supplemental
Glyphosate(80WD G)	Fathead minnow (<i>Pimephales promelas</i>)	79	LC ₅₀ : 54.3 (47.3 - 79.1) NOAEC: 28.7 Slope:N.R.	Slightly toxic	44125704/1996	Acceptable
Glyphosate(80WD G)	Rainbow trout (<i>Oncorhynchus mykiss</i>)	80	LC ₅₀ : 62.1 (48.2 - 80.0) NOAEC: 28.7 Slope:N.R.	Slightly toxic	44125705/1996	Acceptable
Glyphosate IPA (Rodeo/X-77)	Rainbow trout (<i>Salmo gairdneri</i>)	41	LC ₅₀ : 96.4 (89.0 - 118.7) NOAEC: 37.5 Slope:N.R.	Slightly toxic	40579301/1985	Not classified
Glyphosate IPA (Rodeo/X-77)	Chinook salmon (<i>Oncorhynchus tshawytscha</i>)	41	LC ₅₀ : 103.8 (89.0 - 148.3) NOAEC: 47.5 Slope:N.R.	Practically non-toxic	40579303/1985	Not classified
Glyphosate IPA (Rodeo/X-77)	Rainbow trout ((<i>Salmo gairdneri</i>)	41	LC ₅₀ : 134 (75 - 240) NOAEC: 43 Slope:N.R.	Practically non-toxic	40579306/1987	Not classified
Glyphosate IPA (Rodeo/X-77)	Coho Salmon (<i>Oncorhynchus kisutch</i>)	41	LC ₅₀ : 148.3 (89.0 - 274.4) NOAEC: 88.5 Slope:N.R.	Practically non-toxic	40579302/1985	Not classified
Glyphosate IPA (Rodeo/X-77)	Chinook salmon (<i>Oncorhynchus tshawytscha</i>)	40	LC ₅₀ : 180.2 (133.5 - 240.3) NOAEC: 74.8 Slope:N.R.	Practically non-toxic	40579305/1987	Not classified
Glyphosate (360 g/L SL)	Rainbow trout (<i>Oncorhynchus mykiss</i>)	27	LC ₅₀ : 224.5 (160.1 - 280.0) (824 mg formulation/L) NOAEC: 160 Slope:N.R.	Practically non-toxic	45374001/1999	Supplemental
Trisodium diglyphosate/Urea (Polado formula) - MON 8000	Bluegill sunfish (<i>Lepomis macrochirus</i>)	75	LC ₅₀ : >315 (N.R.) NOAEC: 315 Slope:N.R.	Practically non-toxic	00079146/1980	Supplemental

Table D-2. Freshwater Fish Acute Toxicity for Glyphosate Formulations

Chemical	Species	% a.i. *	96-hour LC ₅₀ / NOAEC (mg a.e.*/L)/ Slope	Toxicity Category ¹	MRID #/Year	Study Classification
Trisodium diglyphosate/Urea (Polado formula) - MON 8000	Rainbow trout (<i>Oncorhynchus mykiss</i>)	75	LC ₅₀ : >315 (N.R.) NOAEC: 315 Slope:N.R.	Practically non-toxic	00085637/1980	Supplemental
Glyphosate IPA (Rodeo)	Rainbow trout ((<i>Salmo gairdneri</i>)	41	LC ₅₀ : 430.1 (341 - 541) NOAEC: 157 Slope:N.R.	Practically non-toxic	40579301/1985	Not classified
Glyphosate IPA (No surfactant)	Rainbow trout (<i>Oncorhynchus mykiss</i>)	62	LC ₅₀ : >461.8 (N.R.) NOAEC: N.R. Slope:N.R.	Practically non-toxic	00078661/1980	Acceptable
Glyphosate IPA (No surfactant)	Bluegill sunfish (<i>Lepomis macrochirus</i>)	62	LC ₅₀ : >461.8 (N.R.) NOAEC: N.R. Slope:N.R.	Practically non-toxic	00078662/1981	Supplemental
Glyphosate IPA (MON77945 Manufacturing concentrate)	Rainbow trout (<i>Oncorhynchus mykiss</i>)	46	LC ₅₀ : >977 (N.A.) mg formulation/L NOAEC: 591 Slope:N.A.	Practically non-toxic	44715409/1998	Not classified
Glyphosate IPA with Geronol CF/AR	Rainbow trout (<i>Oncorhynchus mykiss</i>)	10	LC ₅₀ : > 450 (N.A.) mg a.e./L or > 1000 mg formulation/L NOAEC: 1000 mg formulation/L Slope:N.A.	Practically non-toxic	44738201/1996	Not classified
Glyphosate IPA with Geronol CF/AR	Rainbow trout (<i>Oncorhynchus mykiss</i>)	36	LC ₅₀ : >1000 (N.A.) mg formulation/L NOAEC: 800 Slope:N.A.	Practically non-toxic	44738201/1996	Not classified
Glyphosate IPA (Roundup Biactive)	Rainbow trout (<i>Oncorhynchus mykiss</i>)	36	LC ₅₀ : >1000 (N.A.) mg formulation/L NOAEC: 800 Slope:N.A.	Practically non-toxic	44738201/1996	Not classified
Glyphosate IPA with Geronol CF/AR	Rainbow trout (<i>Oncorhynchus mykiss</i>)	45	LC ₅₀ : >1000 (N.A.) mg formulation/L NOAEC: 1000 Slope:N.A.	Practically non-toxic	44738201/1996	Not classified

* a.i. = active ingredient; a.e. = acid equivalent; IPA = isopropylamine salt; NR = not reported; NA = not available

¹Based on LC₅₀ (mg/L): < 0.1 very highly toxic; 0.1-1 highly toxic; >1-10 moderately toxic; >10-100 slightly toxic; >100 practically nontoxic

² Range is 95% confidence interval for endpoint

Table D-3. Freshwater Fish Acute Toxicity for Surfactants Used with Glyphosate Formulations						
Chemical	Species	% a.i.¹	LC/EC₅₀ (mg/L)	Toxicity Category²	MRID #/Year; comment	Study Classification
Polyoxy ethylene fatty amine (POEA) (MON 0818)	Fathead minnow (<i>Pimephales promelas</i>)	70 ⁴	96-hr LC ₅₀ : 0.7 (0.84 - 1.19) ³ NOAEC and slope not reported	Highly toxic	00162296/1979; MON 0818 LC ₅₀ : 1 mg/L	Acceptable
Polyoxy ethylene fatty amine (POEA) (MON 0818)	Rainbow trout (<i>Oncorhynchus mykiss</i>)	70 ⁴	96-hr LC ₅₀ : 1.4 (1.05 - 1.89) NOAEC and slope not reported	Moderately toxic	00162296/1979; MON 0818 LC ₅₀ : 2mg/L ⁵	Acceptable
Polyoxy ethylene fatty amine (POEA) (MON 0818)	Bluegill sunfish (<i>Lepomis macrochirus</i>)	70 ⁴	96-hr LC ₅₀ : 2.1 (1.75 - 2.59) NOAEC and slope not reported	Moderately toxic	00162296/1979; MON 0818 LC ₅₀ : 3 mg/L	Acceptable
Polyoxy ethylene fatty amine (POEA) (MON 0818)	Channel catfish (<i>Ictalurus punctatus</i>)	70 ⁴	96-hr LC ₅₀ : 9.1 (7.0 - 11.9) NOAEC and slope not reported	Slightly toxic	00162296/1979; MON 0818 LC ₅₀ : 13 mg/L	Acceptable
Surfactant Geronol CF/AR (alkyl polyoxy ethylene phosphoric acid ester)	Zebra fish (<i>Brachydanio rerio</i>)	100	96-hr LC ₅₀ : >100 (N.A.) NOAEC and slope not reported	Practically non-toxic	44738201/ Summary from another study	Not Classified
¹ a.i. = active ingredient, assumed 100% for technical material ² Based on LC ₅₀ (mg/L): < 0.1 very highly toxic; 0.1-1 highly toxic; >1-10 moderately toxic; >10-100 slightly toxic; >100 practically nontoxic ³ Range is 95% confidence interval for endpoint. ⁴ Based on information provided by Registrant, the test material, MON 0818, contains 70% POEA; (comment from Monsanto Co. September 21, 2009; http://www.regulations.gov/#!documentDetail;D=EPA-HQ-OPP-2009-0361-0013) ⁵ In 00162296 (Folmer 1979), for MON 0818, a reported acute 96-hr LC ₅₀ toxicity value of 0.65 mg/L was reported for rainbow trout, however, this study was conducted at a pH of 9.5 and therefore, was not used quantitatively						

Table D-4. Freshwater Fish Acute Toxicity for Aminomethyl Phosphonic Acid (AMPA) Degradate of Glyphosate						
Chemical	Species	% a.i.¹	96-hour LC₅₀/NOAEC (mg/L)/Slope	Toxicity Category²	MRID #/Year	Study Classification
AMPA	Rainbow trout (<i>Oncorhynchus mykiss</i>)	94.38	LC ₅₀ : 499 (391 - 647) NOAEC: 174 Slope: 6.42	Practically nontoxic	43334713/1991	Acceptable
¹ a.i. = active ingredient, assumed 100% for technical material ² Based on LC ₅₀ (mg/L): < 0.1 very highly toxic; 0.1-1 highly toxic; >1-10 moderately toxic; >10-100 slightly toxic; >100 practically nontoxic ³ Range is 95% confidence interval for endpoint.						

Table D-5. Estuarine/marine Fish Acute Toxicity for Technical Glyphosate and Its Salts					
Species	% Active Ingredient*	96-hour LC ₅₀ NOAEC (mg a.e./L)*/ Slope	Toxicity Category ²	MRID #/Year	Study Classification
Sheepshead minnow (<i>Cyprinodon variegatus</i>)	96	96-hr. LC ₅₀ : 240 (180-320) NOAEC: 100 Slope: NA	Practically nontoxic	44320632/1996	Acceptable
* a.i. = active ingredient; a.e. = acid equivalent; N.R. = not reported ¹ Range is 95% confidence interval for endpoint ²Based on LC₅₀ (mg/L): < 0.1 very highly toxic; 0.1-1 highly toxic; >1-10 moderately toxic; >10-100 slightly toxic; >100 practically nontoxic					

Table D-6. Estuarine/marine Fish Acute Toxicity for Glyphosate Formulations						
Chemical	Species	% Active Ingredient*	96-hour LC ₅₀ NOAEC (mg a.e./L)*/ Slope ¹	Toxicity Category ²	MRID #/ Year	Study Classification
Glyphosate (MON 2139)	Sheepshead minnow (<i>Cyprinodon variegatus</i>)	30.75	96-hr LC ₅₀ = 2.7 mg a.e./L 96-hr LC ₅₀ : 8.8 mg formulation/L Slope: NA NOAEC: 6.8	Moderately toxic	48934205/2012	Acceptable
Glyphosate SL formulation	Sheepshead minnow (<i>Cyprinodon variegatus</i>)	28.3	96-hr. LC ₅₀ : >50.9 mg a.e./L >180.2 ppm formulation	Practically nontoxic	45374005 /2000	Supplemental
* a.i. = active ingredient; a.e. = acid equivalent; N.R. = not reported ¹ Range is 95% confidence interval for endpoint ²Based on LC₅₀ (mg/L): < 0.1 very highly toxic; 0.1-1 highly toxic; >1-10 moderately toxic; >10-100 slightly toxic; >100 practically nontoxic						

Table D-7. Aquatic-Phase Amphibian Acute Toxicity for Technical Glyphosate and Its Salts

Species	% Active Ingredient*	96-hour LC ₅₀ NOAEC (mg a.e./L)*/ Slope	Toxicity Category ²	MRID #/Year	Study Classification
Australian tree frog (<i>Litoria moorei</i>) Tadpole	96	LC50: 103.2 (43.2 - 172.8) ¹ NOAEL: N.R.* Slope: N.R.	Practically nontoxic	43839601/1995	Supplemental
Australian frog (<i>Crinia insignifera</i>) Adult	96	LC50: 75 (60.4- 92.7) NOAEL: N.R. Slope: N.R.	Slightly toxic	43839601/1995	Supplemental
Green Frog (<i>Rana clamitans</i>) Gosner Stg 25	Tech ³	LC50: >17.9 (NR) NOAEL: NR Slope: NR	Slightly toxic	46650501/2001	Supplemental

* a.i. = active ingredient; a.e. = acid equivalent; N.R. = not reported

¹ Range is 95% confidence interval for endpoint

²Based on LC₅₀ (mg/L): < 0.1 very highly toxic; 0.1-1 highly toxic; >1-10 moderately toxic; >10-100 slightly toxic; >100 practically nontoxic

³ Study conducted with the isopropylamine salt

Table D-8. Aquatic-Phase Amphibian Acute Toxicity for Glyphosate Formulations

Chemical	Species	% a.i.*	96-hour LC ₅₀ /NOAEC (mg a.e.*/L)/ Slope	Toxicity Category ¹	MRID #/Year	Study Classification
Glyphosate- IPA (Cosmo Flux Coca mix)	African clawed frog (<i>Xenopus laevis</i>) Larvae	18	LC ₅₀ : 1.1 (0.56 - 2.3) or 10 mg/L formulation NOAEL: 0.14 Slope: 4.92	Moderately toxic	46873601/2006	Supplemental
Glyphosate IPA (Cosmo Flux Poppy mix)	African clawed frog (<i>Xenopus laevis</i>) Larvae	0.0205	LC ₅₀ : 1.3 (0.92 - 1.8) or 16 mg/L formulation NOAEL: 0.43 Slope: NA*	Moderately toxic	46873602/2006	Supplemental
Glyphosate IPA (Roundup Original with 15% POEA)	Green Frog (<i>Rana clamitans</i>) Gosner Stg 25	NR	LC ₅₀ : 2 (1.9- 2.2) or 6.5 mg/L formulation NOAEL: NR* Slope: NR	Moderately toxic	46650501/2001	Supplemental

Table D-8. Aquatic-Phase Amphibian Acute Toxicity for Glyphosate Formulations

Chemical	Species	% a.i.*	96-hour LC ₅₀ /NOAEC (mg a.e.*/L)/Slope	Toxicity Category ¹	MRID #/Year	Study Classification
Glyphosate IPA (Roundup Transorb with 15% POEA)	Green Frog (<i>Rana clamitans</i>) Gosner Stg 25	NR	LC ₅₀ : 2.2 (2.1-2.4) or 7.2 mg/L formulation NOAEL: NR Slope: NA	Moderately toxic	46650501/2001	Supplemental
Glyphosate IPA (Roundup Original with 15% POEA)	Leopard Frog (<i>Rana pipiens</i>) Gosner Stg 25	NR	LC ₅₀ : 2.9 (NR) or 9.2 mg/L formulation NOAEL: NR Slope: NR	Moderately toxic	46650501/2000	Supplemental
Glyphosate IPA (Roundup Original with 15% POEA)	American toad (<i>Bufo americanus</i>) Gosner Stg 25	NR	LC ₅₀ : <4.0 (NR) or < 12.9 mg/L formulation NOAEL: NR Slope: NR	Moderately toxic	46650501/1994	Supplemental
Glyphosate IPA (Roundup with 15% POEA)	Wood Frog (<i>Rana sylvatica</i>) Gosner Stg 25	NR	LC ₅₀ : 5.1 (4.9-5.4) or 16.5 mg/L formulation NOAEL: NR Slope: NR	Moderately toxic	46650501/1994	Supplemental
Glyphosate IPA (Roundup 360)	Australian tree frog (<i>Litoria moorei</i>) Tadpole	30.3	LC ₅₀ : 5.6 (4.4 - 7.1) or 18.5 mg/L formulation NOAEL: N.R. Slope: N.R.	Moderately toxic	43839601/1995	Supplemental
Glyphosate IPA (Roundup Original with 15% POEA)	Leopard Frog (<i>Rana pipiens</i>) Gosner Stg 20	NR	LC ₅₀ : 6.5 (6.1-6.8) or 20.9 mg/L formulation NOAEL: NR Slope: NA	Moderately toxic	46650501/1994	Supplemental
Glyphosate IPA (Roundup Original with 15% POEA)	Green frog (<i>Rana clamitans</i>) Gosner Stg 20	NR	LC ₅₀ : 7.1 (6.6-7.6) or 22.8 mg/L formulation NOAEL: NR Slope: NR	Moderately toxic	46650501/1994	Supplemental

Table D-8. Aquatic-Phase Amphibian Acute Toxicity for Glyphosate Formulations

Chemical	Species	% a.i.*	96-hour LC ₅₀ /NOAEC (mg a.e.*/L)/Slope	Toxicity Category ¹	MRID #/Year	Study Classification
Glyphosate IPA (Roundup Original with 15% POEA)	American toad (<i>Bufo americanus</i>) Gosner Stg 20	NR	LC ₅₀ : 8 (NR) or 25.8 mg/L formulation NOAEL: NR Slope: NR	Moderately toxic	46650501/1994	Supplemental
Glyphosate IPA (Roundup Original with 15% POEA)	Wood Frog (<i>Rana sylvatica</i>) Gosner Stg 20	NR	LC ₅₀ : > 8 (NR) or > 25.8 mg/L formulation NOAEL: NR Slope: NR	Moderately toxic	46650501/1994	Supplemental
Glyphosate IPA (Glyphos AU with 3-7% POEA)	Green Frog (<i>Rana clamitans</i>) Gosner Stg 25	NR	LC ₅₀ : 8.9 (8.6-9.2) or 28.6 mg/L formulation NOAEL: NR Slope: NR	Moderately toxic	46650501/2001	Supplemental
Glyphosate IPA (Roundup Biactive with 10-20% unspecified surfactant)	Green frog (<i>Rana clamitans</i>) Gosner Stg 25	NR	LC ₅₀ : >17.9 (NR) or > 57.7 mg/L formulation NOAEL: NR Slope: NR	Slightly toxic	46650501/2001	Supplemental
Glyphosate IPA (Glyphos BIO with 3-7% POEA)	Green Frog (<i>Rana clamitans</i>) Gosner Stg 25	NR	LC ₅₀ : >17.9 (NR) or >57.7 mg/L formulation NOAEL: NR Slope: NR	Slightly toxic	46650501/2001	Supplemental
Glyphosate IPA (Roundup 360)	Australian frog (<i>Crinia insignifera</i>) Adult	30.3	LC ₅₀ : 30.4 (0-infinity) or 100.2 mg/L formulation NOAEL: N.R. Slope: N.R.	Slightly toxic	43839601/1995	Supplemental
Glyphosate IPA (Roundup 360)	Australian frog (<i>Crinia insignifera</i>) Tadpole	30.3	48 hr LC ₅₀ : 38.2 (30.2 - 48.8) or 125.9 mg/L formulation NOAEL: N.R. Slope: N.R.	Slightly toxic	43839601/1995	Supplemental

Table D-8. Aquatic-Phase Amphibian Acute Toxicity for Glyphosate Formulations

Chemical	Species	% a.i.*	96-hour LC ₅₀ /NOAEC (mg a.e.*/L)/Slope	Toxicity Category ¹	MRID #/Year	Study Classification
Glyphosate IPA (with surfactant Geronol CF/AR)	Common froglet (<i>Ranidella signifera</i>) Tadpole	45	LC ₅₀ : >450 (N.A.) or >1000 mg/L formulation NOAEL: 1000 Slope: N.A.	Practically nontoxic	44738201/1996	Supplemental
Glyphosate IPA (Roundup Biactive)	Common froglet (<i>Ranidella signifera</i>) Tadpole	36	LC ₅₀ : >360 (N.A.) or >1000 mg/L formulation NOAEL: <800 Slope: N.A.	Practically nontoxic	44738201/1996	Supplemental
Glyphosate IPA (with surfactant Geronol CF/AR)	Common froglet (<i>Ranidella signifera</i>) Tadpole	36	LC ₅₀ : >360 (N.A.) or >1000 mg/L formulation NOAEL: 1000 Slope: N.A.	Practically nontoxic	44738201/1996	Supplemental
Glyphosate IPA (with surfactant Geronol CF/AR)	Common froglet (<i>Ranidella signifera</i>) Tadpole	10	LC ₅₀ : >100 (N.A.) or >1000 mg/L formulation NOAEL: 1000 Slope: N.A.	Practically nontoxic	44738201/1996	Supplemental
* a.i. = active ingredient; a.e. = acid equivalent; IPA = isopropylamine salt, N.A. = not available, N.R. = not reported ¹Based on LC₅₀ (mg/L): < 0.1 very highly toxic; 0.1-1 highly toxic; >1-10 moderately toxic; >10-100 slightly toxic; >100 practically nontoxic ² Range is 95% confidence interval for endpoint						

Table D-9. Aquatic-Phase Amphibian Acute Toxicity for POEA Surfactant Used with Glyphosate Formulations

Chemical	Species	% a.i. ¹	96-hour LC ₅₀ /NOAEC (mg/L)/Slope	Toxicity Category ²	MRID #/Year	Study Classification
Polyoxy ethylene fatty amine (POEA or MON 0818)	Green Frog (<i>Rana clamitans</i>) Gosner Stg 25	69-73	LC ₅₀ : 2.2 (2.1-2.4) NOAEC: NR* Slope: NR	Moderately toxic	46650501/2001	Supplemental
* NR = not reported ¹ a.i. = active ingredient, assumed 100% for technical material ²Based on LC₅₀ (mg/L): < 0.1 very highly toxic; 0.1-1 highly toxic; >1-10 moderately toxic; >10-100 slightly toxic; >100 practically nontoxic ³ Range is 95% confidence interval for endpoint.						

Table D-10. Freshwater Fish Chronic Toxicity for Technical Glyphosate and Its Salts

Species	% Active Ingredient	NOAEC/LOAEC (mg acid equivalent/L)	MRID #/Year	Study Classification
Fathead minnow (<i>Pimephales promelas</i>)	87.3	25.7/>25.7 ¹	00108171/1975	Acceptable

Table D-11. Aquatic Phase Amphibian Chronic Toxicity for Technical Glyphosate IPA Salt and IPA Salt Formulations

Species	% Active Ingredient	NOAEC/LOAEC (mg acid equivalent/L)	MRID #/Year	Study Classification
Leopard Frog (<i>Rana pipiens</i>)	Tech (assumed 100%)	NOAEC/LOAEC: 1.8/>1.8	46650501/2004	Supplemental
Leopard Frog (<i>Rana pipiens</i>)	Roundup Original & Transorb 15% POEA	NOAEC/LOAEC: <0.6/0.6	46650501/2004	Supplemental

Table D-12. Aquatic-Phase Amphibian Chronic Toxicity for POEA Surfactant Used with Glyphosate Formulations

Chemical	Species	% a.i. ¹	NOAEC/LOAEC (mg a.i./L)	MRID #/Year	Study Classification
Polyoxy ethylene fatty amine (POEA or MON 0818)	Leopard Frog (<i>Rana pipiens</i>) Larvae	Tech	NOAEC/LOAEC: <0.6/0.6 [reported in units of mg acid equivalents/L]	46650501/2004	Supplemental
¹ a.i. = active ingredient, assumed 100% for technical material					

Open Literature Data for Fish and Amphibians (including some submitted studies)

Table D-13. Fish Effects From Submitted and Open Literature Studies				
Species	Chemical	NOAEC	LOAEC:Effects	MRID/ ECOTO X Reference No.
Nile tilapia (<i>O. niloticus</i>)	Roundup (48% a.e.)	Not determined	5 ppm: gills: filament cell proliferation, lamellar cell hyperplasia, lamellar fusion, epithelial lifting, and aneurysm. Liver: vacuolation of hepatocytes and nuclear pyknosis. Kidneys: dilation of Bowman's space and accumulation of hyaline droplets in the tubular epithelial cells. Significant increase in aspartate aminotransferase, alanine aminotransferase, and alkaline phosphatase activities. Decreased activity.	E096917
Nile tilapia (<i>O. niloticus</i>)	Roundup (48% a.e.)	5 ppm	15 ppm: gills: mucosal cells of laminar epithelium - loss of microridges and appearance of intercellular spaces; thickening of primary epithelium, edema, lifting and fusion of secondary lamellae – may impair respiratory function. Liver: progressive reduction and fragmentation of RER; swollen mitochondria; increases in number and sizes of lysosomes and lipid droplets; infiltration of leukocytes; increased hepatocyte size with pyknotic nuclei and presence of vacuoles. Kidney: degeneration of nuclear membrane; mitochondrial contraction and/or swelling; accumulation of large electron dense particles; increase in number and size of lysosomes and apical vacuoles; some cellular necrosis. Increased plasma aspartate and alanine aminotransferase and alkaline phosphatase activities at 15 ppm.	E096937
Topmouth gudgeon (<i>pseudorasbora parva</i>)	Glyphosate IPA salt (41%)	Not determined	1 ppm: Initial possible inhibition of liver esterase activity and then possible induction of enzyme activity. Not dose dependent.	E097111
Rainbow trout (<i>O. mykiss</i>)	Vision (356 g/L glyphosate acid with surfactant)	8 ppb	45.75 ppb: increase in wigwag behavior (one of agonistic behaviors). No effects on growth, foraging variables or antagonistic activity; no evidence of neoplasia or melanomacrophages and no increase in gill lesions at 45.75 ppb (highest concentration tested).	E097714
Rainbow trout (<i>O. mykiss</i>)	Glyphosate (assumed technical) and combinations	1.25 ppm (glyphosate alone)	Rainbow trout vitellogenin assay. Estrogenic effects. No effects with glyphosate alone. When combined with	E080643

Table D-13. Fish Effects From Submitted and Open Literature Studies				
Species	Chemical	NOAEC	LOAEC:Effects	MRID/ ECOTO X Reference No.
	with surfactants R-11 and Target Prospeador Acitvator		surfactants at 1.25 ppm, trends indicated elevated vitellogenin.	
North African catfish (<i>Clarius gariepinus</i>)	Roundup (no other identification)	Not determined	3.9 ppm: Increased plasma AST, ALP, ALT levels.	E097133
Rainbow trout (<i>O. mykiss</i>)	Technical glyphosate 95.6%	30.6 ppm	53.6 ppm: dark coloration	MRID 44320629
<i>T. rendalli</i>	Roundup® (480g/l) and surfactant	No NOAEL	42 mg/kg. Fish erythrocyte micronucleus assay. Pesticide applied by injection. Roundup induced micronuclei at 42, 85 and 170 mg/kg	E074478
Rainbow trout (<i>O. mykiss</i>)	Roundup® 143 g/L	0.01 ppm	0.1 ppm. Olfactory-mediated behavioral and neurophysiological response. Over a concentration range that does not result in acute toxicity, trout detect Roundup but do not avoid it. Above that concentration, they avoid it (≥ 10 ppm). Study found that behavioral responses may be more sensitive toxicological endpoints than neurophysiological responses.	E089625 Tierney 2007
Rainbow trout (<i>O. mykiss</i>)	Roundup® 356 g/L glyphosate IPA MON 02139	30 ppm	40 ppm. Fish tend to avoid concentrations that are lethal (40 ppm and above). 96-hr LC ₅₀ 54.8 in the lab and 52 in the field. No mortality at 2.2 kg a.e./ha, 10x and 100x field dose.	E010471
Rainbow trout (<i>O. mykiss</i>)	Vision® 356 g a.e./L with either 10% or 15% surfactant (POEA). 7.5% surfactant tested in acute study	Avoidance: 27 ppm (15%) & 75 ppm (10%) Other behavior 6.75 ppm (15%) & 18.75 ppm (10%)	96 hr LC ₅₀ : 100 ppm (7.5%); 75 ppm (10%); 27 ppm (15%). Avoidance behavior LOAEC: 150 ppm (10%); 54 ppm (15%) Other behavior LOAEC: Erratic swimming & rapid respiration 13.5 ppm (15%); erratic swimming & labored respiration 37.5 ppm (10%)	E05182
Tilapia (<i>Oreochromis niloticus</i>) Lee Koh (<i>Cyprinus carpio</i>)	Roundup® 30.5% w/w glyphosate	0.31 ppm for tilapia 1.7 ppm for Lee Koh	Tilapia: 0.55 ppm: erratic swimming. 96-hr LC ₅₀ : 2.3 ppm. Lee Koh: LC ₅₀ : 3.1 ppm. LOAEC not provided.	E03296
Piava (<i>Leporinus obtusidens</i>)	Roundup (48% glyphosate acid)	NOAEC < 1 mg/L	LOAEC = 1 mg/L Based on reduced body length & weight gain	E161803 / Salbego <i>et al.</i> 2010

Table D-13. Fish Effects From Submitted and Open Literature Studies				
Species	Chemical	NOAEC	LOAEC:Effects	MRID/ ECOTO X Reference No.
4 species juvenile Pacific salmonids (coho, chum, chinook, and pink) and rainbow trout	Glyphosate (tech); Roundup (41% GLY-IPA); MON 8709 (41% GLY-IPA); MON 0818 (75% POEA)	--	96-hr LC50 range: GLY: 10-211 mg ai/L; Roundup: 11-33 mg form/L; MON 8709: 17-67 mg form/L; MON 0818: 1.4-4.6 mg ai/L	E924/ Wan <i>et al.</i> 1989

Table D-14. Aquatic Amphibian Sublethal Effects From Submitted and Open Literature Studies				
Species	Chemical	NOAEC	LC ₅₀ or LOAEC:Effects	MRID/ ECOTOX Ref. No.
Green frog (<i>Rana pipiens</i>)	Vision® (contains POEA surfactant)	Not determined for mortality	LOAEC for mortality: 0.75 ppm a.e. at pH 7.5. Note: higher pH (7.5) versus 5.5 increases acute toxicity	E072794
African clawed frog (<i>Xenopus laevis</i>)	Rodeo® (480 g a.e./L no surfactant) Roundup® (356 g ae/L with POEA surfactant)	5 ppm a.e. (Roundup®) and 2000 ppm a.e. (Rodeo®)	Frog embryo teratogenesis assay. LC ₅₀ 's: POEA (6.8 ppm), Roundup® (9.3 ppm a.e.), Rodeo® (7297 ppm a.e.). No significant increases in embryo malformations for either formulation.	E053090
<i>Crinia insignifera</i> , <i>Heleioporus eyrei</i> , <i>Limnodynastes dorsalis</i> , and <i>Litoria moorei</i>	Glyphosate, glyphosate IPA, Roundup®, Touchdown® and Roundup® Biactive	N/A	48-hr acute LC ₅₀ 's (formulations) for tadpoles, metamorphs and adults between 2.9 and >360 mg a.e./L with Roundup® (MON 2139) as the most toxic formulation to Roundup® Biactive as the least toxic formulation. Glyphosate IPA salt alone (LC ₅₀ : 466 mg a.e./L) less toxic than glyphosate acid (LC ₅₀ : 81.2 – 121 mg a.e./L), probably due to acid intolerance. Slight differences in species sensitivity <i>L moorei</i> tadpoles more sensitive than other tadpoles; adult and new metamorphs less sensitive than tadpoles.	E071857
Leopard frog (<i>Rana pipiens</i>), Green frog, (<i>Rana clamitans</i>) American toad, (<i>Bufo americanus</i>), African clawed frog	Vision® (contains POEA surfactant)	N/A	96-hr acute studies. Toxicity enhanced by elevated pH with Surfactant POEA (15%) hypothesized as major source of pH interaction. LC ₅₀ 's (mg a.e./L) pH 6.0 pH 7.5 Leopard frog embryo* 15.1 7.5 Leopard frog larvae* 1.8 1.1 Green frog embryo 5.3 4.1 Green frog larvae 3.5 1.4	E072795

Table D-14. Aquatic Amphibian Sublethal Effects From Submitted and Open Literature Studies				
Species	Chemical	NOAEC	LC ₅₀ or LOAEC:Effects	MRID/ ECOTOX Ref. No.
(<i>Xenopus laevis</i>)			American toad embryo 4.8 6.4 American toad larvae 2.9 1.7 African clawed frog embryo 15.6 7.9 African clawed frog larvae 2.1 0.88 *Gosner 8-25 = embryo, Gosner 25 = larvae Growth inhibition in surviving frogs observed with clawed frog, green frog and leopard frog	
<i>Scinax nasicus</i> tadpoles Gosner stages 25-26 (prometamorphic)	Glyphos (48% IPA + 15% POEA)	N/A	96-hr acute LC ₅₀ : 2.64 mg glyphos/L (1.95 mg a.e./L). Malformations (craniofacial and mouth deformities, eye abnormalities and bent curved tails) increase with increased time and mortality.	E071969
Western chorus frog (<i>Pseudacris triseriata</i>) and Plains leopard frog (<i>Rana blairi</i>) tadpoles Gosner stage 25	Kleeraway Grass and Weed Killer RTU (IPA 0.75%, surfactant – ethoxylated tallowamine).		Concentration levels 750, 75, 7.5 or 0.75 ppm IPA. 24-hr exposure period. No frogs survived 7.5 – 750 ppm. Western chorus frogs slightly more sensitive. No effect on growth or final Gosner stage.	E61464
<i>Rana cascadae</i> larvae	Roundup® 50.2%	Not determined for time to metamorphosis	LOAEL 1 ppm. Concentration levels 0.96 and 1.94 ppm for 43 days. None survived to metamorphosis at 1.94 ppm (mean time 7.5 days). Bent tails and slow swimming ability before death. Metamorphosis occurred more rapidly in treated frogs with decreased size and mass. Unclear from this study if LOAEL is in terms of a.e.	E096423
6 amphibian species endemic to the Pacific Northwest (2 salamanders, 1 toad, 3 frogs)	Roundup Regular (50.2% GLY-IPA)	NA	24-h LC ₅₀ = 0.43 – 2.6 mg ai/L 7-d LC ₅₀ = 0.32 – 2.08 15-d LC ₅₀ = 0.30-1.95	E161728 / King and Wagner 2010
American Toad (<i>Bufo americanus</i>)	Roundup WeatherMax (48.8% glyphosate potassium salt)	NOAEC = 0.5 mg a.e./L	LOAEC = 0.572 mg a.e./L based on delayed time to metamorphosis	E153825 / Williams and Semlitsch 2010
Western chorus frog (<i>Pseudoacris triseriata</i>)	Roundup WeatherMax (48.8% glyphosate potassium salt) & Roundup Original (48.7% glyphosate potassium salt)	NOAEC = 0.5 mg a.e./L	LOAEC = 0.572 mg a.e./L based on delayed time to metamorphosis for both formulations and for survival for WeatherMax formulation	E153825 / Williams and Semlitsch 2010

Table D-15. Freshwater Invertebrates Acute Toxicity for Technical Glyphosate*

Species	% a.i.*	48-hour EC ₅₀ - LC ₅₀ /NOAEC (mg a.e./L)*/ Slope	Toxicity Category ¹	MRID #/Year	Study Classification
Midge (<i>Chironomus plumosus</i>)	96.7	LC ₅₀ : 53.2 (30.0 - 93.8) ² NOAEC: N.R. Slope: N.R.	Slightly toxic	00162296/1979	Acceptable
Water flea (<i>Daphnia magna</i>)	95.6	EC ₅₀ : 128.1 (95.6 - 172.1) NOAEC: 95.6 Slope: N.R.	Practically nontoxic	44320631/1995	Acceptable
Water flea (<i>Daphnia magna</i>)	83	EC ₅₀ : 647.4 (577.7 - 725.4) NOAEC: 464.8 Slope: N.R.	Practically nontoxic	00108172/1978	Acceptable
* No technical glyphosate salts were tested; a.i. = active ingredient; a.e. = acid equivalent, N.R. = not reported ¹Based on LC₅₀ (mg/L): < 0.1 very highly toxic; 0.1-1 highly toxic; >1-10 moderately toxic; >10-100 slightly toxic; >100 practically nontoxic ² Range is 95% confidence interval for endpoint					

Table D-16. Freshwater Invertebrates Acute Toxicity for Glyphosate Formulations

Chemical	Species	% a.i.*	48-hour EC ₅₀ - LC ₅₀ /NOAEC (mg a.e./L)*/ Slope	Toxicity Category ¹	MRID #/Year	Study Classification
Glyphosate IPA - Roundup	Water flea (<i>Daphnia magna</i>)	41.36	EC ₅₀ : 1.6 (1.4 - 1.9) ² NOAEC: 0.6 Slope: 5.4	Moderately toxic	00070893/1980	Acceptable
Glyphosate IPA	Water flea (<i>Daphnia magna</i>)	30.3	EC ₅₀ : 2.2 (1.9 - 2.5) NOAEC: N.R. Slope: N.R.	Moderately toxic	00162296/1979	Acceptable
Glyphosate IPA (MON65005)	Water flea (<i>Daphnia magna</i>)	31.32	EC ₅₀ : 2.7 (2.3 - 3.1) NOAEC: 1.3 Slope: 6.2	Moderately toxic	44538201/1998	Acceptable

Table D-16. Freshwater Invertebrates Acute Toxicity for Glyphosate Formulations

Chemical	Species	% a.i.*	48-hour EC ₅₀ - LC ₅₀ /NOAEC (mg a.e./L)* / Slope	Toxicity Category ¹	MRID #/Year	Study Classification
Glyphosate IPA (MON 77360)	Waterflea (<i>Daphnia magna</i>)	30.0	EC ₅₀ : 3.2 (2.9 - 3.7) NOAEC: 0.8 Slope: NA	Moderately toxic	45365004/2000	Acceptable
Glyphosate IPA	Crayfish (<i>Orconectes nais</i>)	30.3	LC ₅₀ : 5.2 (4.1 - 6.4) NOAEC: N.R. Slope: N.R.	Moderately toxic	40098001/1986	Supplemental
Glyphosate IPA (Roundup)	Water flea (<i>Daphnia pulex</i>)	30.3	EC ₅₀ : 5.8 (5.3 - 6.4) NOAEC: N.R. Slope: N.R.	Moderately toxic	44125714/1984	Supplemental
Glyphosate IPA (Roundup)	Scud (<i>Gammarus pseudolimnaeus</i>)	31	LC ₅₀ : 13 (9.6 - 19.2) NOAEC: 1.4 Slope: 2.33	Slightly toxic	00124762/1982	Supplemental
Glyphosate IPA	Midge (<i>Chironomus plumosus</i>)	30.3	LC ₅₀ : 13.3 (7.0 - 23.7) NOAEC: N.R. Slope: N.R.	Slightly toxic	00162296/1979	Acceptable
Glyphosate (80WDG formulation)	Water flea (<i>Daphnia magna</i>)	80	EC ₅₀ : >17.6 (N.A.) NOAEC: 17.6 Slope: N.A.	Slightly toxic	44125706/1996	Supplemental
Glyphosate IPA (Roundup with "W" surfactant)	Water flea (<i>Daphnia magna</i>)	40.7	EC ₅₀ : 21.7 (18.7 - 25.0) NOAEC: N.R. Slope: N.R.	Slightly toxic	00078657/1980	Acceptable
Glyphosate monoammonium salt (MON 14420)	Daphnia (<i>Daphnia magna</i>)	68.5	EC ₅₀ : 28.8 (12.3 - 48.5) NOAEC: 12.3 Slope: N.R.	Slightly toxic	45777401/1999	Acceptable

Table D-16. Freshwater Invertebrates Acute Toxicity for Glyphosate Formulations

Chemical	Species	% a.i.*	48-hour EC ₅₀ - LC ₅₀ /NOAEC (mg a.e./L)*/ Slope	Toxicity Category ¹	MRID #/Year	Study Classification
Glyphosate IPA	Scud (<i>Gammarus pseudolimnaeus</i>)	30.3	LC ₅₀ : 31.8 (20.7 - 48.8) NOAEC: N.R. Slope: N.R.	Slightly toxic	00162296/1979	Acceptable
Glyphosate IPA (X-77 surfactant)	Water flea (<i>Daphnia magna</i>)	5.27	EC ₅₀ : >39 (N.R.) NOAEC: 21.8 Slope: N.A.	Slightly toxic	00078666/1980	Supplemental
Glyphosate (360 g/L SL formulation)	Water flea (<i>Daphnia magna</i>)	27.25	EC ₅₀ : 44.8 (38.0 - 52.0) NOAEC: 26 Slope: 7.6	Slightly toxic	45374003/1999	Acceptable
Glyphosate IPA	Water flea (<i>Daphnia pulex</i>)	48	EC ₅₀ : 68.3 (64.3 - 72.8.) NOAEC: <21.3 Slope: 3.9	Slightly toxic	00108109/1973	Supplemental
Glyphosate (Roundup with "AA" surfactant)	Water flea (<i>Daphnia magna</i>)	41.2	EC ₅₀ : 94.5 (76.3 - 122.0) NOAEC: 17.1 Slope: 3.5	Slightly toxic	00078660/1980	Acceptable
Glyphosate IPA (Roundup Biactive)	Water flea (<i>Daphnia carinata</i>)	36	EC ₅₀ : 150 (151 - 179) NOAEC: 45 Slope: N.R.	Practically nontoxic	44738201/1996	Not classified
Trisodium diglyphosate/Urea (Polado formula - MON 8000)	Water flea (<i>Daphnia magna</i>)	75	LC ₅₀ : >315 (N.R.) NOAEC: 315 Slope: N.R.	Practically nontoxic	00079147/1980	Supplemental
Glyphosate IPA with surfactant Geronol CF/AR	Water flea (<i>Daphnia carinata</i>)	45	EC ₅₀ : 365 (315 - 420) NOAEC: 190 Slope: N.R.	Practically nontoxic	44738201/1996	Not classified

Table D-16. Freshwater Invertebrates Acute Toxicity for Glyphosate Formulations

Chemical	Species	% a.i.*	48-hour EC ₅₀ - LC ₅₀ /NOAEC (mg a.e./L)*/ Slope	Toxicity Category ¹	MRID #/Year	Study Classification
Glyphosate IPA (no surfactant)	Water flea (<i>Daphnia magna</i>)	62.4	EC ₅₀ : 401.3 (347.7 - 470.5) NOAEC: 147.8 Slope: 7.6	Practically nontoxic	00078663/1981	Acceptable
Glyphosate IPA with surfactant Geronol CF/AR	Water flea (<i>Daphnia carinata</i>)	36	EC ₅₀ : 610 (540 - 700) NOAEC: 135 Slope: N.R.	Practically nontoxic	44738201/1996	Not classified
Glyphosate IPA with surfactant Geronol CF/AR	Water flea (<i>Daphnia carinata</i>)	10	EC ₅₀ : 810 (700 - 940) NOAEC: 400 Slope: N.R.	Practically nontoxic	44738201/1996	Not classified
Glyphosate IPA (MON77945 Manufacturing concentrate)	Water flea (<i>Daphnia magna</i>)	46	EC ₅₀ : 833 (665 - 1253) NOAEC: 204 Slope: 3.7	Practically nontoxic	44715410/1998	Not classified
* a.i. = active ingredient; a.e. = acid equivalent; IPA = isopropylamine salt ¹Based on LC₅₀ (mg/L): < 0.1 very highly toxic; 0.1-1 highly toxic; >1-10 moderately toxic; >10-100 slightly toxic; >100 practically nontoxic ² Range is 95% confidence interval for endpoint						

Table D-17. Freshwater Invertebrates Acute Toxicity for Surfactants Used with Glyphosate Formulations

Chemical	Species	% a.i.*	48-hour EC ₅₀ - LC ₅₀ /NOAEC (mg/L)/Slope	Toxicity Category ¹	MRID #/Year	Study Classification
Surfactant Geronol CF/AR (alkyl polyoxy ethylene phosphoric acid ester)	Daphnia (<i>Daphnia magna</i>)	Tech.	EC ₅₀ : 48 NOAEC: Slope: N.A.	Slightly toxic	44738201/1996	Not classified
MON 0818 (POEA)	Midge (<i>Chironomus plumosus</i>)	70 ³	48-hr LC ₅₀ : 9.1 (4.97-16.8)	Slightly toxic	00162296/1979; MON 0818 LC ₅₀ : 13 mg/L	Acceptable

* a.i. = active ingredient, assumed 100% for technical.

¹Based on LC₅₀ (mg/L): < 0.1 very highly toxic; 0.1-1 highly toxic; >1-10 moderately toxic; >10-100 slightly toxic; >100 practically nontoxic

² Range is 95% confidence interval for endpoint

³ Based on information provided by Registrant, the test material, MON 0818, contains 70% POEA; (comment from Monsanto Co. September 21, 2009; www.regulations.gov , Docket ID EPA-HQ-OPP-2009-0361-0013

Table D-18. Freshwater Invertebrates Acute Toxicity for Aminomethyl Phosphonic Acid (AMPA) Degradate of Glyphosate

Chemical	Species	% a.i. ¹	48-hour LC ₅₀ /NOAEC (mg/L)/Slope	Toxicity Category ²	MRID #/Year	Study Classification
AMPA	Water flea (<i>Daphnia magna</i>)	94.38	EC ₅₀ : 683 (553 - 1010) NOAEC: 320 Slope: N.A.	Practically nontoxic	43334715/1994	Acceptable

¹ a.i. = active ingredient, assumed 100% for technical material

²Based on LC₅₀ (mg/L): < 0.1 very highly toxic; 0.1-1 highly toxic; >1-10 moderately toxic; >10-100 slightly toxic; >100 practically nontoxic

³ Range is 95% confidence interval for endpoint, N.A. = not available

Table D-19. Freshwater Invertebrates Chronic Toxicity for Technical Glyphosate IPA Salt

Species	% Active Ingredient	NOAEC/LOAEC (mg acid equivalent/L)	MRID #/Year	Study Classification
Water flea (<i>Daphnia magna</i>)	99.7	49.9/95.7	00124763/1982	Acceptable

Table D-20. Estuarine/marine Invertebrates Acute Toxicity for Technical Glyphosate

Species	% a.i.*	48-hour EC ₅₀ - LC ₅₀ /NOAEC (mg a.e./L)*/ Slope	Toxicity Category ¹	MRID #/Year	Study Classification
Pacific oyster (<i>Crassostrea gigas</i>)	96	48-hr EC ₅₀ : 40 (31-53) NOAEC: 32 Slope: NA	Slightly toxic	44320634 /1996	Acceptable
Mysid shrimp (<i>Americamysis bahia</i>)	96	96-hr LC ₅₀ : 79 (63-99) NOAEC: 32 Slope: 8.5	Slightly toxic	44320633 /1996	Acceptable

a.i. = active ingredient; a.e. = acid equivalent, N.R. = not reported

¹Based on LC₅₀ (mg/L): < 0.1 very highly toxic; 0.1-1 highly toxic; >1-10 moderately toxic; >10-100 slightly toxic; >100 practically nontoxic

² Range is 95% confidence interval for endpoint

Table D-21. Estuarine/marine Invertebrates Acute Toxicity for Glyphosate Formulations

Chemical	Species	% Active Ingredient *	96-hour LC ₅₀ NOAEC (mg a.e./L)*/ Slope ¹	Toxicity Category ²	MRID #/ Year	Study Classification
MON 2139	Eastern oyster (<i>Crassostrea virginica</i>)	30.75 a.e.	96-hr IC ₅₀ : 1.06 mg a.e./L (0.846-1.33); 3.45 mg formulation/L (2.75-4.33) ² NOAEC: 0.51 Slope: NA	Moderately toxic	48934201 / 2012	Acceptable
MON 2139	Mysid shrimp (<i>Americamysis bahia</i>)	30.75 a.e.	96-hr LC ₅₀ : 0.765 mg a.e./L (0.601-0.909); 2.45 mg formulation/L (1.95-2.96) ² NOAEC: 0.51 Slope: 10.4 (5.46-15.3)	Highly toxic	48934202 / 2012	Acceptable
MON 2139	White shrimp (<i>Litopenaeus vannamei</i>)	30.87 a.e.	96-hr LC ₅₀ : 54 mg a.e./L (33-134); 175 mg formulation/L (107-434) ² NOAEC: 5.2 Slope: 1.33	Slightly toxic	48934203/ 2012	Acceptable

MON 2139	Eastern oyster (<i>Crassostrea virginica</i>)	30.75 ae	48-hr EC ₅₀ : 0.93 mg a.e./L (0.87-1.0); 3.0 mg formulation/L (2.8-3.3) NOAEC: 0.48	Highly toxic	48934204 / 2012	Acceptable
Glyphosate SL formulation	Pacific oyster (<i>Crassostrea gigas</i>)	28.3 a.e.	48-hr LC ₅₀ : 23.2 mg a.e./L; 82 mg formulation/L Slope: NR NOAEC: 28.6 mg formulation/L	Slightly toxic	45374006/2000	Acceptable
* a.i. = active ingredient; a.e. = acid equivalent; N.R. = not reported ¹ Range is 95% confidence interval for endpoint ²Based on LC₅₀ (mg/L): < 0.1 very highly toxic; 0.1-1 highly toxic; >1-10 moderately toxic; >10-100 slightly toxic; >100 practically nontoxic						

Open Literature Data for Aquatic Invertebrates

Table D-22. Open Literature Glyphosate Toxicity Studies on Aquatic Invertebrates			
Species	Chemical Form	Endpoint(s)	ECOTOX Ref. No.
Pacific oyster (<i>Crassostrea gigas</i>)	Glyphosate acid (97%); Roundup Express (7.2 g ae/L); AMPA (97.5%)	48 hr EC ₅₀ mollusk abnormality rates, mortality rates, metamorphosis rate (GLY, AMPA, and GLY-express formulation) All values based on nominal GLY = 28.3 mg ae/L (abnorm), >100 mg ae/L (mort, meta) AMPA = 40.6 mg ae/L (abnorm), >100 mg ae/L (mort, meta) GLY-express = 1.13 (abnorm), 8.5 (mort); 6.37 (meta) mg ae/L	E161544 / Mottier <i>et al.</i> 2013
Freshwater snail (<i>Pomaea lineatua</i>)	Roundup (480 g/L glyphosate monoisopropylamine gly-IPA)	Weight gain – two studies ; 1 st = 8 day LOEC/NOEC 0.12/<0.12 mg formulation/L ; 2 nd = 16 day LOEC/NOEC = 2.4/1.2 mg formulation/L (6 reps w/15/rep)	E107038 / Coler <i>et al</i> 2005
Freshwater snail (<i>Biomphalaria alexandrina</i>)	Roundup (120 g ae/L)	3 different studies: 1 – 24-hr LC ₅₀ = 3.15 mg formulation/L; 2 – At 0.85 mg formulation/L, after 5 weeks 100% mortality, effects on # eggs, hatchability, and Increased abnormal eggs, no eggs after 4 weeks; 3 – after 4 weeks changes in glycogen, AchE, ALP, GOT and others at 0.85 mg formulation/L	E161199 / Barky <i>et al</i> 2012
<i>Daphnia magna</i>	Glyphosate monoisopropylamine (GYL-IPA) (40%);	48-h EC ₅₀ 1.4 – 7.2 mg ai/L (tech); 3.7-10.6 mg ai/L (form) Chronic: technical GYL fecundity NOAEC = 0.45 mg	E161204 / Cuhra <i>et al.</i> 2013

	Roundup Weed & Grass Killer concentrate Plus (18% ae; 0.73% diquat-dibromide)	ai/L; Formulation fecundity NOAEC = 0.15 mg a.i./L (<0.05 mg ai/L (F1 growth) (form)	
Sediment-dwelling amphipod (<i>Hyalella azteca</i>)	Rodeo (GLY-IPA; % ae NR); Roundup (% ae NR); Roundup Biactive (% ae NR)	Water column 48-hr LC ₅₀ (mg a.e./L) (95% CI): Rodeo: 225 (151-336); Roundup Biactive: 120 (80.6-180) Roundup: 1.5 (1.0-2.3)	Tsui and Chu 2004
<i>Ceriodaphnia dubia</i>	Rodeo (GLY-IPA; % ae NR); Roundup (% ae NR); Roundup Biactive (% ae NR)	Water column 48-hr LC ₅₀ (mg a.e./L) (95% CI): Rodeo: 415 (339-508); Roundup Biactive: 81.5 (67.1-99.2) Roundup: 5.7 (could not be calculated)	E74234/ Tsui and Chu 2004
Sediment-dwelling blackworm (<i>Lumbriculus variegatus</i>)	Glyphosate acid (98%); Roundup Ultra (GLY-IPA, 360 g/L)	96-hr Water column BCF: worms exposed to 0.05 – 5 mg ae/L for both technical and formulation; Tech BCFs: 1.2 – 2.8 Roundup BCFs: 1.4-5.9	E115572 Contardo-Jara <i>et al.</i> 2009
Freshwater mussel (<i>Lampsilis siliquioda</i>)	Glyphosate acid; Glyphosate IPA; IPA; Aqua Star; Roundup	48-hr EC ₅₀ (mg a.e./L (95% CI) GLY: >200; GLY-IPA: 5.0 (3.3-7.6); IPA: 4.6 (1.9-11.1); Aqua Star: >148 Roundup: 2.9 (2.1-3.9)	E100687 / Bringolf <i>et al.</i> 2007
Copepod (<i>Acartia tonsa</i>)	Glyphosate acid; Glyphosate IPA; Roundup	48-hr LC ₅₀ (mg ae/L) (95% CI) GLY acid: 35.3 (30.9-40.3); GLY-IPA: 49.3 (38.4-63.1); Roundup: 1.77 (1.33-2.34)	Tsui and Chu 2003

Aquatic Plants

Table D-23. Aquatic Vascular and Nonvascular Freshwater Plant Toxicity Studies for Technical Glyphosate				
Species	% Active Ingredient*	EC₅₀ NOAEC (mg a.e./L)*/ Slope	MRID #/Year	Study Classification
Vascular Plants				
Duckweed (<i>Lemna gibba</i>)	95.6	14-day EC ₅₀ : 11.9 (9.4-14.9) NOAEC: 1.3 Slope: N.R.	44320638/1996	Supplemental
Duckweed (<i>Lemna gibba</i>)	96.8	7-day EC ₅₀ : 23.2 (20.3 - 27.1) NOAEC: 7.3 Slope: 2.91	45773101/2002	Acceptable
Duckweed (<i>Lemna gibba</i>)	96.6	14-day EC ₅₀ : 20.8 (N.R.) NOAEC: <1.8 Slope: N.R.	40236905/1987	Acceptable
Non-vascular Plants				
Green algae (<i>Selenastrum capricornutum</i>)	96.6	4-day EC ₅₀ : 12.1 (11.5 - 12.9) NOAEC: N.R. Slope: 12	40236901/1987	Acceptable
Bluegreen algae (<i>Anabaena flos-aquae</i>)	96.6	4-day EC ₅₀ : 11.4 (10.5 - 12.1) NOAEC: N.R. Slope: 3.53	40236904/1987	Acceptable
Green algae (<i>Selenastrum capricornutum</i>)	95.6	5-day EC ₅₀ : 13.4 (9.6 - 19.1) NOAEC: 9.6 Slope: N.R.	44320637/1995	Acceptable
Bluegreen algae (<i>Anabaena flos-aquae</i>)	95.6	5-day EC ₅₀ : 14.3 (9.3 - 25.8) NOAEC: 11.5 Slope: N.R.	44320639/1996	Acceptable
Freshwater diatom (<i>Navicula pelliculosa</i>)	95.6	5-day EC ₅₀ : 16.3 (11.5 - 22.9) NOAEC: 1.7 Slope: N.R.	44320641/1996	Acceptable
Freshwater diatom (<i>Navicula pelliculosa</i>)	96.6	7-day EC ₅₀ : 37.3 (34.8 - 41.5) NOAEC: 18.5 Slope: 5.87	40236902/1987	Acceptable
* a.i. = active ingredient; a.e. = acid equivalent; N.R. = Not reported				
¹ Range is 95% confidence interval for endpoint				

Table D-24 Aquatic Vascular and Nonvascular Freshwater Plant Toxicity Studies for Glyphosate Formulations

Chemical	Species	% a.i.*	EC ₅₀ /NOAEC (mg a.e.*/L)/Slope	MRID #/Year	Study Classification
Vascular Plants					
Glyphosate IPA salt* (glyphos (glyphosate product))	Duckweed (<i>Lemna gibba</i>)	31.0	7-Day EC ₅₀ : 7.7 (7.1 - 8.3) ¹ NOAEC: 0.29 Slope: 4.76	45666704/2001	Acceptable
Glyphosate IPA salt (Roundup 41%)	Duckweed (<i>Lemna minor</i>)	30.3	14-day EC ₅₀ : 1.5 (N.R.) NOAEC: N.R. Slope: N.R.	44125714/1984	Supplemental
Glyphosate IPA salt (TEP Roundup)	Duckweed (<i>Lemna minor</i>)	NR	48 hr. EC ₅₀ : >16.91 (N.A.) NOAEC: 16.91 Slope: N.A.	44125713/1989	Supplemental
Glyphosate IPA salt	Duckweed (<i>Lemna minor</i>)	N.R.	14-day EC ₅₀ : 2.0 (N.R.) NOAEC: N.R. Slope: N.R.	44125714/1984	Supplemental
Nonvascular Plants					
Glyphosate monoammonium salt (MON 14420)	Green algae (<i>Selenastrum capricornutum</i>)	68.5	72-hr EC ₅₀ : 1.85 (1.3 - 2.3) NOAEC: 0.61 Slope: N.R.	45777403/1999	Supplemental
Glyphosate monoammonium salt (MON78568)	Green algae (<i>Selenastrum capricornutum</i>)	64.9	72-hr EC ₅₀ : 11.2 (10 - 12.6) NOAEC: 1.58 Slope: N.R.	45767102/2002	Supplemental
Glyphosate IPA salt with surfactant Geronol CF/AR	Green algae (<i>Selenastrum capricornutum</i>)	36	72-hr EC ₅₀ : 97 (85 - 111) NOAEC: 73 Slope: N.A.	44738201/1996	Supplemental
Glyphosate IPA salt with surfactant Geronol CF/AR	Green algae (<i>Selenastrum capricornutum</i>)	36	72-hr EC ₅₀ : 39 (33 - 45) NOAEC: 16 Slope: N.A.	44738201/1996	Supplemental
Glyphosate (glyphos)	Freshwater diatom (<i>Navicula pelliculosa</i>)	31.0	96-hr EC ₅₀ : 0.12 (0.11 - 0.13) NOAEC: 0.082 Slope: 8.78	45666701/2001	Acceptable
Glyphosate IPA salt (glyphos (glyphosate product))	Green algae (<i>Selenastrum capricornutum</i>)	31.0	96-hr EC ₅₀ : 0.68 (0.57 - 0.81) NOAEC: 0.43 Slope: 4.47	45666702/2001	Acceptable
* a.i. = active ingredient; a.e. = acid equivalent; IPA = isopropylamine salt; NR = not reported; NA = not available					
¹ Range is 95% confidence interval for endpoint					

Table D-25. Aquatic Nonvascular Freshwater Plant Toxicity Studies on Glyphosate Mixtures					
Chemical	Species	% a.i.*	EC ₅₀ /NOAEC (mg a.e.*/L)/Slope	MRID #/Year	Study Classification
Nonvascular Plants					
Glyphosate acid-equivalent (IPA)/Oxyfluorfen mix	Green algae (<i>Selenastrum capricornutum</i>)	32	96-hr EC ₅₀ : 0.0026 (0.0021 - 0.0033) ¹ NOAEC: 0.00045 Slope: 3.96	45906008/2001	Acceptable
* a.i. = active ingredient; a.e. = acid equivalent; IPA = isopropylamine salt; ¹ Range is 95% confidence interval for endpoint					

Open Literature Data for Aquatic Plants

Table D-26. Open literature glyphosate toxicity studies on aquatic plants			
Species	Chemical Form	Endpoint(s)	ECOTOX Ref. No.
<i>Chlorella pyrenoidosa</i>	Tech Glyphosate (95%, unsure if acid or IPA)	96-hr EC ₅₀ : 3.530 mg/L	E61983/ Ma <i>et.al</i> 2001,
<i>Chlorella vulgaris</i>	Tech Glyphosate (95%, assumed to be acid)	96 hr. EC ₅₀ : 4.70 mg/L	E65938/ Ma <i>et al.</i> , 2002
<i>Raphidocelis subcapitata</i> (<i>Selenastrum capricornutum</i>)	Tech Glyphosate (95%, assumed to be acid)	96 hr. EC ₅₀ : 5.56 mg/L	E83543/ Ma <i>et al.</i> , 2006
8 non-vascular species	Roundup 360 SL (% ai NR); Glyphosate acid (% ae NR); Glyphosate isopropylamine (40%)	21-d EC ₅₀ (growth rate) Roundup = 2.9-118 mg formulation/L Glyphosate acid = 246 - >169,000 mg ae/L GLY-IPA = 7.1-233 mg ai/L	E161695 / Lipok <i>et al.</i> 2010
<i>Lemna minor</i>	Sting Pro 2 (400 g a.i./L; glyphosate acid)	96-hr Growth rate inhibition compared to control significant ≥ 20 uL ae/L, inhibition did not exceed 25%; photosynthetic parameters inhibited at ≥20 uL ae/L, inhibition did not exceed 10%, no NOAEC	E156171 / Dosnon-Olette <i>et al.</i> 2011
Rooted vascular plant <i>Myriophyllum aquaticum</i>	Glyphosate (35.6% emulsifiable concentrate)	14-d EC ₅₀ Most sensitive endpoint = 0.221 mg/L (area under growth curve); fresh wt, shoot length and root length EC ₅₀ all about 2 mg/L	E150059 / Turgut <i>et al.</i> 2002

Birds

Table D-27. Avian Acute Toxicity for Technical Glyphosate						
Chemical	Species	% a.i. ¹	LD ₅₀ / LC ₅₀ NOAEL/ NOAEC (mg a.e./kg bw or ppm a.e.) ¹	Toxicity Category ²	MRID #/ Year	Study Classification
Glyphosate	Bobwhite quail (<i>Colinus virginianus</i>)	83	LD ₅₀ : >3196.3 mg a.e./kg bw	Practically nontoxic	00108204	Acceptable
Glyphosate	Mallard duck (<i>Anas platyrhynchos</i>)	98.5	LC ₅₀ : >4570.4 (N.A.) PPM NOAEC: 4570.4	Slightly toxic	108107/37765/1973	Acceptable
Glyphosate	Bobwhite quail (<i>Colinus virginianus</i>)	98.5	LC ₅₀ : >4570 (N.R.) PPM NOAEC: 4570	Slightly toxic	00076492/1973	Acceptable
Glyphosate	Bobwhite quail (<i>Colinus virginianus</i>)	95.6	LD ₅₀ : >1912 (N.A.) mg/kg bw NOAEL: 1912	Slightly toxic	44320626/1997	Acceptable
Glyphosate	Mallard duck (<i>Anas platyrhynchos</i>)	95.6	LC ₅₀ : >4971.2 (N.A.) PPM NOAEC: 4971.2	Slightly toxic	44320627/1998	Acceptable
Glyphosate	Bobwhite quail (<i>Colinus virginianus</i>)	95.6	LC ₅₀ : >4971.2 (N.A.) PPM NOAEC: 4971.2	Slightly toxic	44320628/1997	Acceptable
Glyphosate	Canary (<i>Serinus canaria</i>)	96	LD ₅₀ : >2,000 ED ₅₀ (based on regurgitation): 2819 NOAEL: 2000 (visually observed)	Practically nontoxic	4893406 / 2012	Acceptable
¹ a.i. = active ingredient; a.e. = acid equivalent ² Based on LC ₅₀ (ppm): < 50 very highly toxic; 50 - 500 highly toxic; 501 - 1000 moderately toxic; 1001-5000 slightly toxic; >5000 practically non-toxic; based on LD ₅₀ (mg/kg bw): < 10 very highly toxic; 10 - 50 highly toxic; 51 - 500 moderately toxic; 501-2000 slightly toxic; >2000 practically non-toxic ³ Range is 95% confidence interval for endpoint, N.A. = not available, N.R. = not reported						

Table D-28. Avian Acute Toxicity for Glyphosate Formulations

Chemical	Species	% a.i. ¹	LD ₅₀ / LC ₅₀ NOAEL/ NOAEC (mg a.e./kg bw or ppm a.e.) ¹	Toxicity Category ²	MRID #/Year	Study Classification
Trisodium diglyphosate/Urea (Polado formula; MON 8000)	Bobwhite quail (<i>Colinus virginianus</i>)	75	LD ₅₀ : >780 (N.R.) PPM NOAEC: 780	Slightly toxic	00085638/1980	Supplemental
Trisodium diglyphosate/Urea (Polado formula; MON 8000)	Bobwhite quail (<i>Colinus virginianus</i>)	75	LC ₅₀ : >1770 (N.R.) PPM NOAEC: 1770	Slightly toxic	00085639/1981	Supplemental
Trisodium diglyphosate/Urea (Polado formula; MON 8000)	Mallard duck (<i>Anas platyrhynchos</i>)	75	LC ₅₀ : >1770 (N.R.) PPM NOAEC: 315	Slightly toxic	00085640/1980	Supplemental
Glyphosate monoammonium salt (MON 14420)	Bobwhite quail (<i>Colinus virginianus</i>)	68.5	LD ₅₀ : 1131 (925 - 1541) mg/kg bw NOAEL: 333 (decreases in bw and food consumption at 555 mg/kg bw)	Slightly toxic	45777402/1999	Acceptable
Glyphosate isopropylamine salt (MON65005)	Mallard duck (<i>Anas platyrhynchos</i>)	31.32	LC ₅₀ > 1760 (N.A.) PPM NOAEC: 1760	Slightly toxic	44465701/1997	Acceptable
Glyphosate isopropylamine salt (MON65005)	Bobwhite quail (<i>Colinus virginianus</i>)	31.32	LC ₅₀ > 1760 (N.A.) PPM NOAEC: 1760	Slightly toxic	44465702/1997	Acceptable

¹ a.i. = active ingredient; a.e. = acid equivalent

²Based on LC₅₀ (ppm): < 50 very highly toxic; 50 - 500 highly toxic; 501 - 1000 moderately toxic; 1001-5000 slightly toxic; >5000 practically non-toxic; based on LD₅₀ (mg/kg bw): < 10 very highly toxic; 10 - 50 highly toxic; 51 - 500 moderately toxic; 501-2000 slightly toxic; >2000 practically non-toxic

³ Range is 95% confidence interval for endpoint, N.A. = not available, N.R. = not reported

Table D-29. Avian Acute Toxicity for Aminomethyl Phosphonic Acid (AMPA) Degradate of Glyphosate

Chemical	Species	% a.i. ¹	LD ₅₀ / LC ₅₀ NOAEL/ NOAEC (mg a.e./kg bw or ppm a.e.)/ Slope ¹	Toxicity Category ²	MRID #/Year	Study Classification
AMPA	Bobwhite quail (<i>Colinus virginianus</i>)	87.8	LD50: >1976 (N.A.) mg/kg NOAEL: 1185 Slope: N.A.	Slightly toxic	43334709/1991	Acceptable
AMPA	Bobwhite quail (<i>Colinus virginianus</i>)	87.8	LC50: >4934 (N.A.) PPM NOAEC: 4934 Slope: N.A.	Slightly toxic	43334710/1994	Acceptable
AMPA	Mallard duck (<i>Anas platyrhynchos</i>)	87.8	LC50: >4934 (N.A.) PPM NOAEC: 4934 Slope: N.A.	Slightly toxic	43334711/1994	Acceptable

¹ a.i. = active ingredient; a.e. = acid equivalent

²Based on LC₅₀ (ppm): < 50 very highly toxic; 50 - 500 highly toxic; 501 - 1000 moderately toxic; 1001-5000 slightly toxic; >5000 practically non-toxic; based on LD₅₀ (mg/kg bw): < 10 very highly toxic; 10 - 50 highly toxic; 51 - 500 moderately toxic; 501-2000 slightly toxic; >2000 practically non-toxic

⁴ Range is 95% confidence interval for endpoint, N.A. = not available

Table D-30. Avian Chronic Toxicity for Technical Glyphosate

Chemical	Species	% a.i. ¹	LD ₅₀ / LC ₅₀ NOAEL/ NOAEC (mg a.e./kg bw or ppm a.e.) ¹	Toxicity Category ²	MRID #/Year	Study Classification
Glyphosate	Mallard duck (<i>Anas platyrhynchos</i>)	90.4	LOAEC: >27 (N.A.) PPM NOAEC: 27	N.A.	00036328/ 113457/ 1975	Supplemental
Glyphosate	Mallard duck (<i>Anas platyrhynchos</i>)	83	LOAEC: >830 (N.A.) PPM NOAEC: 830	N.A.	111953/1978	Acceptable
Glyphosate	Bobwhite quail (<i>Colinus virginianus</i>)	83	LOAEC: >830 (N.A.) PPM NOAEC: 830	N.A.	108207/1978	Acceptable

Table D-30. Avian Chronic Toxicity for Technical Glyphosate						
Chemical	Species	% a.i. ¹	LD ₅₀ / LC ₅₀ NOAEL/ NOAEC (mg a.e./kg bw or ppm a.e.) ¹	Toxicity Category ²	MRID #/Year	Study Classification
Glyphosate	Mallard duck (<i>Anas platyrhynchos</i>)	96	NOAEC: <501; LOAEC: 501 mg a.e./kg diet (lowest concentration tested), based on effects to male weight gain and offspring weight.	NA	48876602 / 1999	Supplemental
¹ a.i. = active ingredient; a.e. = acid equivalent ² Range is 95% confidence interval for endpoint, N.A. = not applicable						

Open Literature Data for Birds and Terrestrial-phase Amphibians

Table D-31. Open literature studies for glyphosate for birds and terrestrial-phase amphibians			
Species	Chemical Form	Endpoint(s)	ECOTOX Ref. No.
Rough-skinned newt (<i>Taricha granulosa</i>)	Glyphosate isopropylamine (45.5% solution)	96-h LD ₅₀ > 2,600 mg/kg-bw	E162011 / McComb <i>et al.</i> 2008
8 species frogs in Columbia – juvenile phase	Mixture Glyphos and Cosmo-Flux	96-h LC ₅₀ : 4.5-22.8 kg ae/ha (direct spray on frogs)	E11766 / Bernal <i>et al.</i> 2009
Chicken (<i>Gallus gallus domesticus</i>)	Glyphosate isopropylamine (purity not reported)	Significant 50% reduction in male and female body wt by day 7 at 6080 mg/kg-diet, no effect at 608 mg/kg-diet; 21-d exposure; did not evaluate reproductive parameters	E162010 / Kubena <i>et al.</i> 1981
Mallard duck drakes (<i>Anas platyrhynchos</i>)	Roundup360 g/l of glyphosate, 480 g/l of IPA salt	significant reduction (90%, p≤ 0.05) in plasma testosterone at 5 & 100 mg/kg-bw; no NOAEC; alterations in structure of testis and epididymal region	Oliveira <i>et. al.</i> 2007

Mammals

Table D-32. Mammalian Acute Toxicity for Technical Glyphosate						
Chemical	Species	% a.i. ¹	LD ₅₀ (mg a.e./kg bw) ¹	Toxicity Category ²	MRID No.	Study Classification
Glyphosate	Rat (<i>rattus norvegicus</i>)	96	>4800 limit test. No mortalities.	Practically non-toxic	43728003	Acceptable
Glyphosate	Rat (<i>rattus norvegicus</i>)	95	>4750 – limit test. No mortalities	Practically non-toxic	45058306	Acceptable
Glyphosate	Rat (<i>rattus norvegicus</i>)	97.2	>4860 up and down – no mortalities	Practically non-toxic	46760505	Acceptable
Glyphosate	Rat (<i>rattus norvegicus</i>)	88	>4400. No mortalities	Practically non-toxic	44320604	Acceptable
Glyphosate	Rat (<i>rattus norvegicus</i>)	95	>4750 up and down – no mortalities	Practically non-toxic	46998805	Acceptable
Glyphosate	Rat (<i>rattus norvegicus</i>)	76	>3800 – no mortalities	Practically non-toxic	41400601	Acceptable
Glyphosate (IPA 62%)	Rat (<i>rattus norvegicus</i>)	96	>1920 – no mortalities	Slightly toxic (when expressed as a.e.)	44142104	Acceptable
Glyphosate	Rat (<i>rattus norvegicus</i>)	95.4	>4770 up and down – no mortalities	Practically non-toxic	46816107	Acceptable
¹ a.i. = active ingredient; a.e. = acid equivalent ² Based on LD ₅₀ (mg/kg bw): < 10 very highly toxic; 10 - 50 highly toxic; 51 - 500 moderately toxic; 501-2000 slightly toxic; >2000 practically non-toxic.						

Table D-33. Mammalian Acute Toxicity for Glyphosate Formulations						
Chemical	Species	% a.i.¹	LD₅₀ (mg a.e./ kg bw a.e.)¹	Toxicity Category²	MRID No.	Study Classification
ClearOut 41 (41% glyphosate IPA)	Rat (<i>rattus norvegicus</i>)	30.3	>606	Slightly toxic	44883104	Acceptable
ClearOut 41 Plus (41% glyphosate IPA)	Rat (<i>rattus norvegicus</i>)	30.3	>606	Slightly toxic	44883113	Acceptable
Clearout 62 (62% glyphosate IPA)	Rat (<i>rattus norvegicus</i>)	62	>1240	Slightly toxic	45657801	Acceptable
Dual Salt Fully Loaded (glyphosate IPA and NH ₄ Salt)	Rat (<i>rattus norvegicus</i>)	36	>1800	Slightly toxic	45615104	Acceptable
Glyphosate Acid 7.10 g/kg SL Formulation	Rat (<i>rattus norvegicus</i>)	0.71	>35.5	Highly toxic when reported as a.e. due to low percentage of a.i.	43746804	Acceptable
EH-1384 (6.75% glyphosate IPA)	Rat (<i>rattus norvegicus</i>)	5	>100	Slightly toxic	45328903	Acceptable
EH-1386 (50.0% glyphosate IPA)	Rat (<i>rattus norvegicus</i>)	37	>740	Slightly toxic	45387703	Acceptable
GF-1280 (50.8% glyphosate dimethylammonium)	Rat (<i>rattus norvegicus</i>)	40.1	>2005	Practically nontoxic	46775603	Acceptable
GF-1667 (62.1% glyphosate dimethylammonium salt)	Rat (<i>rattus norvegicus</i>)	49	>2450	Practically nontoxic	46730705	Acceptable
GF-772 (40.2% IPA salt)	Rat (<i>rattus norvegicus</i>)	29.8	>1490	Slightly toxic	45871303	Acceptable
GF-887 (54.2% glyphosate IPA)	Rat (<i>rattus norvegicus</i>)	40.1	>2005	Practically nontoxic	45819303	Acceptable
Glyfos (41% IPA)	Rat (<i>rattus norvegicus</i>)	30.3	>1515	Slightly toxic	43530002	Acceptable
Glygran WDG glyphosate 80 WDG	Rat (<i>rattus norvegicus</i>)	80	>1600	Slightly toxic	44125603	Acceptable
Glyphosate	Rat (<i>rattus norvegicus</i>)	62	>3100	Practically nontoxic	45101503	Acceptable
Glyphosate Unloaded (52.9% IPA)	Rat (<i>rattus norvegicus</i>)	39.2	>1960	Slightly toxic	46783403	Acceptable
Glyphosate 360g/l SL	Rat (<i>rattus norvegicus</i>)	27.25	>1363	Slightly toxic	44953503	Acceptable

Table D-33. Mammalian Acute Toxicity for Glyphosate Formulations						
Chemical	Species	% a.i.¹	LD₅₀ (mg a.e./ kg bw a.e.)¹	Toxicity Category²	MRID No.	Study Classification
Glyphosate 500 SL-M (36.7% Glyphosate Potassium)	Rat (<i>rattus norvegicus</i>)	36.7	>1835	Slightly toxic	45830201	Acceptable
Glyphosate Acid 7.10 g/kg SL Formulation	Rat (<i>rattus norvegicus</i>)	0.73	>36.5	Highly toxic when reported as a.e. due to low percentage of a.i.	44497001	Acceptable
Glyphosate acid formulation 500 g/kg WP	Rat (<i>rattus norvegicus</i>)	49.3	>2465	Practically nontoxic	44317201	Acceptable
Glyphosate IPA	Rat (<i>rattus norvegicus</i>)	22.9	724	Slightly toxic	44918601	Acceptable
Glyphosate IPA salt (NAF 545)	Rat (<i>rattus norvegicus</i>)	30.9	>1545	Slightly toxic	44863801	Acceptable
Glyphosate premix (62.2%)	Rat (<i>rattus norvegicus</i>)	62.2	>3110	Practically nontoxic	44949802	Acceptable
Glyphosate SL (600)	Rat (<i>rattus norvegicus</i>)	42.6	>2130	Practically nontoxic	46006803	Acceptable
HM-0548 5905-LTE Mixture of ammonium salt (19.68%) and IPA (13.36%)	Rat (<i>rattus norvegicus</i>)	25	>1250	Slightly toxic	47236803	Acceptable
HM-2028 (Glyphosate: 11.4%)	Rat (<i>rattus norvegicus</i>)	11.4	357	Moderately toxic when reported as a.e. due to low percentage of a.i.	46714802	Acceptable
LI6130 (13 41% Glyphosate Full Load: 40.6% IPA)	Rat (<i>rattus norvegicus</i>)	4	>215	Moderately toxic when reported as a.e. due to low percentage of a.i.	46862303	Acceptable
LI6167-11 (40.5% IPA (“Half load”))	Rat (<i>rattus norvegicus</i>)	30	>1500	Slightly toxic	46862103	Acceptable
MON 20033	Rat (<i>rattus norvegicus</i>)	63	3150	Practically nontoxic	41142304	Acceptable
MON 20047	Rat (<i>rattus norvegicus</i>)	18.4	460 - 690	Moderately toxic when reported as a.e. due to low percentage of a.i.	41305404	Acceptable
MON 60696 (70.1% monoammonium salt)	Rat (<i>rattus norvegicus</i>)	54	>2700	Practically nontoxic	43049302	Acceptable

Table D-33. Mammalian Acute Toxicity for Glyphosate Formulations						
Chemical	Species	% a.i.¹	LD₅₀ (mg a.e./ kg bw a.e.)¹	Toxicity Category²	MRID No.	Study Classification
MON 65005 (41% IPA)	Rat (<i>rattus norvegicus</i>)	30.3	>1515	Slightly toxic	43020902	Acceptable
MON 77063	Rat (<i>rattus norvegicus</i>)	65.4	2599	Practically nontoxic	44615502	Acceptable
MON 77945	Rat (<i>rattus norvegicus</i>)	46.6	>2330	Practically nontoxic	44715402	Acceptable
MON 78063	Rat (<i>rattus norvegicus</i>)	37.7	>1885	Slightly toxic	44872702	Acceptable
MON 78293	Rat (<i>rattus norvegicus</i>)	39.3	>1965	Slightly toxic	44809002	Acceptable
MON 78634 (71.8% ammonium salt)	Rat (<i>rattus norvegicus</i>)	65.2	>1304	Slightly toxic	46087001	Acceptable
Mon 79186 (2.02% glyphosate IPA)	Rat (<i>rattus norvegicus</i>)	1.5	>75	Moderately toxic when reported as a.e. due to low percentage of a.i.	46473802	Acceptable
MON 79188	Rat (<i>rattus norvegicus</i>)	4.42	>221	Moderately toxic when reported as a.e. due to low percentage of a.i.	46078502	Acceptable
Nufarm NUP 3G 02 (450 g/L glyphosate as IPA salt)	Rat (<i>rattus norvegicus</i>)	45	>2250	Practically nontoxic	46009104	Acceptable
Nufarm RUP0532 (41% Glyphosate as IPA and ammonium salts)	Rat (<i>rattus norvegicus</i>)	30.3	>1515	Slightly toxic	45386802	Acceptable
NUP-07010 (Glyphosate, 41.72%)	Rat (<i>rattus norvegicus</i>)	41.72	>2086	Practically nontoxic	47298403	Acceptable
NUP3a99 (41% glyphosate IPA)	Rat (<i>rattus norvegicus</i>)	30.3	>1515	Slightly toxic	44872602	Acceptable
NUP3b99 (53.8% glyphosate IPA)	Rat (<i>rattus norvegicus</i>)	39.8	>1990	Slightly toxic	44873302	Acceptable
NUP5a99 (62% glyphosate MUP)	Rat (<i>rattus norvegicus</i>)	62	>3100	Practically nontoxic	45293503	Acceptable
56077-LL - Phoss-8	Rat (<i>rattus norvegicus</i>)	80	>4000	Practically nontoxic	45044402	Acceptable

Table D-33. Mammalian Acute Toxicity for Glyphosate Formulations

Chemical	Species	% a.i. ¹	LD ₅₀ (mg a.e./ kg bw a.e.) ¹	Toxicity Category ²	MRID No.	Study Classification
Roundup L&G Ready to Use (glyphosate IPA)	Rat (<i>rattus norvegicus</i>)	0.85	>40	Highly toxic when reported as a.e. due to low percentage of a.i.	41395601	Acceptable
Spray-Charlie (44% GLY-41 (524-475 with 41% IPA)	Rat (<i>rattus norvegicus</i>)	15.2	>760	Slightly toxic	45929403	Acceptable

¹ a.i. = active ingredient; a.e. = acid equivalent
²Based on LD₅₀ (mg/kg bw): < 10 very highly toxic; 10 - 50 highly toxic; 51 - 500 moderately toxic; 501-2000 slightly toxic; >2000 practically non-toxic.

Table D-34. Mammalian Chronic Toxicity for Technical Glyphosate

Chemical	Species	% a.i. ¹	NOAEL/ NOAEC (mg a.e./kg bw or ppm a.e.) ¹	MRID #/Year	Study Classification
Glyphosate	Rat (<i>rattus norvegicus</i>)	97.67	2-generation reproduction study Parental/Systemic NOAEL: 500 mg/kg/day (10,000 ppm) LOAEL: 1500 mg/kg/day (30,000 ppm) Reproductive NOAEL: 1500 mg/kg/day (HDT) Offspring NOAEL: 500 mg/kg/day (10,000 ppm) LOAEL: 1500 mg/kg/day	41621501/1990	Acceptable
Glyphosate	Rat (<i>rattus norvegicus</i>)	100%	3-generation reproduction study Parental/Systemic, Offspring and Reproductive NOAELs: 30 mg/kg/day (highest dose tested).	00081674; 00105995 1981; 1982	Acceptable
Glyphosate	Rabbit (<i>Oryctolagus cuniculus</i>)	98.7	Developmental toxicity study Maternal NOAEL = 175 mg/kg/day LOAEL = 350 mg/kg/day based on mortality, diarrhea, soft stools, and nasal discharge. Developmental NOAEL = 350 mg/kg/day (HDT) LOAEL = not established.	00046363/1980	Acceptable

Table D-34. Mammalian Chronic Toxicity for Technical Glyphosate

Chemical	Species	% a.i. ¹	NOAEL/ NOAEC (mg a.e./kg bw or ppm a.e.) ¹	MRID #/Year	Study Classification
Glyphosate	Rat (<i>rattus norvegicus</i>)		NOAEL: 408/422 mg/kg bw/day (males/females); NOAEC: 5000 mg/kg-diet Reproduction study Offspring toxicity LOAEL: 1234/1273 (males/female) mg/kg bw/day; LOAEC: 15000 ppm (delayed age and increased weight at male sexual development). No observed effects on parental or reproductive toxicity (LOAEL >15000 ppm)	48865101- 48865105 /2007 & 2012	Acceptable

¹ a.i. = active ingredient; a.e. = acid equivalent² Range is 95% confidence interval for endpoint, N.A. = not applicable**Table D-35. Mammalian Chronic Toxicity for Surfactants**

Chemical	Species	% a.i. ¹	NOAEL/ NOAEC (mg a.e./kg bw or ppm a.e.) ¹	MRID #/Year	Study Classification
POEA	Rat (<i>rattus norvegicus</i>)	100%	Reproduction/developmental screening study temporary endpoints: Parental/Systemic NOAEL: 1000 ppm (52.8 – 56.1 mg/kg bw/day (M) and 64.9 – 66.6 mg/kg bw/day (F) Reproductive NOAEL: 300 ppm (14.9 - 16.6 mg/kg bw/day (M) and 18.9 - 19.5 mg/kg bw/day (F) LOAEL: 1000 ppm (52.8 – 56.1 mg/kg bw/day (M) and 64.9 – 66.6 mg/kg bw/day (F) Based on increased mean number of unaccounted-for sites. Offspring NOAEL: 300 ppm (14.9 - 16.6 mg/kg bw/day (M) and 18.9 - 19.5 mg/kg bw/day (F) LOAEL: 1000 ppm (52.8 – 56.1 mg/kg bw/day (M) and 64.9 – 66.6 mg/kg bw/day (F) Based on litter loss, decreased mean number of pups born live, litter size and postnatal survival from birth to PND 4. Effects not reproducible in second generation; however, this is a definitive NOAEL/LOAEL.	47097401/2006	Acceptable

¹ a.i. = active ingredient; a.e. = acid equivalent² Range is 95% confidence interval for endpoint, N.A. = not applicable

Open Literature Data for Mammals

Table D-36. Open Literature Studies for Glyphosate on Mammals			
Species	Chemical Form	Endpoint(s)	ECOTOX Ref. No.
Deer Mouse (<i>Peromyscus maniculatus</i>)	Glyphosate isopropylamine (45.5% solution)	96-h LD ₅₀ > 6000 mg/kg-bw	E162011 / McComb <i>et al.</i> 2008
Rat (male Wistar)	Roundup Transorb (480 g glyphosate acid/L)	Significant sexual development effects at 50 mg ai/kg-bw (NOAEL = 5 mg ae/kg-bw) increase in age of sexual development, hormone changes Newly weaned male rats oral gavage from post natal day (PND) 23 to PND53	E155939 / Romano <i>et al.</i> 2010
Rat (Wistar)	Roundup Transorb (480 g glyphosate acid/L)	Significant sexual development effects at 50 mg ai/kg-bw for male offspring (decrease in age of sexual development, changes in hormone and sexual behavior Parental females oral gavage and then offspring observed, females dosed from gestational day 18 to PND 5	E161810 / Romano <i>et al.</i> 2012

Terrestrial Invertebrates

Table D-37. Acute Toxicity Studies on Terrestrial Invertebrates for Technical Glyphosate					
Chemical	Species	% a.i. ¹	LD ₅₀ / LC ₅₀ NOAEL/ NOAEC	MRID #/Year	Study Classification
Glyphosate	Honey bee (<i>Apis mellifera</i>)	98.5	48 hr LD ₅₀ (O): >100 (N.R.) ² µg/bee NOAEL: N.R. Slope: N.R.	00026489/1972	Acceptable
Glyphosate	Honey bee (<i>Apis mellifera</i>)	98.5	48 hr LD ₅₀ (C): >100 (N.R.) µg/bee NOAEL: N.R. Slope: N.R.	00026489/1972	Acceptable
Glyphosate	Honey bee (<i>Apis mellifera</i>)	97.6	48 hr LD ₅₀ (C): >103 (N.R.) µg/bee NOAEL: 103 48 hr LD ₅₀ (O): >182 (N.R.) µg/bee NOAEL: 182	48876603	Acceptable

¹ a.i. = active ingredient; a.e. = acid equivalent
² Range is 95% confidence interval for endpoint, N.R. = not reported; O = oral study; C = contact study

Table D-38. Acute Toxicity Studies on Terrestrial Invertebrates for Glyphosate Formulations

Chemical	Species	% a.i. ¹	LD ₅₀ / LC ₅₀ NOAEL/ NOAEC	MRID #/Year	Study Classification
Glyphosate monoammonium salt (MON78568)	Honey bee (<i>Apis mellifera</i>)	65.6	48 hr LD ₅₀ (C): >100 (N.A.) ² µg/bee NOAEL: 100 Slope: N.R.	45767104/2001	Not classified
Glyphosate monoammonium salt (MON78568)	Honey bee (<i>Apis mellifera</i>)	65.6	48 hr LD ₅₀ (O): >76.23 (N.A.) µg a.e./bee NOAEL: <76.23 µg a.e./bee Slope: N.R.	45767104/2001	Not classified
Glyphosate monoammonium salt (MON78568)	Predatory mite (<i>Typhlodromus pyri</i>)	64.9	7 D LD ₅₀ (C): 1200 (839-1786) g a.e./ha NOAEL: 216 Slope: N.R.	45767105/2002	Not classified
Glyphosate monoammonium salt (MON78568)	Predatory mite (<i>Typhlodromus pyri</i>)	64.9	7 D LD ₅₀ (C): >4320 (N.R.) g/ha NOAEL: 216 Slope: N.R.	45767106/2002	Not classified
Glyphosate monoammonium salt (MON78568)	Predatory mite (<i>Typhlodromus pyri</i>)	64.9	14 - 21 D LD ₅₀ (C): N.A. (N.A.) g/ha NOAEL: 216 or <119 (no dose-response) Slope: N.A.	45767106/2002	Not classified
Glyphosate monoammonium salt (MON78568)	Earthworm (<i>Eisenia fetida</i>)	64.9	14 D LD ₅₀ (C): >6560 (N.A.) mg/kg soil NOAEL: 6560 Slope: N.R.	45767109/2001	Not classified
Glyphosate monoammonium salt (MON78568)	Parasitic wasp (<i>Aphidius rhopalosiphi</i>)	64.9	48 hr - 13 days LD ₅₀ (C): >108 (N.R.) g a.e./ha NOAEL: Not established Slope: N.R.	45767107/2002	Not classified
Glyphosate monoammonium salt (MON78568)	Parasitic wasp (<i>Aphidius rhopalosiphi</i>)	64.9	48 hr - 13 days LD ₅₀ (C): >4320 (N.R.) g/ha NOAEL: 4320 Slope: N.R.	45767107/2002	Not classified
Glyphosate monoammonium salt (MON78568)	Parasitic wasp (<i>Aphidius rhopalosiphi</i>)	64.9	48 hr - 13 days LD ₅₀ (C): >4320 (N.R.) g a.e./ha NOAEL: 4320 Slope: N.R.	45767108/2002	Not classified

Table D-38. Acute Toxicity Studies on Terrestrial Invertebrates for Glyphosate Formulations					
Chemical	Species	% a.i. ¹	LD ₅₀ / LC ₅₀ NOAEL/ NOAEC	MRID #/Year	Study Classification
Glyphosate monoammonium salt (MON78568)	Lacewing (<i>Chrysoperla carnia</i>)	64.9	Up to 10 days LD ₅₀ (C): >4320 (N.R.) g/ha NOAEC: 4320 Slope: N.R.	45767110/2002	Not classified
Glyphosate IPA salt (MON 2139)	Honey bee (<i>Apis mellifera</i>)	36	48 hr LD ₅₀ (O): >100 (N.R.) µg/bee NOAEL: N.R. Slope: N.R.	00026489/1972	Acceptable
Glyphosate IPA salt (MON 2139)	Honey bee (<i>Apis mellifera</i>)	36	48 hr LD ₅₀ (C): >100 (N.R.) µg/bee NOAEL: N.R. Slope: N.R.	00026489/1972	Acceptable
Glyphosate IPA salt (MON65005)	Honey bee (<i>Apis mellifera</i>)	31.32	48 hr LD ₅₀ (C): >31.3 (N.A.) µg a.e./bee NOAEL: 319 Slope: N.A.	44465703/1997	Acceptable
Glyphosate IPA salt (MON 77360)	Honey bee (<i>Apis mellifera</i>)	30.0	48 hr LD ₅₀ (C): >30 (NA) µg/bee NOAEL: 30 Slope: NA	45370301/2001	Acceptable
Glyphosate IPA salt (MON 77360)	Honey bee (<i>Apis mellifera</i>)	30.0	48 hr LD ₅₀ (O): >30 (NA) µg/bee NOAEL: 15 Slope: NA	45370302/2001	Supplemental
¹ a.i. = active ingredient; a.e. = acid equivalent/ IPA = isopropylamine; N.R. = not reported; O = oral study; C = contact study					
² Range is 95% confidence interval for endpoint,					

Open Literature Data for Terrestrial Invertebrates

Table D-39. Open literature studies for glyphosate for terrestrial invertebrates			
Species	Chemical Form	Endpoint(s)	ECOTOX Ref. No.
Earthworm (<i>Eisenia fetida andrei</i>)	Roundup Ready	56-d sign decrease at 1440 g ai/ha (Roundup applied to soybean field and soil samples collected) in % hatchability of cocoons, # of juveniles, # juv/hatched cocoons Earthworms also sign avoided GLY treated soil in avoidance test; had reduced feeding activity	E160273 / Casabe <i>et al.</i> 2007
Parasitoid Wasp (<i>Trichogramma pretiosum</i>)	Roundup Ready (972 g glyphosate /ha); Roundup Original (960 g glyphosate/ha)	Roundup Ready at 972 mg a.e./ha - 100% decrease egg viability; Roundup original at 960 mg ae/ha decreased egg (37%) and larvae viability (32%); No effects using Roundup Transorb or Gliz; No effect on pupae stage for all 4 formulations; based on categories of effect (% effect) Only one concentration tested	E110225 / De Freitas Bueno <i>et al.</i> 2008

Terrestrial Plants

Studies on Technical Material

Table D-40. Vegetative Vigor Study on Terrestrial Plants with Technical Glyphosate					
Chemical	Species	% a.i. ¹	EC ₂₅ /NOAEC (EC ₀₅) (lb a.e./Acre ¹)	MRID #/Year	Study Classification
Monocots					
Glyphosate	Oat (<i>Avena sativa</i>)	96.6	21 D EC ₂₅ : 0.4 (N.R.) lb/A NOAEC/EC ₀₅ : 0.14 Slope: 2.3	43088701/1994	Acceptable
Glyphosate	Corn (<i>Zea mays</i>)	96.6	21 D EC ₂₅ : 0.43 (N.R.) lb /A NOAEC/EC ₀₅ : 0.07 Slope: 3.7	43088701/1994	Acceptable
Glyphosate	Onion (<i>Allium cepa</i>)	96.6	21 D EC ₂₅ : 0.83 (N.R.) lb /A NOAEC/EC ₀₅ : 0.56 Slope: 2.4	43088701/1994	Acceptable
Glyphosate	Ryegrass (<i>Lolium perenne</i>)	96.6	21 D EC ₂₅ : 0.98 (N.R.) lb /A NOAEC/EC ₀₅ : 0.56 Slope: 4.9	43088701/1994	Acceptable
Dicots					
Glyphosate	Tomato (<i>Lycopersicon esculentum</i>)	96.6	21 D EC ₂₅ : 0.11 (N.R.) lb /A NOAEC/EC ₀₅ : 0.035 Slope: 3.4	43088701/1994	Acceptable
Glyphosate	Cucumber (<i>Cucumis sativus</i>)	96.6	21 D EC ₂₅ : 0.46 (N.R.) lb /A NOAEC/EC ₀₅ : 0.14 Slope: 2.6	43088701/1994	Acceptable
Glyphosate	Lettuce (<i>Lactuca sativa</i>)	96.6	21 D EC ₂₅ : 0.4 (N.R.) lb /A NOAEC/EC ₀₅ : 0.28 Slope: N.R.	43088701/1994	Acceptable
Glyphosate	Cabbage (<i>Brassica oleracea</i>)	96.6	21 D EC ₂₅ : 0.3 (N.R.) lb /A NOAEC/EC ₀₅ : 0.14 Slope: N.R.	43088701/1994	Acceptable
Glyphosate	Soybean (<i>Glycine max</i>)	96.6	21 D EC ₂₅ : 0.42 (N.R.) lb /A NOAEC/EC ₀₅ : 0.28 Slope: N.R.	43088701/1994	Acceptable
Glyphosate	Radish (<i>Rhaphanus sativus</i>)	96.6	21 D EC ₂₅ : 0.14 (N.R.) LB/A NOAEC/EC ₀₅ : 0.035 Slope: N.R.	43088701/1994	Acceptable
¹ a.i. = active ingredient; a.e. = acid equivalent; N.R. = Not reported					

Studies on Formulations

Table D-41. Terrestrial Plant Studies with Glyphosate Formulations					
Chemical	Species	% a.i. ¹	EC ₂₅ /NOAEC (EC ₀₅) (lb a.e./Acre ¹)	MRID #/Year	Study Classification
Seedling Emergence Studies					
Monocots					
Glyphosate (80 WDG formulation)	Veg.Crops (10 Sp.) (Monocots & Dicots)	75	29 D EC ₂₅ : >4.5 (N.R.) NOAEC/EC ₀₅ : 3.6 Slope: N.R.	44125712/1996	Acceptable
Glyphosate IPA salt CP-70139	Oat (<i>Avena sativa</i>)	50	14 D EC ₂₅ : >5 (N.R.) NOAEC/EC ₀₅ : N.R. Slope: N.R.	40159301/1987	Acceptable
Glyphosate IPA salt CP-70139	Rice (<i>Oryza sativa</i>)	50	14 D EC ₂₅ : >5 (N.R.) NOAEC/EC ₀₅ : N.R. Slope: N.R.	40159301/1987	Acceptable
Glyphosate IPA salt CP-70139	Sorghum (<i>Sorghum bicolor</i>)	50	14 D EC ₂₅ : >5 (N.R.) NOAEC/EC ₀₅ : N.R. Slope: N.R.	40159301/1987	Acceptable
Glyphosate IPA salt CP-70139	Barnyard grass (<i>Echinochloa crusgalli</i>)	50	14 D EC ₂₅ : >5 (N.R.) NOAEC/EC ₀₅ : N.R. Slope: N.R.	40159301/1987	Acceptable
Glyphosate (80 WDG formulation)	Veg.Crops (10 Sp.) (Monocots & Dicots)	48.3	4WKS EC ₂₅ : >4 (N.A.) NOAEC/EC ₀₅ : 4 Slope: N.A.	44320635/1996	Acceptable
Dicots					
Glyphosate (80 WDG formulation)	Veg.Crops (10 Sp.) (Monocots & Dicots)	75	29 D EC ₂₅ : >4.5 (N.R.) NOAEC/EC ₀₅ : 3.6 Slope: N.R.	44125712/1996	Acceptable
Glyphosate IPA salt CP-70139	Soybean (<i>Glycine max</i>)	50	14 D EC ₂₅ : >5 (N.R.) NOAEC/EC ₀₅ : N.R. Slope: N.R.	40159301/1987	Acceptable
Glyphosate IPA salt CP-70139	Sugarbeet (<i>Beta vulgaris</i>)	50	14 D EC ₂₅ : >5 (N.R.) NOAEC/EC ₀₅ : N.R. Slope: N.R.	40159301/1987	Acceptable
Glyphosate IPA salt CP-70139	Buckwheat (<i>Polygonum convolvulus</i>)	50	14 D EC ₂₅ : >5 (N.R.) NOAEC/EC ₀₅ : N.R. Slope: N.R.	40159301/1987	Acceptable
Glyphosate IPA salt CP-70139	Cocklebur (<i>Xanthium pensylvanicum</i>)	50	14 D EC ₂₅ : >5 (N.R.) NOAEC/EC ₀₅ : N.R. Slope: N.R.	40159301/1987	Acceptable
Glyphosate IPA salt CP-70139	Crabgrass (<i>Digitaria sanguinalis</i>)	50	14 D EC ₂₅ : >5 (N.R.) NOAEC/EC ₀₅ : N.R. Slope: N.R.	40159301/1987	Acceptable

Table D-41. Terrestrial Plant Studies with Glyphosate Formulations					
Chemical	Species	% a.i. ¹	EC ₂₅ /NOAEC (EC ₀₅) (lb a.e./Acre ¹)	MRID #/Year	Study Classification
Glyphosate IPA salt CP-70139	Panicum grass (<i>Panicum sp.</i>)	50	14 D EC ₂₅ : >5 (N.R.) NOAEC/EC ₀₅ : N.R. Slope: N.R.	40159301/1987	Acceptable
Glyphosate IPA salt CP-70139	Downy brome (<i>Bromus tectorum</i>)	50	14 D EC ₂₅ : >5 (N.R.) NOAEC/EC ₀₅ : N.R. Slope: N.R.	40159301/1987	Acceptable
Glyphosate IPA salt CP-70139	Velvetleaf (<i>Abutilon theophrasti</i>)	50	14 D EC ₂₅ : >5 (N.R.) NOAEC/EC ₀₅ : N.R. Slope: N.R.	40159301/1987	Acceptable
Glyphosate IPA salt CP-70139	Smartweed (<i>Polygonum pensylvanicum</i>)	50	14 D EC ₂₅ : >5 (N.R.) NOAEC/EC ₀₅ : N.R. Slope: N.R.	40159301/1987	Acceptable
Glyphosate IPA salt CP-70139	Morning glory (<i>Ipomoea sp.</i>)	50	14 D EC ₂₅ : >5 (N.R.) NOAEC/EC ₀₅ : N.R. Slope: N.R.	40159301/1987	Acceptable
Glyphosate IPA salt CP-70139	Lambsquarter (<i>Chenopodium album</i>)	50	14 D EC ₂₅ : >5 (N.R.) NOAEC/EC ₀₅ : N.R. Slope: N.R.	40159301/1987	Acceptable
Glyphosate IPA salt CP-70139	Hemp (<i>Sesbania exaltata</i>)	50	14 D EC ₂₅ : >5 (N.R.) NOAEC/EC ₀₅ : N.R. Slope: N.R.	40159301/1987	Acceptable
Glyphosate (80 WDG formulation)	Veg.Crops (10 Sp.) (Monocots & Dicots)	48.3	4WKS EC ₂₅ : >4 (N.A.) NOAEC/EC ₀₅ : 4 Slope: N.A.	44320635/1996	Acceptable
Vegetative Vigor Studies					
Monocots					
Glyphosate (80 WDG formulation)	Onion (<i>Allium cepa</i>)	75	27 D EC ₂₅ : 0.28 (N.R.) NOAEC/EC ₀₅ : 0.14 Slope: N.R.	44125715/4504 5101/1995	Acceptable
Glyphosate (80 WDG formulation)	Sorghum (<i>Sorghum bicolor</i>)	75	27 D EC ₂₅ : 0.16 (N.R.) NOAEC/EC ₀₅ : 0.07 Slope: N.R.	44125715/4504 5101/1995	Acceptable
Glyphosate (80 WDG formulation)	Wheat (<i>Triticum aestivum</i>)	75	27 D EC ₂₅ : 0.22 (N.R.) NOAEC/EC ₀₅ : 0.1 Slope: N.R.	44125715/4504 5101/1995	Acceptable
Glyphosate (80 WDG formulation)	Corn (<i>Zea mays</i>)	75	27 D EC ₂₅ : 0.35 (N.R.) NOAEC/EC ₀₅ : 0.18 Slope: N.R.	44125715/4504 5101/1996	Acceptable
Glyphosate (80 WDG formulation)	Corn (<i>Zea mays</i>)	48.3	48WKS EC ₂₅ : 0.227 (N.R.) NOAEC/EC ₀₅ : 0.148 Slope: N.R.	44320636/1996	Acceptable

Table D-41. Terrestrial Plant Studies with Glyphosate Formulations					
Chemical	Species	% a.i.¹	EC₂₅/NOAEC (EC₀₅) (lb a.e./Acre¹)	MRID #/Year	Study Classification
Glyphosate(80 WDG formulation)	Purple nutsedge (<i>Cyperus rotundus</i>)	48.3	4WKS EC ₂₅ : 0.805 (N.R.) NOAEC/EC ₀₅ : 0.445 Slope: N.R.	44320636/1996	Acceptable
Glyphosate(80 WDG formulation)	Wheat (<i>Triticum aestivum</i>)	48.3	4WKS EC ₂₅ : 0.176 (0.138-0.183 a.e.) NOAEC/EC ₀₅ : 0.049 Slope: N.R.	44320636/1996	Acceptable
Glyphosate(80 WDG formulation)	Oat (<i>Avena sativa</i>)	48.3	4WKS EC ₂₅ : 0.201 (N.R.) NOAEC/EC ₀₅ : 0.148 Slope: N.R.	44320636/1996	Acceptable
Dicots					
Glyphosate(80 WDG formulation)	Garden pea (<i>Pisum sativum</i>)	75	27 D EC ₂₅ : 0.89 (N.R.) NOAEC/EC ₀₅ : 0.45 Slope: N.R.	44125715/ 45045101/ 1995	Acceptable
Glyphosate(80 WDG formulation)	Sugarbeet (<i>Beta vulgaris</i>)	75	27 D EC ₂₅ : 0.21 (B.R.) NOAEC/EC ₀₅ : 0.12 Slope: N.R.	44125715/ 45045101/ 1995	Acceptable
Glyphosate(80 WDG formulation)	Sunflower (<i>Helianthus annus</i>)	75	27 D EC ₂₅ : 0.16 (N.R.) NOAEC/EC ₀₅ : 0.08 Slope: N.R.	44125715/ 45045101 /1995	Acceptable
Glyphosate(80 WDG formulation)	Radish (<i>Rhaphanus sativus</i>)	75	27 D EC ₂₅ : 0.09 (N.R.) NOAEC/EC ₀₅ : 0.02 Slope: N.R.	44125715/ 45045101/ 1995	Acceptable
Glyphosate(80 WDG formulation)	Soybean (<i>Glycine max</i>)	75	27 D EC ₂₅ : 0.32 (N.R.) NOAEC/EC ₀₅ : 0.12 Slope: N.R.	44125715/ 45045101/ 1995	Acceptable
Glyphosate (80 WDG formulation)	Cucumber (<i>Cucumis sativus</i>)	75	27 D EC ₂₅ : 0.45 (N.R.) NOAEC/EC ₀₅ : 0.16 Slope: N.R.	44125715/ 45045101/ 1995	Acceptable
Glyphosate (80 WDG formulation)	Sugarbeet (<i>Beta vulgaris</i>)	48.3	4WKS EC ₂₅ : 0.277 (N.R.) NOAEC/EC ₀₅ : 0.148 Slope: N.R.	44320636/1996	Acceptable
Glyphosate (80 WDG formulation)	Radish (<i>Rhaphanus sativus</i>)	48.3	4WKS EC ₂₅ : 0.235 (N.R.) NOAEC/EC ₀₅ : 0.148 Slope: N.R.	44320636/1996	Acceptable
Glyphosate (80 WDG formulation)	Soybean (<i>Glycine max</i>)	48.3	4WKS EC ₂₅ : 0.126 (N.R.) NOAEC/EC ₀₅ : 0.049 Slope: N.R.	44320636/1996	Acceptable
Glyphosate (80WDG formulation)	Lettuce (<i>Lactuca sativa</i>)	48.3	4WKS EC ₂₅ : 0.217 (N.R.) NOAEC/EC ₀₅ : 0.148 Slope: N.R.	44320636/1996	Acceptable

Table D-41. Terrestrial Plant Studies with Glyphosate Formulations					
Chemical	Species	% a.i.¹	EC₂₅/NOAEC (EC₀₅) (lb a.e./Acre¹)	MRID #/Year	Study Classification
Glyphosate (80WDG formulation)	Cucumber (<i>Cucumis sativus</i>)	48.3	4WKS EC ₂₅ : 0.074 (N.R.) NOAEC/EC ₀₅ : 0.049 Slope: N.R.	44320636/1996	Acceptable
Glyphosate (80WDG formulation)	Rape (<i>Brassica compestris</i>)	48.3	4WKS EC ₂₅ : 0.098 (0.065-0.084) NOAEC/EC ₀₅ : 0.049 Slope: N.A.	44320636/1996	Acceptable
Glyphosate (80WDG formulation)	Okra (<i>Hibiscus esculentus</i>)	48.3	4WKS EC ₂₅ : 0.172 (N.R.) NOAEC/EC ₀₅ : 0.049 Slope: N.R.	44320636/1996	Acceptable
¹ a.i. = active ingredient; a.e. = acid equivalent; N.R. = Not reported; IPA = isopropylamine					

Open Literature for Terrestrial Plants

Table D-42. Open literature studies for glyphosate for terrestrial plants			
Species	Chemical Form	Endpoint(s)	ECOTOX Ref. No.
<i>Bellis perennis</i> (most sensitive species; multiple species tested)	Roundup Original or Vision (both containing 356 g glyphosate acid/L)	Biomass (dry wt) 28-d IC ₂₅ = 0.053 lb a.i./A	E152615 / Boutin <i>et al</i> 2010
<i>Bellis perennis</i> (most sensitive species; multiple species tested)	Roundup Bio (360 g/l glyphosate with 480 g glyphosate-isopropylamine salt)	Biomass (dry wt) 28-d EC ₅₀ = 0.013 lb a.i./A	E87923 / Boutin <i>et al</i> 2004
<i>Brassica oleracea</i> (most sensitive species; multiple species tested)	Roundup Original (356 g glyphosate acid/L)	Biomass (dry wt) (assumed to be 28-d) IC ₂₅ = 0.038 lb a.i./A	E159072 / Boutin <i>et al.</i> 2012
<i>Pisum sativum</i> (Garden pea)	Roundup Original	Seed wt EC ₂₅ = 0.0074 lb ai/A [0.0096 x 833 g ai/ha], NOEC [0.01 x 833]	Rec#8500 / Olszyk <i>et al.</i> 2009
<i>Solanum Tuberosum L</i> (Potatoes)	Roundup	Most endpoints (growth and reproductive) affected at 0.1 x 832 g/ha, most sensitive endpoint was above biomass with EC25 of 0.004 x 832 [0.003 lb/A]	Rec# 5780 / Pflieger <i>et al.</i> 2011
<i>Triticum aestivum</i> (most sensitive species; multiple species tested)	Roundup Original	Biomass (dry wt) (assumed to be 28-d) IC ₂₅ = 0.0178 lb a.i./A	White and Boutin 2007

Appendix E.

Ecotoxicity Bibliography

Chemical Name	Genus	Species	Common Name	Effect Group	Effect	Meas	Endpt1	Endpt2	Dur Preferred Mean	Dur Unit Preferred	Conc #1 Purity Adjusted in Preferred Unit Mean	Conc #2 Purity Adjusted in Preferred Unit Mean	Conc Units Preferred	% Purity	Ref #
Glyphosate isopropylamine salt	Quercus	nigra	Water Oak	POP	POP	ABND	NOAEL		2555	d	1.7		ae kg/ha	100	160829
Glyphosate isopropylamine salt	NR	Magnoliopsida	Dicot Class	POP	POP	DVRS	NOAEL		2555	d	1.7		ae kg/ha	100	160829
Glyphosate isopropylamine salt	NR	Magnoliopsida	Dicot Class	POP	POP	DVRS	NOAEL		2555	d	1.7		ae kg/ha	100	160829
Glyphosate isopropylamine salt	Galium	bermudense	Coastal Bedstraw	POP	POP	ABND	NOAEL		2555	d	1.7		ae kg/ha	100	160829
Glyphosate isopropylamine salt	Eupatorium	sp.	Thoroughwort	POP	POP	ABND	NOAEL		2555	d	1.7		ae kg/ha	100	160829
Glyphosate isopropylamine salt	Lespedeza	sp.	Clover	POP	POP	ABND	NOAEL		2555	d	1.7		ae kg/ha	100	160829
Glyphosate isopropylamine salt	Quercus	sp.	Oak Spp.	POP	POP	ABND	NOAEL		2555	d	1.7		ae kg/ha	100	160829
Glyphosate isopropylamine salt	Andropogon	sp.	Bluestem	POP	POP	ABND	NOAEL		2555	d	1.7		ae kg/ha	100	160829
Glyphosate isopropylamine salt	NR	Plantae	Plant Kingdom	POP	POP	DVRS	NOAEL		2555	d	1.7		ae kg/ha	100	160829
Glyphosate isopropylamine salt	NR	Magnoliopsida	Dicot Class	POP	POP	DVRS	NOAEL		2555	d	1.7		ae kg/ha	100	160829
Glyphosate isopropylamine salt	NR	Magnoliopsida	Dicot Class	POP	POP	DVRS	NOAEL		2555	d	1.7		ae kg/ha	100	160829
Glyphosate isopropylamine salt	NR	Poaceae	Grass Family	POP	POP	DVRS	NOAEL		2555	d	1.7		ae kg/ha	100	160829
Glyphosate isopropylamine salt	NR	Magnoliopsida	Dicot Class	POP	POP	DVRS	NOAEL		2555	d	1.7		ae kg/ha	100	160829
Glyphosate isopropylamine salt	Liquidambar	styraciflua	Sweetgum	POP	POP	ABND	NOAEL		2555	d	1.7		ae kg/ha	100	160829

Glyphosate isopropylamine salt	Cornus	florida	Flowering Dogwood	POP	POP	ABND	NOAEL		2555	d	1.7		ae kg/ha	100	160829
Glyphosate isopropylamine salt	Quercus	falcata	Southern Red Oak	POP	POP	ABND	NOAEL		2555	d	1.7		ae kg/ha	100	160829
Glyphosate isopropylamine salt	Prunus	serotina	Black Cherry	POP	POP	ABND	NOAEL		2555	d	1.7		ae kg/ha	100	160829
Glyphosate isopropylamine salt	NR	Magnoliopsida	Dicot Class	POP	POP	ABND	NOAEL		2555	d	1.7		ae kg/ha	100	160829
Glyphosate isopropylamine salt	NR	Magnoliopsida	Dicot Class	POP	POP	ABND	NOAEL		2555	d	1.7		ae kg/ha	100	160829
Glyphosate isopropylamine salt	Vaccinium	stamineum	Deerberry	POP	POP	ABND	NOAEL		2555	d	1.7		ae kg/ha	100	160829
Glyphosate isopropylamine salt	Vaccinium	sp.	Blueberry	POP	POP	ABND	LOAEL		2555	d	1.7		ae kg/ha	100	160829
Glyphosate isopropylamine salt	Rhus	copallina	Dwarf Sumac	POP	POP	ABND	NOAEL		2555	d	1.7		ae kg/ha	100	160829
Glyphosate isopropylamine salt	Diospyros	virginiana	Common Persimmon	POP	POP	ABND	NOAEL		2555	d	1.7		ae kg/ha	100	160829
Glyphosate isopropylamine salt	Pinus	taeda	Loblolly Pine	POP	POP	ABND	NOAEL		2555	d	1.7		ae kg/ha	100	160829
Glyphosate isopropylamine salt	Panicum	sp.	Panic Grass	POP	POP	ABND	NOAEL		2555	d	1.7		ae kg/ha	100	160829
Glyphosate isopropylamine salt	Dichanthelium	commutatum	Variable Panicgrass	POP	POP	ABND	NOAEL		2555	d	1.7		ae kg/ha	100	160829
Glyphosate isopropylamine salt	Rubus	argutus	Prickly Florida Blackberry	POP	POP	ABND	NOAEL		2555	d	1.7		ae kg/ha	100	160829
Glyphosate isopropylamine salt	Vitis	rotundifolia	Muscadine Grape	POP	POP	ABND	NOAEL		2555	d	1.7		ae kg/ha	100	160829
Glyphosate isopropylamine salt	Gelsemium	sempervirens	Carolina Jessamine	POP	POP	ABND	NOAEL		2555	d	1.7		ae kg/ha	100	160829

Glyphosate isopropylamine salt	Smilax	sp.	Greenbrier	POP	POP	ABND	NOAEL		2555	d	1.7		ae kg/ha	100	160829
Glyphosate isopropylamine salt	Smilax	glauca	Cat Greenbrier	POP	POP	ABND	NOAEL		2555	d	1.7		ae kg/ha	100	160829
Glyphosate isopropylamine salt	Empetrum	nigrum	Black Crowberry	POP	POP	COVR	NOAEL		730	d	1.2488		lb/acre	100	162002
Glyphosate isopropylamine salt	Vaccinium	sp.	Blueberry	POP	POP	COVR	NOAEL		730	d	1.2488		lb/acre	100	162002
Glyphosate isopropylamine salt	Erica	tetralix	Crossleaf Heath	POP	POP	COVR	NOAEL		730	d	1.2488		lb/acre	100	162002
Glyphosate isopropylamine salt	Calluna	vulgaris	Heather	POP	POP	COVR	LOAEL		730	d	1.2488		lb/acre	100	162002
Glyphosate	Rattus	norvegicus	Norway Rat	GRO	MPH	SMIX	NOAEL	LOAEL	91	d	12375	24750	ppm	99	161806
Glyphosate	Rattus	norvegicus	Norway Rat	BCM	BCM	HMCT	NOAEL	LOAEL	90	d	6187.5	12375	ppm	99	161806
Glyphosate	Rattus	norvegicus	Norway Rat	BCM	ENZ	AATT	LOAEL		90	d	3093.75		ppm	99	161806
Glyphosate	Rattus	norvegicus	Norway Rat	REP	REP	ETRS	NOAEL	LOAEL	91	d	24750	49500	ppm	99	161806
Glyphosate	Rattus	norvegicus	Norway Rat	GRO	MPH	SMIX	LOAEL		91	d	3093.75		ppm	99	161806
Glyphosate	Rattus	norvegicus	Norway Rat	CEL	CEL	RBCE	NOAEL	LOAEL	90	d	6187.5	12375	ppm	99	161806
Glyphosate	Rattus	norvegicus	Norway Rat	CEL	CEL	LMPH	LOAEL		90	d	3093.75		ppm	99	161806
Glyphosate	Rattus	norvegicus	Norway Rat	BCM	BCM	HMGL	NOAEL	LOAEL	5	d	24750	49500	ppm	99	161806
Glyphosate	Rattus	norvegicus	Norway Rat	BCM	ENZ	AATT	LOAEL		5	d	3093.75		ppm	99	161806
Glyphosate	Rattus	norvegicus	Norway Rat	GRO	GRO	WGHT	NOAEL	LOAEL	91	d	12375	24750	ppm	99	161806
Glyphosate	Rattus	norvegicus	Norway Rat	REP	REP	SPCL	NOAEL	LOAEL	91	d	12375	24750	ppm	99	161806
Glyphosate	Mus	musculus	House Mouse	REP	REP	SPCL	NOAEL		91	d	49500		ppm	99	161806
Glyphosate	Mus	musculus	House Mouse	GRO	MPH	WGHT	NOAEL	LOAEL	91	d	12375	24750	ppm	99	161806
Glyphosate	Mus	musculus	House Mouse	GRO	GRO	WGHT	NOAEL	LOAEL	91	d	12375	24750	ppm	99	161806
Glyphosate	Mus	musculus	House Mouse	REP	REP	ETRS	NOAEL		91	d	49500		ppm	99	161806
Glyphosate	Mus	musculus	House Mouse	GRO	MPH	SMIX	NOAEL	LOAEL	91	d	3093.75	6187.5	ppm	99	161806
Glyphosate isopropylamine salt	Labeo	rohita	Rohu	MOR	MOR	MORT	NR-LETH		4	d	14		AI ug/L	41	161848
Glyphosate isopropylamine salt	Labeo	rohita	Rohu	MOR	MOR	MORT	NR-LETH		1	d	14		AI ug/L	41	161848
Glyphosate isopropylamine salt	Labeo	rohita	Rohu	MOR	MOR	MORT	NR-LETH		4	d	14		AI ug/L	41	161848
Glyphosate isopropylamine salt	Desmanthus	virgatus	Wild Tantan	POP	POP	WGHT	LOAEL		35	d	0.32112		lb/acre	100	157094

Glyphosate isopropylamine salt	Desmant hus	virgatus	Wild Tantan	GRO	GRO	VGOR	LOAEL		7 d	1.6056		lb/acre	100	157094
Glyphosate isopropylamine salt	Desmant hus	virgatus	Wild Tantan	POP	POP	ABND	LOAEL		39 d	1.6056		lb/acre	100	157094
Glyphosate isopropylamine salt	Sida	rhombifolia	Arrowleaf Sida	GRO	GRO	VGOR	LOAEL		7 d	1.6056		lb/acre	100	157094
Glyphosate isopropylamine salt	Ipomoea	biflora	Bellvine	GRO	GRO	VGOR	LOAEL		7 d	1.6056		lb/acre	100	157094
Glyphosate, Monopotassium salt	Spea	multiplicata	Mexican Spadefoot	MOR	MOR	SURV	NOAEL		2 d	29.8		ppm	48.8	152560
Glyphosate isopropylamine salt	Spea	multiplicata	Mexican Spadefoot	MOR	MOR	SURV	NOAEL		2 d	628		ppm	50.2	152560
Glyphosate isopropylamine salt	Spea	multiplicata	Mexican Spadefoot	MOR	MOR	SURV	NOAEL		2 d	628		ppm	50.2	152560
Glyphosate isopropylamine salt	Spea	multiplicata	Mexican Spadefoot	MOR	MOR	MORT	NR-ZERO		2 d	628		ppm	50.2	152560
Glyphosate isopropylamine salt	Spea	multiplicata	Mexican Spadefoot	MOR	MOR	MORT	NR-LETH		2 d	1092		ppm	2	152560
Glyphosate isopropylamine salt	Spea	multiplicata	Mexican Spadefoot	MOR	MOR	SURV	LOAEL		2 d	1092		ppm	2	152560
Glyphosate isopropylamine salt	Spea	multiplicata	Mexican Spadefoot	MOR	MOR	SURV	LOAEL		2 d	1092		ppm	2	152560
Glyphosate isopropylamine salt	Spea	multiplicata	Mexican Spadefoot	MOR	MOR	MORT	NR-LETH		2 d	1092		ppm	2	152560
Glyphosate, Monopotassium salt	Bufo	cognatus	Great Plains Toad	MOR	MOR	SURV	NOAEL		2 d	29.8		ppm	48.8	152560
Glyphosate, Monopotassium salt	Bufo	cognatus	Great Plains Toad	MOR	MOR	MORT	NR-ZERO		2 d	29.8		ppm	48.8	152560
Glyphosate isopropylamine salt	Bufo	cognatus	Great Plains Toad	MOR	MOR	SURV	LOAEL		2 d	628		ppm	50.2	152560

Glyphosate isopropylamine salt	Bufo	cognatus	Great Plains Toad	MOR	MOR	SURV	LOAEL		2 d	1092		ppm	2	152560
Glyphosate isopropylamine salt	Bufo	cognatus	Great Plains Toad	MOR	MOR	MORT	NR-LETH		2 d	1092		ppm	2	152560
Glyphosate, Monopotassium salt	Spea	multiplicata	Mexican Spadefoot	MOR	MOR	SURV	NOAEL		2 d	29.8		ppm	48.8	152560
Glyphosate, Monopotassium salt	Spea	multiplicata	Mexican Spadefoot	MOR	MOR	MORT	NR-ZERO		2 d	29.8		ppm	48.8	152560
Glyphosate isopropylamine salt	Bufo	cognatus	Great Plains Toad	MOR	MOR	SURV	NOAEL		2 d	628		ppm	50.2	152560
Glyphosate isopropylamine salt	Bufo	cognatus	Great Plains Toad	MOR	MOR	MORT	NR-ZERO		2 d	628		ppm	50.2	152560
Glyphosate isopropylamine salt	Bufo	cognatus	Great Plains Toad	MOR	MOR	SURV	LOAEL		2 d	1092		ppm	2	152560
Glyphosate, Monopotassium salt	Bufo	cognatus	Great Plains Toad	MOR	MOR	SURV	NOAEL		2 d	29.8		ppm	48.8	152560
Glyphosate isopropylamine salt	Deschampsia	flexuosa	Wavy Hairgrass	PHY	INJ	DAMG	LOAEL		15 d	0.32112		lb/acre	100	160843
Glyphosate isopropylamine salt	Deschampsia	flexuosa	Wavy Hairgrass	POP	POP	WGHT	LOAEL		375 d	0.32112		lb/acre	100	160843
Glyphosate isopropylamine salt	Deschampsia	flexuosa	Wavy Hairgrass	PHY	INJ	DAMG	LOAEL		15 d	0.32112		lb/acre	100	160843
Glyphosate isopropylamine salt	Deschampsia	flexuosa	Wavy Hairgrass	POP	POP	WGHT	LOAEL		375 d	0.32112		lb/acre	100	160843
Glyphosate isopropylamine salt	Deschampsia	flexuosa	Wavy Hairgrass	PHY	INJ	DAMG	LOAEL		14 d	0.8028		lb/acre	100	160843
Glyphosate isopropylamine salt	Deschampsia	flexuosa	Wavy Hairgrass	PHY	INJ	DAMG	LOAEL		15 d	0.32112		lb/acre	100	160843
Glyphosate isopropylamine salt	Deschampsia	flexuosa	Wavy Hairgrass	POP	POP	WGHT	LOAEL		375 d	0.32112		lb/acre	100	160843

Glyphosate isopropylamine salt	Deschampsia	flexuosa	Wavy Hairgrass	PHY	INJ	DAMG	LOAEL		13 d	0.64224		lb/acre	100	160843
Glyphosate isopropylamine salt	Deschampsia	flexuosa	Wavy Hairgrass	POP	POP	WGHT	LOAEL		308 d	0.64224		lb/acre	100	160843
Glyphosate isopropylamine salt	Deschampsia	flexuosa	Wavy Hairgrass	PHY	INJ	DAMG	NOAEL	LOAEL	21 d	0.8028	1.6056	lb/acre	100	160843
Glyphosate	Lecane	quadridentata	Rotifer	MOR	MOR	MORT	NOEC	LOEC	2 d	120	140	mg/L	100	161360
Glyphosate	Lecane	quadridentata	Rotifer	MOR	MOR	MORT	LC50		2 d	150		mg/L	100	161360
Glyphosate	Lecane	quadridentata	Rotifer	BCM	ENZ	ESTE	NOEC	LOEC	0.0313 d	0.017	0.033	mg/L	100	161360
Glyphosate	Lecane	quadridentata	Rotifer	BCM	ENZ	ESTE	EC50		0.0313 d	0.15		mg/L	100	161360
Glyphosate	Lecane	quadridentata	Rotifer	BCM	ENZ	PLA2	NOEC	LOEC	0.0313 d	0.22	0.73	mg/L	100	161360
Glyphosate	Lecane	quadridentata	Rotifer	BCM	ENZ	PLA2	EC50		0.0313 d	0.26		mg/L	100	161360
Glyphosate	Lecane	quadridentata	Rotifer	MOR	MOR	MORT	NOEC	LOEC	2 d	5.2	13	mg/L	100	161360
Glyphosate	Lecane	quadridentata	Rotifer	MOR	MOR	MORT	LC50		2 d	13.1		mg/L	100	161360
Glyphosate	Daphnia	magna	Water Flea	MOR	MOR	MORT	NOEC	LOEC	2 d	120	140	mg/L	100	161360
Glyphosate	Daphnia	magna	Water Flea	MOR	MOR	MORT	LC50		2 d	146		mg/L	100	161360
Glyphosate	Daphnia	magna	Water Flea	MOR	MOR	MORT	NOEC	LOEC	2 d	1.7	3.4	mg/L	100	161360
Glyphosate	Daphnia	magna	Water Flea	MOR	MOR	MORT	LC50		2 d	4.1		mg/L	100	161360
Glyphosate	Lecane	quadridentata	Rotifer	BCM	ENZ	ESTE	NOEC	LOEC	0.0313 d	0.01	0.05	mg/L	100	161360
Glyphosate	Lecane	quadridentata	Rotifer	BCM	ENZ	ESTE	EC50		0.0313 d	0.1		mg/L	100	161360
Glyphosate	Lecane	quadridentata	Rotifer	BCM	ENZ	PLA2	NOEC	LOEC	0.0313 d	5	10	mg/L	100	161360
Glyphosate	Lecane	quadridentata	Rotifer	BCM	ENZ	PLA2	EC50		0.0313 d	17.6		mg/L	100	161360
Glyphosate isopropylamine salt	Scenedesmus	quadricauda	Green Algae	POP	POP	PGRT	EC50		3 d	10.17		mg/dm3	100	161189
Glyphosate isopropylamine salt	Pseudokirchneriella	subcapitata	Green Algae	POP	POP	PGRT	EC50		3 d	2.55		mg/dm3	100	161189
Glyphosate isopropylamine salt	Scenedesmus	acutus var. acutus	Green Algae	POP	POP	PGRT	EC50		4 d	80		mg/L	100	152180

Glyphosate isopropylamine salt	Algae	NR	Algae	POP	POP	CHAP	NOAEL			1 d				mg/L	100	161504
Glyphosate isopropylamine salt	Algae	NR	Algae	POP	POP	CHAP	NOAEL			6 d				mg/L	100	161504
Glyphosate isopropylamine salt	Algae	NR	Algae	POP	POP	CHAP	NOAEL			20 d				mg/L	100	161504
Glyphosate isopropylamine salt	Algae	NR	Algae	POP	POP	CHAP	NOAEL			37 d				mg/L	100	161504
Glyphosate isopropylamine salt	Rhamdia	quelen	Catfish	BCM	ENZ	CTLS	LOAEL			4 d		1.21		mg/L	100	151710
Glyphosate isopropylamine salt	Rhamdia	quelen	Catfish	BCM	ENZ	GSTR	LOAEL			4 d		1.21		mg/L	100	151710
Glyphosate isopropylamine salt	Rhamdia	quelen	Catfish	MOR	MOR	MORT	NR-ZERO			4 d		1.21		mg/L	100	151710
Glyphosate isopropylamine salt	Rhamdia	quelen	Catfish	BCM	BCM	TBAR	NOAEL			4 d		1.21		mg/L	100	151710
Glyphosate isopropylamine salt	Rhamdia	quelen	Catfish	BCM	BCM	PCAR	NOAEL			4 d		1.21		mg/L	100	151710
Glyphosate isopropylamine salt	Rhamdia	quelen	Catfish	BCM	BCM	NPSH	NOAEL			4 d		1.21		mg/L	100	151710
Glyphosate isopropylamine salt	Rhamdia	quelen	Catfish	BCM	ENZ	AATT	NOAEL			4 d		1.21		mg/L	100	151710
Glyphosate isopropylamine salt	Rhamdia	quelen	Catfish	BCM	ENZ	ASAT	NOAEL			4 d		1.21		mg/L	100	151710
Glyphosate isopropylamine salt	Rhamdia	quelen	Catfish	BCM	BCM	ASCA	LOAEL			4 d		1.21		mg/L	100	151710
Glyphosate isopropylamine salt	Rhamdia	quelen	Catfish	BCM	BCM	GLTH	LOAEL			4 d		1.21		mg/L	100	151710
Glyphosate isopropylamine salt	Huso	huso	Beluga	MOR	MOR	MORT	LC50			4 d		8.2		mg/L	41	161365

Glyphosate isopropylamine salt	Huso	huso	Beluga	MOR	MOR	MORT	LC50		0.25	d	30.75		mg/L	41	161365
Glyphosate isopropylamine salt	Huso	huso	Beluga	MOR	MOR	MORT	LC50		0.5	d	24.6		mg/L	41	161365
Glyphosate isopropylamine salt	Huso	huso	Beluga	MOR	MOR	MORT	LC50		1	d	18.45		mg/L	41	161365
Glyphosate isopropylamine salt	Huso	huso	Beluga	MOR	MOR	MORT	LC50		2	d	12.3		mg/L	41	161365
Glyphosate isopropylamine salt	Huso	huso	Beluga	MOR	MOR	MORT	LC50		7	d	6.15		mg/L	41	161365
Glyphosate isopropylamine salt	Acipenser	persicus	Persian Sturgeon	MOR	MOR	MORT	LC50		0.25	d	41		mg/L	41	161365
Glyphosate isopropylamine salt	Acipenser	persicus	Persian Sturgeon	MOR	MOR	MORT	LC50		0.5	d	34.85		mg/L	41	161365
Glyphosate isopropylamine salt	Acipenser	persicus	Persian Sturgeon	MOR	MOR	MORT	LC50		1	d	28.7		mg/L	41	161365
Glyphosate isopropylamine salt	Acipenser	persicus	Persian Sturgeon	MOR	MOR	MORT	LC50		2	d	16.4		mg/L	41	161365
Glyphosate isopropylamine salt	Acipenser	persicus	Persian Sturgeon	MOR	MOR	MORT	LC50		4	d	16.4		mg/L	41	161365
Glyphosate isopropylamine salt	Acipenser	persicus	Persian Sturgeon	MOR	MOR	MORT	LC50		7	d	8.2		mg/L	41	161365
Glyphosate isopropylamine salt	Acipenser	stellatus	Sevruga, Stellate Sturgeon	MOR	MOR	MORT	LC50		0.25	d	38.95		mg/L	41	161365
Glyphosate isopropylamine salt	Acipenser	stellatus	Sevruga, Stellate Sturgeon	MOR	MOR	MORT	LC50		0.5	d	32.8		mg/L	41	161365
Glyphosate isopropylamine salt	Acipenser	stellatus	Sevruga, Stellate Sturgeon	MOR	MOR	MORT	LC50		1	d	26.65		mg/L	41	161365
Glyphosate isopropylamine salt	Acipenser	stellatus	Sevruga, Stellate Sturgeon	MOR	MOR	MORT	LC50		2	d	22.55		mg/L	41	161365

Glyphosate isopropylamine salt	Acipenser	stellatus	Sevruga, Sturgeon	MOR	MOR	MORT	LC50		4 d	14.35		mg/L	41	161365
Glyphosate isopropylamine salt	Acipenser	stellatus	Sevruga, Sturgeon	MOR	MOR	MORT	LC50		7 d	8.2		mg/L	41	161365
Glyphosate isopropylamine salt	Algae	NR	Algae	POP	POP	PSYN	NOAEL		0.1667 d	640.8		mg/L	35.6	161202
Glyphosate isopropylamine salt	Algae	NR	Algae	POP	POP	PSYN	EC50		0.1667 d			mg/L	35.6	161202
Glyphosate isopropylamine salt	Algae	NR	Algae	POP	POP	PSYN	EC50		0.1667 d	24.8132		mg/L	35.6	161202
Glyphosate isopropylamine salt	Algae	NR	Algae	POP	POP	PSYN	EC50		0.1667 d			mg/L	35.6	161202
Glyphosate isopropylamine salt	Algae	NR	Algae	POP	POP	PSYN	EC50		0.1667 d			mg/L	35.6	161202
Glyphosate isopropylamine salt	Algae	NR	Algae	POP	POP	PSYN	EC50		0.1667 d			mg/L	35.6	161202
Glyphosate isopropylamine salt	Algae	NR	Algae	POP	POP	PSYN	EC50		0.1667 d	15.8064		mg/L	35.6	161202
Glyphosate isopropylamine salt	Algae	NR	Algae	POP	POP	PSYN	EC50		0.1667 d	12.6024		mg/L	35.6	161202
Glyphosate isopropylamine salt	Pinus	radiata	Insignis Pine	GRO	GRO	DMTR	NOAEL		639.24 d	1.78		lb/acre	100	160718
Glyphosate isopropylamine salt	Phaeosphaeria	nodorum	Fungi	REP	REP	SEPD	LOAEL		7 d	80		ppm	100	162023
Glyphosate isopropylamine salt	Phaeosphaeria	nodorum	Fungi	REP	REP	GERM	LOAEL		0.5 d	160		ppm	100	162023
Glyphosate isopropylamine salt	Phaeosphaeria	nodorum	Fungi	REP	REP	SEPD	LOAEL		7 d	80		ppm	100	162023
Glyphosate isopropylamine salt	Phaeosphaeria	nodorum	Fungi	REP	REP	GERM	LOAEL		0.5 d	160		ppm	100	162023
Glyphosate isopropylamine salt	Phaeosphaeria	nodorum	Fungi	POP	POP	ABND	LOAEL		0.5 d	160		ppm	100	162023

Glyphosate isopropylamine salt	Comptonia	peregrina	Sweet Fern	POP	POP	ABND	LOAEL		730	d	0.5		lb/acre	100	159938
Glyphosate isopropylamine salt	Comptonia	peregrina	Sweet Fern	POP	POP	ABND	LOAEL		1095	d	0.5		lb/acre	100	159938
Glyphosate isopropylamine salt	Comptonia	peregrina	Sweet Fern	POP	POP	ABND	LOAEL		365	d	0.5		lb/acre	100	159938
Glyphosate	Poa	pratensis	Kentucky Bluegrass	POP	POP	ABND	NOAEL			d	3		Al lb/acre	100	161677
Glyphosate	Medicago	sativa	Alfalfa	POP	POP	BMAS	LOAEL			hv	1.784		lb/acre	100	161678
Glyphosate	Agrostis	capillaris	Colonial Bentgrass	POP	POP	ABND	NOAEL		584	d	1.784		lb/acre	100	161678
Glyphosate	Conium	maculatum	Hemlock	GRO	GRO	VGOR	LOAEL		1	gs	0.4		ae kg/ha	100	160719
Glyphosate	Conium	maculatum	Hemlock	POP	POP	CNTL	NOAEL	LOAEL	1	gs	0.4	0.6	ae kg/ha	100	160719
Glyphosate	Conium	maculatum	Hemlock	GRO	GRO	VGOR	LOAEL		1	gs	0.4		ae kg/ha	100	160719
Glyphosate	Conium	maculatum	Hemlock	POP	POP	CNTL	NOAEL	LOAEL	1	gs	0.4	0.6	ae kg/ha	100	160719
Glyphosate	Conium	maculatum	Hemlock	GRO	GRO	VGOR	LOAEL		1	gs	0.4		ae kg/ha	100	160719
Glyphosate	Conium	maculatum	Hemlock	POP	POP	CNTL	LOAEL		1	gs	0.4		ae kg/ha	100	160719
Glyphosate	Cynodon	sp.	Bermudagrass	POP	POP	COVR	NOAEL		90	d	0.15164		lb/acre	100	157310
Glyphosate	NR	Poaceae	Grass Family	PHY	INJ	GINJ	LOAEL		13	d	0.09812		lb/acre	100	157310
Glyphosate	NR	Poaceae	Grass Family	PHY	INJ	GINJ	LOAEL		14	d	0.09812		lb/acre	100	157310
Glyphosate	Lolium	perenne	Perennial Ryegrass	POP	POP	COVR	NOAEL		90	d	0.15164		lb/acre	100	157310
Glyphosate	Cynodon	sp.	Bermudagrass	POP	POP	COVR	NOAEL		78	d	0.15164		lb/acre	100	157310
Glyphosate	Lolium	perenne	Perennial Ryegrass	POP	POP	COVR	NOAEL		78	d	0.15164		lb/acre	100	157310
Glyphosate isopropylamine salt	Paspalum	notatum	Bahiagrass	GRO	GRO	HGHT	LOAEL		14	d	0.1784		lb/acre	100	156191
Glyphosate, Sesquisodium salt	Paspalum	notatum	Bahiagrass	GRO	GRO	HGHT	LOAEL		14	d	0.1784		lb/acre	100	156191
Glyphosate isopropylamine salt	Paspalum	notatum	Bahiagrass	GRO	GRO	HGHT	LOAEL		42	d	0.1784		lb/acre	100	156191
Glyphosate, Sesquisodium salt	Paspalum	notatum	Bahiagrass	GRO	GRO	HGHT	LOAEL		42	d	0.1784		lb/acre	100	156191
Glyphosate	Daphnia	magna	Water Flea	MOR	MOR	MORT	NR-LETH		1	d	350		mg/L	100	161956
Glyphosate	Daphnia	magna	Water Flea	MOR	MOR	MORT	LC05		1	d	190		mg/L	100	161956
Glyphosate	Daphnia	magna	Water Flea	MOR	MOR	MORT	LC10		1	d	202		mg/L	100	161956

Glyphosate	Daphnia	magna	Water Flea	MOR	MOR	MORT	LC20		1	d	214		mg/L	100	161956
Glyphosate	Daphnia	magna	Water Flea	MOR	MOR	MORT	LC50		1	d	234		mg/L	100	161956
Glyphosate isopropylamine salt	Typha	sp.	Cattail	POP	POP	ABND	LOAEL		365	d	4.7		L/ha	100	162001
Glyphosate isopropylamine salt	Typha	sp.	Cattail	POP	POP	ABND	LOAEL		730	d			L/ha	100	162001
Glyphosate isopropylamine salt	Carassius	auratus	Goldfish	BCM	ENZ	CTLS	LOAEL		4	d	2.5		mg/L	100	150118
Glyphosate isopropylamine salt	Carassius	auratus	Goldfish	BCM	ENZ	GSTR	NOAEL		4	d	20		mg/L	100	150118
Glyphosate isopropylamine salt	Carassius	auratus	Goldfish	BCM	ENZ	GLRE	LOAEL		4	d	2.5		mg/L	100	150118
Glyphosate isopropylamine salt	Carassius	auratus	Goldfish	BCM	BCM	NPSH	NOAEL		4	d	20		mg/L	100	150118
Glyphosate isopropylamine salt	Carassius	auratus	Goldfish	BCM	BCM	PRSH	NOAEL		4	d	20		mg/L	100	150118
Glyphosate isopropylamine salt	Carassius	auratus	Goldfish	BCM	BCM	PRSH	NOAEL		4	d	20		mg/L	100	150118
Glyphosate isopropylamine salt	Carassius	auratus	Goldfish	BCM	BCM	PRSH	NOAEL		4	d	20		mg/L	100	150118
Glyphosate isopropylamine salt	Carassius	auratus	Goldfish	BCM	ENZ	SODA	LOAEL		4	d	2.5		mg/L	100	150118
Glyphosate isopropylamine salt	Carassius	auratus	Goldfish	BCM	ENZ	SODA	LOAEL		4	d	2.5		mg/L	100	150118
Glyphosate isopropylamine salt	Carassius	auratus	Goldfish	BCM	ENZ	SODA	LOAEL		4	d	2.5		mg/L	100	150118
Glyphosate isopropylamine salt	Carassius	auratus	Goldfish	BCM	ENZ	CTLS	NOAEL		4	d	20		mg/L	100	150118
Glyphosate isopropylamine salt	Carassius	auratus	Goldfish	BCM	ENZ	GSTR	NOAEL		4	d	20		mg/L	100	150118
Glyphosate isopropylamine salt	Carassius	auratus	Goldfish	BCM	ENZ	GSTR	LOAEL		4	d	2.5		mg/L	100	150118

Glyphosate isopropylamine salt	Carassius	auratus	Goldfish	BCM	ENZ	GLRE	LOAEL		4 d	2.5		mg/L	100	150118
Glyphosate isopropylamine salt	Carassius	auratus	Goldfish	BCM	ENZ	G6PD	LOAEL		4 d	2.5		mg/L	100	150118
Glyphosate isopropylamine salt	Carassius	auratus	Goldfish	BCM	BCM	LDPO	NOAEL		4 d	20		mg/L	100	150118
Glyphosate isopropylamine salt	Carassius	auratus	Goldfish	BCM	BCM	LDPO	NOAEL		4 d	20		mg/L	100	150118
Glyphosate	Chlorella	pyrenoidosa	Green Algae	POP	POP	PGRT	EC50		4 d	3.514		mg/L	95	158793
Glyphosate isopropylamine salt	Ligustrum	lucidum	Glossy Privet	POP	POP	CNTL	LOAEL		182.64 d	2.4		AI %	100	160875
Glyphosate isopropylamine salt	Ligustrum	lucidum	Glossy Privet	POP	POP	CNTL	LOAEL		426.16 d	2.4		AI %	100	160875
Glyphosate isopropylamine salt	Rattus	norvegicus	Norway Rat	MOR	MOR	MORT	NR-ZERO		1 d	1		ml	100	162013
Glyphosate isopropylamine salt	Rattus	norvegicus	Norway Rat	MOR	MOR	MORT	NR-LETH		1 d	5		ml	100	162013
Glyphosate isopropylamine salt	Rattus	norvegicus	Norway Rat	MOR	MOR	MORT	NR-ZERO		1 d	5		ml	100	162013
Glyphosate isopropylamine salt	Peromyscus	maniculatus	Deer Mouse	MOR	MOR	MORT	LD50		4 d	6000		mg/kg bdwt	100	162011
Glyphosate isopropylamine salt	Taricha	granulosa	Rough Skinned Newt	MOR	MOR	MORT	LD50		4 d	2600		mg/kg bdwt	100	162011
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	BCM	ENZ	SODA	LOAEL		1 d	4.1		mg/L	41	155953
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	BCM	ENZ	CTLS	NOAEL		4 d	4.1		mg/L	41	155953
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	BCM	ENZ	GLPX	LOAEL		0.25 d	4.1		mg/L	41	155953
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	BCM	ENZ	SODA	NOAEL		0.25 d	4.1		mg/L	41	155953

Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	BCM	ENZ	CTLS	NOAEL		1 d	4.1		mg/L	41	155953
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	BCM	ENZ	CTLS	NOAEL		0.25 d	4.1		mg/L	41	155953
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	BCM	ENZ	GLPX	LOAEL		1 d	4.1		mg/L	41	155953
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	BCM	ENZ	GSTR	LOAEL		1 d	4.1		mg/L	41	155953
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	BCM	ENZ	GSTR	NOAEL		0.25 d	4.1		mg/L	41	155953
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	BCM	BCM	GLTH	LOAEL		0.25 d	4.1		mg/L	41	155953
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	BCM	BCM	GLTH	LOAEL		1 d	4.1		mg/L	41	155953
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	BCM	BCM	GLTH	NOAEL		4 d	4.1		mg/L	41	155953
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	BCM	ENZ	ACHE	LOAEL		4 d	4.1		mg/L	41	155953
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	BCM	ENZ	ACHE	LOAEL		1 d	4.1		mg/L	41	155953
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	BCM	BCM	MLDH	NOAEL		4 d	4.1		mg/L	41	155953
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	BCM	BCM	MLDH	NOAEL		1 d	4.1		mg/L	41	155953
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	BCM	BCM	MLDH	NOAEL		0.25 d	4.1		mg/L	41	155953
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	MOR	MOR	MORT	NR-ZERO		4 d	4.1		mg/L	41	155953
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	BCM	ENZ	GLPX	NOAEL		4 d	4.1		mg/L	41	155953

Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	BCM	ENZ	GSTR	LOAEL		4 d	4.1		mg/L	41	155953
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	BCM	ENZ	ACHE	NOAEL		0.25 d	4.1		mg/L	41	155953
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	BCM	ENZ	ACHE	LOAEL		4 d	4.1		mg/L	41	155953
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	BCM	ENZ	ACHE	NOAEL		0.25 d	4.1		mg/L	41	155953
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	BCM	ENZ	ACHE	NOAEL		1 d	4.1		mg/L	41	155953
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	BCM	ENZ	SODA	NOAEL		4 d	4.1		mg/L	41	155953
Glyphosate isopropylamine salt	NR	Plantae	Plant Kingdom	REP	REP	GERM	NOAEL	LOAEL	29 d	1000	5000	ppm	100	160882
Glyphosate isopropylamine salt	Rubus	sp.	Brambles	REP	REP	GERM	NOAEL	LOAEL	29 d	1000	5000	ppm	100	160882
Glyphosate isopropylamine salt	NR	Magnoliopsida	Dicot Class	REP	REP	GERM	NOAEL	LOAEL	29 d	1000	5000	ppm	100	160882
Glyphosate isopropylamine salt	NR	Liliopsida	Monocot Class	REP	REP	GERM	NOAEL	LOAEL	29 d	1000	5000	ppm	100	160882
Glyphosate isopropylamine salt	Salix	sp.	Willow Species	MOR	MOR	SURV	LOAEL		365 d	1.8732		lb/acre	100	160748
Glyphosate isopropylamine salt	Salix	sp.	Willow Species	PHY	INJ	DAMG	LOAEL		365 d	1.8732		lb/acre	100	160748
Glyphosate isopropylamine salt	Salix	sp.	Willow Species	GRO	GRO	HGHT	LOAEL		365 d	1.8732		lb/acre	100	160748
Glyphosate isopropylamine salt	Pinus	taeda	Loblolly Pine	MOR	MOR	MORT	NOAEL		2 gs	1.125		ae lb/ac	100	160835
Glyphosate isopropylamine salt	Pinus	taeda	Loblolly Pine	PHY	INJ	DAMG	LOAEL		1 gs	1.125		ae lb/ac	100	160835

Glyphosate isopropylamine salt	Pinus	taeda	Loblolly Pine	GRO	GRO	HGHT	NOAEL			2	gs	1.125		ae lb/ac	100	160835
Glyphosate isopropylamine salt	Pinus	taeda	Loblolly Pine	POP	POP	BMAS	NOAEL			2	gs	1.125		ae lb/ac	100	160835
Glyphosate isopropylamine salt	NR	Plantae	Plant Kingdom	POP	POP	BMAS	LOAEL			2	gs	1.125		ae lb/ac	100	160835
Glyphosate, Monopotassium salt	Lithobates	sylvaticus	Wood Frog	MOR	MOR	MORT	LC10			4	d	1.3		ae mg/L	48.7	153679
Glyphosate, Monopotassium salt	Lithobates	sylvaticus	Wood Frog	MOR	MOR	MORT	LC50			4	d	1.9		ae mg/L	48.7	153679
Glyphosate, Monopotassium salt	Lithobates	sylvaticus	Wood Frog	MOR	MOR	MORT	LC90			4	d	2.8		ae mg/L	48.7	153679
Glyphosate, Monopotassium salt	Lithobates	sylvaticus	Wood Frog	MOR	MOR	MORT	NOAEL	LOAEL		4	d	1.12	2.11	ae mg/L	48.7	153679
Glyphosate, Monopotassium salt	Lithobates	pipiens	Leopard Frog	MOR	MOR	MORT	LC10			4	d	1.2		ae mg/L	48.7	153679
Glyphosate, Monopotassium salt	Lithobates	pipiens	Leopard Frog	MOR	MOR	MORT	LC50			4	d	1.5		ae mg/L	48.7	153679
Glyphosate, Monopotassium salt	Lithobates	pipiens	Leopard Frog	MOR	MOR	MORT	LC90			4	d	1.8		ae mg/L	48.7	153679
Glyphosate, Monopotassium salt	Lithobates	pipiens	Leopard Frog	MOR	MOR	MORT	NOAEL	LOAEL		4	d	1.12	2.11	ae mg/L	48.7	153679
Glyphosate, Monopotassium salt	Rana	cascadae	Cascades Frog	MOR	MOR	MORT	LC10			4	d	1.2		ae mg/L	48.7	153679
Glyphosate, Monopotassium salt	Rana	cascadae	Cascades Frog	MOR	MOR	MORT	LC50			4	d	1.7		ae mg/L	48.7	153679
Glyphosate, Monopotassium salt	Rana	cascadae	Cascades Frog	MOR	MOR	MORT	LC90			4	d	2.1		ae mg/L	48.7	153679
Glyphosate, Monopotassium salt	Rana	cascadae	Cascades Frog	MOR	MOR	MORT	NOAEL	LOAEL		4	d	1.12	2.11	ae mg/L	48.7	153679

Glyphosate, Monopotassium salt	Lithobates	clamitans ssp. clamitans	Bronze Frog	MOR	MOR	MORT	LC10			4 d	1		ae mg/L	48.7	153679
Glyphosate, Monopotassium salt	Lithobates	clamitans ssp. clamitans	Bronze Frog	MOR	MOR	MORT	LC50			4 d	1.4		ae mg/L	48.7	153679
Glyphosate, Monopotassium salt	Lithobates	clamitans ssp. clamitans	Bronze Frog	MOR	MOR	MORT	LC90			4 d	1.8		ae mg/L	48.7	153679
Glyphosate, Monopotassium salt	Lithobates	clamitans ssp. clamitans	Bronze Frog	MOR	MOR	MORT	LOAEL			4 d	1.12		ae mg/L	48.7	153679
Glyphosate, Monopotassium salt	Rana	catesbeiana	Bullfrog	MOR	MOR	MORT	LC10			4 d	0.5		ae mg/L	48.7	153679
Glyphosate, Monopotassium salt	Rana	catesbeiana	Bullfrog	MOR	MOR	MORT	LC50			4 d	0.8		ae mg/L	48.7	153679
Glyphosate, Monopotassium salt	Rana	catesbeiana	Bullfrog	MOR	MOR	MORT	LC90			4 d	1.2		ae mg/L	48.7	153679
Glyphosate, Monopotassium salt	Rana	catesbeiana	Bullfrog	MOR	MOR	MORT	LOAEL			4 d	1.12		ae mg/L	48.7	153679
Glyphosate, Monopotassium salt	Bufo	americanus	American Toad	MOR	MOR	MORT	LC10			4 d	1.2		ae mg/L	48.7	153679
Glyphosate, Monopotassium salt	Bufo	americanus	American Toad	MOR	MOR	MORT	LC50			4 d	1.6		ae mg/L	48.7	153679
Glyphosate, Monopotassium salt	Bufo	americanus	American Toad	MOR	MOR	MORT	LC90			4 d	2.1		ae mg/L	48.7	153679
Glyphosate, Monopotassium salt	Bufo	americanus	American Toad	MOR	MOR	MORT	NOAEL	LOAEL		4 d	1.12	2.11	ae mg/L	48.7	153679
Glyphosate, Monopotassium salt	Anaxyrus	boreas	Western Toad	MOR	MOR	MORT	LC10			4 d	1.7		ae mg/L	48.7	153679
Glyphosate, Monopotassium salt	Anaxyrus	boreas	Western Toad	MOR	MOR	MORT	LC50			4 d	2		ae mg/L	48.7	153679
Glyphosate, Monopotassium salt	Anaxyrus	boreas	Western Toad	MOR	MOR	MORT	LC90			4 d	2.4		ae mg/L	48.7	153679

Glyphosate, Monopotassium salt	Anaxyrus	boreas	Western Toad	MOR	MOR	MORT	NOAEL	LOAEL	4 d	1.12	2.11	ae mg/L	48.7	153679
Glyphosate, Monopotassium salt	Hyla	versicolor	Gray Tree Frog	MOR	MOR	MORT	LC10		4 d	1.4		ae mg/L	48.7	153679
Glyphosate, Monopotassium salt	Hyla	versicolor	Gray Tree Frog	MOR	MOR	MORT	LC50		4 d	1.7		ae mg/L	48.7	153679
Glyphosate, Monopotassium salt	Hyla	versicolor	Gray Tree Frog	MOR	MOR	MORT	LC90		4 d	2		ae mg/L	48.7	153679
Glyphosate, Monopotassium salt	Hyla	versicolor	Gray Tree Frog	MOR	MOR	MORT	NOAEL	LOAEL	4 d	1.12	2.11	ae mg/L	48.7	153679
Glyphosate, Monopotassium salt	Pseudacris	crucifer	Spring Peeper	MOR	MOR	MORT	LC10		4 d	0.1		ae mg/L	48.7	153679
Glyphosate, Monopotassium salt	Pseudacris	crucifer	Spring Peeper	MOR	MOR	MORT	LC50		4 d	0.8		ae mg/L	48.7	153679
Glyphosate, Monopotassium salt	Pseudacris	crucifer	Spring Peeper	MOR	MOR	MORT	LC90		4 d	1.6		ae mg/L	48.7	153679
Glyphosate, Monopotassium salt	Pseudacris	crucifer	Spring Peeper	MOR	MOR	MORT	LOAEL		4 d	1.12		ae mg/L	48.7	153679
Glyphosate, Monopotassium salt	Ambystoma	gracile	Northwestern Salamander	MOR	MOR	MORT	LC10		4 d	2.4		ae mg/L	48.7	153679
Glyphosate, Monopotassium salt	Ambystoma	gracile	Northwestern Salamander	MOR	MOR	MORT	LC50		4 d	2.8		ae mg/L	48.7	153679
Glyphosate, Monopotassium salt	Ambystoma	gracile	Northwestern Salamander	MOR	MOR	MORT	LC90		4 d	3.3		ae mg/L	48.7	153679
Glyphosate, Monopotassium salt	Ambystoma	maculatum	Spotted Salamander	MOR	MOR	MORT	LC10		4 d	2.4		ae mg/L	48.7	153679
Glyphosate, Monopotassium salt	Ambystoma	maculatum	Spotted Salamander	MOR	MOR	MORT	LC50		4 d	2.8		ae mg/L	48.7	153679
Glyphosate, Monopotassium salt	Ambystoma	maculatum	Spotted Salamander	MOR	MOR	MORT	LC90		4 d	3.3		ae mg/L	48.7	153679

Glyphosate, Monopotassium salt	Ambystoma	laterale	Blue-spotted Salamander	MOR	MOR	MORT	LC10		4 d	2.7		ae mg/L	48.7	153679
Glyphosate, Monopotassium salt	Ambystoma	laterale	Blue-spotted Salamander	MOR	MOR	MORT	LC50		4 d	3.2		ae mg/L	48.7	153679
Glyphosate, Monopotassium salt	Ambystoma	laterale	Blue-spotted Salamander	MOR	MOR	MORT	LC90		4 d	3.7		ae mg/L	48.7	153679
Glyphosate, Monopotassium salt	Notophtalmus	viridescens	Salamander	MOR	MOR	MORT	LC10		4 d	2.3		ae mg/L	48.7	153679
Glyphosate, Monopotassium salt	Notophtalmus	viridescens	Salamander	MOR	MOR	MORT	LC50		4 d	2.7		ae mg/L	48.7	153679
Glyphosate, Monopotassium salt	Notophtalmus	viridescens	Salamander	MOR	MOR	MORT	LC90		4 d	3.1		ae mg/L	48.7	153679
Glyphosate isopropylamine salt	Rattus	norvegicus	Norway Rat	GRO	GRO	WGHT	NOAEL		30 d	250		mg/kg bdwt	100	155939
Glyphosate isopropylamine salt	Rattus	norvegicus	Norway Rat	GRO	MPH	SMIX	NOAEL	LOAEL	30 d	5	50	mg/kg bdwt	100	155939
Glyphosate isopropylamine salt	Rattus	norvegicus	Norway Rat	BCM	HRM	TSTR	LOAEL		30 d	5		mg/kg bdwt	100	155939
Glyphosate isopropylamine salt	Rattus	norvegicus	Norway Rat	CEL	CEL	HGHT	LOAEL		30 d	5		mg/kg bdwt	100	155939
Glyphosate isopropylamine salt	Rattus	norvegicus	Norway Rat	GRO	DVP	SXDP	NOAEL	LOAEL	30 d	5	50	mg/kg bdwt	100	155939
Glyphosate	NR	Fungi	Fungi Kingdom	PHY	PHY	RESP	LOAEL		214 d	1000		ppm	100	162021
Glyphosate	NR	Fungi	Fungi Kingdom	POP	POP	ABND	NOAEL		214 d	1000		ppm	100	162021
Glyphosate isopropylamine salt	Leporinus	obtusidens	Characin	MOR	MOR	MORT	NR-ZERO		90 d	2.4		mg/L	48	161803
Glyphosate isopropylamine salt	Leporinus	obtusidens	Characin	GRO	GRO	COND	NOAEL		90 d	2.4		mg/L	48	161803
Glyphosate isopropylamine salt	Leporinus	obtusidens	Characin	GRO	GRO	LGTH	NOAEL		60 d	2.4		mg/L	48	161803
Glyphosate isopropylamine salt	Leporinus	obtusidens	Characin	GRO	GRO	LGTH	LOAEL		90 d	2.4		mg/L	48	161803

Glyphosate isopropylamine salt	Leporinus	obtusidens	Characin	GRO	GRO	GAIN	LOAEL		30 d	0.48		mg/L	48	161803
Glyphosate isopropylamine salt	Leporinus	obtusidens	Characin	GRO	GRO	GAIN	LOAEL		60 d	0.48		mg/L	48	161803
Glyphosate isopropylamine salt	Leporinus	obtusidens	Characin	BCM	BCM	GLYC	LOAEL		90 d	0.48		mg/L	48	161803
Glyphosate isopropylamine salt	Leporinus	obtusidens	Characin	BCM	BCM	GLUC	NOAEL	LOAEL	90 d	0.48	2.4	mg/L	48	161803
Glyphosate isopropylamine salt	Leporinus	obtusidens	Characin	BCM	BCM	LACT	LOAEL		90 d	0.48		mg/L	48	161803
Glyphosate isopropylamine salt	Leporinus	obtusidens	Characin	BCM	BCM	HMCT	LOAEL		90 d	0.48		mg/L	48	161803
Glyphosate isopropylamine salt	Leporinus	obtusidens	Characin	BCM	BCM	HMGL	LOAEL		90 d	0.48		mg/L	48	161803
Glyphosate isopropylamine salt	Leporinus	obtusidens	Characin	CEL	CEL	LEUK	NOAEL		90 d	2.4		mg/L	48	161803
Glyphosate isopropylamine salt	Leporinus	obtusidens	Characin	BEH	FDB	FCNS	NOAEL		90 d	2.4		mg/L	48	161803
Glyphosate isopropylamine salt	Leporinus	obtusidens	Characin	GRO	GRO	LGTH	LOAEL		30 d	0.48		mg/L	48	161803
Glyphosate isopropylamine salt	Leporinus	obtusidens	Characin	GRO	GRO	GAIN	LOAEL		90 d	0.48		mg/L	48	161803
Glyphosate isopropylamine salt	Leporinus	obtusidens	Characin	BCM	ENZ	ACHE	NOAEL	LOAEL	90 d	0.48	2.4	mg/L	48	161803
Glyphosate isopropylamine salt	Leporinus	obtusidens	Characin	BCM	BCM	PRTL	NOAEL	LOAEL	90 d	0.48	2.4	mg/L	48	161803
Glyphosate isopropylamine salt	Leporinus	obtusidens	Characin	BCM	BCM	GLYC	NOAEL		90 d	2.4		mg/L	48	161803
Glyphosate isopropylamine salt	Leporinus	obtusidens	Characin	BCM	BCM	GLUC	NOAEL		90 d	2.4		mg/L	48	161803

Glyphosate isopropylamine salt	Leporinus	obtusidens	Characin	BCM	BCM	LACT	LOAEL		90 d	0.48		mg/L	48	161803
Glyphosate isopropylamine salt	Leporinus	obtusidens	Characin	BCM	BCM	PRTL	LOAEL		90 d	0.48		mg/L	48	161803
Glyphosate isopropylamine salt	Leporinus	obtusidens	Characin	BCM	BCM	PRTL	LOAEL		90 d	0.48		mg/L	48	161803
Glyphosate isopropylamine salt	Leporinus	obtusidens	Characin	CEL	CEL	RBCE	LOAEL		90 d	0.48		mg/L	48	161803
Glyphosate	Danio rerio		Zebra Danio	GRO	DVP	NORM	NOAEL		5 dpf	9.9		mg/L	99	161316
Glyphosate	Danio rerio		Zebra Danio	GRO	GRO	LGTH	NOAEL		5 dpf	9.9		mg/L	99	161316
Glyphosate	Myriophyllum	aquaticum	Parrot Feather Watermilfoil	BCM	BCM	CHLA	EC50		14 d	0.222		AI mg/L	35.6	150059
Glyphosate	Myriophyllum	aquaticum	Parrot Feather Watermilfoil	BCM	BCM	CHLB	EC50		14 d	0.222		AI mg/L	35.6	150059
Glyphosate	Myriophyllum	aquaticum	Parrot Feather Watermilfoil	BCM	BCM	CARC	EC50		14 d	0.222		AI mg/L	35.6	150059
Glyphosate	Myriophyllum	aquaticum	Parrot Feather Watermilfoil	GRO	GRO	GRRT	EC50		14 d	0.221		AI mg/L	35.6	150059
Glyphosate	Myriophyllum	aquaticum	Parrot Feather Watermilfoil	GRO	GRO	WGHT	EC50		14 d	1.999		AI mg/L	35.6	150059
Glyphosate	Myriophyllum	aquaticum	Parrot Feather Watermilfoil	GRO	GRO	LGTH	EC50		14 d	2.04		AI mg/L	35.6	150059
Glyphosate	Myriophyllum	aquaticum	Parrot Feather Watermilfoil	GRO	GRO	LGTH	EC50		14 d	1.998		AI mg/L	35.6	150059
Glyphosate	Chlorella	saccharophila	Green Algae	POP	POP	PGRT	EC10		3 d	2.925		mg/L	97.5	150096
Glyphosate	Chlorella	saccharophila	Green Algae	POP	POP	PGRT	NOAEL	LOAEL	3 d	0.38025	1.521	mg/L	97.5	150096
Glyphosate	Chlorella	saccharophila	Green Algae	POP	POP	PGRT	EC50		3 d	39.585		mg/L	97.5	150096
Glyphosate	Chlorella	saccharophila	Green Algae	POP	POP	PGRT	EC90		3 d	76.1475		mg/L	97.5	150096
Glyphosate	Chlorella	vulgaris	Green Algae	POP	POP	PGRT	LOAEL		3 d	0.0975		mg/L	97.5	150096
Glyphosate	Chlorella	vulgaris	Green Algae	POP	POP	ABND	LOAEL		3 d	0.0975		mg/L	97.5	150096
Glyphosate	Chlorella	vulgaris	Green Algae	POP	POP	PGRT	EC50		3 d	40.6575		mg/L	97.5	150096
Glyphosate	Chlorella	vulgaris	Green Algae	POP	POP	PGRT	EC90		3 d	84.7275		mg/L	97.5	150096
Glyphosate	Scenedesmus	acutus	Green Algae	POP	POP	PGRT	LOAEL		3 d	0.0975		mg/L	97.5	150096

Glyphosate	Scenedesmus	acutus	Green Algae	POP	POP	ABND	LOAEL		3 d	0.0975		mg/L	97.5	150096
Glyphosate	Scenedesmus	acutus	Green Algae	POP	POP	PGRT	EC50		3 d	23.8875		mg/L	97.5	150096
Glyphosate	Scenedesmus	acutus	Green Algae	POP	POP	PGRT	EC90		3 d	52.26		mg/L	97.5	150096
Glyphosate	Scenedesmus	subspicatus	Green Algae	POP	POP	PGRT	NOAEL	LOAEL	3 d	0.0975	0.38025	mg/L	97.5	150096
Glyphosate	Scenedesmus	subspicatus	Green Algae	POP	POP	ABND	NOAEL	LOAEL	3 d	0.0975	0.38025	mg/L	97.5	150096
Glyphosate	Scenedesmus	subspicatus	Green Algae	POP	POP	PGRT	EC10		3 d	1.56		mg/L	97.5	150096
Glyphosate	Scenedesmus	subspicatus	Green Algae	POP	POP	PGRT	EC50		3 d	25.35		mg/L	97.5	150096
Glyphosate	Scenedesmus	subspicatus	Green Algae	POP	POP	PGRT	EC90		3 d	49.0425		mg/L	97.5	150096
Glyphosate	Bromus	tectorum	Downy Brome	POP	POP	CNTL	LOAEL		d	0.2676		lb/acre	100	159489
Glyphosate	Pascopyrum	smithii	Western Wheatgrass	POP	POP	BMAS	NOAEL		91.32 d	0.2676		lb/acre	100	159489
Glyphosate	Elymus	trachycaulus	Slender Wheatgrass	POP	POP	BMAS	NOAEL		91.32 d	0.2676		lb/acre	100	159489
Glyphosate	Leymus	triticoideus	Beardless Wildrye	POP	POP	BMAS	NOAEL		91.32 d	0.2676		lb/acre	100	159489
Glyphosate	Elymus	lanceolatus	Streambank Wheatgrass	POP	POP	BMAS	LOAEL		91.32 d	0.2676		lb/acre	100	159489
Glyphosate	Bromus	biebersteinii	Meadow Brome	POP	POP	BMAS	LOAEL		91.32 d	0.2676		lb/acre	100	159489
Glyphosate	NR	Poaceae	Grass Family	POP	POP	BMAS	NOAEL		91.32 d	0.2676		lb/acre	100	159489
Glyphosate, Monopotassium salt	Hyla	versicolor	Gray Tree Frog	GRO	DVP	MMPH	NOAEL		42 go	572		ae ppb	48.8	153825
Glyphosate isopropylamine salt	Pseudacris	triseriata	Striped, Northern Chorus Frog	GRO	GRO	WGHT	NOAEL		29 d	572		ae ppb	48.7	153825
Glyphosate isopropylamine salt	Pseudacris	triseriata	Striped, Northern Chorus Frog	GRO	DVP	MMPH	NOAEL		29 d	572		ae ppb	48.7	153825
Glyphosate, Monopotassium salt	Hyla	versicolor	Gray Tree Frog	GRO	GRO	WGHT	NOAEL		42 go	572		ae ppb	48.8	153825
Glyphosate isopropylamine salt	Bufo	americanus	American Toad	GRO	GRO	WGHT	NOAEL		26.2 d	572		ae ppb	48.7	153825
Glyphosate, Monopotassium salt	Pseudacris	triseriata	Striped, Northern Chorus Frog	GRO	GRO	WGHT	NOAEL		32 d	572		ae ppb	48.8	153825

Glyphosate isopropylamine salt	Hyla	versicolor	Gray Tree Frog	MOR	MOR	SURV	NOAEL		42	go	572		ae ppb	48.7	153825
Glyphosate, Monopotassium salt	Hyla	versicolor	Gray Tree Frog	MOR	MOR	SURV	NOAEL		42	go	572		ae ppb	48.8	153825
Glyphosate isopropylamine salt	Hyla	versicolor	Gray Tree Frog	GRO	GRO	WGHT	NOAEL		42	go	572		ae ppb	48.7	153825
Glyphosate, Monopotassium salt	Bufo	americanus	American Toad	GRO	GRO	WGHT	NOAEL		27.8	d	572		ae ppb	48.8	153825
Glyphosate isopropylamine salt	Pseudacris	triseriata	Striped, Northern Chorus Frog	MOR	MOR	SURV	NOAEL		42	go	572		ae ppb	48.7	153825
Glyphosate isopropylamine salt	Hyla	versicolor	Gray Tree Frog	GRO	DVP	MMPH	NOAEL		42	go	572		ae ppb	48.7	153825
Glyphosate, Monopotassium salt	Bufo	americanus	American Toad	GRO	DVP	MMPH	NOAEL	LOAEL		d	0.5	572	ae ppb	48.8	153825
Glyphosate, Monopotassium salt	Pseudacris	triseriata	Striped, Northern Chorus Frog	MOR	MOR	SURV	NOAEL	LOAEL	42	go	0.5	572	ae ppb	48.8	153825
Glyphosate, Monopotassium salt	Bufo	americanus	American Toad	MOR	MOR	SURV	NOAEL		42	go	572		ae ppb	48.8	153825
Glyphosate isopropylamine salt	Bufo	americanus	American Toad	GRO	DVP	MMPH	NOAEL	LOAEL		d	0.5	572	ae ppb	48.7	153825
Glyphosate, Monopotassium salt	Pseudacris	triseriata	Striped, Northern Chorus Frog	GRO	DVP	MMPH	NOAEL		32	d	572		ae ppb	48.8	153825
Glyphosate isopropylamine salt	Bufo	americanus	American Toad	MOR	MOR	SURV	NOAEL		42	go	572		ae ppb	48.7	153825
Glyphosate isopropylamine salt	Zizaniopsis	miliaceae	Giant Cutgrass	POP	POP	ABND	LOAEL		365	d	4.66		L/ha	100	161190
Glyphosate isopropylamine salt	Zizaniopsis	miliaceae	Giant Cutgrass	POP	POP	ABND	LOAEL		730	d	4.66		L/ha	100	161190
Glyphosate isopropylamine salt	Polygonum	hydropiperoides	Swamp Smartweed	POP	POP	ABND	NOAEL		365	d	4.66		L/ha	100	161190

Glyphosate isopropylamine salt	Polygonum	hydropiperoides	Swamp Smartweed	POP	POP	ABND	NOAEL		730	d	4.66		L/ha	100	161190
Glyphosate isopropylamine salt	Cyperus	sp.	Flatsedge	POP	POP	ABND	NOAEL		365	d	4.66		L/ha	100	161190
Glyphosate isopropylamine salt	Cyperus	sp.	Flatsedge	POP	POP	ABND	NOAEL		730	d	4.66		L/ha	100	161190
Glyphosate isopropylamine salt	Panicum	sp.	Panic Grass	POP	POP	ABND	LOAEL		365	d	4.66		L/ha	100	161190
Glyphosate isopropylamine salt	Panicum	sp.	Panic Grass	POP	POP	ABND	NOAEL		730	d	4.66		L/ha	100	161190
Glyphosate isopropylamine salt	Alternanthera	philoxeroides	Alligator-Weed	POP	POP	ABND	NOAEL		365	d	4.66		L/ha	100	161190
Glyphosate isopropylamine salt	Alternanthera	philoxeroides	Alligator-Weed	POP	POP	ABND	NOAEL		730	d	4.66		L/ha	100	161190
Glyphosate isopropylamine salt	Sesbania	herbacea	Colorado Riverhemp	POP	POP	ABND	NOAEL		365	d	4.66		L/ha	100	161190
Glyphosate isopropylamine salt	Sesbania	herbacea	Colorado Riverhemp	POP	POP	ABND	NOAEL		730	d	4.66		L/ha	100	161190
Glyphosate isopropylamine salt	Echinochloa	walteri	Coast Cockspur	POP	POP	ABND	NOAEL		730	d	4.66		L/ha	100	161190
Glyphosate isopropylamine salt	Eleocharis	parvula	Dwarf Spikesedge	POP	POP	ABND	NOAEL		730	d	4.66		L/ha	100	161190
Glyphosate isopropylamine salt	Sagittaria	latifolia	Arrowhead	POP	POP	ABND	NOAEL		365	d	4.66		L/ha	100	161190
Glyphosate isopropylamine salt	Sagittaria	latifolia	Arrowhead	POP	POP	ABND	NOAEL		730	d	4.66		L/ha	100	161190
Glyphosate isopropylamine salt	Luziola	fluitans	Southern Watergrass	POP	POP	ABND	NOAEL		365	d	4.66		L/ha	100	161190
Glyphosate isopropylamine salt	Luziola	fluitans	Southern Watergrass	POP	POP	ABND	NOAEL		730	d	4.66		L/ha	100	161190

Glyphosate isopropylamine salt	Rhopalosiphum	padi	Aphid	MOR	MOR	MORT	NOAEL		0.7083	d	800		Al g/ha	100	150565
Glyphosate	Chlamydomonas	eugametos	Green Algae	POP	POP	ABND	NOAEL	LOAEL	2	d	0.0001	0.001	M	100	6513
Glyphosate	Lithobates	pipiens	Leopard Frog	GRO	DVP	MMPH	NOAEL			d	0.0069		mg/L	98	114296
Glyphosate	Hyla	versicolor	Gray Tree Frog	GRO	DVP	WGHT	NOAEL		26	d	0.0069		mg/L	98	114296
Glyphosate	Lithobates	pipiens	Leopard Frog	MOR	MOR	SURV	NOAEL			d	0.0069		mg/L	98	114296
Glyphosate	NR	Plantae	Plant Kingdom	POP	POP	CHLA	NOAEL		16	d	0.0069		mg/L	98	114296
Glyphosate	Leptodiptomus	minutus	Copepod	POP	POP	ABND	NOAEL			d	0.0069		mg/L	98	114296
Glyphosate	Hyla	versicolor	Gray Tree Frog	GRO	DVP	MMPH	NOAEL		26	d	0.0069		mg/L	98	114296
Glyphosate	Hyla	versicolor	Gray Tree Frog	MOR	MOR	SURV	NOAEL		26	d	0.0069		mg/L	98	114296
Glyphosate	NR	Plantae	Plant Kingdom	POP	POP	CHLA	NOAEL		35	d	0.0069		mg/L	98	114296
Glyphosate	Ceriodaphnia	sp.	Water Flea	POP	POP	ABND	NOAEL			d	0.0069		mg/L	98	114296
Glyphosate	NR	Plantae	Plant Kingdom	POP	POP	BMAS	NOAEL		36	d	0.0069		mg/L	98	114296
Glyphosate	NR	Plantae	Plant Kingdom	POP	POP	BMAS	NOAEL		25	d	0.0069		mg/L	98	114296
Glyphosate	Skistodiptomus	oregonensis	Calanoid Copepod	POP	POP	ABND	NOAEL			d	0.0069		mg/L	98	114296
Glyphosate	Lithobates	pipiens	Leopard Frog	GRO	DVP	WGHT	NOAEL			d	0.0069		mg/L	98	114296
Glyphosate	Daphnia	pulex	Water Flea	POP	POP	ABND	NOAEL			d	0.0069		mg/L	98	114296
AMPA	Glomus	intraradices	Mycorrhizal Fungi	REP	REP	SEPD	IC50		14	d	5.335		ppm	97	55367
AMPA	Glomus	intraradices	Mycorrhizal Fungi	GRO	GRO	LGTH	IC50		14	d	4.947		ppm	97	55367
Glyphosate	Glomus	intraradices	Mycorrhizal Fungi	REP	REP	SEPD	IC50		14	d	0.3996		ppm	99.9	55367
Glyphosate	Glomus	intraradices	Mycorrhizal Fungi	GRO	GRO	LGTH	IC50		14	d	0.4995		ppm	99.9	55367
Glyphosate	Kochia	scoparia	Kochia	GRO	GRO	WGHT	LOAEL		28	d	0.74928		lb/acre	100	116117
Glyphosate	Kochia	scoparia	Kochia	GRO	GRO	WGHT	LOAEL		28	d	0.74928		lb/acre	100	116117
Glyphosate isopropylamine salt	Rhamdia	quelen	Catfish	BCM	ENZ	ACHE	LOAEL		4	d	0.096		mg/L	48	111451
Glyphosate isopropylamine salt	Rhamdia	quelen	Catfish	BCM	BCM	TBAR	LOAEL		4	d	0.096		mg/L	48	111451
Glyphosate isopropylamine salt	Rhamdia	quelen	Catfish	BCM	BCM	TBAR	NOAEL		4	d	0.192		mg/L	48	111451

Glyphosate isopropylamine salt	Rhamdia	quelen	Catfish	BCM	BCM	TBAR	LOAEL			4 d	0.096		mg/L	48	111451
Glyphosate isopropylamine salt	Rhamdia	quelen	Catfish	BCM	BCM	GLUC	LOAEL			4 d	0.096		mg/L	48	111451
Glyphosate isopropylamine salt	Rhamdia	quelen	Catfish	BCM	BCM	GLYC	LOAEL			4 d	0.096		mg/L	48	111451
Glyphosate isopropylamine salt	Rhamdia	quelen	Catfish	BCM	BCM	LACT	LOAEL			4 d	0.096		mg/L	48	111451
Glyphosate isopropylamine salt	Rhamdia	quelen	Catfish	BCM	BCM	PRCO	LOAEL			4 d	0.096		mg/L	48	111451
Glyphosate isopropylamine salt	Rhamdia	quelen	Catfish	BCM	BCM	AMMO	LOAEL			4 d	0.096		mg/L	48	111451
Glyphosate isopropylamine salt	Rhamdia	quelen	Catfish	BCM	BCM	GLUC	LOAEL			4 d	0.096		mg/L	48	111451
Glyphosate isopropylamine salt	Rhamdia	quelen	Catfish	BCM	BCM	GLYC	LOAEL			4 d	0.096		mg/L	48	111451
Glyphosate isopropylamine salt	Rhamdia	quelen	Catfish	BCM	BCM	LACT	LOAEL			4 d	0.096		mg/L	48	111451
Glyphosate isopropylamine salt	Rhamdia	quelen	Catfish	BCM	BCM	PRCO	LOAEL			4 d	0.096		mg/L	48	111451
Glyphosate isopropylamine salt	Rhamdia	quelen	Catfish	BCM	BCM	AMMO	LOAEL			4 d	0.096		mg/L	48	111451
Glyphosate isopropylamine salt	Rhamdia	quelen	Catfish	BCM	ENZ	ACHE	NOAEL			4 d	0.192		mg/L	48	111451
Glyphosate isopropylamine salt	Piaractus	brachypomus	Pirapatinga	MOR	MOR	MORT	LC50			4 d	46.7856		mg/L	48	120635
Glyphosate isopropylamine salt	Rhamdia	quelen	Catfish	MOR	MOR	MORT	LC50			4 d	7.3		mg/L	100	111938
Glyphosate isopropylamine salt	Prosopis	glandulosa var. glandulosa	Honey Mesquite	MOR	MOR	MORT	LOAEL			2 gs	30		ae g/L	100	44096

Glyphosate isopropylamine salt	Prosopis	glandulosa var. glandulosa	Honey Mesquite	MOR	MOR	MORT	NOAEL		2	gs	30		ae g/L	100	44096
Glyphosate isopropylamine salt	Prosopis	glandulosa var. glandulosa	Honey Mesquite	MOR	MOR	MORT	LOAEL		2	gs	120		ae g/L	100	44096
Glyphosate isopropylamine salt	Prosopis	glandulosa var. glandulosa	Honey Mesquite	POP	POP	COVR	LOAEL		1	gs	30		ae g/L	100	44096
Glyphosate isopropylamine salt	Prosopis	glandulosa var. glandulosa	Honey Mesquite	MOR	MOR	MORT	LOAEL		1	gs	30		ae g/L	100	44096
Glyphosate isopropylamine salt	Prosopis	glandulosa var. glandulosa	Honey Mesquite	MOR	MOR	MORT	LOAEL		1	gs	120		ae g/L	100	44096
Glyphosate isopropylamine salt	Prosopis	glandulosa var. glandulosa	Honey Mesquite	MOR	MOR	MORT	NOAEL		1	gs	30		ae g/L	100	44096
Glyphosate isopropylamine salt	Prosopis	glandulosa var. glandulosa	Honey Mesquite	POP	POP	COVR	LOAEL		1	gs	30		ae g/L	100	44096
Glyphosate isopropylamine salt	Prosopis	glandulosa var. glandulosa	Honey Mesquite	POP	POP	COVR	LOAEL		2	gs	30		ae g/L	100	44096
Glyphosate isopropylamine salt	Prosopis	glandulosa var. glandulosa	Honey Mesquite	MOR	MOR	MORT	LOAEL		2	gs	120		ae g/L	100	44096
Glyphosate isopropylamine salt	Prosopis	glandulosa var. glandulosa	Honey Mesquite	MOR	MOR	MORT	NOAEL		2	gs	30		ae g/L	100	44096
Glyphosate isopropylamine salt	Prosopis	glandulosa var. glandulosa	Honey Mesquite	MOR	MOR	MORT	NOAEL		2	gs	120		ae g/L	100	44096
Glyphosate isopropylamine salt	Prosopis	glandulosa var. glandulosa	Honey Mesquite	POP	POP	COVR	LOAEL		2	gs	30		ae g/L	100	44096
Glyphosate isopropylamine salt	Prosopis	glandulosa var. glandulosa	Honey Mesquite	POP	POP	COVR	LOAEL		1	gs	30		ae g/L	100	44096
Glyphosate isopropylamine salt	Prosopis	glandulosa var. glandulosa	Honey Mesquite	MOR	MOR	MORT	LOAEL		1	gs	30		ae g/L	100	44096
Glyphosate isopropylamine salt	Prosopis	glandulosa var. glandulosa	Honey Mesquite	MOR	MOR	MORT	NOAEL		1	gs	30		ae g/L	100	44096

Glyphosate isopropylamine salt	Prosopis	glandulosa var. glandulosa	Honey Mesquite	MOR	MOR	MORT	LOAEL		1	gs	120		ae g/L	100	44096
Glyphosate isopropylamine salt	Prosopis	glandulosa var. glandulosa	Honey Mesquite	POP	POP	COVR	LOAEL		1	gs	30		ae g/L	100	44096
Glyphosate isopropylamine salt	Prosopis	glandulosa var. glandulosa	Honey Mesquite	POP	POP	COVR	LOAEL		2	gs	30		ae g/L	100	44096
Glyphosate isopropylamine salt	Prosopis	glandulosa var. glandulosa	Honey Mesquite	MOR	MOR	MORT	LOAEL		2	gs	30		ae g/L	100	44096
Glyphosate isopropylamine salt	Prosopis	glandulosa var. glandulosa	Honey Mesquite	MOR	MOR	MORT	LOAEL		2	gs	120		ae g/L	100	44096
Glyphosate isopropylamine salt	Prosopis	glandulosa var. glandulosa	Honey Mesquite	MOR	MOR	MORT	NOAEL		2	gs	30		ae g/L	100	44096
Glyphosate isopropylamine salt	Prosopis	glandulosa var. glandulosa	Honey Mesquite	POP	POP	COVR	LOAEL		2	gs	30		ae g/L	100	44096
Glyphosate	Glycine	max	Soybean	POP	POP	ABND	NOAEL			hv	3.0328		lb/acre	100	116445
Glyphosate	Sorghum	bicolor	Broomcorn	POP	POP	ABND	NOAEL			hv	3.0328		lb/acre	100	116445
Glyphosate	Brunnichia	ovata	Buckwheat Vine	POP	POP	ABND	LOAEL		304.4	d	3.0328		lb/acre	100	116445
Glyphosate isopropylamine salt	Pomacea	lineata	Golden Apple Snail	GRO	GRO	GAIN	NOEC		8	d	0.12		mg/L	100	107038
Glyphosate isopropylamine salt	Pomacea	lineata	Golden Apple Snail	GRO	GRO	GAIN	NOEC	LOEC	4	d	0.25	0.5	mg/L	100	107038
Glyphosate isopropylamine salt	Pomacea	lineata	Golden Apple Snail	GRO	GRO	GAIN	NOEC	LOEC	4	d	2.4	4.8	mg/L	100	107038
Glyphosate isopropylamine salt	Lumbriculus	variegatus	Oligochaete, Worm	BCM	ENZ	GSTR	LOAEL		4	d	0.05		mg/L	100	115572
Glyphosate isopropylamine salt	Lumbriculus	variegatus	Oligochaete, Worm	BCM	ENZ	GSTR	NOAEL		4	d	5		mg/L	100	115572
Glyphosate isopropylamine salt	Lumbriculus	variegatus	Oligochaete, Worm	BCM	ENZ	CTLS	NOAEL		4	d	5		mg/L	100	115572
Glyphosate isopropylamine salt	Lumbriculus	variegatus	Oligochaete, Worm	BCM	ENZ	SODA	NOAEL	LOAEL	4	d	0.05	0.1	mg/L	100	115572

Glyphosate isopropylamine salt	Lumbriculus	variegatus	Oligochaete, Worm	ACC	ACC	RSDE	BCF		4 d	0.05		mg/L	100	115572
Glyphosate isopropylamine salt	Lumbriculus	variegatus	Oligochaete, Worm	ACC	ACC	RSDE	BCF		4 d	0.1		mg/L	100	115572
Glyphosate isopropylamine salt	Lumbriculus	variegatus	Oligochaete, Worm	ACC	ACC	RSDE	BCF		4 d	0.5		mg/L	100	115572
Glyphosate isopropylamine salt	Lumbriculus	variegatus	Oligochaete, Worm	ACC	ACC	RSDE	BCF		4 d	1		mg/L	100	115572
Glyphosate isopropylamine salt	Lumbriculus	variegatus	Oligochaete, Worm	ACC	ACC	RSDE	BCF		4 d	5		mg/L	100	115572
Glyphosate	Lumbriculus	variegatus	Oligochaete, Worm	ACC	ACC	RSDE	BCF		4 d	1		mg/L	98	115572
Glyphosate	Lumbriculus	variegatus	Oligochaete, Worm	ACC	ACC	RSDE	BCF		4 d	5		mg/L	98	115572
Glyphosate	Lumbriculus	variegatus	Oligochaete, Worm	ACC	ACC	RSDE	BCF		4 d	0.05		mg/L	98	115572
Glyphosate	Lumbriculus	variegatus	Oligochaete, Worm	ACC	ACC	RSDE	BCF		4 d	0.1		mg/L	98	115572
Glyphosate	Lumbriculus	variegatus	Oligochaete, Worm	ACC	ACC	RSDE	BCF		4 d	0.5		mg/L	98	115572
Glyphosate isopropylamine salt	Thalassiosira	weissflogii	Diatom	POP	POP	PGRT	NOAEL		2 d	1.96		mg/L	>=98	105925
Glyphosate	Oncorhynchus	kisutch	Silver Salmon	PHY	PHY	EPYR	NOAEL	LOAEL	0.0139 d	0.099	0.99	mg/L	99	89637
Glyphosate	Oncorhynchus	kisutch	Silver Salmon	PHY	PHY	EPYR	NOAEL	LOAEL	0.0174 d	0.099	0.99	mg/L	99	89637
Glyphosate	Oncorhynchus	kisutch	Silver Salmon	PHY	PHY	EPYR	NOAEL	LOAEL	0.0014 d	9.9	99	mg/L	99	89637
Glyphosate	Oncorhynchus	kisutch	Silver Salmon	PHY	PHY	EPYR	NOAEL	LOAEL	0.0035 d	0.99	9.9	mg/L	99	89637
Glyphosate	Oncorhynchus	kisutch	Silver Salmon	PHY	PHY	EPYR	NOAEL	LOAEL	0.0069 d	0.099	0.99	mg/L	99	89637
Glyphosate	Oncorhynchus	kisutch	Silver Salmon	PHY	PHY	EPYR	NOAEL	LOAEL	0.0104 d	0.099	0.99	mg/L	99	89637
Glyphosate	Oncorhynchus	kisutch	Silver Salmon	PHY	PHY	EPYR	NOAEL	LOAEL	0.0208 d	0.099	0.99	mg/L	99	89637
Glyphosate isopropylamine salt	Lithobates	clamitans ssp. clamitans	Bronze Frog	MOR	MOR	MORT	NOAEL		4 d	0.03		ae mg/L	100	72797

Glyphosate isopropylamine salt	Lithobates	clamitans ssp. clamitans	Bronze Frog	MOR	MOR	MORT	NOAEL		4 d	0.18		ae mg/L	100	72797
Glyphosate isopropylamine salt	Lithobates	pipiens	Leopard Frog	MOR	MOR	MORT	NOAEL		4 d	0.18		ae mg/L	100	72797
Glyphosate isopropylamine salt	Lithobates	pipiens	Leopard Frog	MOR	MOR	MORT	NOAEL		4 d	0.03		ae mg/L	100	72797
Glyphosate	Prosopis	farcta	Syrian Mesquite	POP	POP	BMAS	LOAEL		19 d	3.84		Al l/ha	100	99679
Glyphosate	Prosopis	farcta	Syrian Mesquite	POP	POP	BMAS	LOAEL		72 d	3.84		Al l/ha	100	99679
Glyphosate	Rubus	fruticosus	Bramble Blackberry	REP	REP	VEGR	LOAEL		d	3.8356		lb/acre	100	116507
Glyphosate	Rubus	fruticosus	Bramble Blackberry	REP	REP	VEGR	LOAEL		d	3.8356		lb/acre	100	116507
Glyphosate	Rubus	fruticosus	Bramble Blackberry	POP	POP	ABND	LOAEL		d	3.8356		lb/acre	100	116507
Glyphosate	Rubus	fruticosus	Bramble Blackberry	POP	POP	ABND	LOAEL		d	3.8356		lb/acre	100	116507
Glyphosate	Xanthoxoma	sagittifolium	Cocoyam	POP	POP	BMAS	LOAEL		370 d	2.34		L/ha	100	116434
Glyphosate	Phragmites	australis	Grass	POP	POP	WGHT	LOAEL		30.44 d	1.99808		lb/acre	100	110337
Glyphosate	Phragmites	australis	Grass	POP	POP	WGHT	LOAEL		30.44 d	1.99808		lb/acre	100	110337
Glyphosate	Steinernema	feltiae	Nematode	REP	REP	PROG	NOAEL		10 d	21600		ppm	100	109598
Glyphosate	Steinernema	feltiae	Nematode	BEH	FDB	PRBE	NOAEL		d	21600		ppm	100	109598
Glyphosate	Steinernema	feltiae	Nematode	REP	REP	PROG	NOAEL		10 d	21600		ppm	100	109598
Glyphosate	Steinernema	feltiae	Nematode	BEH	FDB	PRBE	NOAEL		5 d	21600		ppm	100	109598
Glyphosate	Pinus	taeda	Loblolly Pine	BCM	BCM	MGCO	LOAEL		1 gs	4.46		lb/acre	100	120301
Glyphosate	Pinus	taeda	Loblolly Pine	GRO	GRO	HGHT	NOAEL		2 gs	4.46		lb/acre	100	120301
Glyphosate	NR	Plantae	Plant Kingdom	POP	POP	ABND	LOAEL		1 gs	4.46		lb/acre	100	120301
Glyphosate	Rhyacionia	frustrana	Nantucket Pinetip Moth	GRO	GRO	WGHT	LOAEL		730 d	5		Al kg/ha	100	120301
Glyphosate	Rhyacionia	frustrana	Nantucket Pinetip Moth	POP	POP	ABND	LOAEL		730 d	5		Al kg/ha	100	120301
Glyphosate isopropylamine salt	Cornus	canadensis	Bunchberry Dogwood	POP	POP	COVR	NOAEL		3650 d	2.676		lb/acre	100	118733

Glyphosate isopropylamine salt	Picea	glauca	White Spruce	GRO	GRO	HGHT	NOAEL		3650	d	2.676		lb/acre	100	118733
Glyphosate isopropylamine salt	NR	Plantae	Plant Kingdom	POP	POP	DVRS	LOAEL		3650	d	2.676		lb/acre	100	118733
Glyphosate isopropylamine salt	Alnus	viridis	Green Alder	POP	POP	COVR	NOAEL		3650	d	2.676		lb/acre	100	118733
Glyphosate isopropylamine salt	Betula	papyrifera	Paper Birch	POP	POP	COVR	NOAEL		3650	d	2.676		lb/acre	100	118733
Glyphosate isopropylamine salt	Calamagrostis	canadensis	Bluejoint Reedgrass	POP	POP	COVR	NOAEL		3650	d	2.676		lb/acre	100	118733
Glyphosate isopropylamine salt	Chamerion	angustifolium ssp. angustifolium	Fireweed	POP	POP	COVR	NOAEL		3650	d	2.676		lb/acre	100	118733
Glyphosate isopropylamine salt	Equisetum	arvense	Field Horsetail	POP	POP	COVR	NOAEL		3650	d	2.676		lb/acre	100	118733
Glyphosate isopropylamine salt	Equisetum	sylvaticum	Woodland Horsetail	POP	POP	COVR	NOAEL		3650	d	2.676		lb/acre	100	118733
Glyphosate isopropylamine salt	Heracleum	sphondylium ssp. montanum	Common Cowparsnip	POP	POP	COVR	NOAEL		3650	d	2.676		lb/acre	100	118733
Glyphosate isopropylamine salt	Lonicera	involucrata	Bearberry Honeysuckle	POP	POP	COVR	NOAEL		3650	d	2.676		lb/acre	100	118733
Glyphosate isopropylamine salt	Picea	glauca	White Spruce	POP	POP	COVR	NOAEL		3650	d	2.676		lb/acre	100	118733
Glyphosate isopropylamine salt	Populus	balsamifera	Balsam Poplar	POP	POP	COVR	LOAEL		3650	d	2.676		lb/acre	100	118733
Glyphosate isopropylamine salt	Rosa	acicularis	Prickly Rose	POP	POP	COVR	NOAEL		3650	d	2.676		lb/acre	100	118733
Glyphosate isopropylamine salt	Rubus	idaeus	European Red Raspberry	POP	POP	COVR	NOAEL		3650	d	2.676		lb/acre	100	118733
Glyphosate isopropylamine salt	Rubus	pubescens	Dwarf Red Raspberry	POP	POP	COVR	NOAEL		3650	d	2.676		lb/acre	100	118733

Glyphosate isopropylamine salt	Salix	sp.	Willow Species	POP	POP	COVR	NOAEL		3650	d	2.676		lb/acre	100	118733
Glyphosate isopropylamine salt	Viburnum	edule	Squashberry	POP	POP	COVR	NOAEL		3650	d	2.676		lb/acre	100	118733
Glyphosate isopropylamine salt	Rhamdia	quelen	Catfish	BCM	HRM	CRTS	LOAEL		4	d	1.2		mg/L	100	112293
Glyphosate isopropylamine salt	Sclerotinia	sclerotiorum	Fungus	POP	POP	ABND	NOAEL		26	d	840		ae g/ha	100	70920
Glyphosate isopropylamine salt	Glycine	max	Soybean	BCM	BCM	PYAX	NOAEL		26	d	840		ae g/ha	100	70920
Glyphosate isopropylamine salt	Glycine	max	Soybean	POP	POP	BMAS	NOAEL			hv	840		ae g/ha	100	70920
Glyphosate isopropylamine salt	Glycine	max	Soybean	POP	POP	BMAS	NOAEL			hv	840		ae g/ha	100	70920
Glyphosate isopropylamine salt	Glycine	max	Soybean	POP	POP	BMAS	NOAEL			hv	840		ae g/ha	100	70920
Glyphosate isopropylamine salt	Glycine	max	Soybean	POP	POP	BMAS	NOAEL			hv	840		ae g/ha	100	70920
Glyphosate isopropylamine salt	Glycine	max	Soybean	POP	POP	BMAS	NOAEL			hv	840		ae g/ha	100	70920
Glyphosate isopropylamine salt	Glycine	max	Soybean	PHY	INJ	SYMP	NOAEL		7	d	840		ae g/ha	100	70920
Glyphosate isopropylamine salt	Glycine	max	Soybean	PHY	INJ	SYMP	NOAEL		7	d	840		ae g/ha	100	70920
Glyphosate isopropylamine salt	Glycine	max	Soybean	PHY	INJ	SYMP	NOAEL		7	d	840		ae g/ha	100	70920
Glyphosate isopropylamine salt	Sclerotinia	sclerotiorum	Fungus	POP	POP	ABND	NOAEL			hv	840		ae g/ha	100	70920
Glyphosate isopropylamine salt	Sclerotinia	sclerotiorum	Fungus	POP	POP	ABND	NOAEL			hv	840		ae g/ha	100	70920

Glyphosate isopropylamine salt	Sclerotinia	sclerotiorum	Fungus	POP	POP	ABND	LOAEL			hv	840		ae g/ha	100	70920
Glyphosate isopropylamine salt	Sclerotinia	sclerotiorum	Fungus	POP	POP	ABND	NOAEL			hv	840		ae g/ha	100	70920
Glyphosate isopropylamine salt	Peromyscus	maniculatus	Deer Mouse	MOR	MOR	LFSP	NOAEL		1217.6	d	3		AI kg/ha	100	69229
Glyphosate isopropylamine salt	Peromyscus	maniculatus	Deer Mouse	REP	REP	RPRD	NOAEL		1217.6	d	3		AI kg/ha	100	69229
Glyphosate isopropylamine salt	Peromyscus	maniculatus	Deer Mouse	REP	REP	RPRD	NOAEL		1217.6	d	3		AI kg/ha	100	69229
Glyphosate isopropylamine salt	Microtus	oregoni	Creeping Vole	REP	REP	RPRD	NOAEL		1217.6	d	3		AI kg/ha	100	69229
Glyphosate isopropylamine salt	Peromyscus	maniculatus	Deer Mouse	REP	REP	RPRD	NOAEL		365	d	3		AI kg/ha	100	69229
Glyphosate isopropylamine salt	Peromyscus	maniculatus	Deer Mouse	REP	REP	RPRD	NOAEL		365	d	3		AI kg/ha	100	69229
Glyphosate isopropylamine salt	Microtus	oregoni	Creeping Vole	MOR	MOR	LFSP	LOAEL		365.28	d	3		AI kg/ha	100	69229
Glyphosate isopropylamine salt	Microtus	oregoni	Creeping Vole	REP	REP	RPRD	NOAEL		1217.6	d	3		AI kg/ha	100	69229
Glyphosate isopropylamine salt	Carassius	auratus	Goldfish	CEL	GEN	NABN	NOAEL	LOAEL	2	d	5	10	mg/L	100	97710
Glyphosate isopropylamine salt	Carassius	auratus	Goldfish	CEL	GEN	MNUC	NOAEL	LOAEL	2	d	10	15	mg/L	100	97710
Glyphosate isopropylamine salt	Carassius	auratus	Goldfish	CEL	GEN	NABN	NOAEL	LOAEL	4	d	5	10	mg/L	100	97710
Glyphosate isopropylamine salt	Carassius	auratus	Goldfish	CEL	GEN	DAMG	LOAEL		2	d	5		mg/L	100	97710
Glyphosate isopropylamine salt	Carassius	auratus	Goldfish	CEL	GEN	NABN	LOAEL		6	d	5		mg/L	100	97710

Glyphosate isopropylamine salt	Carassius	auratus	Goldfish	CEL	GEN	MNUC	LOAEL		6 d	5		mg/L	100	97710
Glyphosate isopropylamine salt	Carassius	auratus	Goldfish	CEL	GEN	DAMG	LOAEL		6 d	5		mg/L	100	97710
Glyphosate isopropylamine salt	Carassius	auratus	Goldfish	CEL	GEN	DAMG	LOAEL		4 d	5		mg/L	100	97710
Glyphosate	Algae	NR	Algae	POP	POP	PSYN	NOAEL	0.1667	d	10		uM	100	109342
Glyphosate	Algae	NR	Algae	POP	POP	PSYN	NOAEL	0.1667	d	10		uM	100	109342
Glyphosate	Algae	NR	Algae	POP	POP	PSYN	NOAEL	0.1667	d	10		uM	100	109342
Glyphosate	Zostera	marina	Eelgrass	GRO	GRO	RLGR	NOAEL	3	d	100		uM	100	109342
Glyphosate	Zostera	marina	Eelgrass	BCM	BCM	CHAB	NOAEL	3	d	100		uM	100	109342
Glyphosate	Algae	NR	Algae	POP	POP	PSYN	NOAEL	0.1667	d	10		uM	100	109342
Glyphosate	Algae	NR	Algae	POP	POP	PSYN	NOAEL	0.1667	d	10		uM	100	109342
Glyphosate	Algae	NR	Algae	POP	POP	PSYN	NOAEL	0.1667	d	10		uM	100	109342
Glyphosate	Cassinia	arcuata	Drooping Cassinia	MOR	MOR	MORT	LOAEL	111	d	0.4014		lb/acre	100	70755
Glyphosate	Cassinia	arcuata	Drooping Cassinia	MOR	MOR	MORT	NR-LETH	111	d	0.4014		lb/acre	100	70755
Glyphosate	Cassinia	arcuata	Drooping Cassinia	MOR	MOR	MORT	LOAEL	111	d	0.4014		lb/acre	100	70755
Glyphosate	Cassinia	arcuata	Drooping Cassinia	MOR	MOR	MORT	NR-LETH	111	d	0.8028		lb/acre	100	70755
Glyphosate	Cassinia	arcuata	Drooping Cassinia	MOR	MOR	MORT	LOAEL	111	d	0.4014		lb/acre	100	70755
Glyphosate	Cassinia	arcuata	Drooping Cassinia	MOR	MOR	MORT	NR-LETH	111	d	0.4014		lb/acre	100	70755
Glyphosate	Aphis	fabae	Black Bean Aphid	BEH	AVO	CHEM	LOAEL	0.0104	d	1.5		mM	100	118858
Glyphosate	Aphis	fabae	Black Bean Aphid	POP	POP	ABND	LOAEL	8	d	0.015		mM	100	118858
Glyphosate	Vicia	faba	Broadbean	GRO	GRO	HGHT	NOAEL	LOAEL	8 d	15	150	mM	100	118858
Glyphosate	Aphis	fabae	Black Bean Aphid	POP	POP	ABND	NOAEL	LOAEL	8 d	15	150	mM	100	118858
Glyphosate	Vicia	faba	Broadbean	GRO	GRO	HGHT	NOAEL		8 d	150		mM	100	118858
Glyphosate	Vicia	faba	Broadbean	GRO	GRO	HGHT	NOAEL	LOAEL	8 d	15	150	mM	100	118858
Glyphosate	Aphis	fabae	Black Bean Aphid	POP	POP	ABND	LOAEL		2 d	1.5		mM	100	118858
Glyphosate	Vicia	faba	Broadbean	GRO	GRO	HGHT	LOAEL		8 d	0.015		mM	100	118858
Glyphosate	Poa	annua	Annual Bluegrass	POP	POP	CNTL	LOAEL		7 d	0.2676		lb/acre	100	121125
Glyphosate isopropylamine salt	Tetrahymena	pyriformis	Ciliate	BEH	AVO	STIM	EC50	0.2083	d	0.83712		mg/L	0.96	60864

Glyphosate isopropylamine salt	Aphytis	melinus	Red Scale Parasite	MOR	MOR	MORT	NR-ZERO		0.3333	d	0.48		%	48	90421
Glyphosate isopropylamine salt	Aphytis	lignanensis	Parasitic Wasp	MOR	MOR	MORT	NR-ZERO		0.3333	d	0.48		%	48	90421
Glyphosate isopropylamine salt	Aphytis	melinus	Red Scale Parasite	MOR	MOR	MORT	NR-ZERO		0.3333	d	0.48		%	48	90421
Glyphosate isopropylamine salt	Aphytis	lignanensis	Parasitic Wasp	MOR	MOR	MORT	NR-ZERO		0.3333	d	0.48		%	48	90421
Glyphosate isopropylamine salt	Leporinus	obtusidens	Characin	BCM	ENZ	ACHE	NOAEL		4	d	9.6		mg/L	48	108093
Glyphosate isopropylamine salt	Leporinus	obtusidens	Characin	BCM	BCM	GLYC	LOAEL		4	d	1.44		mg/L	48	108093
Glyphosate isopropylamine salt	Leporinus	obtusidens	Characin	BCM	BCM	AMMO	LOAEL		4	d	1.44		mg/L	48	108093
Glyphosate isopropylamine salt	Leporinus	obtusidens	Characin	BCM	BCM	AMMO	LOAEL		4	d	1.44		mg/L	48	108093
Glyphosate isopropylamine salt	Leporinus	obtusidens	Characin	BCM	ENZ	ACHE	LOAEL		4	d	1.44		mg/L	48	108093
Glyphosate isopropylamine salt	Leporinus	obtusidens	Characin	BCM	BCM	LACT	LOAEL		4	d	1.44		mg/L	48	108093
Glyphosate isopropylamine salt	Leporinus	obtusidens	Characin	BCM	BCM	GLYC	LOAEL		4	d	1.44		mg/L	48	108093
Glyphosate isopropylamine salt	Leporinus	obtusidens	Characin	BCM	BCM	PRCO	LOAEL		4	d	1.44		mg/L	48	108093
Glyphosate isopropylamine salt	Leporinus	obtusidens	Characin	BCM	BCM	PRCO	LOAEL		4	d	1.44		mg/L	48	108093
Glyphosate isopropylamine salt	Leporinus	obtusidens	Characin	BCM	BCM	GLUC	LOAEL		4	d	1.44		mg/L	48	108093
Glyphosate isopropylamine salt	Leporinus	obtusidens	Characin	BCM	BCM	GLUC	LOAEL		4	d	1.44		mg/L	48	108093

Glyphosate isopropylamine salt	Leporinus	obtusidens	Characin	BCM	BCM	HMCT	LOAEL		4 d	1.44		mg/L	48	108093
Glyphosate isopropylamine salt	Leporinus	obtusidens	Characin	BCM	BCM	PRCO	LOAEL		4 d	1.44		mg/L	48	108093
Glyphosate isopropylamine salt	Leporinus	obtusidens	Characin	BCM	BCM	HMGL	LOAEL		4 d	1.44		mg/L	48	108093
Glyphosate isopropylamine salt	Leporinus	obtusidens	Characin	CEL	CEL	RBCE	LOAEL		4 d	1.44		mg/L	48	108093
Glyphosate isopropylamine salt	Leporinus	obtusidens	Characin	CEL	CEL	LEUK	NOAEL		4 d	9.6		mg/L	48	108093
Glyphosate isopropylamine salt	Leporinus	obtusidens	Characin	BCM	BCM	LACT	LOAEL		4 d	1.44		mg/L	48	108093
Glyphosate	Lemna	minor	Duckweed	PHY	PHY	PERM	LOAEL		1 d	1.69		mg/L	100	6963
Glyphosate	Lemna	minor	Duckweed	PHY	PHY	PERM	LOAEL		2 d	1.69		mg/L	100	6963
Glyphosate	Lemna	minor	Duckweed	PHY	PHY	PERM	NOAEL	LOAEL	3 d	1.69	16.9	mg/L	100	6963
Glyphosate	Lemna	minor	Duckweed	PHY	PHY	PERM	LOAEL		4 d	1.69		mg/L	100	6963
Glyphosate	Lemna	minor	Duckweed	PHY	PHY	PERM	NOAEL		0.5 d	16.9		mg/L	100	6963
Glyphosate isopropylamine salt	NR	Fungi	Fungi Kingdom	POP	POP	ABND	NOAEL		3 d	3600		ppm	100	71212
Glyphosate isopropylamine salt	NR	Fungi	Fungi Kingdom	POP	POP	ABND	NOAEL		7 d	3600		ppm	100	71212
Glyphosate isopropylamine salt	Picea	glauca	White Spruce	MOR	MOR	MORT	NR-ZERO		182.64 d	10		AI ul/L	35.9	92279
Glyphosate isopropylamine salt	Picea	glauca	White Spruce	MOR	MOR	MORT	NR-LETH		182.64 d	100		AI ul/L	35.9	92279
Glyphosate isopropylamine salt	Picea	glauca	White Spruce	GRO	GRO	HGHT	LOAEL		182.64 d	1		AI ul/L	35.9	92279
Glyphosate isopropylamine salt	Picea	glauca	White Spruce	GRO	GRO	HGHT	NOAEL		182.64 d	0.1		AI ul/L	35.9	92279
Glyphosate isopropylamine salt	Picea	glauca	White Spruce	GRO	GRO	LGTH	NOAEL		182.64 d	1		AI ul/L	35.9	92279
Glyphosate isopropylamine salt	Picea	glauca	White Spruce	GRO	GRO	LGTH	LOAEL		182.64 d	10		AI ul/L	35.9	92279

Glyphosate isopropylamine salt	Picea	glauca	White Spruce	GRO	GRO	WGHT	NOAEL		182.64	d		1		AI ul/L	35.9	92279
Glyphosate isopropylamine salt	Picea	glauca	White Spruce	GRO	GRO	WGHT	LOAEL		182.64	d		10		AI ul/L	35.9	92279
Glyphosate isopropylamine salt	Picea	glauca	White Spruce	GRO	GRO	NROT	NOAEL		182.64	d		0.1		AI ul/L	35.9	92279
Glyphosate isopropylamine salt	Picea	glauca	White Spruce	GRO	GRO	NROT	LOAEL		182.64	d		1		AI ul/L	35.9	92279
Glyphosate isopropylamine salt	Pinus	contorta var. latifolia	Lodgepole Pine	MOR	MOR	MORT	NR-ZERO		182.64	d		10		AI ul/L	35.9	92279
Glyphosate isopropylamine salt	Pinus	contorta var. latifolia	Lodgepole Pine	MOR	MOR	MORT	NR-LETH		182.64	d		50		AI ul/L	35.9	92279
Glyphosate isopropylamine salt	Pinus	contorta var. latifolia	Lodgepole Pine	GRO	GRO	HGHT	LOAEL		182.64	d		0.1		AI ul/L	35.9	92279
Glyphosate isopropylamine salt	Pinus	contorta var. latifolia	Lodgepole Pine	GRO	GRO	LGTH	LOAEL		182.64	d		1		AI ul/L	35.9	92279
Glyphosate isopropylamine salt	Pinus	contorta var. latifolia	Lodgepole Pine	GRO	GRO	LGTH	NOAEL		182.64	d		0.1		AI ul/L	35.9	92279
Glyphosate isopropylamine salt	Pinus	contorta var. latifolia	Lodgepole Pine	GRO	GRO	WGHT	LOAEL		182.64	d		10		AI ul/L	35.9	92279
Glyphosate isopropylamine salt	Pinus	contorta var. latifolia	Lodgepole Pine	GRO	GRO	WGHT	NOAEL		182.64	d		1		AI ul/L	35.9	92279
Glyphosate isopropylamine salt	Pinus	contorta var. latifolia	Lodgepole Pine	GRO	GRO	NROT	NOAEL		182.64	d		0.1		AI ul/L	35.9	92279
Glyphosate isopropylamine salt	Pinus	contorta var. latifolia	Lodgepole Pine	GRO	GRO	NROT	LOAEL		182.64	d		1		AI ul/L	35.9	92279
Glyphosate isopropylamine salt	Perkinsus	olseni	Protozoan	POP	POP	ABND	IC50		3	d		0.2788		mM	68	111736
Glyphosate	Perkinsus	olseni	Protozoan	POP	POP	ABND	IC50		3	d		3.4		mM	100	111736
Glyphosate isopropylamine salt	Ruditapes	decussatus	Clam	MOR	MOR	MORT	NR-ZERO		4	d		6.8		mg/L	68	111736

Glyphosate	Ruditape s	decussatus	Clam	MOR	MOR	MORT	NR- ZERO		4 d	10		mg/L	100	111736
Glyphosate isopropylamine salt	NR	Plantae	Plant Kingdom	POP	POP	COVR	LOAEL		1 gs	50		AI %	100	120311
Glyphosate isopropylamine salt	Pinus	sylvestris	Scots Pine	MOR	MOR	MORT	NOAEL		6 gs	50		AI %	100	120311
Glyphosate isopropylamine salt	Pinus	sylvestris	Scots Pine	GRO	GRO	HGHT	NOAEL		11 gs	50		AI %	100	120311
Glyphosate isopropylamine salt	Pinus	sylvestris	Scots Pine	POP	POP	ABND	NOAEL		4015 d	50		AI %	100	120311
Glyphosate isopropylamine salt	Picea	abies	Norway Spruce	MOR	MOR	MORT	NOAEL		6 gs	50		AI %	100	120311
Glyphosate isopropylamine salt	Picea	abies	Norway Spruce	GRO	GRO	HGHT	NOAEL		11 gs	50		AI %	100	120311
Glyphosate isopropylamine salt	Picea	abies	Norway Spruce	POP	POP	ABND	NOAEL		4015 d	50		AI %	100	120311
Glyphosate isopropylamine salt	Picea	abies	Norway Spruce	MOR	MOR	MORT	NOAEL		6 gs	100		AI %	100	120311
Glyphosate isopropylamine salt	Picea	abies	Norway Spruce	GRO	GRO	HGHT	NOAEL		4 gs	100		AI %	100	120311
Glyphosate isopropylamine salt	NR	Plantae	Plant Kingdom	POP	POP	COVR	LOAEL		1 gs	100		AI %	100	120311
Glyphosate isopropylamine salt	Pinus	sylvestris	Scots Pine	MOR	MOR	MORT	NOAEL		6 gs	100		AI %	100	120311
Glyphosate isopropylamine salt	Pinus	sylvestris	Scots Pine	GRO	GRO	HGHT	NOAEL		6 gs	100		AI %	100	120311
Glyphosate isopropylamine salt	Trechus	apicalis	Ground Beetle	POP	POP	ABND	NOAEL		770 d	1.5		ae kg/ha	100	97441
Glyphosate isopropylamine salt	Invertebr ates	NR	Invertebrates	POP	POP	ABND	NOAEL		730 d	2.8		L/ha	100	96964
Glyphosate	Danthoni a	sp.	Oatgrass	POP	POP	BMAS	NOAEL	LOAEL	96 d	0.1602	0.3204	lb/acre	100	44275

Glyphosate	Trichogramma	pretiosum	Parasitic Wasp	GRO	DVP	EMRG	NOAEL			em	960		AI g/ha	100	110225
Glyphosate	Trichogramma	pretiosum	Parasitic Wasp	GRO	DVP	EMRG	NOAEL			em	960		AI g/ha	100	110225
Glyphosate	Trichogramma	pretiosum	Parasitic Wasp	GRO	DVP	EMRG	LOAEL			em	960		AI g/ha	100	110225
Glyphosate isopropylamine salt	Trichogramma	pretiosum	Parasitic Wasp	GRO	DVP	EMRG	LOAEL			em	960		AI g/ha	100	110225
Glyphosate isopropylamine salt	Trichogramma	pretiosum	Parasitic Wasp	GRO	DVP	EMRG	NOAEL			em	960		AI g/ha	100	110225
Glyphosate isopropylamine salt	Trichogramma	pretiosum	Parasitic Wasp	GRO	DVP	EMRG	LOAEL			em	960		AI g/ha	100	110225
Glyphosate isopropylamine salt	Trichogramma	pretiosum	Parasitic Wasp	GRO	DVP	EMRG	NOAEL			em	960		AI g/ha	100	110225
Glyphosate isopropylamine salt	Trichogramma	pretiosum	Parasitic Wasp	GRO	DVP	EMRG	NOAEL			em	960		AI g/ha	100	110225
Glyphosate isopropylamine salt	Trichogramma	pretiosum	Parasitic Wasp	GRO	DVP	EMRG	NOAEL			em	960		AI g/ha	100	110225
Glyphosate isopropylamine salt	Trichogramma	pretiosum	Parasitic Wasp	GRO	DVP	EMRG	NOAEL			em	960		AI g/ha	100	110225
Glyphosate isopropylamine salt	Trichogramma	pretiosum	Parasitic Wasp	GRO	DVP	EMRG	NOAEL			em	972		AI g/ha	100	110225
Glyphosate isopropylamine salt	Trichogramma	pretiosum	Parasitic Wasp	GRO	DVP	EMRG	NOAEL			em	972		AI g/ha	100	110225
Glyphosate isopropylamine salt	Trichogramma	pretiosum	Parasitic Wasp	GRO	DVP	EMRG	LOAEL			em	972		AI g/ha	100	110225
Glyphosate isopropylamine salt	Fragilaria	sp.	Diatom	POP	POP	ABND	NOAEL		5 d		2.2		AI kg/ha	100	6383
Glyphosate isopropylamine salt	Fragilaria	sp.	Diatom	POP	POP	ABND	NOAEL		5 d		2.2		AI kg/ha	100	6383
Glyphosate isopropylamine salt	Meridion	sp.	Diatom	POP	POP	ABND	NOAEL		5 d		2.2		AI kg/ha	100	6383
Glyphosate isopropylamine salt	Fragilaria	sp.	Diatom	POP	POP	ABND	NOAEL		47 d		2.2		AI kg/ha	100	6383

Glyphosate isopropylamine salt	Amphora	sp.	Diatom	POP	POP	ABND	NOAEL		1 d	2.2		AI kg/ha	100	6383
Glyphosate isopropylamine salt	NR	Tabellariales	Diatom Order	POP	POP	ABND	LOAEL		5 d	2.2		AI kg/ha	100	6383
Glyphosate isopropylamine salt	NR	Tabellariales	Diatom Order	POP	POP	ABND	NOAEL		29 d	22		AI kg/ha	100	6383
Glyphosate isopropylamine salt	NR	Cymbellaceae	Diatom Family	POP	POP	ABND	NOAEL		5 d	2.2		AI kg/ha	100	6383
Glyphosate isopropylamine salt	Frustilia	sp.	Diatom	POP	POP	ABND	NOAEL		5 d	2.2		AI kg/ha	100	6383
Glyphosate isopropylamine salt	Achnanthes	sp.	Diatom	POP	POP	ABND	NOAEL		5 d	2.2		AI kg/ha	100	6383
Glyphosate isopropylamine salt	NR	Cymbellaceae	Diatom Family	POP	POP	ABND	NOAEL		1 d	2.2		AI kg/ha	100	6383
Glyphosate isopropylamine salt	Amphora	sp.	Diatom	POP	POP	ABND	NOAEL		29 d	2.2		AI kg/ha	100	6383
Glyphosate isopropylamine salt	Achnanthes	sp.	Diatom	POP	POP	ABND	NOAEL		1 d	2.2		AI kg/ha	100	6383
Glyphosate isopropylamine salt	Navicula	sp.	Diatom	POP	POP	ABND	NOAEL		5 d	2.2		AI kg/ha	100	6383
Glyphosate isopropylamine salt	Meridion	sp.	Diatom	POP	POP	ABND	NOAEL		29 d	2.2		AI kg/ha	100	6383
Glyphosate isopropylamine salt	Achnanthes	sp.	Diatom	POP	POP	ABND	NOAEL		5 d	22		AI kg/ha	100	6383
Glyphosate isopropylamine salt	NR	Tabellariales	Diatom Order	POP	POP	ABND	NOAEL		5 d	22		AI kg/ha	100	6383
Glyphosate isopropylamine salt	Frustilia	sp.	Diatom	POP	POP	ABND	NOAEL		47 d	2.2		AI kg/ha	100	6383
Glyphosate isopropylamine salt	Fragilaria	sp.	Diatom	POP	POP	ABND	NOAEL		1 d	2.2		AI kg/ha	100	6383

Glyphosate isopropylamine salt	Amphora	sp.	Diatom	POP	POP	ABND	NOAEL		5 d	2.2		Al kg/ha	100	6383
Glyphosate isopropylamine salt	Hannaea	sp.	Diatom	POP	POP	ABND	NOAEL		5 d	2.2		Al kg/ha	100	6383
Glyphosate isopropylamine salt	Fragilaria	sp.	Diatom	POP	POP	ABND	NOAEL		29 d	2.2		Al kg/ha	100	6383
Glyphosate isopropylamine salt	NR	Cymbellaceae	Diatom Family	POP	POP	ABND	NOAEL		29 d	2.2		Al kg/ha	100	6383
Glyphosate isopropylamine salt	Navicula	sp.	Diatom	POP	POP	ABND	NOAEL		29 d	2.2		Al kg/ha	100	6383
Glyphosate isopropylamine salt	Achnanthes	sp.	Diatom	POP	POP	ABND	NOAEL		47 d	2.2		Al kg/ha	100	6383
Glyphosate isopropylamine salt	Achnanthes	sp.	Diatom	POP	POP	ABND	NOAEL		29 d	2.2		Al kg/ha	100	6383
Glyphosate isopropylamine salt	Hannaea	sp.	Diatom	POP	POP	ABND	NOAEL		47 d	2.2		Al kg/ha	100	6383
Glyphosate isopropylamine salt	Meridion	sp.	Diatom	POP	POP	ABND	NOAEL		1 d	2.2		Al kg/ha	100	6383
Glyphosate isopropylamine salt	NR	Tabellariales	Diatom Order	POP	POP	ABND	NOAEL		29 d	2.2		Al kg/ha	100	6383
Glyphosate isopropylamine salt	NR	Tabellariales	Diatom Order	POP	POP	ABND	NOAEL		1 d	2.2		Al kg/ha	100	6383
Glyphosate isopropylamine salt	Frustilia	sp.	Diatom	POP	POP	ABND	NOAEL		1 d	2.2		Al kg/ha	100	6383
Glyphosate isopropylamine salt	Frustilia	sp.	Diatom	POP	POP	ABND	NOAEL		29 d	2.2		Al kg/ha	100	6383
Glyphosate isopropylamine salt	Fragilaria	sp.	Diatom	POP	POP	ABND	NOAEL		5 d	2.2		Al kg/ha	100	6383
Glyphosate isopropylamine salt	Amphora	sp.	Diatom	POP	POP	ABND	NOAEL		47 d	2.2		Al kg/ha	100	6383

Glyphosate isopropylamine salt	Achnanthes	sp.	Diatom	POP	POP	ABND	NOAEL		29 d	2.2		AI kg/ha	100	6383
Glyphosate isopropylamine salt	Fragilaria	sp.	Diatom	POP	POP	ABND	NOAEL		29 d	2.2		AI kg/ha	100	6383
Glyphosate isopropylamine salt	Frustilia	sp.	Diatom	POP	POP	ABND	NOAEL		29 d	2.2		AI kg/ha	100	6383
Glyphosate isopropylamine salt	Meridion	sp.	Diatom	POP	POP	ABND	NOAEL		47 d	2.2		AI kg/ha	100	6383
Glyphosate isopropylamine salt	Meridion	sp.	Diatom	POP	POP	ABND	NOAEL		29 d	2.2		AI kg/ha	100	6383
Glyphosate isopropylamine salt	Gomphonema	sp.	Diatom	POP	POP	ABND	LOAEL		29 d	2.2		AI kg/ha	100	6383
Glyphosate isopropylamine salt	Gomphonema	sp.	Diatom	POP	POP	ABND	LOAEL		5 d	2.2		AI kg/ha	100	6383
Glyphosate isopropylamine salt	Fragilaria	sp.	Diatom	POP	POP	ABND	NOAEL		47 d	2.2		AI kg/ha	100	6383
Glyphosate isopropylamine salt	Frustilia	sp.	Diatom	POP	POP	ABND	NOAEL		47 d	2.2		AI kg/ha	100	6383
Glyphosate isopropylamine salt	Meridion	sp.	Diatom	POP	POP	ABND	NOAEL		5 d	2.2		AI kg/ha	100	6383
Glyphosate isopropylamine salt	NR	Tabellariales	Diatom Order	POP	POP	ABND	NOAEL		5 d	2.2		AI kg/ha	100	6383
Glyphosate isopropylamine salt	Navicula	sp.	Diatom	POP	POP	ABND	NOAEL		1 d	2.2		AI kg/ha	100	6383
Glyphosate isopropylamine salt	Meridion	sp.	Diatom	POP	POP	ABND	NOAEL		5 d	2.2		AI kg/ha	100	6383
Glyphosate isopropylamine salt	NR	Tabellariales	Diatom Order	POP	POP	ABND	LOAEL		29 d	2.2		AI kg/ha	100	6383
Glyphosate isopropylamine salt	Hannaea	sp.	Diatom	POP	POP	ABND	NOAEL		29 d	2.2		AI kg/ha	100	6383

Glyphosate isopropylamine salt	Frustilia	sp.	Diatom	POP	POP	ABND	NOAEL		5 d	2.2		Al kg/ha	100	6383
Glyphosate isopropylamine salt	Triticum	sp.	Wheat	GRO	GRO	NROT	NOAEL		50 d	360000		ppm	100	96992
Glyphosate isopropylamine salt	Triticum	sp.	Wheat	GRO	GRO	NROT	NOAEL		50 d	360000		ppm	100	96992
Glyphosate isopropylamine salt	Gaeumannomyces	graminis var. tritici	Fungus	POP	POP	CNTL	LOAEL		4 d	360000		ppm	100	96992
Glyphosate isopropylamine salt	Alnus	sp.	Alder	PHY	INJ	SYMP	NOAEL		182.64 d	0.9812		lb/acre	100	70518
Glyphosate isopropylamine salt	Alnus	sp.	Alder	GRO	GRO	HGHT	LOAEL		30.44 d	0.9812		lb/acre	100	70518
Glyphosate isopropylamine salt	NR	Plantae	Plant Kingdom	POP	POP	CNTL	LOAEL		60.88 d	0.9812		lb/acre	100	70518
Glyphosate	Lemna	gibba	Inflated Duckweed	GRO	MPH	SIZE	NOEC	LOEC	10 d	7.5		mg/L	95	114615
Glyphosate	Lemna	gibba	Inflated Duckweed	GRO	MPH	SIZE	IC50		7 d	25		mg/L	95	114615
Glyphosate	Lemna	gibba	Inflated Duckweed	GRO	MPH	SIZE	IC25		7 d	16.2		mg/L	95	114615
Glyphosate	Lemna	gibba	Inflated Duckweed	GRO	MPH	SIZE	IC10		7 d			mg/L	95	114615
Glyphosate	Lemna	gibba	Inflated Duckweed	GRO	MPH	SIZE	IC10		10 d	8.5		mg/L	95	114615
Glyphosate	Lemna	gibba	Inflated Duckweed	GRO	MPH	SIZE	IC25		10 d	11.9		mg/L	95	114615
Glyphosate	Lemna	gibba	Inflated Duckweed	GRO	MPH	SIZE	IC50		10 d	22.1		mg/L	95	114615
Glyphosate	Lemna	gibba	Inflated Duckweed	GRO	GRO	GRRT	IC25		5 d	11.4		mg/L	95	114615
Glyphosate	Lemna	gibba	Inflated Duckweed	GRO	GRO	GRRT	IC25		2 d	15.1		mg/L	95	114615
Glyphosate	Lemna	gibba	Inflated Duckweed	GRO	GRO	GRRT	IC50		2 d	33.1		mg/L	95	114615
Glyphosate	Lemna	gibba	Inflated Duckweed	GRO	GRO	GRRT	IC50		5 d	22.6		mg/L	95	114615
Glyphosate	Lemna	gibba	Inflated Duckweed	GRO	GRO	GRRT	IC50		10 d	20.5		mg/L	95	114615
Glyphosate	Lemna	gibba	Inflated Duckweed	GRO	MPH	SIZE	IC50		10 d	25		mg/L	95	114615

Glyphosate	Lemna	gibba	Inflated Duckweed	GRO	MPH	SIZE	IC10		10	d	10.2		mg/L	95	114615
Glyphosate	Lemna	gibba	Inflated Duckweed	GRO	MPH	SIZE	IC10		7	d	14.1		mg/L	95	114615
Glyphosate	Lemna	gibba	Inflated Duckweed	GRO	MPH	SIZE	IC25		7	d	25		mg/L	95	114615
Glyphosate	Lemna	gibba	Inflated Duckweed	GRO	MPH	SIZE	IC25		10	d	15.8		mg/L	95	114615
Glyphosate	Lemna	gibba	Inflated Duckweed	GRO	MPH	SIZE	IC50		7	d	25		mg/L	95	114615
Glyphosate	Lemna	gibba	Inflated Duckweed	GRO	MPH	SIZE	IC50		7	d	25		mg/L	95	114615
Glyphosate	Lemna	gibba	Inflated Duckweed	GRO	MPH	SIZE	IC25		7	d	16		mg/L	95	114615
Glyphosate	Lemna	gibba	Inflated Duckweed	GRO	MPH	SIZE	IC10		7	d	11.2		mg/L	95	114615
Glyphosate	Lemna	gibba	Inflated Duckweed	GRO	GRO	GRRT	IC10		2	d			mg/L	95	114615
Glyphosate	Lemna	gibba	Inflated Duckweed	GRO	GRO	GRRT	IC10		5	d			mg/L	95	114615
Glyphosate	Lemna	gibba	Inflated Duckweed	GRO	GRO	GRRT	IC10		10	d	4.6		mg/L	95	114615
Glyphosate	Lemna	gibba	Inflated Duckweed	GRO	GRO	GRRT	IC25		10	d	10.7		mg/L	95	114615
Glyphosate	Lemna	gibba	Inflated Duckweed	GRO	MPH	SIZE	IC10		10	d	10.1		mg/L	95	114615
Glyphosate	Lemna	gibba	Inflated Duckweed	GRO	MPH	SIZE	IC25		10	d	14.5		mg/L	95	114615
Glyphosate	Lemna	gibba	Inflated Duckweed	GRO	MPH	SIZE	IC50		10	d	25		mg/L	95	114615
Glyphosate	Lemna	gibba	Inflated Duckweed	GRO	MPH	SIZE	IC50		10	d	18.3		mg/L	95	114615
Glyphosate	Lemna	gibba	Inflated Duckweed	GRO	MPH	SIZE	IC25		10	d	10.2		mg/L	95	114615
Glyphosate	Lemna	gibba	Inflated Duckweed	GRO	MPH	SIZE	IC10		10	d	6.3		mg/L	95	114615
Glyphosate	Lemna	gibba	Inflated Duckweed	GRO	MPH	SIZE	IC10		7	d			mg/L	95	114615
Glyphosate	Lemna	gibba	Inflated Duckweed	GRO	MPH	SIZE	IC25		7	d	7.3		mg/L	95	114615
Glyphosate	Lemna	gibba	Inflated Duckweed	GRO	MPH	SIZE	IC50		7	d	25		mg/L	95	114615
Glyphosate	Lemna	gibba	Inflated Duckweed	GRO	MPH	SIZE	NOEC	LOEC	10	d		7.5	mg/L	95	114615
Glyphosate	Lemna	gibba	Inflated Duckweed	GRO	MPH	SIZE	NOEC	LOEC	10	d	7.5		mg/L	95	114615

Glyphosate	Lemna	gibba	Inflated Duckweed	GRO	MPH	SIZE	NOEC	LOEC	10	d	7.5		mg/L	95	114615
Glyphosate	Lemna	gibba	Inflated Duckweed	GRO	MPH	SIZE	NOEC		10	d			mg/L	95	114615
Glyphosate	Lemna	gibba	Inflated Duckweed	GRO	MPH	SIZE	NOEC		10	d			mg/L	95	114615
Glyphosate	Lemna	gibba	Inflated Duckweed	GRO	MPH	SIZE	IC10		7	d	2.8		mg/L	100	114615
Glyphosate	Lemna	gibba	Inflated Duckweed	GRO	MPH	SIZE	IC50		7	d	13.6		mg/L	100	114615
Glyphosate	Lemna	gibba	Inflated Duckweed	GRO	MPH	SIZE	NOEC	LOEC	10	d	1	7.5	mg/L	100	114615
Glyphosate	Lemna	gibba	Inflated Duckweed	GRO	MPH	SIZE	LOEC		10	d	1		mg/L	100	114615
Glyphosate	Lemna	gibba	Inflated Duckweed	GRO	MPH	SIZE	NOEC		10	d	25		mg/L	100	114615
Glyphosate	Lemna	gibba	Inflated Duckweed	GRO	GRO	GRRT	IC25		5	d	6.5		mg/L	100	114615
Glyphosate	Lemna	gibba	Inflated Duckweed	GRO	MPH	SIZE	IC25		10	d	10.1		mg/L	100	114615
Glyphosate	Lemna	gibba	Inflated Duckweed	GRO	MPH	SIZE	IC25		7	d	25		mg/L	100	114615
Glyphosate	Lemna	gibba	Inflated Duckweed	GRO	MPH	SIZE	IC50		7	d	25		mg/L	100	114615
Glyphosate	Lemna	gibba	Inflated Duckweed	GRO	MPH	SIZE	IC50		7	d	25		mg/L	100	114615
Glyphosate	Lemna	gibba	Inflated Duckweed	GRO	MPH	SIZE	IC25		7	d	25		mg/L	100	114615
Glyphosate	Lemna	gibba	Inflated Duckweed	GRO	GRO	GRRT	IC10		10	d	2.5		mg/L	100	114615
Glyphosate	Lemna	gibba	Inflated Duckweed	GRO	MPH	SIZE	IC10		7	d	5.3		mg/L	100	114615
Glyphosate	Lemna	gibba	Inflated Duckweed	GRO	MPH	SIZE	IC10		10	d	3.4		mg/L	100	114615
Glyphosate	Lemna	gibba	Inflated Duckweed	GRO	MPH	SIZE	IC25		10	d	7		mg/L	100	114615
Glyphosate	Lemna	gibba	Inflated Duckweed	GRO	MPH	SIZE	IC50		10	d	8.8		mg/L	100	114615
Glyphosate	Lemna	gibba	Inflated Duckweed	GRO	MPH	SIZE	IC25		10	d	2.6		mg/L	100	114615
Glyphosate	Lemna	gibba	Inflated Duckweed	GRO	MPH	SIZE	IC10		10	d			mg/L	100	114615
Glyphosate	Lemna	gibba	Inflated Duckweed	GRO	MPH	SIZE	IC25		7	d	6		mg/L	100	114615
Glyphosate	Lemna	gibba	Inflated Duckweed	GRO	MPH	SIZE	IC50		7	d	25		mg/L	100	114615

Glyphosate	Lemna	gibba	Inflated Duckweed	GRO	MPH	SIZE	IC25		7 d	6.2		mg/L	100	114615
Glyphosate	Lemna	gibba	Inflated Duckweed	GRO	MPH	SIZE	IC10		7 d	2.7		mg/L	100	114615
Glyphosate	Lemna	gibba	Inflated Duckweed	GRO	MPH	SIZE	IC10		10 d			mg/L	100	114615
Glyphosate	Lemna	gibba	Inflated Duckweed	GRO	GRO	GRRT	IC10		2 d			mg/L	100	114615
Glyphosate	Lemna	gibba	Inflated Duckweed	GRO	GRO	GRRT	IC10		5 d	2.1		mg/L	100	114615
Glyphosate	Lemna	gibba	Inflated Duckweed	GRO	GRO	GRRT	IC25		10 d	5		mg/L	100	114615
Glyphosate	Lemna	gibba	Inflated Duckweed	GRO	GRO	GRRT	IC25		2 d			mg/L	100	114615
Glyphosate	Lemna	gibba	Inflated Duckweed	GRO	GRO	GRRT	IC50		2 d	9.2		mg/L	100	114615
Glyphosate	Lemna	gibba	Inflated Duckweed	GRO	GRO	GRRT	IC50		5 d	15.9		mg/L	100	114615
Glyphosate	Lemna	gibba	Inflated Duckweed	GRO	GRO	GRRT	IC50		10 d	11.6		mg/L	100	114615
Glyphosate	Lemna	gibba	Inflated Duckweed	GRO	MPH	SIZE	IC50		10 d	25		mg/L	100	114615
Glyphosate	Lemna	gibba	Inflated Duckweed	GRO	MPH	SIZE	IC10		10 d	2.8		mg/L	100	114615
Glyphosate	Lemna	gibba	Inflated Duckweed	GRO	MPH	SIZE	IC10		7 d	9.7		mg/L	100	114615
Glyphosate	Lemna	gibba	Inflated Duckweed	GRO	MPH	SIZE	IC25		10 d	3.8		mg/L	100	114615
Glyphosate	Lemna	gibba	Inflated Duckweed	GRO	MPH	SIZE	IC50		10 d	12.7		mg/L	100	114615
Glyphosate	Lemna	gibba	Inflated Duckweed	GRO	MPH	SIZE	NOEC	LOEC	10 d	1	7.5	mg/L	100	114615
Glyphosate	Lemna	gibba	Inflated Duckweed	GRO	MPH	SIZE	LOEC		10 d	1		mg/L	100	114615
Glyphosate	Lemna	gibba	Inflated Duckweed	GRO	MPH	SIZE	IC50		10 d	25		mg/L	100	114615
Glyphosate	Lemna	gibba	Inflated Duckweed	GRO	MPH	SIZE	NOEC		10 d	25		mg/L	100	114615
Glyphosate	Lemna	gibba	Inflated Duckweed	POP	POP	ABND	NOEC	LOEC	10 d	0.5	1	mg/L	100	114615
Glyphosate	Lemna	gibba	Inflated Duckweed	POP	POP	ABND	NOEC	LOEC	7 d	0.5	1	mg/L	100	114615
Glyphosate isopropylamine salt	Cyprinus	carpio	Common Carp	MOR	MOR	MORT	LOAEL		0.0208 d	410		mg/L	100	56640

Glyphosate isopropylamine salt	Cyprinus	carpio	Common Carp	MOR	MOR	MORT	LOAEL		0.0417	d	205		mg/L	100	56640
Glyphosate isopropylamine salt	Myriophyllum	sibiricum	Water Milfoil	BCM	BCM	CARC	NOAEL		14	d	25.6		ae mg/L	100	111592
Glyphosate isopropylamine salt	Myriophyllum	sibiricum	Water Milfoil	BCM	BCM	CHLA	NOAEL		14	d	25.6		ae mg/L	100	111592
Glyphosate isopropylamine salt	Myriophyllum	sibiricum	Water Milfoil	BCM	BCM	CHLB	NOAEL		14	d	25.6		ae mg/L	100	111592
Glyphosate isopropylamine salt	Myriophyllum	sibiricum	Water Milfoil	GRO	GRO	WGHT	IC50		14	d	3.81		ae mg/L	100	111592
Glyphosate isopropylamine salt	Myriophyllum	sibiricum	Water Milfoil	GRO	GRO	WGHT	IC50		14	d	1.65		ae mg/L	100	111592
Glyphosate isopropylamine salt	Myriophyllum	sibiricum	Water Milfoil	PHY	PHY	PERM	NOAEL		14	d	25.6		ae mg/L	100	111592
Glyphosate isopropylamine salt	Myriophyllum	sibiricum	Water Milfoil	GRO	GRO	LGTH	IC50		14	d	0.84		ae mg/L	100	111592
Glyphosate isopropylamine salt	Myriophyllum	sibiricum	Water Milfoil	GRO	GRO	NROT	IC50		14	d	1.77		ae mg/L	100	111592
Glyphosate isopropylamine salt	Myriophyllum	sibiricum	Water Milfoil	GRO	GRO	LGTH	IC50		14	d	31.16		ae mg/L	100	111592
Glyphosate isopropylamine salt	Myriophyllum	sibiricum	Water Milfoil	GRO	GRO	AREA	IC50		14	d	3.22		ae mg/L	100	111592
Glyphosate isopropylamine salt	Myriophyllum	sibiricum	Water Milfoil	BCM	BCM	CARC	NOAEL		14	d	25.6		ae mg/L	100	111592
Glyphosate isopropylamine salt	Myriophyllum	sibiricum	Water Milfoil	BCM	BCM	CHLA	NOAEL		14	d	25.6		ae mg/L	100	111592
Glyphosate isopropylamine salt	Myriophyllum	sibiricum	Water Milfoil	BCM	BCM	CHLB	NOAEL		14	d	25.6		ae mg/L	100	111592
Glyphosate isopropylamine salt	Myriophyllum	sibiricum	Water Milfoil	GRO	GRO	WGHT	IC50		14	d	24.14		ae mg/L	100	111592

Glyphosate isopropylamine salt	Myriophyllum	sibiricum	Water Milfoil	GRO	GRO	WGHT	IC50		14	d	2.98		ae mg/L	100	111592
Glyphosate isopropylamine salt	Myriophyllum	sibiricum	Water Milfoil	PHY	PHY	PERM	NOAEL		14	d	25.6		ae mg/L	100	111592
Glyphosate isopropylamine salt	Myriophyllum	sibiricum	Water Milfoil	GRO	GRO	LGTH	IC50		14	d	1.22		ae mg/L	100	111592
Glyphosate isopropylamine salt	Myriophyllum	sibiricum	Water Milfoil	GRO	GRO	NROT	IC50		14	d	3.35		ae mg/L	100	111592
Glyphosate isopropylamine salt	Myriophyllum	sibiricum	Water Milfoil	GRO	GRO	LGTH	IC50		14	d	28.79		ae mg/L	100	111592
Glyphosate isopropylamine salt	Myriophyllum	sibiricum	Water Milfoil	GRO	GRO	AREA	IC50		14	d	14.76		ae mg/L	100	111592
Glyphosate	Lemna	gibba	Inflated Duckweed	BCM	BCM	CARC	IC50		7	d	20.92		ae mg/L	97	111592
Glyphosate	Lemna	gibba	Inflated Duckweed	BCM	BCM	CHLA	IC50		7	d	24.97		ae mg/L	97	111592
Glyphosate	Lemna	gibba	Inflated Duckweed	BCM	BCM	CHLB	NOAEL		7	d	26		ae mg/L	97	111592
Glyphosate	Lemna	gibba	Inflated Duckweed	GRO	GRO	WGHT	NOAEL		7	d	26		ae mg/L	97	111592
Glyphosate	Lemna	gibba	Inflated Duckweed	GRO	GRO	WGHT	IC50		7	d	9.98		ae mg/L	97	111592
Glyphosate	Lemna	gibba	Inflated Duckweed	GRO	GRO	NLEF	IC50		7	d	11.74		ae mg/L	97	111592
Glyphosate isopropylamine salt	Lemna	gibba	Inflated Duckweed	BCM	BCM	CARC	IC50		7	d	11.54		ae mg/L	100	111592
Glyphosate isopropylamine salt	Lemna	gibba	Inflated Duckweed	BCM	BCM	CHLA	IC50		7	d	7.85		ae mg/L	100	111592
Glyphosate isopropylamine salt	Lemna	gibba	Inflated Duckweed	BCM	BCM	CHLB	IC50		7	d	7.69		ae mg/L	100	111592
Glyphosate isopropylamine salt	Lemna	gibba	Inflated Duckweed	GRO	GRO	WGHT	NOAEL		7	d	26		ae mg/L	100	111592
Glyphosate isopropylamine salt	Lemna	gibba	Inflated Duckweed	GRO	GRO	WGHT	IC50		7	d	8.57		ae mg/L	100	111592

Glyphosate isopropylamine salt	Lemna	gibba	Inflated Duckweed	GRO	GRO	NLEF	IC50		7 d	5.37		ae mg/L	100	111592
Glyphosate isopropylamine salt	Lemna	gibba	Inflated Duckweed	POP	POP	ABND	IC50		7 d	4.58		ae mg/L	100	111592
Glyphosate isopropylamine salt	Lemna	gibba	Inflated Duckweed	BCM	BCM	CARC	IC50		7 d	32.24		ae mg/L	100	111592
Glyphosate isopropylamine salt	Lemna	gibba	Inflated Duckweed	BCM	BCM	CHLA	IC50		7 d	22.76		ae mg/L	100	111592
Glyphosate isopropylamine salt	Lemna	gibba	Inflated Duckweed	BCM	BCM	CHLB	IC50		7 d	16.27		ae mg/L	100	111592
Glyphosate isopropylamine salt	Lemna	gibba	Inflated Duckweed	GRO	GRO	WGHT	NOAEL		7 d	26		ae mg/L	100	111592
Glyphosate isopropylamine salt	Lemna	gibba	Inflated Duckweed	GRO	GRO	WGHT	IC50		7 d	14.44		ae mg/L	100	111592
Glyphosate isopropylamine salt	Lemna	gibba	Inflated Duckweed	GRO	GRO	NLEF	IC50		7 d	12.46		ae mg/L	100	111592
Glyphosate isopropylamine salt	Lemna	gibba	Inflated Duckweed	POP	POP	ABND	IC50		7 d	7.6		ae mg/L	100	111592
Glyphosate isopropylamine salt	Tubifex	tubifex	Tubificid Worm	MOR	MOR	SURV	NOAEL		28 d	106.4		ae mg/L	100	111592
Glyphosate isopropylamine salt	Tubifex	tubifex	Tubificid Worm	REP	REP	PROG	NOAEL		28 d	106.4		ae mg/L	100	111592
Glyphosate isopropylamine salt	Tubifex	tubifex	Tubificid Worm	REP	REP	PROG	NOAEL		28 d	106.4		ae mg/L	100	111592
Glyphosate isopropylamine salt	Tubifex	tubifex	Tubificid Worm	REP	REP	PROG	NOAEL		28 d	106.4		ae mg/L	100	111592
Glyphosate isopropylamine salt	Tubifex	tubifex	Tubificid Worm	REP	REP	PROG	NOAEL		28 d	106.4		ae mg/L	100	111592
Glyphosate isopropylamine salt	Tubifex	tubifex	Tubificid Worm	REP	REP	PROG	NOAEL		28 d	106.4		ae mg/L	100	111592

Glyphosate isopropylamine salt	Tubifex	tubifex	Tubificid Worm	MOR	MOR	SURV	NOAEL		28 d	106.4		ae mg/L	100	111592
Glyphosate isopropylamine salt	Tubifex	tubifex	Tubificid Worm	REP	REP	PROG	NOAEL		28 d	106.4		ae mg/L	100	111592
Glyphosate isopropylamine salt	Tubifex	tubifex	Tubificid Worm	REP	REP	PROG	NOAEL		28 d	106.4		ae mg/L	100	111592
Glyphosate isopropylamine salt	Tubifex	tubifex	Tubificid Worm	REP	REP	PROG	NOAEL		28 d	106.4		ae mg/L	100	111592
Glyphosate isopropylamine salt	Tubifex	tubifex	Tubificid Worm	REP	REP	PROG	NOAEL		28 d	106.4		ae mg/L	100	111592
Glyphosate isopropylamine salt	Tubifex	tubifex	Tubificid Worm	REP	REP	PROG	NOAEL		28 d	106.4		ae mg/L	100	111592
Glyphosate isopropylamine salt	Tubifex	tubifex	Tubificid Worm	REP	REP	PROG	NOAEL		28 d	106.4		ae mg/L	100	111592
Glyphosate isopropylamine salt	Tubifex	tubifex	Tubificid Worm	MOR	MOR	SURV	NOAEL		28 d	53.2		ae mg/L	100	111592
Glyphosate isopropylamine salt	Tubifex	tubifex	Tubificid Worm	REP	REP	PROG	NOAEL		28 d	53.2		ae mg/L	100	111592
Glyphosate isopropylamine salt	Tubifex	tubifex	Tubificid Worm	REP	REP	PROG	NOAEL		28 d	53.2		ae mg/L	100	111592
Glyphosate isopropylamine salt	Tubifex	tubifex	Tubificid Worm	REP	REP	PROG	NOAEL		28 d	53.2		ae mg/L	100	111592
Glyphosate isopropylamine salt	Tubifex	tubifex	Tubificid Worm	REP	REP	PROG	NOAEL		28 d	53.2		ae mg/L	100	111592
Glyphosate isopropylamine salt	Tubifex	tubifex	Tubificid Worm	REP	REP	PROG	NOAEL		28 d	53.2		ae mg/L	100	111592
Glyphosate isopropylamine salt	Tubifex	tubifex	Tubificid Worm	REP	REP	PROG	NOAEL		28 d	53.2		ae mg/L	100	111592
Glyphosate isopropylamine salt	Tubifex	tubifex	Tubificid Worm	MOR	MOR	MORT	NR-ZERO		28 d	53.2		ae mg/L	100	111592
Glyphosate isopropylamine salt	Tubifex	tubifex	Tubificid Worm	MOR	MOR	SURV	NOAEL		28 d	53.2		ae mg/L	100	111592
Glyphosate isopropylamine salt	Tubifex	tubifex	Tubificid Worm	REP	REP	PROG	NOAEL		28 d	53.2		ae mg/L	100	111592

Glyphosate isopropylamine salt	Tubifex	tubifex	Tubificid Worm	REP	REP	PROG	NOAEL		28 d	53.2		ae mg/L	100	111592
Glyphosate isopropylamine salt	Tubifex	tubifex	Tubificid Worm	REP	REP	PROG	NOAEL		28 d	53.2		ae mg/L	100	111592
Glyphosate isopropylamine salt	Tubifex	tubifex	Tubificid Worm	REP	REP	PROG	NOAEL		28 d	53.2		ae mg/L	100	111592
Glyphosate isopropylamine salt	Tubifex	tubifex	Tubificid Worm	REP	REP	PROG	NOAEL		28 d	53.2		ae mg/L	100	111592
Glyphosate	Myriophyllum	sibiricum	Water Milfoil	GRO	GRO	LGTH	IC50		14 d	34.53		ae mg/L	97	111592
Glyphosate	Myriophyllum	sibiricum	Water Milfoil	BCM	BCM	CARC	NOAEL		14 d	25.6		ae mg/L	97	111592
Glyphosate	Myriophyllum	sibiricum	Water Milfoil	BCM	BCM	CHLA	NOAEL		14 d	25.6		ae mg/L	97	111592
Glyphosate	Myriophyllum	sibiricum	Water Milfoil	BCM	BCM	CHLB	NOAEL		14 d	25.6		ae mg/L	97	111592
Glyphosate	Myriophyllum	sibiricum	Water Milfoil	GRO	GRO	WGHT	IC50		14 d	6.79		ae mg/L	97	111592
Glyphosate	Myriophyllum	sibiricum	Water Milfoil	GRO	GRO	WGHT	IC50		14 d	3.3		ae mg/L	97	111592
Glyphosate	Myriophyllum	sibiricum	Water Milfoil	PHY	PHY	PERM	NOAEL		14 d	25.6		ae mg/L	97	111592
Glyphosate	Myriophyllum	sibiricum	Water Milfoil	GRO	GRO	LGTH	IC50		14 d	1.56		ae mg/L	97	111592
Glyphosate	Myriophyllum	sibiricum	Water Milfoil	GRO	GRO	NROT	IC50		14 d	4.57		ae mg/L	97	111592
Glyphosate	Myriophyllum	sibiricum	Water Milfoil	GRO	GRO	AREA	IC50		14 d	4.82		ae mg/L	97	111592
Glyphosate isopropylamine salt	Pinus	contorta	Tamarack Pine	PHY	IMM	PRNF	LOAEL		35 d	360000		ppm	100	96963
Glyphosate isopropylamine salt	Pinus	contorta	Tamarack Pine	PHY	IMM	PRNF	LOAEL		49 d	360000		ppm	100	96963
Glyphosate isopropylamine salt	Xylothamia	palmeri	Texas Desert Goldenrod	POP	POP	COVR	LOAEL		730 d	0.9812		lb/acre	100	44033
Glyphosate isopropylamine salt	Xylothamia	palmeri	Texas Desert Goldenrod	POP	POP	COVR	LOAEL		182.64 d	0.9812		lb/acre	100	44033
Glyphosate isopropylamine salt	Xylothamia	palmeri	Texas Desert Goldenrod	POP	POP	COVR	LOAEL		d	0.9812		lb/acre	100	44033

Glyphosate isopropylamine salt	NR	Poaceae	Grass Family	POP	POP	COVR	NOAEL		730.56	d	1.9624		lb/acre	100	44033
Glyphosate isopropylamine salt	NR	Poaceae	Grass Family	POP	POP	COVR	NOAEL	LOAEL	182.64	d	0.9812	1.9624	lb/acre	100	44033
Glyphosate isopropylamine salt	NR	Plantae	Plant Kingdom	POP	POP	BMAS	NOAEL			d	1.9624		lb/acre	100	44033
Glyphosate	Anacardi	um	occidentale	Cashew	POP	POP	BMAS	NOAEL		hv	2.676		lb/acre	100	48148
Glyphosate	Anacardi	um	occidentale	Cashew	BCM	BCM	NCON	NOAEL		hv	2.676		lb/acre	100	48148
Glyphosate	NR	Cyperales	Grass/Sedge Order	POP	POP	BMAS	NOAEL	LOAEL	121.76	d	1.784	2.676	lb/acre	100	48148
Glyphosate	NR	Cyperales	Grass/Sedge Order	BCM	BCM	KCON	NOAEL	LOAEL	121.76	d	1.784	2.676	lb/acre	100	48148
Glyphosate	NR	Plantae	Plant Kingdom	POP	POP	BMAS	LOAEL		121.76	d	1.784		lb/acre	100	48148
Glyphosate	NR	Plantae	Plant Kingdom	BCM	BCM	NCON	NOAEL		121.76	d	2.676		lb/acre	100	48148
Glyphosate	NR	Plantae	Plant Kingdom	POP	POP	BMAS	NOAEL	LOAEL	121.76	d	1.784	2.676	lb/acre	100	48148
Glyphosate	NR	Plantae	Plant Kingdom	BCM	BCM	NCON	NOAEL	LOAEL	121.76	d	1.784	2.676	lb/acre	100	48148
Glyphosate	NR	Cyperales	Grass/Sedge Order	POP	POP	BMAS	NOAEL		121.76	d	2.676		lb/acre	100	48148
Glyphosate	NR	Cyperales	Grass/Sedge Order	BCM	BCM	NCON	NOAEL	LOAEL	121.76	d	1.784	2.676	lb/acre	100	48148
Glyphosate	Anacardi	um	occidentale	Cashew	BCM	BCM	NCON	NOAEL		hv	2.676		lb/acre	100	48148
Glyphosate	NR	Plantae	Plant Kingdom	POP	POP	BMAS	LOAEL		121.76	d	1.784		lb/acre	100	48148
Glyphosate	NR	Plantae	Plant Kingdom	POP	POP	BMAS	LOAEL		121.76	d	1.784		lb/acre	100	48148
Glyphosate	Gladiolus	sp.	Gladiolus	REP	REP	VEGR	LOAEL			gm	0.892		lb/acre	100	113903
Glyphosate	Gladiolus	sp.	Gladiolus	GRO	MPH	WGHT	LOAEL			hv	0.892		lb/acre	100	113903
Glyphosate	Gladiolus	sp.	Gladiolus	GRO	GRO	DMTR	NOAEL			hv	0.892		lb/acre	100	113903
Glyphosate	NR	Plantae	Plant Kingdom	POP	POP	ABND	LOAEL		90	d	0.892		lb/acre	100	113903
Glyphosate isopropylamine salt	Plankton	sp.	Plankton	POP	POP	PSYN	NOAEL		1	d	0.43		Al kg/ha	100	53095
Glyphosate	Nicotian	a	tabacum	Tobacco	POP	POP	BMAS	LOAEL		hv	1.99808		lb/acre	100	48141
Glyphosate	Nicotian	a	tabacum	Tobacco	GRO	GRO	VGOR	NOAEL		d	1.99808		lb/acre	100	48141
Glyphosate	Nicotian	a	tabacum	Tobacco	POP	POP	ABND	LOAEL	27	d	1.99808		lb/acre	100	48141
Glyphosate	Nicotian	a	tabacum	Tobacco	GRO	GRO	VGOR	LOAEL		d	1.99808		lb/acre	100	48141

Glyphosate	Dactylis	glomerata	Orchardgrass	PHY	INJ	DAMG	NOAEL		42	d	1.99808		lb/acre	100	48141
Glyphosate	Secale	cereale	Common Rye	PHY	INJ	DAMG	NOAEL		42	d	1.99808		lb/acre	100	48141
Glyphosate	Caenorh abditis	elegans	Nematode	BEH	BEH	NMVM	LOAEL		1	d	7		ppm	100	117675
Glyphosate	Caenorh abditis	elegans	Nematode	BEH	BEH	BOWW	NOAEL		1	d	0.7		ppm	100	117675
Glyphosate	Caenorh abditis	elegans	Nematode	BEH	BEH	BOWW	LOAEL		1	d	7		ppm	100	117675
Glyphosate	Caenorh abditis	elegans	Nematode	BEH	BEH	NMVM	NOAEL		3	d	0.7		ppm	100	117675
Glyphosate	Caenorh abditis	elegans	Nematode	BEH	BEH	NMVM	LOAEL		3	d	7		ppm	100	117675
Glyphosate	Caenorh abditis	elegans	Nematode	REP	REP	PROG	NOAEL		3	d	0.7		ppm	100	117675
Glyphosate	Caenorh abditis	elegans	Nematode	REP	REP	PROG	LOAEL		3	d	7		ppm	100	117675
Glyphosate isopropylamine salt	Anas	platyrhynch os	Mallard Duck	NOC	NOC	MULT	NOAEL		15	d	178		Al lb/100gal/ ac	100	35249
Glyphosate isopropylamine salt	Anas	platyrhynch os	Mallard Duck	GRO	DVP	ABNM	NOAEL		15	d	178		Al lb/100gal/ ac	100	35249
Glyphosate isopropylamine salt	Anas	platyrhynch os	Mallard Duck	MOR	MOR	MORT	LC50		15	d	178		Al lb/100gal/ ac	100	35249
Glyphosate isopropylamine salt	Zea	mays	Corn	POP	POP	ABND	NOAEL		28	d	3		fl oz mat/cwt	100	88098
Glyphosate isopropylamine salt	Melanot us	depressus	Wireworm	POP	POP	ABND	LOAEL		28	d	3		fl oz mat/cwt	100	88098
Glyphosate isopropylamine salt	Melanot us	depressus	Wireworm	POP	POP	ABND	LOAEL		28	d	3		fl oz mat/cwt	100	88098
Glyphosate isopropylamine salt	Ageratu m	houstonianu m	Ageratum	PHY	INJ	DAMG	NOAEL		56	d	0.74036		lb/acre	100	70759
Glyphosate isopropylamine salt	Lobularia	maritima	Sweet Alyssum	PHY	INJ	DAMG	LOAEL		14	d	0.74036		lb/acre	100	70759
Glyphosate isopropylamine salt	Callistep hus	chinensis	China Aster	PHY	INJ	DAMG	LOAEL		14	d	0.74036		lb/acre	100	70759
Glyphosate isopropylamine salt	Celosia	cristata	Crested Cock's Comb	PHY	INJ	DAMG	LOAEL		56	d	0.74036		lb/acre	100	70759

Glyphosate isopropylamine salt	Coreopsis	lanceolata	Lanceleaf Tickseed	PHY	INJ	DAMG	LOAEL		14 d	0.74036		lb/acre	100	70759
Glyphosate isopropylamine salt	Dahlia	sp.	Dahlia	PHY	INJ	DAMG	LOAEL		14 d	0.74036		lb/acre	100	70759
Glyphosate isopropylamine salt	Dianthus	barbatus	Sweet-William	PHY	INJ	DAMG	LOAEL		14 d	0.74036		lb/acre	100	70759
Glyphosate isopropylamine salt	Pelargonium	x hortorum	Zonal Geranium	PHY	INJ	DAMG	NOAEL		56 d	0.74036		lb/acre	100	70759
Glyphosate isopropylamine salt	Hibiscus	moscheutos	Crimson-eyed Rosemallow	PHY	INJ	DAMG	NOAEL		56 d	0.74036		lb/acre	100	70759
Glyphosate isopropylamine salt	Impatiens	walleriana	Busy Lizzy	PHY	INJ	DAMG	NOAEL		56 d	0.74036		lb/acre	100	70759
Glyphosate isopropylamine salt	Tagetes	patula	French Marigold	PHY	INJ	DAMG	NOAEL		56 d	0.74036		lb/acre	100	70759
Glyphosate isopropylamine salt	Tagetes	patula	French Marigold	PHY	INJ	DAMG	NOAEL		56 d	0.74036		lb/acre	100	70759
Glyphosate isopropylamine salt	Nicotiana	alata	Jasmine Tobacco	PHY	INJ	DAMG	NOAEL		56 d	0.74036		lb/acre	100	70759
Glyphosate isopropylamine salt	Capsicum	annuum	Bell Pepper	PHY	INJ	DAMG	NOAEL		56 d	0.74036		lb/acre	100	70759
Glyphosate isopropylamine salt	Petunia	hybrida	Petunia	PHY	INJ	DAMG	LOAEL		14 d	0.74036		lb/acre	100	70759
Glyphosate isopropylamine salt	Petunia	hybrida	Petunia	PHY	INJ	DAMG	NOAEL		56 d	0.74036		lb/acre	100	70759
Glyphosate isopropylamine salt	Salvia	farinacea	Mealycup Sage	PHY	INJ	DAMG	NOAEL		56 d	0.74036		lb/acre	100	70759
Glyphosate isopropylamine salt	Salvia	splendens	Scarlet Sage	PHY	INJ	DAMG	NOAEL		56 d	0.74036		lb/acre	100	70759
Glyphosate isopropylamine salt	Antirrhinum	majus	Snapdragon	PHY	INJ	DAMG	LOAEL		14 d	0.74036		lb/acre	100	70759

Glyphosate isopropylamine salt	Catharanthus	roseus	Bright-Eyes	PHY	INJ	DAMG	NOAEL		56 d	0.74036		lb/acre	100	70759
Glyphosate isopropylamine salt	Zinnia	violacea	Zinnia	PHY	INJ	DAMG	NOAEL		56 d	0.74036		lb/acre	100	70759
Glyphosate isopropylamine salt	Digitaria	sanguinalis	Purple Crabgrass	POP	POP	CNTL	LOAEL		14 d	0.74036		lb/acre	100	70759
Glyphosate isopropylamine salt	Amaranthus	sp.	Amaranth	POP	POP	CNTL	LOAEL		14 d	0.74036		lb/acre	100	70759
Glyphosate	Toxicodendron	radicans	Poison-Ivy	POP	POP	CNTL	LOAEL		35 d	0.74928		lb/acre	100	73745
Glyphosate	Vitis	labrusca	American Grape	POP	POP	BMAS	NOAEL		126 d	0.74928		lb/acre	100	73745
Glyphosate	Conyza	canadensis	Butterweed	POP	POP	CNTL	LOAEL		35 d	0.74928		lb/acre	100	73745
Glyphosate	Bromus	catharticus	Rescuegrass	POP	POP	CNTL	LOAEL		35 d	0.74928		lb/acre	100	73745
Glyphosate	Lolium	multiflorum	Annual Ryegrass	POP	POP	CNTL	LOAEL		35 d	0.74928		lb/acre	100	73745
Glyphosate	Taraxacum	officinale	Common Dandelion	POP	POP	CNTL	LOAEL		35 d	0.74928		lb/acre	100	73745
Glyphosate isopropylamine salt	Triticum	sp.	Wheat	POP	POP	CNTL	LOAEL		14 d	0.5352		lb/acre	100	73916
Glyphosate isopropylamine salt	Vicia	villosa	Hairy Vetch	POP	POP	CNTL	LOAEL		14 d	0.5352		lb/acre	100	73916
Glyphosate isopropylamine salt	Glycine	max	Soybean	PHY	INJ	GINJ	NOAEL		7 d	840		ae g/ha	100	114121
Glyphosate isopropylamine salt	Glycine	max	Soybean	POP	POP	BMAS	NOAEL		hv	840		ae g/ha	100	114121
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	CEL	GEN	DAMG	LOAEL		0.25 d	4.1		mg/L	41	117389
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	CEL	GEN	DAMG	NOAEL		1 d	4.1		mg/L	41	117389
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	CEL	GEN	DAMG	NOAEL		4 d	4.1		mg/L	41	117389
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	CEL	GEN	DAMG	LOAEL		0.25 d	4.1		mg/L	41	117389

Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	CEL	GEN	DAMG	LOAEL		1 d	4.1		mg/L	41	117389
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	CEL	GEN	DAMG	NOAEL		4 d	4.1		mg/L	41	117389
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	CEL	GEN	MNUC	NOAEL		0.25 d	4.1		mg/L	41	117389
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	CEL	GEN	MNUC	NOAEL		1 d	4.1		mg/L	41	117389
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	CEL	GEN	MNUC	NOAEL		4 d	4.1		mg/L	41	117389
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	CEL	GEN	NABN	NOAEL		0.25 d	4.1		mg/L	41	117389
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	CEL	GEN	NABN	NOAEL		1 d	4.1		mg/L	41	117389
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	CEL	GEN	NABN	NOAEL		4 d	4.1		mg/L	41	117389
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	CEL	GEN	DAMG	LOAEL		0.25 d	4.1		mg/L	41	117389
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	CEL	GEN	DAMG	NOAEL		1 d	4.1		mg/L	41	117389
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	CEL	GEN	DAMG	LOAEL		4 d	4.1		mg/L	41	117389
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	CEL	GEN	DAMG	LOAEL		0.25 d	4.1		mg/L	41	117389
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	CEL	GEN	DAMG	LOAEL		1 d	4.1		mg/L	41	117389
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	CEL	GEN	DAMG	NOAEL		4 d	4.1		mg/L	41	117389
Glyphosate isopropylamine salt	Phakopsora	pachyrhizi	Fungi	POP	POP	ABND	LOAEL		14 d	1.26		ae kg/ha	100	109341

Glyphosate isopropylamine salt	Phakopsora	pachyrhizi	Fungi	POP	POP	ABND	NOAEL		21	d	1.26		ae kg/ha	100	109341
Glyphosate isopropylamine salt	Phakopsora	pachyrhizi	Fungi	POP	POP	ABND	LOAEL		14	d	1.26		ae kg/ha	100	109341
Glyphosate isopropylamine salt	Phakopsora	pachyrhizi	Fungi	POP	POP	ABND	NOAEL	LOAEL	14	d	1.26	2.52	ae kg/ha	100	109341
Glyphosate isopropylamine salt	Phakopsora	pachyrhizi	Fungi	POP	POP	ABND	LOAEL		14	d	1.26		ae kg/ha	100	109341
Glyphosate isopropylamine salt	Phakopsora	pachyrhizi	Fungi	POP	POP	ABND	LOAEL		14	d	1.26		ae kg/ha	100	109341
Glyphosate	Echinochloa	phyllopogon	Rice Barnyardgrass	POP	POP	BMAS	EC50			d	0.26		ae kg/ha	100	59421
Glyphosate	Echinochloa	phyllopogon	Rice Barnyardgrass	POP	POP	BMAS	EC50			d	0.16		ae kg/ha	100	59421
Glyphosate isopropylamine salt	Chenopodium	album	Lamb's-Quarters	POP	POP	COVR	LOAEL		56	d	0.9812		lb/acre	100	117340
Glyphosate isopropylamine salt	Glycine	max	Soybean	GRO	GRO	HGHT	NOAEL		56	d	1.9624		lb/acre	100	117340
Glyphosate isopropylamine salt	Glycine	max	Soybean	POP	POP	BMAS	NOAEL		56	d	1.9624		lb/acre	100	117340
Glyphosate isopropylamine salt	Sida	spinosa	Prickly Mallow	POP	POP	COVR	NOAEL		56	d	1.9624		lb/acre	100	117340
Glyphosate isopropylamine salt	Sorghum	halepense	Johnson Grass	POP	POP	COVR	NOAEL		56	d	1.9624		lb/acre	100	117340
Glyphosate isopropylamine salt	Amaranthus	sp.	Amaranth	POP	POP	COVR	LOAEL		56	d	0.9812		lb/acre	100	117340
Glyphosate isopropylamine salt	Chenopodium	album	Lamb's-Quarters	POP	POP	COVR	LOAEL		56	d	0.9812		lb/acre	100	117340
Glyphosate isopropylamine salt	Glycine	max	Soybean	GRO	GRO	HGHT	NOAEL		56	d	1.9624		lb/acre	100	117340
Glyphosate isopropylamine salt	Glycine	max	Soybean	POP	POP	BMAS	NOAEL		56	d	1.9624		lb/acre	100	117340

Glyphosate isopropylamine salt	Sida	spinosa	Prickly Mallow	POP	POP	COVR	NOAEL		56	d	1.9624		lb/acre	100	117340
Glyphosate isopropylamine salt	Sorghum	halepense	Johnson Grass	POP	POP	COVR	NOAEL		56	d	1.9624		lb/acre	100	117340
Glyphosate isopropylamine salt	Amarant hus	sp.	Amaranth	POP	POP	COVR	LOAEL		56	d	0.9812		lb/acre	100	117340
Glyphosate isopropylamine salt	Glycine	max	Soybean	POP	POP	COVR	NOAEL		56	d	1.9624		lb/acre	100	117340
Glyphosate isopropylamine salt	Glycine	max	Soybean	PHY	INJ	GINJ	NOAEL		56	d	1.9624		lb/acre	100	117340
Glyphosate isopropylamine salt	Glycine	max	Soybean	POP	POP	COVR	NOAEL		56	d	1.9624		lb/acre	100	117340
Glyphosate isopropylamine salt	Glycine	max	Soybean	PHY	INJ	GINJ	NOAEL		56	d	1.9624		lb/acre	100	117340
Glyphosate isopropylamine salt	Ipomoea	lacunosa	White Morninglory	PHY	PHY	WLSS	LOAEL		7	d	0.9812		lb/acre	100	63873
Glyphosate isopropylamine salt	Ipomoea	lacunosa	White Morninglory	PHY	PHY	WLSS	LOAEL		7	d	0.9812		lb/acre	100	63873
Glyphosate isopropylamine salt	Euphorbia	maculata	Spotted Spurge	PHY	PHY	WLSS	LOAEL		7	d	0.9812		lb/acre	100	63873
Glyphosate isopropylamine salt	Sesbania	herbacea	Colorado Riverhemp	PHY	PHY	WLSS	LOAEL		7	d	0.9812		lb/acre	100	63873
Glyphosate isopropylamine salt	Senna	obtusifolia	Sicklepod	PHY	PHY	WLSS	LOAEL		7	d	0.9812		lb/acre	100	63873
Glyphosate isopropylamine salt	Ipomoea	lacunosa	White Morninglory	PHY	PHY	WLSS	LOAEL		7	d	0.9812		lb/acre	100	63873
Glyphosate isopropylamine salt	Xanthium	strumarium	Common Cocklebur	PHY	PHY	WLSS	LOAEL		7	d	0.9812		lb/acre	100	63873
Glyphosate isopropylamine salt	Glycine	max	Soybean	BCM	BCM	WTCO	NOAEL		1	gs	1.9624		lb/acre	100	63873

Glyphosate isopropylamine salt	Glycine	max	Soybean	BCM	BCM	WTCO	NOAEL		1	gs	1.9624		lb/acre	100	63873
Glyphosate isopropylamine salt	Salvinia	molesta	Water Fern	POP	POP	CNTL	LOAEL		42	d	8.97		ae kg/ha	100	71381
Glyphosate isopropylamine salt	Salvinia	molesta	Water Fern	POP	POP	CNTL	LOAEL		21	d	8.97		ae kg/ha	100	71381
Glyphosate isopropylamine salt	Salvinia	molesta	Water Fern	POP	POP	CNTL	LOAEL		14	d	8.97		ae kg/ha	100	71381
Glyphosate isopropylamine salt	Salvinia	molesta	Water Fern	POP	POP	CNTL	LOAEL		28	d	8.97		ae kg/ha	100	71381
Glyphosate isopropylamine salt	Salvinia	molesta	Water Fern	POP	POP	CNTL	LOAEL		7	d	56.7		ae kg/ha	100	71381
Glyphosate isopropylamine salt	Salvinia	molesta	Water Fern	POP	POP	CNTL	LOAEL		3	d	8.97		ae kg/ha	100	71381
Glyphosate	Epilobium	nummulariifolium	Creeping Willow Herb	POP	POP	INDX	NOAEL		49	d	0.64224		lb/acre	100	120532
Glyphosate	Veronica	filiformis	Whetzel Weed	POP	POP	INDX	LOAEL		49	d	0.48168		lb/acre	100	120532
Glyphosate	Ranunculus	repens	Creeping Buttercup	POP	POP	INDX	LOAEL		49	d	0.48168		lb/acre	100	120532
Glyphosate isopropylamine salt	Dichondra	micrantha	Dichondra	POP	POP	ABND	LOAEL		4.9	d	0.48168		lb/acre	100	120479
Glyphosate isopropylamine salt	Dichondra	micrantha	Dichondra	POP	POP	ABND	NOAEL		126	d	0.48168		lb/acre	100	120479
Glyphosate	Brassica	napus	Colza	POP	POP	PGRT	IC50		8	d	0.0005		M	100	78497
Glyphosate	Zea	mays	Corn	POP	POP	PGRT	IC50		8	d	0.0003		M	100	78497
Glyphosate monosodium salt	Chlorella	sp.	Green Algae	POP	POP	CHLO	IC10		0.0833	d	450		mg/L	100	118972
Glyphosate monosodium salt	NR	Trebouxiophyceae	Algae Class	POP	POP	CHLO	IC10		0.0833	d	4700		mg/L	100	118972
Glyphosate monosodium salt	Neochloris	sp.	Green Algae	POP	POP	CHLO	IC10		0.0833	d	3600		mg/L	100	118972
Glyphosate monosodium salt	NR	Trebouxiophyceae	Algae Class	POP	POP	CHLO	IC10		0.0833	d	4000		mg/L	100	118972

Glyphosate isopropylamine salt	Neochetina	eichhorniae	Weevil	POP	POP	ABND	NOAEL		60 d	0.11		AI g/m2	100	115186
Glyphosate isopropylamine salt	Neochetina	eichhorniae	Weevil	BEH	FDB	FDNG	LOAEL		60 d	0.11		AI g/m2	100	115186
Glyphosate isopropylamine salt	Neochetina	eichhorniae	Weevil	POP	POP	ABND	NOAEL		60 d	0.11		AI g/m2	100	115186
Glyphosate isopropylamine salt	Neochetina	eichhorniae	Weevil	POP	POP	ABND	NOAEL		60 d	0.11		AI g/m2	100	115186
Glyphosate isopropylamine salt	Eichhornia	crassipes	Water-Hyacinth	REP	REP	VEGR	NOAEL	LOAEL	56 d	0.07	0.11	AI g/m2	100	115186
Glyphosate isopropylamine salt	Eichhornia	crassipes	Water-Hyacinth	GRO	DVP	STGE	NOAEL	LOAEL	56 d	0.04	0.07	AI g/m2	100	115186
Glyphosate isopropylamine salt	Eichhornia	crassipes	Water-Hyacinth	GRO	GRO	NLEF	NOAEL	LOAEL	56 d	0.04	0.07	AI g/m2	100	115186
Glyphosate isopropylamine salt	Neochetina	bruchii	Water Hyacinth Weevil	POP	POP	ABND	NOAEL		60 d	0.11		AI g/m2	100	115186
Glyphosate isopropylamine salt	Neochetina	bruchii	Water Hyacinth Weevil	BEH	FDB	FDNG	LOAEL		60 d	0.11		AI g/m2	100	115186
Glyphosate isopropylamine salt	Neochetina	bruchii	Water Hyacinth Weevil	POP	POP	ABND	NOAEL		60 d	0.11		AI g/m2	100	115186
Glyphosate isopropylamine salt	Neochetina	bruchii	Water Hyacinth Weevil	POP	POP	ABND	NOAEL		60 d	0.11		AI g/m2	100	115186
Glyphosate isopropylamine salt	Eichhornia	crassipes	Water-Hyacinth	MOR	MOR	MORT	NR-LETH		60 d	0.21		AI g/m2	100	115186
Glyphosate isopropylamine salt	Eichhornia	crassipes	Water-Hyacinth	MOR	MOR	MORT	NR-ZERO		60 d	0.11		AI g/m2	100	115186
Glyphosate	NR	Annelida	Segmented Worm Phylum	POP	POP	ABND	NOAEL		730 d	900		AI g/ha	100	52153
Glyphosate isopropylamine salt	Aedes	aegypti	Yellow Fever Mosquito	BCM	ENZ	P450	NOAEL		3 d	0.1691		mg/L	100	117853
Glyphosate isopropylamine salt	Aedes	aegypti	Yellow Fever Mosquito	BCM	ENZ	GSTR	NOAEL		3 d	0.1691		mg/L	100	117853

Glyphosate isopropylamine salt	Aedes	aegypti	Yellow Fever Mosquito	CEL	GEN	GEXP	NOAEL		3 d	0.1691		mg/L	100	117853
Glyphosate isopropylamine salt	Aedes	aegypti	Yellow Fever Mosquito	CEL	GEN	GEXP	LOAEL		3 d	0.1691		mg/L	100	117853
Glyphosate isopropylamine salt	Aedes	aegypti	Yellow Fever Mosquito	BCM	ENZ	ESTE	LOAEL		3 d	0.1691		mg/L	100	117853
Glyphosate isopropylamine salt	Aedes	aegypti	Yellow Fever Mosquito	BCM	ENZ	ESTE	NOAEL		3 d	0.1691		mg/L	100	117853
Glyphosate isopropylamine salt	Juniperus	pinchotii	Juniper, Redb	MOR	MOR	MORT	LOAEL	365.28	d	0.5		AI %	100	41265
Glyphosate isopropylamine salt	Juniperus	pinchotii	Juniper, Redb	MOR	MOR	MORT	LOAEL	487.04	d	0.5		AI %	100	41265
Glyphosate isopropylamine salt	Juniperus	pinchotii	Juniper, Redb	MOR	MOR	MORT	LOAEL	761	d	0.5		AI %	100	41265
Glyphosate isopropylamine salt	Juniperus	pinchotii	Juniper, Redb	MOR	MOR	MORT	LOAEL	91.32	d	0.5		AI %	100	41265
Glyphosate, Monopotassium salt	Beta	vulgaris ssp. vulgaris	Beet	BCM	BCM	GBCM	LOAEL	3	d	0.84		ae kg/ha	100	97121
Glyphosate, Monopotassium salt	Beta	vulgaris ssp. vulgaris	Beet	BCM	BCM	GBCM	LOAEL	3	d	0.84		ae kg/ha	100	97121
Glyphosate, Monopotassium salt	Beta	vulgaris ssp. vulgaris	Beet	BCM	BCM	GBCM	LOAEL	7	d	0.84		ae kg/ha	100	97121
Glyphosate, Monopotassium salt	Fusarium	oxysporum	Fungi	POP	POP	CNTL	LOAEL	1	d	0.84		ae kg/ha	100	97121
Glyphosate, Monopotassium salt	Thanatephorus	cucumeris	Fungi	POP	POP	CNTL	NOAEL	9	d	0.84		ae kg/ha	100	97121
Glyphosate, Monopotassium salt	Thanatephorus	cucumeris	Fungi	POP	POP	CNTL	LOAEL	1	d	0.84		ae kg/ha	100	97121
Glyphosate, Monopotassium salt	Fusarium	oxysporum	Fungi	POP	POP	CNTL	LOAEL	1	d	0.84		ae kg/ha	100	97121

Glyphosate, Monopotassium salt	Thanatephorus	cucumeris	Fungi	POP	POP	CNTL	NOAEL		9 d	0.84		ae kg/ha	100	97121
Glyphosate, Monopotassium salt	Thanatephorus	cucumeris	Fungi	POP	POP	CNTL	NOAEL		9 d	0.84		ae kg/ha	100	97121
Glyphosate, Monopotassium salt	Beta	vulgaris ssp. vulgaris	Beet	PHY	INJ	GINJ	NOAEL		42 d	0.84		ae kg/ha	100	97121
Glyphosate, Monopotassium salt	Beta	vulgaris ssp. vulgaris	Beet	PHY	INJ	GINJ	NOAEL		42 d	0.84		ae kg/ha	100	97121
Glyphosate, Monopotassium salt	Beta	vulgaris ssp. vulgaris	Beet	PHY	INJ	GINJ	NOAEL		42 d	0.84		ae kg/ha	100	97121
Glyphosate isopropylamine salt	Ceriodaphnia	dubia	Water Flea	MOR	MOR	MORT	LC50		1 d	6000		ae ug/L	41	87704
Glyphosate	Thanatephorus	cucumeris	Fungi	POP	POP	ABND	NOAEL		28 d	1.49856		lb/acre	100	59458
Glyphosate	Thanatephorus	cucumeris	Fungi	REP	REP	GERM	NOAEL	LOAEL	28 d	0.74928	1.49856	lb/acre	100	59458
Glyphosate	Thanatephorus	cucumeris	Fungi	POP	POP	ABND	LOAEL		42 d	0.37464		lb/acre	100	59458
Glyphosate	Thanatephorus	cucumeris	Fungi	REP	REP	GERM	NOAEL		42 d	1.49856		lb/acre	100	59458
Glyphosate	Thanatephorus	cucumeris	Fungi	POP	POP	ABND	NOAEL		28 d	0.74928		lb/acre	100	59458
Glyphosate	Thanatephorus	cucumeris	Fungi	REP	REP	GERM	NOAEL		28 d	0.74928		lb/acre	100	59458
Glyphosate	Thanatephorus	cucumeris	Fungi	POP	POP	ABND	NOAEL		42 d	1.49856		lb/acre	100	59458
Glyphosate	Thanatephorus	cucumeris	Fungi	REP	REP	GERM	NOAEL		42 d	1.49856		lb/acre	100	59458
Glyphosate	Thanatephorus	cucumeris	Fungi	POP	POP	ABND	NOAEL		42 d	1.49856		lb/acre	100	59458
Glyphosate	Thanatephorus	cucumeris	Fungi	REP	REP	GERM	NOAEL		42 d	1.49856		lb/acre	100	59458
Glyphosate isopropylamine salt	Sclerotinia	sclerotiorum	Fungus	REP	REP	GERM	NOAEL		28 d	0.89		lb/acre	100	70745
Glyphosate isopropylamine salt	Sclerotinia	sclerotiorum	Fungus	REP	REP	GERM	NOAEL		28 d	0.89		lb/acre	100	70745
Glyphosate	Kalmia	angustifolia	Sheep Laurel	POP	POP	ABND	NOAEL		273.96 d	2.99712		lb/acre	100	116216

Glyphosate	Kalmia	angustifolia	Sheep Laurel	GRO	MPH	LGTH	NOAEL		273.96	d	2.99712		lb/acre	100	116216
Glyphosate	Kalmia	angustifolia	Sheep Laurel	POP	POP	ABND	LOAEL		273.96	d	2.56896		lb/acre	100	116216
Glyphosate	Kalmia	angustifolia	Sheep Laurel	GRO	MPH	LGTH	NOAEL		273.96	d	2.56896		lb/acre	100	116216
Glyphosate	Kalmia	angustifolia	Sheep Laurel	POP	POP	ABND	NOAEL		273.96	d	2.56896		lb/acre	100	116216
Glyphosate	Kalmia	angustifolia	Sheep Laurel	GRO	MPH	LGTH	NOAEL		273.96	d	2.56896		lb/acre	100	116216
Glyphosate isopropylamine salt	Calocoris	norvegicus	Strawberry Bug	MOR	MOR	MORT	NOAEL		0.5	d	1.8		Al ug/org	100	91087
Glyphosate isopropylamine salt	Adenostoma	fasciculatum	Chamise	POP	POP	ABND	LOAEL		2920	d	2.2		ae kg/ha	100	44103
Glyphosate isopropylamine salt	Adenostoma	fasciculatum	Chamise	REP	REP	SEED	NOAEL		2920	d	4.5		ae kg/ha	100	44103
Glyphosate isopropylamine salt	Quercus	dumosa	Coastal Sage Scrub Oak	POP	POP	COVR	NOAEL		730	d	4.5		ae kg/ha	100	44103
Glyphosate isopropylamine salt	Quercus	dumosa	Coastal Sage Scrub Oak	POP	POP	ABND	NOAEL		730	d	4.5		ae kg/ha	100	44103
Glyphosate isopropylamine salt	Quercus	dumosa	Coastal Sage Scrub Oak	POP	POP	ABND	LOAEL		2920	d	4.5		ae kg/ha	100	44103
Glyphosate isopropylamine salt	Quercus	dumosa	Coastal Sage Scrub Oak	POP	POP	ABND	NOAEL		2920	d	2.2		ae kg/ha	100	44103
Glyphosate isopropylamine salt	Quercus	dumosa	Coastal Sage Scrub Oak	POP	POP	COVR	NOAEL		2920	d	2.2		ae kg/ha	100	44103
Glyphosate isopropylamine salt	Quercus	dumosa	Coastal Sage Scrub Oak	POP	POP	COVR	LOAEL		2920	d	4.5		ae kg/ha	100	44103
Glyphosate isopropylamine salt	Adenostoma	fasciculatum	Chamise	POP	POP	ABND	LOAEL		730	d	2.2		ae kg/ha	100	44103
Glyphosate isopropylamine salt	Adenostoma	fasciculatum	Chamise	POP	POP	COVR	LOAEL		730	d	2.2		ae kg/ha	100	44103
Glyphosate isopropylamine salt	Adenostoma	fasciculatum	Chamise	POP	POP	COVR	LOAEL		2920	d	2.2		ae kg/ha	100	44103
Glyphosate	Mus	musculus	House Mouse	CEL	CEL	NCCM	NOAEL		90	d	5		%	100	116496

Glyphosate isopropylamine salt	Simocephalus	vetulus	Water Flea	MOR	MOR	MORT	NR-LETH		21	d	1.5		ae mg/L	100	72794
Glyphosate isopropylamine salt	NR	Fungi	Fungi Kingdom	POP	POP	ABND	NOAEL		426.16	d	2.88116		lb/acre	100	48089
Glyphosate isopropylamine salt	NR	Fungi	Fungi Kingdom	POP	POP	ABND	NOAEL		365.28	d	2.88116		lb/acre	100	48089
Glyphosate isopropylamine salt	NR	Fungi	Fungi Kingdom	POP	POP	ABND	NOAEL		304.4	d	2.88116		lb/acre	100	48089
Glyphosate	Pinus	banksiana	Jack Pine	GRO	GRO	HGHT	NOAEL	LOAEL	1460	d	1.784	3.568	lb/acre	100	31942
Glyphosate	Pinus	banksiana	Jack Pine	GRO	GRO	HGHT	NOAEL	LOAEL	1095	d	0.892	1.784	lb/acre	100	31942
Glyphosate	Acacia	farnesiana	Cassie	POP	POP	COVR	NOAEL	LOAEL		d	0.12488	0.24976	lb/acre	100	115987
Glyphosate	Prosopis	juliflora	Mesquite	POP	POP	COVR	NOAEL	LOAEL		d	0.12488	0.24976	lb/acre	100	115987
Glyphosate	Aloysia	gratissima	Whitebrush	POP	POP	COVR	LOAEL			d	0.49952		lb/acre	100	115987
Glyphosate	Quercus	virginiana	Live Oak	POP	POP	COVR	NOAEL			d	1.99808		lb/acre	100	115987
Glyphosate isopropylamine salt	Rattus	norvegicus	Norway Rat	GRO	MPH	SMIX	NOAEL			d	450		mg/kg bdwt	100	106280
Glyphosate isopropylamine salt	Rattus	norvegicus	Norway Rat	GRO	GRO	GAIN	NOAEL		21	d	450		mg/kg bdwt	100	106280
Glyphosate isopropylamine salt	Rattus	norvegicus	Norway Rat	POP	POP	SEXR	NOAEL		21	d	450		mg/kg bdwt	100	106280
Glyphosate isopropylamine salt	Rattus	norvegicus	Norway Rat	GRO	DVP	SXDP	LOAEL		58.6	d	50		mg/kg bdwt	100	106280
Glyphosate isopropylamine salt	Rattus	norvegicus	Norway Rat	BCM	HRM	TSTR	NOAEL	LOAEL		d	150	450	mg/kg bdwt	100	106280
Glyphosate isopropylamine salt	Rattus	norvegicus	Norway Rat	REP	REP	SPCL	NOAEL			d	450		mg/kg bdwt	100	106280
Glyphosate isopropylamine salt	Rattus	norvegicus	Norway Rat	MOR	MOR	MORT	NR-ZERO			d	450		mg/kg bdwt	100	106280
Glyphosate isopropylamine salt	Rattus	norvegicus	Norway Rat	GRO	DVP	SXDP	NOAEL	LOAEL		d	150	450	mg/kg bdwt	100	106280
Glyphosate	Oryza	sativa	Rice	POP	POP	ABND	LOAEL		1	gs	1.8		Al kg/ha	100	95840
Glyphosate	Oryza	sativa	Rice	POP	POP	BMAS	NOAEL		1	hv	1.8		Al kg/ha	100	95840
Glyphosate	Rosa	bracteata	Macartney Rose	PHY	INJ	DAMG	NOAEL		365	d	4.014		lb/acre	100	44158

Glyphosate	Rosa	bracteata	Macartney Rose	POP	POP	COVR	LOAEL		365	d	4.014		lb/acre	100	44158
Glyphosate	Rosa	bracteata	Macartney Rose	PHY	INJ	DAMG	NOAEL		730	d	4.014		lb/acre	100	44158
Glyphosate	Rosa	bracteata	Macartney Rose	POP	POP	COVR	LOAEL		730	d	4.014		lb/acre	100	44158
Glyphosate	Rosa	bracteata	Macartney Rose	PHY	INJ	DAMG	NOAEL		1095	d	4.014		lb/acre	100	44158
Glyphosate	Rosa	bracteata	Macartney Rose	POP	POP	COVR	NOAEL		1095	d	4.014		lb/acre	100	44158
Glyphosate	Rosa	bracteata	Macartney Rose	PHY	INJ	DAMG	NOAEL			d	4.014		lb/acre	100	44158
Glyphosate	Rosa	bracteata	Macartney Rose	POP	POP	COVR	NOAEL			d	4.014		lb/acre	100	44158
Glyphosate	NR	Poaceae	Grass Family	POP	POP	COVR	NOAEL		365	d	4.014		lb/acre	100	44158
Glyphosate	NR	Poaceae	Grass Family	POP	POP	COVR	NOAEL		730	d	4.014		lb/acre	100	44158
Glyphosate	NR	Poaceae	Grass Family	POP	POP	COVR	LOAEL		91.32	d	1.9624		lb/acre	100	44158
Glyphosate	NR	Plantae	Plant Kingdom	POP	POP	COVR	LOAEL		91.32	d	1.9624		lb/acre	100	44158
Glyphosate isopropylamine salt	Adenostoma	fasciculatum	Chamise	PHY	INJ	GINJ	LOAEL		700.12	d	2.99712		lb/acre	100	41472
Glyphosate isopropylamine salt	Adenostoma	fasciculatum	Chamise	PHY	INJ	GINJ	LOAEL		852.32	d	2.99712		lb/acre	100	41472
Glyphosate isopropylamine salt	Adenostoma	fasciculatum	Chamise	POP	POP	CNTL	LOAEL		1339.36	d	2.99712		lb/acre	100	41472
Glyphosate isopropylamine salt	Adenostoma	fasciculatum	Chamise	POP	POP	COVR	LOAEL		1339.36	d	2.99712		lb/acre	100	41472
Glyphosate isopropylamine salt	Adenostoma	fasciculatum	Chamise	POP	POP	CNTL	LOAEL		1491.56	d	2.99712		lb/acre	100	41472
Glyphosate isopropylamine salt	Adenostoma	fasciculatum	Chamise	POP	POP	COVR	LOAEL		1491.56	d	2.99712		lb/acre	100	41472
Glyphosate isopropylamine salt	Adenostoma	sparsifolium	Redshank	POP	POP	COVR	NOAEL		456.6	d	3.99616		lb/acre	100	41472
Glyphosate isopropylamine salt	Adenostoma	sparsifolium	Redshank	PHY	INJ	GINJ	LOAEL		365.28	d	1.99808		lb/acre	100	41472
Glyphosate isopropylamine salt	Adenostoma	sparsifolium	Redshank	POP	POP	CNTL	NOAEL		639.24	d	1.99808		lb/acre	100	41472

Glyphosate isopropylamine salt	Adenostoma	sparsifolium	Redshank	POP	POP	CNTL	LOAEL		639.24	d	3.99616		lb/acre	100	41472
Glyphosate isopropylamine salt	Adenostoma	sparsifolium	Redshank	POP	POP	COVR	LOAEL		639.24	d	3.99616		lb/acre	100	41472
Glyphosate isopropylamine salt	Adenostoma	sparsifolium	Redshank	POP	POP	COVR	NOAEL		639.24	d	1.99808		lb/acre	100	41472
Glyphosate isopropylamine salt	Adenostoma	fasciculatum	Chamise	PHY	INJ	GINJ	LOAEL		365.28	d	1.99808		lb/acre	100	41472
Glyphosate isopropylamine salt	Adenostoma	fasciculatum	Chamise	POP	POP	CNTL	LOAEL		639.24	d	1.99808		lb/acre	100	41472
Glyphosate isopropylamine salt	Adenostoma	fasciculatum	Chamise	POP	POP	COVR	LOAEL		639.24	d	1.99808		lb/acre	100	41472
Glyphosate isopropylamine salt	Adenostoma	fasciculatum	Chamise	PHY	INJ	GINJ	LOAEL		365.28	d	1.99808		lb/acre	100	41472
Glyphosate isopropylamine salt	Adenostoma	fasciculatum	Chamise	PHY	INJ	GINJ	LOAEL		426.16	d	1.99808		lb/acre	100	41472
Glyphosate isopropylamine salt	Adenostoma	fasciculatum	Chamise	POP	POP	COVR	LOAEL		456.6	d	1.99808		lb/acre	100	41472
Glyphosate isopropylamine salt	Adenostoma	fasciculatum	Chamise	POP	POP	CNTL	LOAEL		456.6	d	1.99808		lb/acre	100	41472
Glyphosate isopropylamine salt	Adenostoma	fasciculatum	Chamise	POP	POP	CNTL	LOAEL		608.8	d	1.99808		lb/acre	100	41472
Glyphosate isopropylamine salt	Adenostoma	fasciculatum	Chamise	POP	POP	COVR	LOAEL		608.8	d	1.99808		lb/acre	100	41472
Glyphosate isopropylamine salt	Rhamdia	quelen	Catfish	BCM	HRM	CRTS	NOAEL		4	d	1.2118		mg/L	100	112903
Glyphosate	Gossypium	sp.	Cotton	PHY	INJ	DAMG	NOAEL		14	d	870		ae g/ha	100	110909
Glyphosate	Gossypium	sp.	Cotton	PHY	INJ	DAMG	NOAEL		7	d	870		ae g/ha	100	110909
Glyphosate	Gossypium	sp.	Cotton	POP	POP	BMAS	NOAEL			hv	870		ae g/ha	100	110909
Glyphosate	Gossypium	sp.	Cotton	POP	POP	BMAS	NOAEL			hv	870		ae g/ha	100	110909

Glyphosate isopropylamine salt	Beauveria	bassiana	Fungus	GRO	GRO	WGHT	LOAEL		7 d	12000		ppm	100	70790
Glyphosate isopropylamine salt	Beauveria	bassiana	Fungus	GRO	GRO	WGHT	NOAEL		7 d	6000		ppm	100	70790
Glyphosate isopropylamine salt	Beauveria	bassiana	Fungus	REP	REP	GERM	NOAEL		1 d	30000		ppm	100	70790
Glyphosate	Vicia	faba	Broadbean	POP	POP	BMAS	NOAEL		2 gs	12.6		ml/100 L	36	95836
Glyphosate	Vicia	faba	Broadbean	BCM	BCM	DRYM	NOAEL		hv	12.6		ml/100 L	36	95836
Glyphosate	Vicia	faba	Broadbean	GRO	GRO	HGHT	NOAEL		hv	12.6		ml/100 L	36	95836
Glyphosate	Vicia	faba	Broadbean	GRO	MPH	LGTH	LOAEL		hv	12.6		ml/100 L	36	95836
Glyphosate	Botrytis	fabae	Fungus	POP	POP	ABND	LOAEL		hv	12.6		ml/100 L	36	95836
Glyphosate isopropylamine salt	Cyperus	esculentus	Yellow Nutsedge	GRO	GRO	WGHT	LOAEL		28 d	0.84		ae kg/ha	100	120063
Glyphosate isopropylamine salt	Rana	cascadae	Cascades Frog	GRO	DVP	EMRG	LOAEL		34 d	0.96		mg/L	50.2	96423
Glyphosate isopropylamine salt	Rana	cascadae	Cascades Frog	GRO	DVP	MMPH	LOAEL		33 d	0.96		mg/L	50.2	96423
Glyphosate isopropylamine salt	Rana	cascadae	Cascades Frog	GRO	DVP	MMPH	LOAEL		30 d	0.96		mg/L	50.2	96423
Glyphosate isopropylamine salt	Rana	cascadae	Cascades Frog	GRO	GRO	BMAS	LOAEL		43 d	0.96		mg/L	50.2	96423
Glyphosate isopropylamine salt	Rana	cascadae	Cascades Frog	MOR	MOR	MORT	NR-LETH		43 d	1.94		mg/L	50.2	96423
Glyphosate	Citrus	sp.	Citrus	PHY	INJ	DAMG	NOAEL		28 d	4.014		lb/acre	100	43582
Glyphosate	Citrus	sp.	Citrus	PHY	INJ	DAMG	NOAEL		189 d	4.014		lb/acre	100	43582
Glyphosate	Deroceras	reticulatum	Grey Field Slug	MOR	MOR	MORT	NOAEL		10 d	1.4		AI %	100	79821
Glyphosate	Deroceras	panormitanum	Longneck Fieldslug	MOR	MOR	MORT	NOAEL		10 d	1.4		AI %	100	79821
Glyphosate	Deroceras	reticulatum	Grey Field Slug	MOR	MOR	MORT	NOAEL		10 d	2.2		kg/ha	100	79821
Glyphosate	Deroceras	panormitanum	Longneck Fieldslug	MOR	MOR	MORT	NOAEL		10 d	2.2		kg/ha	100	79821
Glyphosate isopropylamine salt	NR	Plantae	Plant Kingdom	PHY	INJ	DAMG	LOAEL		60.88 d	1.6056		lb/acre	36	116055

Glyphosate isopropylamine salt	Rumex	acetosella	Field Sorrel	POP	POP	ABND	LOAEL		60.88	d	1.6056		lb/acre	36	116055
Glyphosate isopropylamine salt	Oryctolagus	cuniculus	European Rabbit	POP	POP	INDX	NOAEL		943.64	d	1.8		lb kg/ha	36	116055
Glyphosate isopropylamine salt	Calluna	vulgaris	Heather	PHY	INJ	DAMG	LOAEL		60.88	d	1.6056		lb/acre	36	116055
Glyphosate	Myriophyllum	aquaticum	Parrot Feather Watermilfoil	BCM	BCM	CHLA	LOAEL		14	d	0.168744		mg/L	35.6	105140
Glyphosate	Myriophyllum	aquaticum	Parrot Feather Watermilfoil	BCM	BCM	CHLB	LOAEL		14	d	0.168744		mg/L	35.6	105140
Glyphosate	Myriophyllum	aquaticum	Parrot Feather Watermilfoil	BCM	BCM	CARC	LOAEL		14	d	0.168744		mg/L	35.6	105140
Glyphosate	Myriophyllum	aquaticum	Parrot Feather Watermilfoil	GRO	GRO	LGTH	NOAEL		14	d	0.168744		mg/L	35.6	105140
Glyphosate isopropylamine salt	Fragaria	sp.	Strawberry	GRO	GRO	WGHT	LOAEL		60.88	d	0.16056		lb/acre	36	40855
Glyphosate	Lotus	pedunculatus	Big Trefoil	PHY	INJ	DAMG	LOAEL		49	d	0.64224		lb/acre	100	70295
Glyphosate	Trifolium	repens	Dutch Clover	PHY	INJ	DAMG	NOAEL	LOAEL	49	d	0.32112	0.64224	lb/acre	100	70295
Glyphosate	Hydrocotyle	heteromeria	Waxweed	PHY	INJ	DAMG	NOAEL		49	d	0.48168		lb/acre	100	70295
Glyphosate	Dichondra	micrantha	Dichondra	PHY	INJ	DAMG	NOAEL		56	d	0.48168		lb/acre	100	70295
Glyphosate	Agrostis	castellana	Bentgrass	PHY	INJ	DAMG	LOAEL		49	d	0.48168		lb/acre	100	70295
Glyphosate	Centella	asiatica	Asiatic Pennywort	PHY	INJ	DAMG	NOAEL		49	d	0.48168		lb/acre	100	70295
Glyphosate	Dichondra	micrantha	Dichondra	PHY	INJ	DAMG	NOAEL		49	d	0.48168		lb/acre	100	70295
Glyphosate	Festuca	rubra	Ravine Fescue	PHY	INJ	DAMG	LOAEL		49	d	0.48168		lb/acre	100	70295
Glyphosate	Festuca	trachyphylla	Hard Fescue	PHY	INJ	DAMG	NOAEL		49	d	0.48168		lb/acre	100	70295
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	MOR	MOR	MORT	LC50		4	d			mg/L	100	111445
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	MOR	MOR	MORT	LC50		1	d			mg/L	100	111445
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	MOR	MOR	MORT	LC50		0.25	d	20		mg/L	100	111445

Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	CEL	HIS	GHIS	NOAEL	LOAEL	4 d	7.5	10 mg/L	100	111445
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	BCM	BCM	GLUC	NOAEL	LOAEL	4 d	7.5	10 mg/L	100	111445
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	BCM	BCM	GLUC	NOAEL	LOAEL	1 d	7.5	10 mg/L	100	111445
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	BCM	BCM	NACO	NOAEL		4 d	10	mg/L	100	111445
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	BCM	BCM	CLCO	NOAEL		4 d	10	mg/L	100	111445
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	PHY	PHY	OSML	NOAEL	LOAEL	1 d	7.5	10 mg/L	100	111445
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	PHY	PHY	OSML	NOAEL		0.25 d	10	mg/L	100	111445
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	PHY	PHY	OSML	NOAEL		4 d	10	mg/L	100	111445
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	BCM	ENZ	GSTR	NOAEL		1 d	10	mg/L	100	111445
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	BCM	BCM	NACO	NOAEL		0.25 d	10	mg/L	100	111445
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	BCM	BCM	NACO	NOAEL		1 d	10	mg/L	100	111445
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	BCM	ENZ	GSTR	NOAEL		4 d	10	mg/L	100	111445
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	BCM	HRM	CRTS	NOAEL		4 d	10	mg/L	100	111445
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	BCM	ENZ	GSTR	NOAEL		0.25 d	10	mg/L	100	111445
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	BCM	ENZ	CTLS	NOAEL		0.25 d	10	mg/L	100	111445

Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	BCM	ENZ	CTLS	NOAEL		4 d	10		mg/L	100	111445
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	BCM	ENZ	CTLS	NOAEL	LOAEL	4 d	7.5	10	mg/L	100	111445
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	CEL	HIS	GHIS	LOAEL		1 d	7.5		mg/L	100	111445
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	CEL	HIS	GHIS	NOAEL	LOAEL	0.25 d	7.5	10	mg/L	100	111445
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	BCM	HRM	CRTS	NOAEL		0.25 d	10		mg/L	100	111445
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	BCM	BCM	GLUC	NOAEL		0.25 d	10		mg/L	100	111445
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	BCM	HRM	CRTS	NOAEL		1 d	10		mg/L	100	111445
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	BCM	BCM	CLCO	NOAEL		0.25 d	10		mg/L	100	111445
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	BCM	BCM	CLCO	NOAEL	LOAEL	1 d	7.5	10	mg/L	100	111445
Glyphosate isopropylamine salt	Procamburus	sp.	Crayfish	MOR	MOR	MORT	LC50		2 d	32650		mg/L	35.6	46779
Glyphosate isopropylamine salt	Lepomis	macrochirus	Bluegill	MOR	MOR	MORT	LC50		2 d	4.5		mg/L	35.6	46779
Glyphosate isopropylamine salt	Ictalurus	punctatus	Channel Catfish	MOR	MOR	MORT	LC50		2 d	5.5		mg/L	35.6	46779
Glyphosate isopropylamine salt	Pseudokirchneriella	subcapitata	Green Algae	POP	POP	PGRT	EC50		4 d	71		mg/L	100	118717
Glyphosate isopropylamine salt	Daphnia	magna	Water Flea	PHY	ITX	IMBL	EC50		2 d	307		mg/L	100	118717
Glyphosate	Pseudokirchneriella	subcapitata	Green Algae	POP	POP	PGRT	EC50		4 d	129		mg/L	95	118717
Glyphosate	Daphnia	magna	Water Flea	PHY	ITX	IMBL	EC50		2 d	2000		mg/L	95	118717
Glyphosate	Eisenia	andrei	Earthworm	BEH	AVO	CHEM	NOAEL		2 d	8.49		AI kg/ha	95	118717

Glyphosate isopropylamine salt	Eisenia	andrei	Earthworm	BEH	AVO	CHEM	NOAEL			2 d	14.7		Al kg/ha	100	118717
Glyphosate isopropylamine salt	Rhinella	sp.	South American Toads	MOR	MOR	MORT	LC50			4 d	1500		ae ug/L	100	117668
Glyphosate isopropylamine salt	Rhinella	marina	Cane Toad	MOR	MOR	MORT	LC01			4 d	1578		ae ug/L	100	117668
Glyphosate isopropylamine salt	Rhinella	marina	Cane Toad	MOR	MOR	MORT	LC50			4 d	2733		ae ug/L	100	117668
Glyphosate isopropylamine salt	Dendropsophus	microcephalus	Tree Frog	MOR	MOR	MORT	LC50			4 d	1200		ae ug/L	100	117668
Glyphosate isopropylamine salt	Scinax	ruber	Red Snouted Treefrog	MOR	MOR	MORT	LC01			4 d	1103		ae ug/L	100	117668
Glyphosate isopropylamine salt	Scinax	ruber	Red Snouted Treefrog	MOR	MOR	MORT	LC50			4 d	1642		ae ug/L	100	117668
Glyphosate isopropylamine salt	Hypsiboa	crepitans	Emerald-Eyed Tree Frog	MOR	MOR	MORT	LC01			4 d	984		ae ug/L	100	117668
Glyphosate isopropylamine salt	Hypsiboa	crepitans	Emerald-Eyed Tree Frog	MOR	MOR	MORT	LC50			4 d	2064		ae ug/L	100	117668
Glyphosate isopropylamine salt	Rhinella	granulosa	Toad	MOR	MOR	MORT	LC01			4 d	1300		ae ug/L	100	117668
Glyphosate isopropylamine salt	Rhinella	granulosa	Toad	MOR	MOR	MORT	LC50			4 d	2348		ae ug/L	100	117668
Glyphosate isopropylamine salt	Centrolene	prosoblepon	Glass Frog	MOR	MOR	MORT	LC01			4 d	1145		ae ug/L	100	117668
Glyphosate isopropylamine salt	Centrolene	prosoblepon	Glass Frog	MOR	MOR	MORT	LC50			4 d	2414		ae ug/L	100	117668
Glyphosate isopropylamine salt	Engystomops	pustulosus	Tungara Frog	MOR	MOR	MORT	LC01			4 d	1514		ae ug/L	100	117668
Glyphosate isopropylamine salt	Engystomops	pustulosus	Tungara Frog	MOR	MOR	MORT	LC50			4 d	2787		ae ug/L	100	117668

Glyphosate isopropylamine salt	Rhinella	marina	Cane Toad	MOR	MOR	MORT	NR-LETH		4	d	29.52		ae kg/ha	100	117666
Glyphosate isopropylamine salt	Rhinella	marina	Cane Toad	MOR	MOR	MORT	LC01		4	d	2.4		ae kg/ha	100	117666
Glyphosate isopropylamine salt	Rhinella	marina	Cane Toad	MOR	MOR	MORT	LC50		4	d	5963		ae ug/L	100	117666
Glyphosate isopropylamine salt	Scinax	ruber	Red Snouted Treefrog	MOR	MOR	MORT	NR-LETH		4	d	14.76		ae kg/ha	100	117666
Glyphosate isopropylamine salt	Scinax	ruber	Red Snouted Treefrog	MOR	MOR	MORT	LC50		4	d	6900		ae ug/L	100	117666
Glyphosate isopropylamine salt	Rhinella	granulosa	Toad	MOR	MOR	MORT	LC01		4	d	6.4		ae kg/ha	100	117666
Glyphosate isopropylamine salt	Rhinella	granulosa	Toad	MOR	MOR	MORT	LC50		4	d	7169		ae ug/L	100	117666
Glyphosate isopropylamine salt	Hypsiboas	crepitans	Emerald-Eyed Tree Frog	MOR	MOR	MORT	NR-LETH		4	d	29.52		ae kg/ha	100	117666
Glyphosate isopropylamine salt	Hypsiboas	crepitans	Emerald-Eyed Tree Frog	MOR	MOR	MORT	LC01		4	d	4.8		ae kg/ha	100	117666
Glyphosate isopropylamine salt	Hypsiboas	crepitans	Emerald-Eyed Tree Frog	MOR	MOR	MORT	LC50		4	d	7303		ae ug/L	100	117666
Glyphosate isopropylamine salt	Hypsiboas	crepitans	Emerald-Eyed Tree Frog	MOR	MOR	MORT	NR-ZERO		4	d	1.85		ae kg/ha	100	117666
Glyphosate isopropylamine salt	Centrolene	prosoblepon	Glass Frog	MOR	MOR	MORT	NR-ZERO		4	d	1.85		ae kg/ha	100	117666
Glyphosate isopropylamine salt	Centrolene	prosoblepon	Glass Frog	MOR	MOR	MORT	NR-LETH		4	d	14.76		ae kg/ha	100	117666
Glyphosate isopropylamine salt	Centrolene	prosoblepon	Glass Frog	MOR	MOR	MORT	LC01		4	d	1.97		ae kg/ha	100	117666
Glyphosate isopropylamine salt	Centrolene	prosoblepon	Glass Frog	MOR	MOR	MORT	LC50		4	d	4.5		ae kg/ha	100	117666

Glyphosate isopropylamine salt	Pristima ntis	taeniatus	Frog	MOR	MOR	MORT	NR-ZERO			4 d	1.85		ae kg/ha	100	117666
Glyphosate isopropylamine salt	Pristima ntis	taeniatus	Frog	MOR	MOR	MORT	LC01			4 d	1.93		ae kg/ha	100	117666
Glyphosate isopropylamine salt	Pristima ntis	taeniatus	Frog	MOR	MOR	MORT	LC50			4 d	5.6		ae kg/ha	100	117666
Glyphosate isopropylamine salt	Rhinella	granulosa	Toad	MOR	MOR	MORT	NR-LETH			4 d	29.52		ae kg/ha	100	117666
Glyphosate isopropylamine salt	Rhinella	granulosa	Toad	MOR	MOR	MORT	LC50			4 d	6.5		ae kg/ha	100	117666
Glyphosate isopropylamine salt	Scinax	ruber	Red Snouted Treefrog	MOR	MOR	MORT	LC01			4 d	0.32		ae kg/ha	100	117666
Glyphosate isopropylamine salt	Scinax	ruber	Red Snouted Treefrog	MOR	MOR	MORT	LC50			4 d	7.3		ae kg/ha	100	117666
Glyphosate isopropylamine salt	Rhinella	sp.	South American Toads	MOR	MOR	MORT	LC01			4 d	1.56		ae kg/ha	100	117666
Glyphosate isopropylamine salt	Rhinella	sp.	South American Toads	MOR	MOR	MORT	LC50			4 d	14.8		ae kg/ha	100	117666
Glyphosate isopropylamine salt	Engysto mops	pustulosus	Tungara Frog	MOR	MOR	MORT	NR-ZERO			4 d	7.38		ae kg/ha	100	117666
Glyphosate isopropylamine salt	Engysto mops	pustulosus	Tungara Frog	MOR	MOR	MORT	LC01			4 d	7.02		ae kg/ha	100	117666
Glyphosate isopropylamine salt	Engysto mops	pustulosus	Tungara Frog	MOR	MOR	MORT	LC50			4 d	19.6		ae kg/ha	100	117666
Glyphosate isopropylamine salt	Rhinella	marina	Cane Toad	MOR	MOR	MORT	LC01			4 d	5.08		ae kg/ha	100	117666
Glyphosate isopropylamine salt	Rhinella	marina	Cane Toad	MOR	MOR	MORT	LC50			4 d	22.8		ae kg/ha	100	117666
Glyphosate isopropylamine salt	Dendrobates	truncatus	Poison Dart Frog	MOR	MOR	MORT	NR-ZERO			4 d	7.38		ae kg/ha	100	117666

Glyphosate isopropylamine salt	Dendrobates	truncatus	Poison Dart Frog	MOR	MOR	MORT	LC01			4 d	7.38		ae kg/ha	100	117666
Glyphosate isopropylamine salt	Dendrobates	truncatus	Poison Dart Frog	MOR	MOR	MORT	LC50			4 d	7.38		ae kg/ha	100	117666
Glyphosate isopropylamine salt	Chordodes	nobilii	Horsehair Worm	POP	~POP	ABND	LOAEL			d	0.07		ae mg/L	35.2	111033
Glyphosate isopropylamine salt	Chordodes	nobilii	Horsehair Worm	POP	~POP	ABND	LOAEL			5 d	0.07		ae mg/L	35.2	111033
Glyphosate	Chordodes	nobilii	Horsehair Worm	POP	~POP	ABND	LOAEL			d	0.1		ae mg/L	95	111033
Glyphosate	Chordodes	nobilii	Horsehair Worm	POP	~POP	ABND	LOAEL			5 d	0.1		ae mg/L	95	111033
Glyphosate isopropylamine salt	Chordodes	nobilii	Horsehair Worm	MOR	MOR	MORT	LOAEL			4 d	1.76		ae mg/L	35.2	111033
Glyphosate isopropylamine salt	Bellis	perennis	English Daisy	GRO	MPH	WGHT	EC50			21 d	0.0126914		lb/acre	100	87923
Glyphosate isopropylamine salt	Centaurea	cyanus	Bachelor's-Button	GRO	MPH	WGHT	EC50			21 d	0.0259702		lb/acre	100	87923
Glyphosate isopropylamine salt	Inula	helenium	Elecampane Inula	GRO	MPH	WGHT	EC50			21 d	0.0386794		lb/acre	100	87923
Glyphosate isopropylamine salt	Rudbeckia	hirta	Blackeyed Susan	GRO	MPH	WGHT	EC50			21 d	0.021983		lb/acre	100	87923
Glyphosate isopropylamine salt	Solidago	canadensis	Canada Goldenrod	GRO	MPH	WGHT	EC50			21 d	0.0214134		lb/acre	100	87923
Glyphosate isopropylamine salt	Leonurus	cardiaca	Motherwort	GRO	MPH	WGHT	EC50			21 d	0.0318798		lb/acre	100	87923
Glyphosate isopropylamine salt	Mentha	spicata	Spearmint	GRO	MPH	WGHT	EC50			21 d	0.0159666		lb/acre	100	87923
Glyphosate isopropylamine salt	Nepeta	cataria	Catmint	GRO	MPH	WGHT	EC50			21 d	0.0353686		lb/acre	100	87923
Glyphosate isopropylamine salt	Prunella	vulgaris	Heal All	GRO	MPH	WGHT	EC50			21 d	0.02492		lb/acre	100	87923

Glyphosate isopropylamine salt	Fallopia	convolvulus	Black Bindweed	GRO	MPH	WGHT	EC50			21	d	0.0140264		lb/acre	100	87923
Glyphosate isopropylamine salt	Rumex	crispus	Curley Dock	GRO	MPH	WGHT	EC50			21	d	0.024475		lb/acre	100	87923
Glyphosate isopropylamine salt	Anagallis	arvensis	Pimpernel	GRO	MPH	WGHT	EC50			21	d	0.0155928		lb/acre	100	87923
Glyphosate isopropylamine salt	Digitalis	purpurea	Common Foxglove	GRO	MPH	WGHT	EC50			21	d	0.0575474		lb/acre	100	87923
Glyphosate isopropylamine salt	Sinapis	arvensis	California Rape	GRO	MPH	WGHT	EC50			21	d	0.0171592		lb/acre	100	87923
Glyphosate isopropylamine salt	Papaver	rhoeas	Corn Poppy	GRO	MPH	WGHT	EC50			21	d	0.0164828		lb/acre	100	87923
Glyphosate isopropylamine salt	Leonurus	cardiaca	Motherwort	GRO	GRO	GGRO, VGOR	LOEL			14	d	0.012816		lb/acre	100	87923
Glyphosate isopropylamine salt	Solidago	canadensis	Canada Goldenrod	GRO	GRO	GGRO, VGOR	LOEL			14	d	0.012816		lb/acre	100	87923
Glyphosate isopropylamine salt	Rudbeckia	hirta	Blackeyed Susan	GRO	GRO	GGRO, VGOR	LOEL			14	d	0.012816		lb/acre	100	87923
Glyphosate isopropylamine salt	Inula	helenium	Elecampane Inula	GRO	GRO	GGRO, VGOR	NOAEL	LOAEL		14	d	0.012816	0.12816	lb/acre	100	87923
Glyphosate isopropylamine salt	Centaurea	cyanus	Bachelor's-Button	GRO	GRO	GGRO, VGOR	NOAEL	LOAEL		14	d	0.012816	0.12816	lb/acre	100	87923
Glyphosate isopropylamine salt	Bellis	perennis	English Daisy	GRO	GRO	GGRO, VGOR	LOEL			14	d	0.012816		lb/acre	100	87923
Glyphosate isopropylamine salt	Sinapis	arvensis	California Rape	GRO	GRO	GGRO, VGOR	NOAEL	LOAEL		14	d	0.012816	0.12816	lb/acre	100	87923
Glyphosate isopropylamine salt	Papaver	rhoeas	Corn Poppy	GRO	GRO	GGRO, VGOR	LOEL			14	d	0.012816		lb/acre	100	87923
Glyphosate isopropylamine salt	Digitalis	purpurea	Common Foxglove	GRO	GRO	GGRO, VGOR	NOAEL	LOAEL		14	d	0.012816	0.12816	lb/acre	100	87923

Glyphosate isopropylamine salt	Anagallis	arvensis	Pimpernel	GRO	GRO	GGRO, VGOR	LOEL		14 d	0.012816		lb/acre	100	87923
Glyphosate isopropylamine salt	Rumex	crispus	Curley Dock	GRO	GRO	GGRO, VGOR	NOAEL	LOAEL	14 d	0.012816	0.12816	lb/acre	100	87923
Glyphosate isopropylamine salt	Fallopia	convolvulus	Black Bindweed	GRO	GRO	GGRO, VGOR	LOEL		14 d	0.012816		lb/acre	100	87923
Glyphosate isopropylamine salt	Prunella	vulgaris	Heal All	GRO	GRO	GGRO, VGOR	LOEL		14 d	0.012816		lb/acre	100	87923
Glyphosate isopropylamine salt	Nepeta	cataria	Catmint	GRO	GRO	GGRO, VGOR	LOEL		14 d	0.012816		lb/acre	100	87923
Glyphosate isopropylamine salt	Mentha	spicata	Spearmint	GRO	GRO	GGRO, VGOR	NOAEL	LOAEL	14 d	0.012816	0.12816	lb/acre	100	87923
Glyphosate	Planorbe lla	trivolis	Snail, Marsh Rams-Horn	BEH	BEH	MIGR	NOAEL		28 d	3.7		mg/L	>98	112912
Glyphosate	Lithobates	clamitans ssp. clamitans	Bronze Frog	PHY	IMM	PRNF	LOAEL		15 d	3.7		mg/L	>98	112912
Glyphosate	Echinostoma	trivolis	Trematode	BEH	BEH	PNPY	NOAEL		0.1667 d	3.7		mg/L	>98	112912
Glyphosate	Echinostoma	trivolis	Trematode	MOR	MOR	LFSP	NOAEL		1.0833 d	3.7		mg/L	>98	112912
Glyphosate	Planorbe lla	trivolis	Snail, Marsh Rams-Horn	REP	REP	PROG	NOAEL		28 d	3.7		mg/L	>98	112912
Glyphosate	Planorbe lla	trivolis	Snail, Marsh Rams-Horn	GRO	GRO	GAIN	NOAEL		28 d	3.7		mg/L	>98	112912
Glyphosate	Lithobates	clamitans ssp. clamitans	Bronze Frog	MOR	MOR	MORT	NOAEL		14 d	3.7		mg/L	>98	112912
Glyphosate	Lithobates	clamitans ssp. clamitans	Bronze Frog	MOR	MOR	MORT	NOAEL		7 d	3.7		mg/L	>98	112912
Glyphosate	Planorbe lla	trivolis	Snail, Marsh Rams-Horn	MOR	MOR	SURV	NOAEL		28 d	3.7		mg/L	>98	112912
Glyphosate isopropylamine salt	Abies	fraseri	Fraser Balsam Fir	GRO	MPH	LGTH	NOAEL		395.72 d	0.9968		lb/acre	100	118596
Glyphosate	Daucus	carota	Wild Carrot	PHY	INJ	GINJ	LOAEL		7 d	840		ae g/ha	100	117333
Glyphosate	Daucus	carota	Wild Carrot	GRO	GRO	BMAS	NOAEL		28 d	840		ae g/ha	100	117333
Glyphosate	Daucus	carota	Wild Carrot	POP	POP	CNTL	LOAEL		198 d	0.21		ae kg/ha	100	117333
Glyphosate	Daucus	carota	Wild Carrot	POP	POP	CNTL	LOAEL		198 d	0.21		ae kg/ha	100	117333
Glyphosate	Daucus	carota	Wild Carrot	POP	POP	CNTL	LOAEL		74 d	420		ae g/ha	100	117333

Glyphosate	Daucus	carota	Wild Carrot	POP	POP	CNTL	LOAEL		64	d	420		ae g/ha	100	117333
Glyphosate	Daucus	carota	Wild Carrot	POP	POP	CNTL	LOAEL		67	d	420		ae g/ha	100	117333
Glyphosate	Daucus	carota	Wild Carrot	POP	POP	CNTL	LOAEL		54	d	420		ae g/ha	100	117333
Glyphosate	Helix	aspersa	Brown Gardensnail	MOR	MOR	HTCH	NOEC		20	d	1000		ppm	100	150358
Glyphosate	Helix	aspersa	Brown Gardensnail	MOR	MOR	HTCH	EC50		20	d	1324		ppm	100	150358
Glyphosate	Helix	aspersa	Brown Gardensnail	MOR	MOR	HTCH	EC10		20	d	854		ppm	100	150358
Glyphosate	Helix	aspersa	Brown Gardensnail	MOR	MOR	HTCH	NOEC	LOEC	20	d	1782	3564	ppm	99	150358
Glyphosate	Helix	aspersa	Brown Gardensnail	MOR	MOR	HTCH	EC10		20	d	1249.38		ppm	99	150358
Glyphosate	Helix	aspersa	Brown Gardensnail	MOR	MOR	HTCH	EC50		20	d	1821.6		ppm	99	150358
Glyphosate	Helix	aspersa	Brown Gardensnail	MOR	MOR	HTCH	EC50		20	d	1178.1		ppm	99	150358
Glyphosate	Helix	aspersa	Brown Gardensnail	MOR	MOR	HTCH	EC10		20	d	724.68		ppm	99	150358
Glyphosate	Helix	aspersa	Brown Gardensnail	MOR	MOR	HTCH	NOEC		20	d	1386		ppm	99	150358
Glyphosate	Helix	aspersa	Brown Gardensnail	MOR	MOR	HTCH	NOEC		20	d	1782		ppm	99	150358
Glyphosate	Helix	aspersa	Brown Gardensnail	MOR	MOR	HTCH	EC10		20	d	1436.49		ppm	99	150358
Glyphosate	Helix	aspersa	Brown Gardensnail	MOR	MOR	HTCH	EC50		20	d	1564.2		ppm	99	150358
Glyphosate isopropylamine salt	Helix	aspersa	Brown Gardensnail	MOR	MOR	HTCH	EC50		20	d	18		ppm	100	150358
Glyphosate isopropylamine salt	Helix	aspersa	Brown Gardensnail	MOR	MOR	HTCH	EC10		20	d	1		ppm	100	150358
Glyphosate isopropylamine salt	Helix	aspersa	Brown Gardensnail	MOR	MOR	HTCH	NOEC	LOEC	20	d	45	225	ppm	100	150358
Glyphosate isopropylamine salt	Galaxias	anomalus	Roundhead Galaxias	PHY	IMM	PARA	NOAEL		26	d	0.36		AI mg/L	100	161707
Glyphosate isopropylamine salt	Galaxias	anomalus	Roundhead Galaxias	GRO	DVP	DFRM	NOAEL		26	d	0.36		AI mg/L	100	161707
Glyphosate isopropylamine salt	Galaxias	anomalus	Roundhead Galaxias	MOR	MOR	SURV	LOAEL		26	d	0.36		AI mg/L	100	161707

Glyphosate isopropylamine salt	Potamopyrgus	antipodarium	Snail	MOR	MOR	MORT	NR-ZERO		21 d	0.36		AI mg/L	100	161707
Glyphosate isopropylamine salt	Potamopyrgus	antipodarium	Snail	MOR	MOR	MORT	NR-LETH		21 d	36		AI mg/L	100	161707
Glyphosate isopropylamine salt	Potamopyrgus	antipodarium	Snail	PHY	IMM	PARA	NOAEL	LOAEL	21 d	0.36	3.6	AI mg/L	100	161707
Glyphosate isopropylamine salt	Galaxias	anomalus	Roundhead Galaxias	GRO	DVP	DFRM	NOAEL		26 d	0.36		AI mg/L	100	161707
Glyphosate isopropylamine salt	Galaxias	anomalus	Roundhead Galaxias	MOR	MOR	SURV	NOAEL		26 d	0.36		AI mg/L	100	161707
Glyphosate	Asclepias	syriaca	Common Milkweed	GRO	GRO	HGHT	LOAEL		65.8 d	1.1		ae kg/ha	100	150896
Glyphosate	Asclepias	syriaca	Common Milkweed	GRO	GRO	HGHT	NOAEL		49 d	1.1		ae kg/ha	100	150896
Glyphosate	Asclepias	syriaca	Common Milkweed	GRO	GRO	HGHT	LOAEL		65.8 d	1.1		ae kg/ha	100	150896
Glyphosate	Asclepias	syriaca	Common Milkweed	ACC	ACC	RSDE	NOAEL		6 d	1.1		ae kg/ha	100	150896
Glyphosate, Monopotassium salt	Spea	bombifrons	Plains Spadefoot	MOR	MOR	MORT	NR-LETH		11 d	2		ae mg/L	48.8	155517
Glyphosate, Monopotassium salt	Spea	bombifrons	Plains Spadefoot	MOR	MOR	MORT	NR-LETH		12 d	2		ae mg/L	48.8	155517
Glyphosate, Monopotassium salt	Spea	multiplicata	Mexican Spadefoot	MOR	MOR	MORT	NR-LETH		18 d	2		ae mg/L	48.8	155517
Glyphosate, Monopotassium salt	Spea	multiplicata	Mexican Spadefoot	MOR	MOR	MORT	NR-LETH		5 d	2.8		ae mg/L	48.8	155517
Glyphosate, Monopotassium salt	Spea	bombifrons	Plains Spadefoot	MOR	MOR	MORT	NR-ZERO		2 d	0.75		ae mg/L	48.8	155517
Glyphosate, Monopotassium salt	Spea	bombifrons	Plains Spadefoot	MOR	MOR	MORT	LC50		2 d	1.85		ae mg/L	48.8	155517
Glyphosate, Monopotassium salt	Spea	bombifrons	Plains Spadefoot	MOR	MOR	MORT	LC01		2 d	0.97		ae mg/L	48.8	155517
Glyphosate, Monopotassium salt	Spea	bombifrons	Plains Spadefoot	MOR	MOR	MORT	LC01		2 d	1.09		ae mg/L	48.8	155517

Glyphosate, Monopotassium salt	Spea	bombifrons	Plains Spadefoot	MOR	MOR	MORT	LC50		2 d	2.03		ae mg/L	48.8	155517
Glyphosate, Monopotassium salt	Spea	bombifrons	Plains Spadefoot	MOR	MOR	MORT	NR-ZERO		2 d	0.75		ae mg/L	48.8	155517
Glyphosate, Monopotassium salt	Spea	multiplicata	Mexican Spadefoot	MOR	MOR	MORT	LC50		2 d	2.3		ae mg/L	48.8	155517
Glyphosate, Monopotassium salt	Spea	multiplicata	Mexican Spadefoot	MOR	MOR	MORT	LC01		2 d	1.32		ae mg/L	48.8	155517
Glyphosate, Monopotassium salt	Spea	multiplicata	Mexican Spadefoot	MOR	MOR	MORT	NR-ZERO		2 d	0.75		ae mg/L	48.8	155517
Glyphosate, Monopotassium salt	Spea	multiplicata	Mexican Spadefoot	MOR	MOR	MORT	LC50		2 d	2.11		ae mg/L	48.8	155517
Glyphosate, Monopotassium salt	Spea	multiplicata	Mexican Spadefoot	MOR	MOR	MORT	LC01		2 d	1.01		ae mg/L	48.8	155517
Glyphosate, Monopotassium salt	Spea	multiplicata	Mexican Spadefoot	MOR	MOR	MORT	NR-ZERO		2 d	0.75		ae mg/L	48.8	155517
Glyphosate	Vicia	faba	Broadbean	CEL	GEN	MNUC	NOAEL		4 d	1400		ppm	21	153794
Glyphosate	Vicia	faba	Broadbean	CEL	GEN	MNUC	NOAEL		4 d	1400		ppm	21	153794
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	NABN	NOAEL		1 d	0.036		mg/L	30.8	161797
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	LOAEL		1 d	0.018		mg/L	30.8	161797
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	NABN	NOAEL		1 d	0.036		mg/L	30.8	161797
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	NABN	LOAEL		3 d	0.018		mg/L	30.8	161797
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	NOAEL		1 d	0.036		mg/L	30.8	161797
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	LOAEL		1 d	0.018		mg/L	30.8	161797
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	LOAEL		3 d	0.018		mg/L	30.8	161797

Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	NABN	NOAEL			1 d	0.036		mg/L	30.8	161797
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	NABN	LOAEL			3 d	0.018		mg/L	30.8	161797
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	MNUC	NOAEL			3 d	0.036		mg/L	30.8	161797
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	NABN	NOAEL			1 d	0.036		mg/L	30.8	161797
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	NABN	LOAEL			3 d	0.036		mg/L	30.8	161797
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	BCM	ENZ	CTLS	NOAEL			1 d	0.036		mg/L	30.8	161797
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	BCM	ENZ	CTLS	NOAEL			3 d	0.036		mg/L	30.8	161797
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	BCM	ENZ	GSTR	NOAEL			3 d	0.036		mg/L	30.8	161797
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	BCM	ENZ	GLPX	NOAEL			1 d	0.036		mg/L	30.8	161797
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	BCM	ENZ	GLRE	NOAEL			3 d	0.036		mg/L	30.8	161797
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	BCM	ENZ	GLRE	NOAEL			3 d	0.036		mg/L	30.8	161797
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	BCM	BCM	GLTH	NOAEL			1 d	0.036		mg/L	30.8	161797
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	LOAEL			3 d	0.018		mg/L	30.8	161797
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	LOAEL			1 d	0.018		mg/L	30.8	161797
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	NOAEL	LOAEL		1 d	0.018	0.036	mg/L	30.8	161797

Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	NOAEL	LOAEL	1 d	0.018	0.036	mg/L	30.8	161797
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	NOAEL		3 d	0.036		mg/L	30.8	161797
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	LOAEL		3 d	0.018		mg/L	30.8	161797
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	LOAEL		3 d	0.018		mg/L	30.8	161797
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	NOAEL		3 d	0.036		mg/L	30.8	161797
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	NABN	NOAEL		1 d	0.036		mg/L	30.8	161797
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	NABN	NOAEL		1 d	0.036		mg/L	30.8	161797
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	MNUC	NOAEL		1 d	0.036		mg/L	30.8	161797
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	NABN	LOAEL		3 d	0.018		mg/L	30.8	161797
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	NABN	NOAEL		3 d	0.036		mg/L	30.8	161797
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	NABN	NOAEL		3 d	0.036		mg/L	30.8	161797
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	BCM	ENZ	GSTR	NOAEL		1 d	0.036		mg/L	30.8	161797
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	BCM	ENZ	GLPX	NOAEL		3 d	0.036		mg/L	30.8	161797
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	BCM	ENZ	GLRE	NOAEL		1 d	0.036		mg/L	30.8	161797
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	BCM	BCM	GLTH	NOAEL		3 d	0.036		mg/L	30.8	161797

Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	BCM	BCM	TBAR	NOAEL	LOAEL	1 d	0.018	0.036	mg/L	30.8	161797
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	BCM	BCM	TBAR	NOAEL		3 d	0.036		mg/L	30.8	161797
Glyphosate	Rhamdia	quelen	Catfish	PHY	IMM	PHAG	LOAEL		1 d	0.73		mg/L	100	153795
Glyphosate isopropylamine salt	Gallus	domesticus	Domestic Chicken	GRO	GRO	WGHT	NOAEL	LOAEL	7 d	608	6080	ppm	100	162010
Glyphosate isopropylamine salt	Gallus	domesticus	Domestic Chicken	GRO	MPH	WGHT	NOAEL	LOAEL	7 d	608	6080	ppm	100	162010
Glyphosate isopropylamine salt	Gallus	domesticus	Domestic Chicken	BCM	BCM	CAPR	LOAEL		21 d	60.8		ppm	100	162010
Glyphosate isopropylamine salt	Gallus	domesticus	Domestic Chicken	GRO	MPH	WGHT	NOAEL	LOAEL	14 d	60.8	608	ppm	100	162010
Glyphosate isopropylamine salt	Gallus	domesticus	Domestic Chicken	GRO	GRO	WGHT	NOAEL	LOAEL	7 d	608	6080	ppm	100	162010
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	BCM	ENZ	CTLS	LOAEL		1 d	1		mg/L	100	161813
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	BCM	BCM	GLTH	NOAEL		0.25 d	5		mg/L	100	161813
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	BCM	BCM	GLTH	NOAEL	LOAEL	4 d	1	5	mg/L	100	161813
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	BCM	ENZ	GLPX	NOAEL		0.25 d	5		mg/L	100	161813
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	BCM	BCM	LDPO	LOAEL		0.25 d	1		mg/L	100	161813
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	MOR	MOR	MORT	NR-ZERO		4 d	5		mg/L	100	161813
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	BCM	BCM	HMGL	NOAEL		0.25 d	5		mg/L	100	161813
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	BCM	BCM	HMGL	NOAEL		1 d	5		mg/L	100	161813

Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	CEL	CEL	MONO	NOAEL		1 d	5		mg/L	100	161813
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	CEL	CEL	BASO	NOAEL		0.25 d	5		mg/L	100	161813
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	BCM	ENZ	SODA	NOAEL		4 d	5		mg/L	100	161813
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	BCM	ENZ	GSTR	NOAEL		4 d	5		mg/L	100	161813
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	BCM	BCM	HMGL	NOAEL		4 d	5		mg/L	100	161813
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	BCM	BCM	HMCT	NOAEL		0.25 d	5		mg/L	100	161813
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	CEL	CEL	NEUT	NOAEL		1 d	5		mg/L	100	161813
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	CEL	CEL	NEUT	NOAEL	LOAEL	4 d	1	5	mg/L	100	161813
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	CEL	CEL	MONO	NOAEL		0.25 d	5		mg/L	100	161813
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	CEL	CEL	MONO	NOAEL		4 d	5		mg/L	100	161813
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	CEL	CEL	EOSN	NOAEL		4 d	5		mg/L	100	161813
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	CEL	CEL	BASO	NOAEL		1 d	5		mg/L	100	161813
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	CEL	CEL	BASO	NOAEL		4 d	5		mg/L	100	161813
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	BCM	ENZ	SODA	NOAEL	LOAEL	0.25 d	1	5	mg/L	100	161813
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	BCM	ENZ	SODA	NOAEL		1 d	5		mg/L	100	161813

Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	BCM	BCM	HMCT	NOAEL	LOAEL	4 d	1	5 mg/L	100	161813
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	CEL	CEL	RBCE	NOAEL		0.25 d	5	mg/L	100	161813
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	CEL	CEL	TWBC	NOAEL		0.25 d	5	mg/L	100	161813
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	CEL	CEL	TWBC	NOAEL		1 d	5	mg/L	100	161813
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	CEL	CEL	TWBC	NOAEL	LOAEL	4 d	1	5 mg/L	100	161813
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	CEL	CEL	LMPH	NOAEL		0.25 d	5	mg/L	100	161813
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	CEL	CEL	LMPH	NOAEL		1 d	5	mg/L	100	161813
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	CEL	CEL	LMPH	NOAEL	LOAEL	4 d	1	5 mg/L	100	161813
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	CEL	CEL	NEUT	NOAEL		0.25 d	5	mg/L	100	161813
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	BCM	ENZ	GSTR	LOAEL		0.25 d	1	mg/L	100	161813
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	BCM	ENZ	GSTR	NOAEL	LOAEL	1 d	1	5 mg/L	100	161813
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	BCM	ENZ	GLPX	NOAEL	LOAEL	1 d	1	5 mg/L	100	161813
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	BCM	ENZ	GLPX	NOAEL	LOAEL	4 d	1	5 mg/L	100	161813
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	BCM	BCM	LDPO	NOAEL		1 d	5	mg/L	100	161813
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	BCM	ENZ	ACHE	NOAEL		0.25 d	5	mg/L	100	161813

Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	BCM	ENZ	ACHE	NOAEL		1 d	5		mg/L	100	161813
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	BCM	ENZ	ACHE	NOAEL		1 d	5		mg/L	100	161813
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	BCM	ENZ	ACHE	NOAEL	LOAEL	4 d	1	5	mg/L	100	161813
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	BCM	ENZ	CTLS	NOAEL		4 d	5		mg/L	100	161813
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	BCM	BCM	GLTH	LOAEL		1 d	1		mg/L	100	161813
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	BCM	BCM	LDPO	NOAEL		4 d	5		mg/L	100	161813
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	BCM	ENZ	ACHE	NOAEL		0.25 d	5		mg/L	100	161813
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	BCM	ENZ	ACHE	LOAEL		4 d	1		mg/L	100	161813
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	BCM	BCM	HMCT	NOAEL	LOAEL	1 d	1	5	mg/L	100	161813
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	CEL	CEL	RBCE	NOAEL	LOAEL	1 d	1	5	mg/L	100	161813
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	CEL	CEL	RBCE	NOAEL	LOAEL	4 d	1	5	mg/L	100	161813
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	CEL	CEL	EOSN	NOAEL		0.25 d	5		mg/L	100	161813
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	CEL	CEL	EOSN	NOAEL		1 d	5		mg/L	100	161813
Glyphosate isopropylamine salt	Prochilodus	lineatus	Curimbata	BCM	ENZ	CTLS	NOAEL	LOAEL	0.25 d	1	5	mg/L	100	161813
Glyphosate	Eisenia	fetida	Earthworm	REP	REP	PROG	LOAEL		56 d	9.97		mg/kg d soil	99.7	161791
Glyphosate	Eisenia	fetida	Earthworm	MOR	MOR	MORT	NR-ZERO		56 d	997		mg/kg d soil	99.7	161791

Glyphosate	Eisenia	fetida	Earthworm	REP	REP	PROG	LOAEL		56	d	9.97		mg/kg d soil	99.7	161791
Glyphosate isopropylamine salt	Chlorella	vulgaris	Green Algae	POP	POP	PGRT	EC50		21	d	118.1		mg/L	100	161695
Glyphosate isopropylamine salt	Spirulina	platensis	Blue-Green Algae	POP	POP	PGRT	EC50		21	d	134.9		mg/L	100	161695
Glyphosate isopropylamine salt	Arthrospira	fusiformis	Blue-Green Algae	POP	POP	PGRT	EC50		21	d	82.4		mg/L	100	161695
Glyphosate isopropylamine salt	Chlorella	vulgaris	Green Algae	POP	POP	PGRT	EC50		21	d	83.1		mg/L	100	161695
Glyphosate isopropylamine salt	Spirulina	platensis	Blue-Green Algae	POP	POP	DBLT	NOAEL	LOAEL	21	d	5.2	51.99	mg/L	100	161695
Glyphosate isopropylamine salt	Synechocystis	aquaticilis	Blue-Green Algae	POP	POP	PGRT	EC50		21	d	89.8		mg/L	100	161695
Glyphosate isopropylamine salt	Arthrospira	fusiformis	Blue-Green Algae	POP	POP	DBLT	NOAEL	LOAEL	21	d	5.2	51.99	mg/L	100	161695
Glyphosate isopropylamine salt	Nostoc	commune	Blue-Green Algae	POP	POP	DBLT	NOAEL		21	d	51.99		mg/L	100	161695
Glyphosate isopropylamine salt	Synechocystis	aquaticilis	Blue-Green Algae	POP	POP	DBLT	NOAEL	LOAEL	21	d	5.2	51.99	mg/L	100	161695
Glyphosate isopropylamine salt	Microcystis	aeruginosa	Blue-Green Algae	POP	POP	DBLT	LOAEL		21	d	5.2		mg/L	100	161695
Glyphosate isopropylamine salt	Leptolyngbya	boryana	Blue-Green Algae	POP	POP	DBLT	LOAEL		21	d	5.2		mg/L	100	161695
Glyphosate	Chlorella	vulgaris	Green Algae	POP	POP	PGRT	EC50		21	d	292.3		mg/L	100	161695
Glyphosate	Arthrospira	fusiformis	Blue-Green Algae	POP	POP	PGRT	EC50		21	d	169		mg/L	100	161695
Glyphosate	Anabaena	catenula	Blue-Green Algae	POP	POP	PGRT	EC50		21	d	256.5		mg/L	100	161695
Glyphosate	Synechocystis	aquaticilis	Blue-Green Algae	POP	POP	PGRT	EC50		21	d	164.9		mg/L	100	161695
Glyphosate	Microcystis	aeruginosa	Blue-Green Algae	POP	POP	PGRT	EC50		21	d	251.4		mg/L	100	161695
Glyphosate	Leptolyngbya	boryana	Blue-Green Algae	POP	POP	PGRT	EC50		21	d	246.6		mg/L	100	161695

Glyphosate isopropylamine salt	Nostoc	commune	Blue-Green Algae	POP	POP	PGRT	EC50		21	d	59.3	mg/L	100	161695
Glyphosate isopropylamine salt	Anabaena	catenula	Blue-Green Algae	POP	POP	PGRT	EC50		21	d	7.1	mg/L	100	161695
Glyphosate isopropylamine salt	Synechocystis	aquaticilis	Blue-Green Algae	POP	POP	PGRT	EC50		21	d	233	mg/L	100	161695
Glyphosate isopropylamine salt	Microcystis	aeruginosa	Blue-Green Algae	POP	POP	PGRT	EC50		21	d	10.7	mg/L	100	161695
Glyphosate isopropylamine salt	Leptolyngbya	boryana	Blue-Green Algae	POP	POP	PGRT	EC50		21	d	8.9	mg/L	100	161695
Glyphosate	Chlorella	vulgaris	Green Algae	POP	POP	DBLT	NOAEL		21	d	11.83	mg/L	100	161695
Glyphosate	Spirulina	platensis	Blue-Green Algae	POP	POP	DBLT	NOAEL		21	d	11.83	mg/L	100	161695
Glyphosate	Arthrospira	fusiformis	Blue-Green Algae	POP	POP	DBLT	NOAEL		21	d	11.83	mg/L	100	161695
Glyphosate	Nostoc	commune	Blue-Green Algae	POP	POP	DBLT	NOAEL		21	d	11.83	mg/L	100	161695
Glyphosate	Anabaena	catenula	Blue-Green Algae	POP	POP	DBLT	NOAEL		21	d	11.83	mg/L	100	161695
Glyphosate	Synechocystis	aquaticilis	Blue-Green Algae	POP	POP	DBLT	NOAEL		21	d	11.83	mg/L	100	161695
Glyphosate	Microcystis	aeruginosa	Blue-Green Algae	POP	POP	DBLT	NOAEL		21	d	11.83	mg/L	100	161695
Glyphosate isopropylamine salt	Chlorella	vulgaris	Green Algae	POP	POP	DBLT	NOAEL		21	d	51.99	mg/L	100	161695
Glyphosate isopropylamine salt	Spirulina	platensis	Blue-Green Algae	POP	POP	DBLT	NOAEL		21	d	51.99	mg/L	100	161695
Glyphosate isopropylamine salt	Arthrospira	fusiformis	Blue-Green Algae	POP	POP	DBLT	NOAEL		21	d	51.99	mg/L	100	161695
Glyphosate isopropylamine salt	Nostoc	commune	Blue-Green Algae	POP	POP	DBLT	NOAEL		21	d	51.99	mg/L	100	161695
Glyphosate isopropylamine salt	Anabaena	catenula	Blue-Green Algae	POP	POP	DBLT	LOAEL		21	d	51.99	mg/L	100	161695
Glyphosate isopropylamine salt	Microcystis	aeruginosa	Blue-Green Algae	POP	POP	DBLT	LOAEL		21	d	51.99	mg/L	100	161695

Glyphosate isopropylamine salt	Leptolyn gbya	boryana	Blue-Green Algae	POP	POP	DBLT	LOAEL		21	d	51.99		mg/L	100	161695
Glyphosate isopropylamine salt	Microcystis	aeruginosa	Blue-Green Algae	POP	POP	PGRT	EC50		21	d	6.7		mg/L	100	161695
Glyphosate	Leptolyn gbya	boryana	Blue-Green Algae	POP	POP	DBLT	NOAEL		21	d	11.83		mg/L	100	161695
Glyphosate isopropylamine salt	Synechocystis	aquaticilis	Blue-Green Algae	POP	POP	DBLT	NOAEL		21	d	51.99		mg/L	100	161695
Glyphosate isopropylamine salt	Spirulina	platensis	Blue-Green Algae	POP	POP	PGRT	EC50		21	d	33.1		mg/L	100	161695
Glyphosate isopropylamine salt	Arthrospira	fusiformis	Blue-Green Algae	POP	POP	PGRT	EC50		21	d	28.2		mg/L	100	161695
Glyphosate isopropylamine salt	Nostoc	commune	Blue-Green Algae	POP	POP	PGRT	EC50		21	d	42.3		mg/L	100	161695
Glyphosate isopropylamine salt	Anabaena	catenula	Blue-Green Algae	POP	POP	PGRT	EC50		21	d	2.9		mg/L	100	161695
Glyphosate isopropylamine salt	Leptolyn gbya	boryana	Blue-Green Algae	POP	POP	PGRT	EC50		21	d	4.1		mg/L	100	161695
Glyphosate	Spirulina	platensis	Blue-Green Algae	POP	POP	PGRT	EC50		21	d	169		mg/L	100	161695
Glyphosate isopropylamine salt	Chlorella	vulgaris	Green Algae	POP	POP	DBLT	NOAEL	LOAEL	21	d	5.2	51.99	mg/L	100	161695
Glyphosate	Nostoc	commune	Blue-Green Algae	POP	POP	PGRT	EC50		21	d	598.4		mg/L	100	161695
Glyphosate	Polypedates	cruciger	Common Hourglass Tree Frog	MOR	MOR	MORT	LC50		2	d	14.99		ppm	100	159829
Glyphosate	Polypedates	cruciger	Common Hourglass Tree Frog	MOR	MOR	MORT	NOAEL	LOAEL	5	d	0.75	1	mg/L	100	159829
Glyphosate	Polypedates	cruciger	Common Hourglass Tree Frog	MOR	MOR	MORT	NOAEL	LOAEL	25	d	0.75	1	mg/L	100	159829
Glyphosate	Polypedates	cruciger	Common Hourglass Tree Frog	MOR	MOR	MORT	NOAEL	LOAEL		mmph	0.5	0.75	mg/L	100	159829

Glyphosate	Polypeda tes	cruciger	Common Hourglass Tree Frog	GRO	GRO	LGTH	LOAEL			mmph	0.25		mg/L	100	159829
Glyphosate	Polypeda tes	cruciger	Common Hourglass Tree Frog	GRO	GRO	WGHT	LOAEL			mmph	0.25		mg/L	100	159829
Glyphosate	Polypeda tes	cruciger	Common Hourglass Tree Frog	GRO	DVP	DVLP	ET50			d	0.25		mg/L	100	159829
Glyphosate	Polypeda tes	cruciger	Common Hourglass Tree Frog	GRO	DVP	DVLP	ET50			d	0.5		mg/L	100	159829
Glyphosate	Polypeda tes	cruciger	Common Hourglass Tree Frog	GRO	DVP	DVLP	ET50			d	0.75		mg/L	100	159829
Glyphosate	Polypeda tes	cruciger	Common Hourglass Tree Frog	GRO	DVP	DVLP	ET50			d	1		mg/L	100	159829
Glyphosate	Polypeda tes	cruciger	Common Hourglass Tree Frog	GRO	DVP	DVLP	NOAEL	LOAEL		d	0.25	0.5	mg/L	100	159829
Glyphosate	Channa	punctata	Snake-Head Catfish	MOR	MOR	MORT	LC90		4	d	14.37214		mg/L	41	153834
Glyphosate	Channa	punctata	Snake-Head Catfish	MOR	MOR	MORT	LC90		1	d	18.8149		mg/L	41	153834
Glyphosate	Channa	punctata	Snake-Head Catfish	MOR	MOR	MORT	LC10		2	d	14.23069		mg/L	41	153834
Glyphosate	Channa	punctata	Snake-Head Catfish	MOR	MOR	MORT	LC90		3	d	15.3832		mg/L	41	153834
Glyphosate	Channa	punctata	Snake-Head Catfish	MOR	MOR	MORT	LC50		2	d	15.3053		mg/L	41	153834
Glyphosate	Channa	punctata	Snake-Head Catfish	MOR	MOR	MORT	LC10		1	d	14.8625		mg/L	41	153834
Glyphosate	Channa	punctata	Snake-Head Catfish	MOR	MOR	MORT	LC10		4	d	11.14339		mg/L	41	153834
Glyphosate	Channa	punctata	Snake-Head Catfish	MOR	MOR	MORT	LC50		4	d	13.3414		mg/L	41	153834
Glyphosate	Channa	punctata	Snake-Head Catfish	MOR	MOR	MORT	LC10		3	d	11.47631		mg/L	41	153834
Glyphosate	Channa	punctata	Snake-Head Catfish	MOR	MOR	MORT	LC90		2	d	16.4574		mg/L	41	153834
Glyphosate	Channa	punctata	Snake-Head Catfish	MOR	MOR	MORT	LC50		1	d	16.72308		mg/L	41	153834
Glyphosate	Channa	punctata	Snake-Head Catfish	MOR	MOR	MORT	LC50		3	d	13.93631		mg/L	41	153834

Glyphosate isopropylamine salt	Callinectes	sapidus	Blue Crab	MOR	MOR	MORT	LC50			1 d	6.279		mg/L	50.2	152973
Glyphosate isopropylamine salt	Callinectes	sapidus	Blue Crab	GRO	DVP	MMPH	LOAEL		2.6408	d	5.5		mg/L	50.2	152973
Glyphosate isopropylamine salt	Callinectes	sapidus	Blue Crab	BCM	BCM	GLTH	NOAEL			1 d	5.5		mg/L	50.2	152973
Glyphosate isopropylamine salt	Callinectes	sapidus	Blue Crab	BCM	BCM	MLDH	NOAEL			1 d	5.5		mg/L	50.2	152973
Glyphosate isopropylamine salt	Callinectes	sapidus	Blue Crab	MOR	MOR	MORT	LC50			1 d	316		mg/L	50.2	152973
Glyphosate isopropylamine salt	Callinectes	sapidus	Blue Crab	GRO	DVP	MOLT	NOAEL			it	5.5		mg/L	50.2	152973
Glyphosate isopropylamine salt	Callinectes	sapidus	Blue Crab	MOR	MOR	MORT	LOAEL			it	5.5		mg/L	50.2	152973
Glyphosate isopropylamine salt	Callinectes	sapidus	Blue Crab	GRO	DVP	MMPH	ET50		2.1692	d	5.5		mg/L	50.2	152973
Glyphosate isopropylamine salt	Hyalella	castroi	Scud	BCM	BCM	PRTL	LOAEL			7 d	0.36		mg/L	100	152145
Glyphosate isopropylamine salt	Hyalella	castroi	Scud	BCM	BCM	TBAR	LOAEL			7 d	0.36		mg/L	100	152145
Glyphosate isopropylamine salt	Phalloceos	caudimaculatus	Spotted Livebearer	MOR	MOR	MORT	LC50			4 d	975		mg/L	100	156213
Glyphosate, Monopotassium salt	Rana	catesbeiana	Bullfrog	MOR	MOR	MORT	LC10			d	1.38		ae mg/L	48.7	156497
Glyphosate, Monopotassium salt	Rana	catesbeiana	Bullfrog	MOR	MOR	MORT	LC50			d	2.18		ae mg/L	48.7	156497
Glyphosate, Monopotassium salt	Rana	catesbeiana	Bullfrog	MOR	MOR	MORT	LC90			d	3.46		ae mg/L	48.7	156497
Glyphosate, Monopotassium salt	Rana	catesbeiana	Bullfrog	GRO	GRO	WGHT	NOAEL			d	2.04		ae mg/L	48.7	156497

Glyphosate, Monopotassium salt	Lithobates	clamitans ssp. clamitans	Bronze Frog	MOR	MOR	MORT	LC10			d	1.84		ae mg/L	48.7	156497
Glyphosate, Monopotassium salt	Lithobates	clamitans ssp. clamitans	Bronze Frog	MOR	MOR	MORT	LC50			d	2.35		ae mg/L	48.7	156497
Glyphosate, Monopotassium salt	Lithobates	clamitans ssp. clamitans	Bronze Frog	MOR	MOR	MORT	LC90			d	3		ae mg/L	48.7	156497
Glyphosate, Monopotassium salt	Lithobates	clamitans ssp. clamitans	Bronze Frog	GRO	GRO	WGHT	NOAEL			d	2.04		ae mg/L	48.7	156497
Glyphosate, Monopotassium salt	Hyla	versicolor	Gray Tree Frog	MOR	MOR	MORT	LC90			d	2.96		ae mg/L	48.7	156497
Glyphosate, Monopotassium salt	Hyla	versicolor	Gray Tree Frog	MOR	MOR	MORT	LC10			d	1		ae mg/L	48.7	156497
Glyphosate, Monopotassium salt	Hyla	versicolor	Gray Tree Frog	MOR	MOR	MORT	LC50			d	1.71		ae mg/L	48.7	156497
Glyphosate, Monopotassium salt	Hyla	versicolor	Gray Tree Frog	GRO	GRO	WGHT	NOAEL			d	2.04		ae mg/L	48.7	156497
Glyphosate, Monopotassium salt	Lithobates	clamitans ssp. clamitans	Bronze Frog	MOR	MOR	MORT	LC10			d	1.58		ae mg/L	48.7	156497
Glyphosate, Monopotassium salt	Lithobates	clamitans ssp. clamitans	Bronze Frog	GRO	GRO	WGHT	NOAEL			d	2.04		ae mg/L	48.7	156497
Glyphosate, Monopotassium salt	Lithobates	clamitans ssp. clamitans	Bronze Frog	MOR	MOR	MORT	LC50			d	2.18		ae mg/L	48.7	156497
Glyphosate, Monopotassium salt	Lithobates	clamitans ssp. clamitans	Bronze Frog	MOR	MOR	MORT	LC90			d	3		ae mg/L	48.7	156497
Glyphosate, Monopotassium salt	Hyla	versicolor	Gray Tree Frog	MOR	MOR	MORT	LC10			d	1.41		ae mg/L	48.7	156497
Glyphosate, Monopotassium salt	Hyla	versicolor	Gray Tree Frog	MOR	MOR	MORT	LC50			d	2.04		ae mg/L	48.7	156497
Glyphosate, Monopotassium salt	Hyla	versicolor	Gray Tree Frog	MOR	MOR	MORT	LC90			d	2.96		ae mg/L	48.7	156497

Glyphosate, Monopotassium salt	Hyla	versicolor	Gray Tree Frog	GRO	GRO	WGHT	NOAEL			d	2.04		ae mg/L	48.7	156497
Glyphosate, Monopotassium salt	Lithobates	clamitans ssp. clamitans	Bronze Frog	MOR	MOR	MORT	LC50			d	2.58		ae mg/L	48.7	156497
Glyphosate, Monopotassium salt	Lithobates	clamitans ssp. clamitans	Bronze Frog	MOR	MOR	MORT	LC90			d	5.28		ae mg/L	48.7	156497
Glyphosate, Monopotassium salt	Lithobates	clamitans ssp. clamitans	Bronze Frog	MOR	MOR	MORT	LC10			d	1.26		ae mg/L	48.7	156497
Glyphosate, Monopotassium salt	Lithobates	clamitans ssp. clamitans	Bronze Frog	GRO	GRO	WGHT	NOAEL			d	2.04		ae mg/L	48.7	156497
Glyphosate, Monopotassium salt	Hyla	versicolor	Gray Tree Frog	MOR	MOR	MORT	LC10			d	1.85		ae mg/L	48.7	156497
Glyphosate, Monopotassium salt	Hyla	versicolor	Gray Tree Frog	MOR	MOR	MORT	LC50			d	2.29		ae mg/L	48.7	156497
Glyphosate, Monopotassium salt	Hyla	versicolor	Gray Tree Frog	MOR	MOR	MORT	LC90			d	2.83		ae mg/L	48.7	156497
Glyphosate, Monopotassium salt	Hyla	versicolor	Gray Tree Frog	GRO	GRO	WGHT	NOAEL			d	2.04		ae mg/L	48.7	156497
Glyphosate, Monopotassium salt	Rana	catesbeiana	Bullfrog	MOR	MOR	MORT	LC10			d	1.63		ae mg/L	48.7	156497
Glyphosate, Monopotassium salt	Rana	catesbeiana	Bullfrog	MOR	MOR	MORT	LC50			d	2.12		ae mg/L	48.7	156497
Glyphosate, Monopotassium salt	Rana	catesbeiana	Bullfrog	MOR	MOR	MORT	LC90			d	2.76		ae mg/L	48.7	156497
Glyphosate, Monopotassium salt	Rana	catesbeiana	Bullfrog	GRO	GRO	WGHT	NOAEL			d	2.04		ae mg/L	48.7	156497
Glyphosate, Monopotassium salt	Rana	catesbeiana	Bullfrog	MOR	MOR	MORT	LC50			d	1.61		ae mg/L	48.7	156497
Glyphosate, Monopotassium salt	Rana	catesbeiana	Bullfrog	MOR	MOR	MORT	LC90			d	2.21		ae mg/L	48.7	156497

Glyphosate, Monopotassium salt	Rana	catesbeiana	Bullfrog	GRO	GRO	WGHT	NOAEL		d	2.04		ae mg/L	48.7	156497
Glyphosate, Monopotassium salt	Rana	catesbeiana	Bullfrog	MOR	MOR	MORT	LC10		d	1.18		ae mg/L	48.7	156497
Glyphosate, Monopotassium salt	Algae	NR	Algae	POP	POP	BMAS	NOAEL		8 d	2.04		ae mg/L	48.7	156497
Glyphosate, Monopotassium salt	Algae	NR	Algae	POP	POP	BMAS	NOAEL		8 d	2.04		ae mg/L	48.7	156497
Glyphosate, Monopotassium salt	Algae	NR	Algae	POP	POP	BMAS	NOAEL		8 d	2.04		ae mg/L	48.7	156497
Glyphosate isopropylamine salt	Eichhornia	crassipes	Water-Hyacinth	PHY	INJ	GINJ	LOAEL		7 d	0.4		ae kg/ha	100	159025
Glyphosate isopropylamine salt	Eichhornia	crassipes	Water-Hyacinth	PHY	INJ	GINJ	LOAEL		21 d	0.4		ae kg/ha	100	159025
Glyphosate isopropylamine salt	Eichhornia	crassipes	Water-Hyacinth	PHY	INJ	GINJ	LOAEL		42 d	0.4		ae kg/ha	100	159025
Glyphosate isopropylamine salt	Eichhornia	crassipes	Water-Hyacinth	PHY	INJ	GINJ	LOAEL		42 d	0.4		ae kg/ha	100	159025
Glyphosate isopropylamine salt	Eichhornia	crassipes	Water-Hyacinth	PHY	INJ	GINJ	LOAEL		7 d	0.4		ae kg/ha	100	159025
Glyphosate isopropylamine salt	Eichhornia	crassipes	Water-Hyacinth	PHY	INJ	GINJ	LOAEL		21 d	0.4		ae kg/ha	100	159025
Glyphosate	Rhamdia	quelen	Catfish	CEL	CEL	RBCE	LOAEL		4 d	0.73		mg/L	100	155345
Glyphosate	Rhamdia	quelen	Catfish	CEL	CEL	NEUT	NOAEL		4 d	0.73		mg/L	100	155345
Glyphosate	Rhamdia	quelen	Catfish	CEL	CEL	MONO	NOAEL		4 d	0.73		mg/L	100	155345
Glyphosate	Rhamdia	quelen	Catfish	CEL	CEL	LMPH	LOAEL		4 d	0.73		mg/L	100	155345
Glyphosate	Rhamdia	quelen	Catfish	CEL	CEL	LEUK	LOAEL		4 d	0.73		mg/L	100	155345
Glyphosate	Rhamdia	quelen	Catfish	BCM	BCM	HMCT	NOAEL		4 d	0.73		mg/L	100	155345
Glyphosate	Rhamdia	quelen	Catfish	CEL	CEL	NCEL	LOAEL		4 d	0.73		mg/L	100	155345

Glyphosate	Rhamdia	quelen	Catfish	CEL	CEL	THRM	LOAEL		4 d	0.73		mg/L	100	155345
Glyphosate	Rhamdia	quelen	Catfish	PHY	IMM	PHAG	LOAEL		1 d	0.73		mg/L	100	155345
Glyphosate	Rhamdia	quelen	Catfish	PHY	IMM	PHAG	NOAEL		10 d	0.73		mg/L	100	155345
Glyphosate	Rhamdia	quelen	Catfish	PHY	IMM	NKCA	NOAEL		1 d	0.73		mg/L	100	155345
Glyphosate	Rhamdia	quelen	Catfish	PHY	IMM	NKCA	NOAEL		10 d	0.73		mg/L	100	155345
Glyphosate	Rhamdia	quelen	Catfish	PHY	IMM	GIMM	LOAEL		10 d	0.73		mg/L	100	155345
Glyphosate	Rhamdia	quelen	Catfish	BCM	ENZ	PODA	NOAEL		10 d	0.73		mg/L	100	155345
Glyphosate	Rhamdia	quelen	Catfish	PHY	IMM	GIMM	LOAEL		1 d	0.73		mg/L	100	155345
Glyphosate	Rhamdia	quelen	Catfish	BCM	ENZ	LYZM	NOAEL		1 d	0.73		mg/L	100	155345
Glyphosate	Rhamdia	quelen	Catfish	BCM	ENZ	LYZM	LOAEL		10 d	0.73		mg/L	100	155345
Glyphosate	Rhamdia	quelen	Catfish	BCM	ENZ	PODA	LOAEL		1 d	0.73		mg/L	100	155345
Glyphosate	Rhamdia	quelen	Catfish	PHY	IMM	ABDT	NOAEL		1 d	0.73		mg/L	100	155345
Glyphosate	Rhamdia	quelen	Catfish	PHY	IMM	ABDT	NOAEL		10 d	0.73		mg/L	100	155345
Glyphosate	Digitaria	sanguinalis	Purple Crabgrass	POP	POP	DBMS	EC50		28 d	0.10852072		lb/acre	100	152884
Glyphosate	Digitaria	sanguinalis	Purple Crabgrass	POP	POP	DBMS	EC80		28 d	0.17445736		lb/acre	100	152884
Glyphosate	Sorghum	bicolor	Broomcorn	POP	POP	DBMS	EC50		28 d	0.01098944		lb/acre	100	152884
Glyphosate	Sorghum	bicolor	Broomcorn	POP	POP	DBMS	EC80		28 d	0.01923152		lb/acre	100	152884
Glyphosate	Amarant hus	palmeri	Palmer's Amaranth	POP	POP	DBMS	EC50		28 d	0.08379448		lb/acre	100	152884
Glyphosate	Amarant hus	palmeri	Palmer's Amaranth	POP	POP	DBMS	EC80		28 d	0.13324696		lb/acre	100	152884
Glyphosate	Amarant hus	palmeri	Palmer's Amaranth	MOR	MOR	MORT	NR- LETH		28 d	1.37368		lb/acre	100	152884
Glyphosate	Abutilon	theophrasti	Butter Print	POP	POP	DBMS	EC50		28 d	0.12637856		lb/acre	100	152884
Glyphosate	Digitaria	sanguinalis	Purple Crabgrass	POP	POP	DBMS	EC50		28 d	0.02884728		lb/acre	100	152884
Glyphosate	Digitaria	sanguinalis	Purple Crabgrass	MOR	MOR	MORT	NR- LETH		28 d	0.042816		lb/acre	100	152884

Glyphosate	Amarant hus	palmeri	Palmer's Amaranth	POP	POP	DBMS	EC50			28	d	0.0412104		lb/acre	100	152884
Glyphosate	Abutilon	theophrasti	Butter Print	POP	POP	DBMS	EC50			28	d	0.0274736		lb/acre	100	152884
Glyphosate	Abutilon	theophrasti	Butter Print	POP	POP	DBMS	EC80			28	d	0.04395776		lb/acre	100	152884
Glyphosate	Abutilon	theophrasti	Butter Print	MOR	MOR	MORT	NR- LETH			28	d	0.68684		lb/acre	100	152884
Glyphosate	Digitaria	sanguinalis	Purple Crabgrass	POP	POP	DBMS	EC50			28	d	0.07692608		lb/acre	100	152884
Glyphosate	Digitaria	sanguinalis	Purple Crabgrass	POP	POP	DBMS	EC80			28	d	0.1236312		lb/acre	100	152884
Glyphosate	Sorghum	bicolor	Broomcorn	POP	POP	DBMS	EC50			28	d	0.0206052		lb/acre	100	152884
Glyphosate	Sorghum	bicolor	Broomcorn	POP	POP	DBMS	EC80			28	d	0.03159464		lb/acre	100	152884
Glyphosate	Amarant hus	palmeri	Palmer's Amaranth	POP	POP	DBMS	EC50			28	d	0.0412104		lb/acre	100	152884
Glyphosate	Amarant hus	palmeri	Palmer's Amaranth	POP	POP	DBMS	EC80			28	d	0.06731032		lb/acre	100	152884
Glyphosate	Amarant hus	palmeri	Palmer's Amaranth	MOR	MOR	MORT	NR- LETH			28	d	1.37368		lb/acre	100	152884
Glyphosate	Abutilon	theophrasti	Butter Print	POP	POP	DBMS	EC50			28	d	0.0961576		lb/acre	100	152884
Glyphosate	Digitaria	sanguinalis	Purple Crabgrass	POP	POP	DBMS	EC50			28	d	0.02335256		lb/acre	100	152884
Glyphosate	Digitaria	sanguinalis	Purple Crabgrass	MOR	MOR	MORT	NR- LETH			28	d	0.042816		lb/acre	100	152884
Glyphosate	Amarant hus	palmeri	Palmer's Amaranth	POP	POP	DBMS	EC50			28	d	0.03022096		lb/acre	100	152884
Glyphosate	Sorghum	arundinaceu m	Shattercane	POP	POP	DBMS	EC50			28	d	0.03708936		lb/acre	100	152884
Glyphosate	Sorghum	arundinaceu m	Shattercane	MOR	MOR	MORT	NR- LETH			28	d	0.042816		lb/acre	100	152884
Glyphosate	Sorghum	arundinaceu m	Shattercane	MOR	MOR	MORT	NR- LETH			28	d	0.042816		lb/acre	100	152884
Glyphosate	Abutilon	theophrasti	Butter Print	POP	POP	DBMS	EC50			28	d	0.16758896		lb/acre	100	152884
Glyphosate	Abutilon	theophrasti	Butter Print	POP	POP	DBMS	EC80			28	d	0.26924128		lb/acre	100	152884
Glyphosate	Digitaria	sanguinalis	Purple Crabgrass	POP	POP	DBMS	EC50			28	d	0.17033632		lb/acre	100	152884
Glyphosate	Digitaria	sanguinalis	Purple Crabgrass	POP	POP	DBMS	EC80			28	d	0.27198864		lb/acre	100	152884
Glyphosate	Sorghum	bicolor	Broomcorn	POP	POP	DBMS	EC50			28	d	0.03022096		lb/acre	100	152884

Glyphosate	Sorghum	bicolor	Broomcorn	POP	POP	DBMS	EC80			28	d	0.04945248		lb/acre	100	152884
Glyphosate	Amarant	hus	palmeri	Palmer's	POP	POP	DBMS	EC50		28	d	0.17033632		lb/acre	100	152884
Glyphosate	Amarant	hus	palmeri	Palmer's	POP	POP	DBMS	EC80		28	d	0.27336232		lb/acre	100	152884
Glyphosate	Amarant	hus	palmeri	Palmer's	MOR	MOR	MORT	NR- LETH		28	d	1.37368		lb/acre	100	152884
Glyphosate	Abutilon	theophrasti	Butter Print	POP	POP	DBMS	EC50			28	d	0.1236312		lb/acre	100	152884
Glyphosate	Digitaria	sanguinalis	Purple Crabgrass	POP	POP	DBMS	EC50			28	d	0.03296832		lb/acre	100	152884
Glyphosate	Digitaria	sanguinalis	Purple Crabgrass	MOR	MOR	MORT	NR- LETH			28	d	0.042816		lb/acre	100	152884
Glyphosate	Amarant	hus	palmeri	Palmer's	POP	POP	DBMS	EC50		28	d	0.0274736		lb/acre	100	152884
Glyphosate	Sorghum	arundinaceu m	Shattercane	POP	POP	DBMS	EC50			28	d	0.03159464		lb/acre	100	152884
Glyphosate	Abutilon	theophrasti	Butter Print	POP	POP	DBMS	EC50			28	d	0.08791552		lb/acre	100	152884
Glyphosate	Abutilon	theophrasti	Butter Print	POP	POP	DBMS	EC80			28	d	0.14148904		lb/acre	100	152884
Glyphosate	Amarant	hus	palmeri	Palmer's	MOR	MOR	MORT	NR- LETH		28	d	1.37368		lb/acre	100	152884
Glyphosate	Abutilon	theophrasti	Butter Print	POP	POP	DBMS	EC50			28	d	0.1236312		lb/acre	100	152884
Glyphosate	Digitaria	sanguinalis	Purple Crabgrass	POP	POP	DBMS	EC50			28	d	0.03846304		lb/acre	100	152884
Glyphosate	Digitaria	sanguinalis	Purple Crabgrass	MOR	MOR	MORT	NR- LETH			28	d	0.042816		lb/acre	100	152884
Glyphosate	Amarant	hus	palmeri	Palmer's	POP	POP	DBMS	EC50		28	d	0.0480788		lb/acre	100	152884
Glyphosate	Sorghum	arundinaceu m	Shattercane	POP	POP	DBMS	EC50			28	d	0.01236312		lb/acre	100	152884
Glyphosate	Sorghum	arundinaceu m	Shattercane	MOR	MOR	MORT	NR- LETH			28	d	0.042816		lb/acre	100	152884
Glyphosate	Abutilon	theophrasti	Butter Print	POP	POP	DBMS	EC50			28	d	0.09753128		lb/acre	100	152884
Glyphosate	Abutilon	theophrasti	Butter Print	POP	POP	DBMS	EC80			28	d	0.15659952		lb/acre	100	152884
Glyphosate	Digitaria	sanguinalis	Purple Crabgrass	POP	POP	DBMS	EC50			28	d	0.0892892		lb/acre	100	152884
Glyphosate	Digitaria	sanguinalis	Purple Crabgrass	POP	POP	DBMS	EC80			28	d	0.14148904		lb/acre	100	152884
Glyphosate	Amarant	hus	palmeri	Palmer's	POP	POP	DBMS	EC50		28	d	0.05906824		lb/acre	100	152884

Glyphosate	Sorghum	arundinaceu m	Shattercane	POP	POP	DBMS	EC50			28	d	0.02472624		lb/acre	100	152884
Glyphosate	Sorghum	arundinaceu m	Shattercane	MOR	MOR	MORT	NR- LETH			28	d	0.042816		lb/acre	100	152884
Glyphosate	Abutilon	theophrasti	Butter Print	POP	POP	DBMS	EC50			28	d	0.03296832		lb/acre	100	152884
Glyphosate	Abutilon	theophrasti	Butter Print	POP	POP	DBMS	EC80			28	d	0.05219984		lb/acre	100	152884
Glyphosate	Digitaria	sanguinalis	Purple Crabgrass	POP	POP	DBMS	EC50			28	d	0.11813648		lb/acre	100	152884
Glyphosate	Digitaria	sanguinalis	Purple Crabgrass	POP	POP	DBMS	EC80			28	d	0.18819416		lb/acre	100	152884
Glyphosate	Sorghum	bicolor	Broomcorn	POP	POP	DBMS	EC50			28	d	0.00549472		lb/acre	100	152884
Glyphosate	Sorghum	bicolor	Broomcorn	POP	POP	DBMS	EC80			28	d	0.00961576		lb/acre	100	152884
Glyphosate	Amarant hus	palmeri	Palmer's Amaranth	POP	POP	DBMS	EC50			28	d	0.05219984		lb/acre	100	152884
Glyphosate	Amarant hus	palmeri	Palmer's Amaranth	POP	POP	DBMS	EC80			28	d	0.08379448		lb/acre	100	152884
Glyphosate	Sorghum	bicolor	Broomcorn	POP	POP	DBMS	EC50			28	d	0.01648416		lb/acre	100	152884
Glyphosate	Sorghum	bicolor	Broomcorn	POP	POP	DBMS	EC80			28	d	0.0274736		lb/acre	100	152884
Glyphosate	Amarant hus	palmeri	Palmer's Amaranth	POP	POP	DBMS	EC50			28	d	0.0618156		lb/acre	100	152884
Glyphosate	Amarant hus	palmeri	Palmer's Amaranth	POP	POP	DBMS	EC80			28	d	0.09890496		lb/acre	100	152884
Glyphosate	Amarant hus	palmeri	Palmer's Amaranth	MOR	MOR	MORT	NR- LETH			28	d	1.37368		lb/acre	100	152884
Glyphosate	Abutilon	theophrasti	Butter Print	POP	POP	DBMS	EC50			28	d	0.10577336		lb/acre	100	152884
Glyphosate	Digitaria	sanguinalis	Purple Crabgrass	POP	POP	DBMS	EC50			28	d	0.03983672		lb/acre	100	152884
Glyphosate	Digitaria	sanguinalis	Purple Crabgrass	MOR	MOR	MORT	NR- LETH			28	d	0.042816		lb/acre	100	152884
Glyphosate	Amarant hus	palmeri	Palmer's Amaranth	POP	POP	DBMS	EC50			28	d	0.04670512		lb/acre	100	152884
Glyphosate	Sorghum	arundinaceu m	Shattercane	POP	POP	DBMS	EC50			28	d	0.02335256		lb/acre	100	152884
Glyphosate	Sorghum	arundinaceu m	Shattercane	MOR	MOR	MORT	NR- LETH			28	d	0.042816		lb/acre	100	152884
Glyphosate	Abutilon	theophrasti	Butter Print	POP	POP	DBMS	EC50			28	d	0.05632088		lb/acre	100	152884
Glyphosate	Abutilon	theophrasti	Butter Print	POP	POP	DBMS	EC80			28	d	0.09066288		lb/acre	100	152884

Glyphosate	Abutilon	theophrasti	Butter Print	MOR	MOR	MORT	NR-LETH		28	d	0.68684		lb/acre	100	152884
Glyphosate	Digitaria	sanguinalis	Purple Crabgrass	POP	POP	DBMS	EC50		28	d	0.1923152		lb/acre	100	152884
Glyphosate	Digitaria	sanguinalis	Purple Crabgrass	POP	POP	DBMS	EC80		28	d	0.30633064		lb/acre	100	152884
Glyphosate	Sorghum	bicolor	Broomcorn	POP	POP	DBMS	EC50		28	d	0.0137368		lb/acre	100	152884
Glyphosate	Sorghum	bicolor	Broomcorn	POP	POP	DBMS	EC80		28	d	0.0206052		lb/acre	100	152884
Glyphosate	Amarant hus	palmeri	Palmer's Amaranth	POP	POP	DBMS	EC50		28	d	0.02472624		lb/acre	100	152884
Glyphosate	Amarant hus	palmeri	Palmer's Amaranth	POP	POP	DBMS	EC80		28	d	0.03983672		lb/acre	100	152884
Glyphosate	Amarant hus	palmeri	Palmer's Amaranth	MOR	MOR	MORT	NR-LETH		28	d	1.37368		lb/acre	100	152884
Glyphosate	Abutilon	theophrasti	Butter Print	POP	POP	DBMS	EC50		28	d	0.14286272		lb/acre	100	152884
Glyphosate	Digitaria	sanguinalis	Purple Crabgrass	POP	POP	DBMS	EC50		28	d	0.02197888		lb/acre	100	152884
Glyphosate	Digitaria	sanguinalis	Purple Crabgrass	MOR	MOR	MORT	NR-LETH		28	d	0.042816		lb/acre	100	152884
Glyphosate	Amarant hus	palmeri	Palmer's Amaranth	POP	POP	DBMS	EC50		28	d	0.02335256		lb/acre	100	152884
Glyphosate	Sorghum	arundinaceu m	Shattercane	POP	POP	DBMS	EC50		28	d	0.01648416		lb/acre	100	152884
Glyphosate	Sorghum	arundinaceu m	Shattercane	MOR	MOR	MORT	NR-LETH		28	d	0.042816		lb/acre	100	152884
Glyphosate	Abutilon	theophrasti	Butter Print	POP	POP	DBMS	EC50		28	d	0.0274736		lb/acre	100	152884
Glyphosate	Abutilon	theophrasti	Butter Print	POP	POP	DBMS	EC80		28	d	0.04395776		lb/acre	100	152884
Glyphosate	Abutilon	theophrasti	Butter Print	MOR	MOR	MORT	NR-LETH		28	d	0.68684		lb/acre	100	152884
Glyphosate	Digitaria	sanguinalis	Purple Crabgrass	POP	POP	DBMS	EC50		28	d	0.1167628		lb/acre	100	152884
Glyphosate	Digitaria	sanguinalis	Purple Crabgrass	POP	POP	DBMS	EC80		28	d	0.18819416		lb/acre	100	152884
Glyphosate	Sorghum	bicolor	Broomcorn	POP	POP	DBMS	EC50		28	d	0.01785784		lb/acre	100	152884
Glyphosate	Sorghum	bicolor	Broomcorn	POP	POP	DBMS	EC80		28	d	0.02884728		lb/acre	100	152884
Glyphosate	Amarant hus	palmeri	Palmer's Amaranth	POP	POP	DBMS	EC50		28	d	0.0824208		lb/acre	100	152884
Glyphosate	Amarant hus	palmeri	Palmer's Amaranth	POP	POP	DBMS	EC80		28	d	0.13187328		lb/acre	100	152884

Glyphosate	Amarant hus	palmeri	Palmer's Amaranth	MOR	MOR	MORT	NR- LETH		28	d	1.37368		lb/acre	100	152884
Glyphosate	Abutilon	theophrasti	Butter Print	POP	POP	DBMS	EC50		28	d	0.0206052		lb/acre	100	152884
Glyphosate	Digitaria	sanguinalis	Purple Crabgrass	POP	POP	DBMS	EC50		28	d	0.01785784		lb/acre	100	152884
Glyphosate	Digitaria	sanguinalis	Purple Crabgrass	MOR	MOR	MORT	NR- LETH		28	d	0.042816		lb/acre	100	152884
Glyphosate	Amarant hus	palmeri	Palmer's Amaranth	POP	POP	DBMS	EC50		28	d	0.01923152		lb/acre	100	152884
Glyphosate	Sorghum	arundinaceu m	Shattercane	POP	POP	DBMS	EC50		28	d	0.03022096		lb/acre	100	152884
Glyphosate	Sorghum	arundinaceu m	Shattercane	MOR	MOR	MORT	NR- LETH		28	d	0.042816		lb/acre	100	152884
Glyphosate	Abutilon	theophrasti	Butter Print	POP	POP	DBMS	EC50		28	d	0.08104712		lb/acre	100	152884
Glyphosate	Abutilon	theophrasti	Butter Print	POP	POP	DBMS	EC80		28	d	0.12912592		lb/acre	100	152884
Glyphosate	Digitaria	sanguinalis	Purple Crabgrass	POP	POP	DBMS	EC50		28	d	0.10714704		lb/acre	100	152884
Glyphosate	Digitaria	sanguinalis	Purple Crabgrass	POP	POP	DBMS	EC80		28	d	0.17171		lb/acre	100	152884
Glyphosate	Sorghum	bicolor	Broomcorn	POP	POP	DBMS	EC50		28	d	0.03159464		lb/acre	100	152884
Glyphosate	Sorghum	bicolor	Broomcorn	POP	POP	DBMS	EC80		28	d	0.05082616		lb/acre	100	152884
Glyphosate	Amarant hus	palmeri	Palmer's Amaranth	POP	POP	DBMS	EC50		28	d	0.09753128		lb/acre	100	152884
Glyphosate	Amarant hus	palmeri	Palmer's Amaranth	POP	POP	DBMS	EC80		28	d	0.15659952		lb/acre	100	152884
Glyphosate	Amarant hus	palmeri	Palmer's Amaranth	MOR	MOR	MORT	NR- LETH		28	d	1.37368		lb/acre	100	152884
Glyphosate	Abutilon	theophrasti	Butter Print	POP	POP	DBMS	EC50		28	d	0.17583104		lb/acre	100	152884
Glyphosate	Digitaria	sanguinalis	Purple Crabgrass	POP	POP	DBMS	EC50		28	d	0.0206052		lb/acre	100	152884
Glyphosate	Digitaria	sanguinalis	Purple Crabgrass	MOR	MOR	MORT	NR- LETH		28	d	0.042816		lb/acre	100	152884
Glyphosate	Sorghum	arundinaceu m	Shattercane	POP	POP	DBMS	EC50		28	d	0.034342		lb/acre	100	152884
Glyphosate	Sorghum	arundinaceu m	Shattercane	MOR	MOR	MORT	NR- LETH		28	d	0.042816		lb/acre	100	152884
Glyphosate	Abutilon	theophrasti	Butter Print	POP	POP	DBMS	EC50		28	d	0.03571568		lb/acre	100	152884
Glyphosate	Abutilon	theophrasti	Butter Print	POP	POP	DBMS	EC80		28	d	0.05769456		lb/acre	100	152884

Glyphosate	Abutilon	theophrasti	Butter Print	MOR	MOR	MORT	NR-LETH		28	d	0.68684		lb/acre	100	152884
Glyphosate	Digitaria	sanguinalis	Purple Crabgrass	POP	POP	DBMS	EC50		28	d	0.10577336		lb/acre	100	152884
Glyphosate	Digitaria	sanguinalis	Purple Crabgrass	POP	POP	DBMS	EC80		28	d	0.16896264		lb/acre	100	152884
Glyphosate	Sorghum	bicolor	Broomcorn	POP	POP	DBMS	EC50		28	d	0.00961576		lb/acre	100	152884
Glyphosate	Sorghum	bicolor	Broomcorn	POP	POP	DBMS	EC80		28	d	0.01511048		lb/acre	100	152884
Glyphosate	Amarant hus	palmeri	Palmer's Amaranth	POP	POP	DBMS	EC50		28	d	0.07967344		lb/acre	100	152884
Glyphosate	Amarant hus	palmeri	Palmer's Amaranth	POP	POP	DBMS	EC80		28	d	0.12775224		lb/acre	100	152884
Glyphosate	Amarant hus	palmeri	Palmer's Amaranth	MOR	MOR	MORT	NR-LETH		28	d	1.37368		lb/acre	100	152884
Glyphosate	Abutilon	theophrasti	Butter Print	POP	POP	DBMS	EC50		28	d	0.11951016		lb/acre	100	152884
Glyphosate	Digitaria	sanguinalis	Purple Crabgrass	POP	POP	DBMS	EC50		28	d	0.03159464		lb/acre	100	152884
Glyphosate	Digitaria	sanguinalis	Purple Crabgrass	MOR	MOR	MORT	NR-LETH		28	d	0.042816		lb/acre	100	152884
Glyphosate	Amarant hus	palmeri	Palmer's Amaranth	POP	POP	DBMS	EC50		28	d	0.03708936		lb/acre	100	152884
Glyphosate	Sorghum	arundinaceu m	Shattercane	POP	POP	DBMS	EC50		28	d	0.0206052		lb/acre	100	152884
Glyphosate	Sorghum	arundinaceu m	Shattercane	MOR	MOR	MORT	NR-LETH		28	d	0.042816		lb/acre	100	152884
Glyphosate	Apis	mellifera	Honey Bee	CEL	GEN	APOP	LOAEL		4	d	400		ppm	100	156418
Glyphosate	Apis	mellifera	Honey Bee	CEL	GEN	APOP	LOAEL		4	d	400		ppm	100	156418
Glyphosate isopropylamine salt	Lemna	minor	Duckweed	BCM	ENZ	ASCP	LOAEL		2	d	1.58		Al mmol/dm3	100	161958
Glyphosate isopropylamine salt	Lemna	minor	Duckweed	BCM	BCM	PUTR	LOAEL		2	d	1.58		Al mmol/dm3	100	161958
Glyphosate isopropylamine salt	Lemna	minor	Duckweed	GRO	GRO	BMAS	LOAEL		21	d	1.58		Al mmol/dm3	100	161958
Glyphosate isopropylamine salt	Lithobates	pipiens	Leopard Frog	CEL	CEL	MONO	NOAEL		94	d			ae ug/L	100	153789
Glyphosate isopropylamine salt	Lithobates	pipiens	Leopard Frog	CEL	HIS	MELM	NOAEL		94	d			ae ug/L	100	153789

Glyphosate isopropylamine salt	Lithobates	pipiens	Leopard Frog	GRO	MPH	SMIX	NOAEL		21	d				ae ug/L	100	153789
Glyphosate isopropylamine salt	Lithobates	pipiens	Leopard Frog	CEL	CEL	RATO	NOAEL		94	d				ae ug/L	100	153789
Glyphosate isopropylamine salt	Lithobates	pipiens	Leopard Frog	GRO	DVP	MOLT	NOAEL		54	d				ae ug/L	100	153789
Glyphosate isopropylamine salt	Lithobates	pipiens	Leopard Frog	CEL	CEL	NEUT	NOAEL		94	d				ae ug/L	100	153789
Glyphosate isopropylamine salt	Lithobates	pipiens	Leopard Frog	CEL	HIS	MELM	NOAEL		94	d				ae ug/L	100	153789
Glyphosate isopropylamine salt	Lithobates	pipiens	Leopard Frog	CEL	HIS	GRNM	NOAEL		94	d				ae ug/L	100	153789
Glyphosate isopropylamine salt	Lithobates	pipiens	Leopard Frog	GRO	MPH	SMIX	NOAEL		21	d				ae ug/L	100	153789
Glyphosate isopropylamine salt	Lithobates	pipiens	Leopard Frog	CEL	HIS	MELM	NOAEL		94	d				ae ug/L	100	153789
Glyphosate isopropylamine salt	Lithobates	pipiens	Leopard Frog	CEL	CEL	RATO	NOAEL		94	d				ae ug/L	100	153789
Glyphosate isopropylamine salt	Lithobates	pipiens	Leopard Frog	CEL	HIS	MELM	NOAEL		94	d				ae ug/L	100	153789
Glyphosate isopropylamine salt	Lithobates	pipiens	Leopard Frog	CEL	CEL	LMPH	NOAEL		94	d				ae ug/L	100	153789
Glyphosate isopropylamine salt	Lithobates	pipiens	Leopard Frog	MOR	MOR	SURV	NOAEL		21	d				ae ug/L	100	153789
Glyphosate isopropylamine salt	Lithobates	pipiens	Leopard Frog	CEL	CEL	BASO	NOAEL		94	d				ae ug/L	100	153789
Glyphosate isopropylamine salt	Lithobates	pipiens	Leopard Frog	GRO	GRO	GAIN	NOAEL		21	d				ae ug/L	100	153789
Glyphosate isopropylamine salt	Lithobates	pipiens	Leopard Frog	CEL	HIS	GRNM	NOAEL		94	d				ae ug/L	100	153789

Glyphosate isopropylamine salt	Lithobates	pipiens	Leopard Frog	CEL	CEL	EOSN	NOAEL		94	d				ae ug/L	100	153789
Glyphosate isopropylamine salt	Lithobates	pipiens	Leopard Frog	GRO	GRO	LGTH	LOAEL		21	d				ae ug/L	100	153789
Sulfosate	Caenorhabditis	elegans	Nematode	MOR	MOR	MORT	LC50		1	d		8		AI %	52.3	156398
Sulfosate	Caenorhabditis	elegans	Nematode	CEL	HIS	DEGN	LOAEL		1	d		3		AI %	52.3	156398
Sulfosate	Caenorhabditis	elegans	Nematode	MOR	MOR	MORT	LC50		1	d		5.7		AI %	52.3	156398
Sulfosate	Caenorhabditis	elegans	Nematode	CEL	HIS	DEGN	NOAEL	LOAEL	1	d		5.5	9.8	AI %	52.3	156398
Glyphosate isopropylamine salt	Lemna	minor	Duckweed	BCM	BCM	FLRS	LOAEL		1	d		20		AI ug/L	100	156171
Glyphosate isopropylamine salt	Lemna	minor	Duckweed	BCM	BCM	FLRS	LOAEL		4	d		20		AI ug/L	100	156171
Glyphosate isopropylamine salt	Lemna	minor	Duckweed	BCM	BCM	FLRS	LOAEL		4	d		20		AI ug/L	100	156171
Glyphosate isopropylamine salt	Lemna	minor	Duckweed	BCM	BCM	FLRS	LOAEL		3	d		20		AI ug/L	100	156171
Glyphosate isopropylamine salt	Lemna	minor	Duckweed	BCM	BCM	FLRS	LOAEL		2	d		20		AI ug/L	100	156171
Glyphosate isopropylamine salt	Lemna	minor	Duckweed	BCM	BCM	FLRS	LOAEL		1	d		20		AI ug/L	100	156171
Glyphosate isopropylamine salt	Lemna	minor	Duckweed	POP	POP	PGRT	LOAEL		1	d		20		AI ug/L	100	156171
Glyphosate isopropylamine salt	Lemna	minor	Duckweed	POP	POP	PGRT	LOAEL		2	d		20		AI ug/L	100	156171
Glyphosate isopropylamine salt	Lemna	minor	Duckweed	POP	POP	PGRT	LOAEL		3	d		20		AI ug/L	100	156171
Glyphosate isopropylamine salt	Lemna	minor	Duckweed	POP	POP	PGRT	LOAEL		4	d		20		AI ug/L	100	156171
Glyphosate isopropylamine salt	Lemna	minor	Duckweed	PHY	PHY	PSII	NOAEL	LOAEL	4	d		40	80	AI ug/L	100	156171

Glyphosate isopropylamine salt	Lemna	minor	Duckweed	PHY	PHY	PSII	NOAEL	LOAEL	3 d	40	80	AI ug/L	100	156171
Glyphosate isopropylamine salt	Lemna	minor	Duckweed	PHY	PHY	PSII	NOAEL	LOAEL	2 d	40	80	AI ug/L	100	156171
Glyphosate isopropylamine salt	Lemna	minor	Duckweed	PHY	PHY	PSII	NOAEL	LOAEL	1 d	40	80	AI ug/L	100	156171
Glyphosate isopropylamine salt	Lemna	minor	Duckweed	BCM	BCM	FLRS	LOAEL		2 d	20		AI ug/L	100	156171
Glyphosate isopropylamine salt	Lemna	minor	Duckweed	BCM	BCM	FLRS	LOAEL		3 d	20		AI ug/L	100	156171
Glyphosate	Echinostoma	trivolvis	Trematode	GRO	DVP	GDVP	NOAEL		26 d	3.6853		mg/L	>98	153845
Glyphosate	Echinostoma	trivolvis	Trematode	MOR	MOR	HTCH	NOAEL		26 d	3.6853		mg/L	>98	153845
Glyphosate	Echinostoma	trivolvis	Trematode	MOR	MOR	SURV	NOAEL		0.5 d	3.6853		mg/L	>98	153845
Glyphosate isopropylamine salt	Lilium	sp.	Lily	GRO	GRO	WGHT	LOAEL		209 d	0.6408		lb/acre	100	153931
Glyphosate isopropylamine salt	Lilium	longiflorum	Easter Lily	GRO	GRO	WGHT	NOAEL		209 d	0.6408		lb/acre	100	153931
Glyphosate isopropylamine salt	Lilium	sp.	Lily	GRO	GRO	WGHT	LOAEL		212 d	0.3204		lb/acre	100	153931
Glyphosate isopropylamine salt	Lilium	longiflorum	Easter Lily	GRO	GRO	WGHT	NOAEL		66 d	0.6408		lb/acre	100	153931
Glyphosate isopropylamine salt	Lilium	sp.	Lily	GRO	GRO	WGHT	NOAEL		161 d	0.3204		lb/acre	100	153931
Glyphosate isopropylamine salt	Lilium	sp.	Lily	GRO	GRO	WGHT	NOAEL		66 d	0.6408		lb/acre	100	153931
Glyphosate isopropylamine salt	Lilium	sp.	Lily	GRO	GRO	WGHT	NOAEL		66 d	0.6408		lb/acre	100	153931
Glyphosate isopropylamine salt	Lilium	sp.	Lily	GRO	GRO	WGHT	NOAEL		66 d	0.6408		lb/acre	100	153931

Glyphosate isopropylamine salt	Xenopus	laevis	African Clawed Frog	CEL	HIS	EDMA	NOAEL		2 d	5		mg/L	100	153876
Glyphosate isopropylamine salt	Xenopus	laevis	African Clawed Frog	MOR	MOR	MORT	NR-ZERO		2 d	5		mg/L	100	153876
Glyphosate isopropylamine salt	Xenopus	laevis	African Clawed Frog	GRO	DVP	DFRM	NOAEL	LOAEL	2 d	1	5	mg/L	100	153876
Glyphosate isopropylamine salt	Rhamdia	quelen	Catfish	BCM	BCM	NPSH	NOAEL	LOAEL	8 d			mg/L	48	161790
Glyphosate isopropylamine salt	Rhamdia	quelen	Catfish	BCM	BCM	MLDH	NOAEL	LOAEL	8 d			mg/L	48	161790
Glyphosate isopropylamine salt	Rhamdia	quelen	Catfish	BCM	BCM	MLDH	LOAEL		8 d			mg/L	48	161790
Glyphosate isopropylamine salt	Rhamdia	quelen	Catfish	BCM	BCM	MLDH	NOAEL	LOAEL	8 d			mg/L	48	161790
Glyphosate isopropylamine salt	Rhamdia	quelen	Catfish	BCM	BCM	PCAR	LOAEL		8 d			mg/L	48	161790
Glyphosate isopropylamine salt	Rhamdia	quelen	Catfish	BCM	ENZ	CTLS	NOAEL		8 d			mg/L	48	161790
Glyphosate isopropylamine salt	Rhamdia	quelen	Catfish	BCM	ENZ	SODA	NOAEL		8 d			mg/L	48	161790
Glyphosate isopropylamine salt	Rhamdia	quelen	Catfish	BCM	ENZ	GSTR	LOAEL		8 d			mg/L	48	161790
Glyphosate isopropylamine salt	Rhamdia	quelen	Catfish	BCM	BCM	ASCA	NOAEL		8 d			mg/L	48	161790
Glyphosate ammonium salt	Rhinella	arenarum	Toad	MOR	MOR	MORT	LC50		0.5 d	3.26		ae mg/L	74.7	161996
Glyphosate ammonium salt	Rhinella	arenarum	Toad	BCM	ENZ	ACHE	LOAEL		2 d	1.85		ae mg/L	74.7	161996
Glyphosate ammonium salt	Rhinella	arenarum	Toad	BCM	ENZ	BCHE	LOAEL		2 d	1.85		ae mg/L	74.7	161996
Glyphosate ammonium salt	Rhinella	arenarum	Toad	MOR	MOR	MORT	LC50		0.25 d	5.62		ae mg/L	74.7	161996
Glyphosate ammonium salt	Rhinella	arenarum	Toad	MOR	MOR	MORT	LC50		1 d	2.42		ae mg/L	74.7	161996

Glyphosate ammonium salt	Rhinella	arenarum	Toad	MOR	MOR	MORT	LC50		2 d	2.42		ae mg/L	74.7	161996
Glyphosate ammonium salt	Rhinella	arenarum	Toad	BCM	ENZ	ALIE	LOAEL		2 d	1.85		ae mg/L	74.7	161996
Glyphosate ammonium salt	Rhinella	arenarum	Toad	BCM	ENZ	GSTR	LOAEL		2 d	1.85		ae mg/L	74.7	161996
Glyphosate ammonium salt	Rhinella	arenarum	Toad	MOR	MOR	MORT	LC50		0.25 d	104.33		ae mg/L	48	161996
Glyphosate ammonium salt	Rhinella	arenarum	Toad	MOR	MOR	MORT	LC50		0.5 d	84.06		ae mg/L	48	161996
Glyphosate ammonium salt	Rhinella	arenarum	Toad	MOR	MOR	MORT	LC50		1 d	77.52		ae mg/L	48	161996
Glyphosate ammonium salt	Rhinella	arenarum	Toad	MOR	MOR	MORT	LC50		2 d	77.52		ae mg/L	48	161996
Glyphosate ammonium salt	Rhinella	arenarum	Toad	BCM	ENZ	ACHE	LOAEL		2 d	1.85		ae mg/L	48	161996
Glyphosate ammonium salt	Rhinella	arenarum	Toad	BCM	ENZ	BCHE	LOAEL		2 d	1.85		ae mg/L	48	161996
Glyphosate ammonium salt	Rhinella	arenarum	Toad	BCM	ENZ	ALIE	LOAEL		2 d	1.85		ae mg/L	48	161996
Glyphosate ammonium salt	Rhinella	arenarum	Toad	BCM	ENZ	GSTR	LOAEL		2 d	1.85		ae mg/L	48	161996
Glyphosate ammonium salt	Rhinella	arenarum	Toad	MOR	MOR	MORT	LC50		0.25 d	49.65		ae mg/L	48	161996
Glyphosate ammonium salt	Rhinella	arenarum	Toad	MOR	MOR	MORT	LC50		0.5 d	47.25		ae mg/L	48	161996
Glyphosate ammonium salt	Rhinella	arenarum	Toad	MOR	MOR	MORT	LC50		1 d	38.76		ae mg/L	48	161996
Glyphosate ammonium salt	Rhinella	arenarum	Toad	MOR	MOR	MORT	LC50		2 d	38.76		ae mg/L	48	161996
Glyphosate ammonium salt	Rhinella	arenarum	Toad	BCM	ENZ	ACHE	LOAEL		2 d	1.85		ae mg/L	48	161996
Glyphosate ammonium salt	Rhinella	arenarum	Toad	BCM	ENZ	BCHE	LOAEL		2 d	1.85		ae mg/L	48	161996
Glyphosate ammonium salt	Rhinella	arenarum	Toad	BCM	ENZ	ALIE	LOAEL		2 d	1.85		ae mg/L	48	161996
Glyphosate ammonium salt	Rhinella	arenarum	Toad	BCM	ENZ	GSTR	LOAEL		2 d	1.85		ae mg/L	48	161996
Glyphosate ammonium salt	Rhinella	arenarum	Toad	MOR	MOR	MORT	LC50		0.25 d	96.87		ae mg/L	48	161996
Glyphosate ammonium salt	Rhinella	arenarum	Toad	MOR	MOR	MORT	LC50		0.5 d	77.52		ae mg/L	48	161996
Glyphosate ammonium salt	Rhinella	arenarum	Toad	MOR	MOR	MORT	LC50		1 d	73.77		ae mg/L	48	161996
Glyphosate ammonium salt	Rhinella	arenarum	Toad	MOR	MOR	MORT	LC50		2 d	73.77		ae mg/L	48	161996

Glyphosate ammonium salt	Rhinella	arenarum	Toad	BCM	ENZ	ACHE	LOAEL		2 d	1.85		ae mg/L	48	161996
Glyphosate ammonium salt	Rhinella	arenarum	Toad	BCM	ENZ	BCHE	LOAEL		2 d	1.85		ae mg/L	48	161996
Glyphosate ammonium salt	Rhinella	arenarum	Toad	BCM	ENZ	ALIE	LOAEL		2 d	1.85		ae mg/L	48	161996
Glyphosate ammonium salt	Rhinella	arenarum	Toad	BCM	ENZ	GSTR	LOAEL		2 d	1.85		ae mg/L	48	161996
Glyphosate	Glyptocidaris	crenularis	Sea Urchin	GRO	DVP	ABNM	EC50		0 d	13.2		uM	95	160866
Glyphosate	Glyptocidaris	crenularis	Sea Urchin	GRO	DVP	ABNM	EC50		0.0208 d	12.78		uM	95	160866
Glyphosate	Glyptocidaris	crenularis	Sea Urchin	GRO	DVP	ABNM	EC50		0.0417 d	10.78		uM	95	160866
Glyphosate	Glyptocidaris	crenularis	Sea Urchin	GRO	DVP	ABNM	EC50		0.4167 d	10.63		uM	95	160866
Glyphosate	Glyptocidaris	crenularis	Sea Urchin	GRO	DVP	ABNM	EC50		0.875 d	9.17		uM	95	160866
Glyphosate	Glyptocidaris	crenularis	Sea Urchin	GRO	DVP	ABNM	EC50		2.0833 d	6.35		uM	95	160866
Glyphosate	Glyptocidaris	crenularis	Sea Urchin	REP	REP	FERZ	EC50		0.0556 d	29.3		uM	95	160866
Glyphosate potassium salt	Lithobates	clamitans	Green Frog	MOR	MOR	SURV	NOAEL		14 d			ae kg/ha	100	161819
Glyphosate potassium salt	Lithobates	clamitans	Green Frog	GRO	MPH	SMIX	NOAEL		14 d			ae kg/ha	100	161819
Glyphosate isopropylamine salt	Biomphalaria	alexandrina	Snail	CEL	CEL	HCYT	LOAEL		3 d	0.02		mg/L	48	161812
Glyphosate isopropylamine salt	Biomphalaria	alexandrina	Snail	CEL	CEL	HCYT	LOAEL		7 d	0.02		mg/L	48	161812
Glyphosate isopropylamine salt	Biomphalaria	alexandrina	Snail	CEL	CEL	HCYT	NOAEL		0.25 d	0.02		mg/L	48	161812
Glyphosate isopropylamine salt	Biomphalaria	alexandrina	Snail	CEL	CEL	HCYT	NOAEL		1 d	0.02		mg/L	48	161812
Glyphosate isopropylamine salt	Biomphalaria	alexandrina	Snail	CEL	CEL	HCYT	NOAEL		7 d	0.02		mg/L	48	161812
Glyphosate isopropylamine salt	Biomphalaria	alexandrina	Snail	CEL	CEL	HCYT	LOAEL		0.25 d	0.02		mg/L	48	161812
Glyphosate isopropylamine salt	Biomphalaria	alexandrina	Snail	CEL	CEL	HCYT	LOAEL		1 d	0.02		mg/L	48	161812

Glyphosate isopropylamine salt	Biomphalaria	alexandrina	Snail	CEL	CEL	HCYT	LOAEL		3 d	0.02		mg/L	48	161812
Glyphosate isopropylamine salt	Biomphalaria	alexandrina	Snail	CEL	CEL	HCYT	NOAEL		7 d	0.02		mg/L	48	161812
Glyphosate isopropylamine salt	Biomphalaria	alexandrina	Snail	CEL	CEL	HCYT	LOAEL		0.25 d	0.02		mg/L	48	161812
Glyphosate isopropylamine salt	Biomphalaria	alexandrina	Snail	CEL	CEL	HCYT	LOAEL		1 d	0.02		mg/L	48	161812
Glyphosate isopropylamine salt	Biomphalaria	alexandrina	Snail	CEL	CEL	HCYT	LOAEL		3 d	0.02		mg/L	48	161812
Glyphosate isopropylamine salt	Biomphalaria	alexandrina	Snail	CEL	CEL	HCYT	NOAEL		7 d	0.02		mg/L	48	161812
Glyphosate isopropylamine salt	Biomphalaria	alexandrina	Snail	PHY	IMM	PHAG	LOAEL		0.25 d	0.02		mg/L	48	161812
Glyphosate isopropylamine salt	Biomphalaria	alexandrina	Snail	PHY	IMM	PHAG	NOAEL		1 d	0.02		mg/L	48	161812
Glyphosate isopropylamine salt	Biomphalaria	alexandrina	Snail	PHY	IMM	PHAG	LOAEL		7 d	0.02		mg/L	48	161812
Glyphosate isopropylamine salt	Biomphalaria	alexandrina	Snail	CEL	CEL	HCYT	NOAEL		0.25 d	0.02		mg/L	48	161812
Glyphosate isopropylamine salt	Biomphalaria	alexandrina	Snail	CEL	CEL	HCYT	LOAEL		1 d	0.02		mg/L	48	161812
Glyphosate isopropylamine salt	Biomphalaria	alexandrina	Snail	CEL	CEL	HCYT	NOAEL		3 d	0.02		mg/L	48	161812
Glyphosate isopropylamine salt	Biomphalaria	alexandrina	Snail	PHY	IMM	PHAG	LOAEL		3 d	0.02		mg/L	48	161812
Glyphosate isopropylamine salt	Parachlorella	kessleri	Green Algae	BCM	BCM	MLDH	NOAEL	LOAEL	4 d	40	50	mg/L	48	161954
Glyphosate isopropylamine salt	Parachlorella	kessleri	Green Algae	POP	POP	ABND	NOAEL	LOAEL	4 d	50	60	mg/L	48	161954

Glyphosate isopropylamine salt	Parachlorella	kessleri	Green Algae	BCM	ENZ	CTLS	LOAEL			4 d	40		mg/L	48	161954
Glyphosate isopropylamine salt	Parachlorella	kessleri	Green Algae	POP	POP	PGRT	EC50			4 d	55.62		mg/L	48	161954
Glyphosate isopropylamine salt	Caridina	nilotica	Shrimp	MOR	MOR	MORT	LOAEL			3 d	19.6		mg/L	98	156113
Glyphosate isopropylamine salt	Caridina	nilotica	Shrimp	MOR	MOR	MORT	LOAEL			4 d	19.6		mg/L	98	156113
Glyphosate isopropylamine salt	Caridina	nilotica	Shrimp	MOR	MOR	MORT	LC50			4 d	59.7408		mg/L	98	156113
Glyphosate isopropylamine salt	Caridina	nilotica	Shrimp	MOR	MOR	MORT	NOAEL			1 d	39.2		mg/L	98	156113
Glyphosate isopropylamine salt	Caridina	nilotica	Shrimp	MOR	MOR	MORT	LOAEL			1 d	78.4		mg/L	98	156113
Glyphosate isopropylamine salt	Caridina	nilotica	Shrimp	MOR	MOR	MORT	LOAEL			2 d	39.2		mg/L	98	156113
Glyphosate isopropylamine salt	Caridina	nilotica	Shrimp	MOR	MOR	MORT	NOAEL			2 d	19.6		mg/L	98	156113
Glyphosate isopropylamine salt	Caridina	nilotica	Shrimp	MOR	MOR	MORT	LC50			3 d	105.3794		mg/L	98	156113
Glyphosate isopropylamine salt	Phyllodia ptomus	annae	Copepod	MOR	MOR	MORT	LOAEL			2 d	0.098		mg/L	98	156113
Glyphosate isopropylamine salt	Phyllodia ptomus	annae	Copepod	MOR	MOR	MORT	LC50			2 d	1.03782		mg/L	98	156113
Glyphosate isopropylamine salt	Helix	aspersa	Brown Gardensnail	GRO	GRO	WGHT	LOAEL			12 d	856.9		g/ha	100	155488
Glyphosate isopropylamine salt	Helix	aspersa	Brown Gardensnail	MOR	MOR	MORT	NOAEL			12 d	856.9		g/ha	100	155488
Glyphosate isopropylamine salt	Helix	aspersa	Brown Gardensnail	MOR	MOR	HTCH	NOEC	LOEC		20 d	178	231	ppm	100	155483

Glyphosate isopropylamine salt	Helix	aspersa	Brown Gardensnail	MOR	MOR	HTCH	EC50		20	d	219		ppm	100	155483
Glyphosate isopropylamine salt	Helix	aspersa	Brown Gardensnail	MOR	MOR	HTCH	NOEC		20	d	300		ppm	100	155483
Glyphosate isopropylamine salt	Helix	aspersa	Brown Gardensnail	MOR	MOR	HTCH	NOEC	LOEC	20	d	20	40	ppm	100	155483
Glyphosate isopropylamine salt	Helix	aspersa	Brown Gardensnail	MOR	MOR	HTCH	EC10		20	d	31.2		ppm	100	155483
Glyphosate isopropylamine salt	Helix	aspersa	Brown Gardensnail	MOR	MOR	HTCH	EC50		20	d	43.1		ppm	100	155483
Glyphosate isopropylamine salt	Helix	aspersa	Brown Gardensnail	MOR	MOR	HTCH	NOEC	LOEC	20	d	44.4	66.7	ppm	100	155483
Glyphosate isopropylamine salt	Helix	aspersa	Brown Gardensnail	MOR	MOR	HTCH	EC10		20	d	47.3		ppm	100	155483
Glyphosate isopropylamine salt	Helix	aspersa	Brown Gardensnail	MOR	MOR	HTCH	EC50		20	d	55.3		ppm	100	155483
Glyphosate isopropylamine salt	Helix	aspersa	Brown Gardensnail	MOR	MOR	HTCH	NOEC	LOEC	20	d	45	90	ppm	100	155483
Glyphosate isopropylamine salt	Helix	aspersa	Brown Gardensnail	MOR	MOR	HTCH	EC10		20	d	50		ppm	100	155483
Glyphosate isopropylamine salt	Helix	aspersa	Brown Gardensnail	MOR	MOR	HTCH	EC50		20	d	90.3		ppm	100	155483
Glyphosate isopropylamine salt	Helix	aspersa	Brown Gardensnail	MOR	MOR	HTCH	NOEC	LOEC	20	d	90	130	ppm	100	155483
Glyphosate isopropylamine salt	Helix	aspersa	Brown Gardensnail	MOR	MOR	HTCH	EC10		20	d	64.7		ppm	100	155483
Glyphosate isopropylamine salt	Helix	aspersa	Brown Gardensnail	MOR	MOR	HTCH	EC50		20	d	130.5		ppm	100	155483
Glyphosate	Cynodon	sp.	Bermudagrass	PHY	INJ	DAMG	IC50		17	d	0.63		ae kg/ha	100	155802
Glyphosate	Cynodon	sp.	Bermudagrass	GRO	GRO	VGOR	IC50		31	d	0.71		ae kg/ha	100	155802

Glyphosate	Cynodon	sp.	Bermudagrass	PHY	INJ	DAMG	IC50		17	d	0.54		ae kg/ha	100	155802
Glyphosate	Cynodon	sp.	Bermudagrass	GRO	GRO	VGOR	IC50		31	d	0.52		ae kg/ha	100	155802
Glyphosate	Cynodon	sp.	Bermudagrass	PHY	INJ	DAMG	IC50		17	d	0.52		ae kg/ha	100	155802
Glyphosate	Cynodon	sp.	Bermudagrass	GRO	GRO	VGOR	IC50		31	d	0.56		ae kg/ha	100	155802
Glyphosate	Cynodon	sp.	Bermudagrass	PHY	INJ	DAMG	IC50		17	d	0.34		ae kg/ha	100	155802
Glyphosate	Cynodon	sp.	Bermudagrass	GRO	GRO	VGOR	IC50		31	d	0.39		ae kg/ha	100	155802
Glyphosate	Cynodon	sp.	Bermudagrass	PHY	INJ	DAMG	IC50		17	d	0.63		ae kg/ha	100	155802
Glyphosate	Cynodon	sp.	Bermudagrass	GRO	GRO	VGOR	IC50		31	d	0.57		ae kg/ha	100	155802
Glyphosate	Cynodon	sp.	Bermudagrass	PHY	INJ	DAMG	IC50		17	d	0.61		ae kg/ha	100	155802
Glyphosate	Cynodon	sp.	Bermudagrass	GRO	GRO	VGOR	IC50		31	d	0.66		ae kg/ha	100	155802
Glyphosate	Cynodon	sp.	Bermudagrass	PHY	INJ	DAMG	IC50		17	d	0.81		ae kg/ha	100	155802
Glyphosate	Cynodon	sp.	Bermudagrass	GRO	GRO	VGOR	IC50		31	d	0.92		ae kg/ha	100	155802
Glyphosate	Cynodon	sp.	Bermudagrass	PHY	INJ	DAMG	IC50		17	d	0.56		ae kg/ha	100	155802
Glyphosate	Cynodon	sp.	Bermudagrass	GRO	GRO	VGOR	IC50		31	d	0.83		ae kg/ha	100	155802
Glyphosate	Cynodon	sp.	Bermudagrass	PHY	INJ	DAMG	IC50		17	d	0.54		ae kg/ha	100	155802
Glyphosate	Cynodon	sp.	Bermudagrass	GRO	GRO	VGOR	IC50		31	d	0.8		ae kg/ha	100	155802
Glyphosate	Cynodon	sp.	Bermudagrass	PHY	INJ	DAMG	IC50		17	d	0.77		ae kg/ha	100	155802
Glyphosate	Cynodon	sp.	Bermudagrass	GRO	GRO	VGOR	IC50		31	d	1		ae kg/ha	100	155802
Glyphosate	Cynodon	dactylon	Bermudagrass	PHY	INJ	DAMG	IC50		17	d	1.14		ae kg/ha	100	155802
Glyphosate	Cynodon	dactylon	Bermudagrass	GRO	GRO	VGOR	IC50		31	d	0.99		ae kg/ha	100	155802
Glyphosate	Cynodon	sp.	Bermudagrass	PHY	INJ	DAMG	IC50		17	d	0.51		ae kg/ha	100	155802
Glyphosate	Cynodon	sp.	Bermudagrass	GRO	GRO	VGOR	IC50		31	d	0.76		ae kg/ha	100	155802
Glyphosate isopropylamine salt	Cyprinus	carpio	Common Carp	BCM	ENZ	ACHE	LOAEL		4	d	0.48		mg/L	100	161752

Glyphosate isopropylamine salt	Cyprinus	carpio	Common Carp	BCM	BCM	TBAR	LOAEL			4 d	0.48		mg/L	100	161752
Glyphosate isopropylamine salt	Cyprinus	carpio	Common Carp	BCM	ENZ	ACHE	LOAEL			4 d	0.48		mg/L	100	161752
Glyphosate isopropylamine salt	Astyanax	sp.	Astynaxes	BCM	ENZ	CTLS	NOAEL			4 d	0.006		ml/L	100	160633
Glyphosate isopropylamine salt	Astyanax	sp.	Astynaxes	PHY	PHY	LDPX	LOAEL			4 d	0.006		ml/L	100	160633
Glyphosate isopropylamine salt	Astyanax	sp.	Astynaxes	BCM	ENZ	GSTR	NOAEL			4 d	0.006		ml/L	100	160633
Glyphosate isopropylamine salt	Astyanax	sp.	Astynaxes	BCM	ENZ	ACHE	NOAEL			4 d	0.006		ml/L	100	160633
Glyphosate isopropylamine salt	Astyanax	sp.	Astynaxes	PHY	PHY	LDPX	NOAEL			4 d	0.003		ml/L	100	160633
Glyphosate isopropylamine salt	Astyanax	sp.	Astynaxes	CEL	GEN	DAMG	LOAEL			4 d	0.006		ml/L	100	160633
Glyphosate isopropylamine salt	Astyanax	sp.	Astynaxes	CEL	GEN	DAMG	NOAEL			4 d	0.003		ml/L	100	160633
Glyphosate isopropylamine salt	Ischaemum	magnum	Grass	POP	POP	BMAS	LOAEL			84 d	1.92672		lb/acre	100	155608
Glyphosate isopropylamine salt	NR	Plantae	Plant Kingdom	POP	POP	BMAS	LOAEL			45 d	0.8028		lb/acre	100	155644
Glyphosate isopropylamine salt	NR	Plantae	Plant Kingdom	POP	POP	BMAS	LOAEL			90 d	0.8028		lb/acre	100	155644
Glyphosate isopropylamine salt	NR	Plantae	Plant Kingdom	POP	POP	BMAS	LOAEL			165 d	0.8028		lb/acre	100	155644
Glyphosate isopropylamine salt	NR	Plantae	Plant Kingdom	POP	POP	BMAS	LOAEL			210 d	0.8028		lb/acre	100	155644
Glyphosate isopropylamine salt	NR	Plantae	Plant Kingdom	POP	POP	ABND	LOAEL			45 d	0.8028		lb/acre	100	155644

Glyphosate isopropylamine salt	NR	Plantae	Plant Kingdom	POP	POP	ABND	LOAEL		90 d	0.8028		lb/acre	100	155644
Glyphosate	Pardosa	milvina	Wolf Spider	BEH	AVO	CHEM	LOAEL		0.2917 d	4920		ppm	41	161972
Glyphosate	Pardosa	milvina	Wolf Spider	BEH	BEH	SMEL	NOAEL		0.0139 d	3148.8		ppm	41	161972
Glyphosate	Pardosa	milvina	Wolf Spider	BEH	BEH	SMEL	LOAEL		0.0139 d	3148.8		ppm	41	161972
Glyphosate	Pardosa	milvina	Wolf Spider	BEH	AVO	CHEM	LOAEL		0.2917 d	4920		ppm	41	161972
Glyphosate isopropylamine salt	Eisenia	andrei	Earthworm	POP	POP	ABND	NOAEL		28 d			ppm	100	160452
Glyphosate isopropylamine salt	Eisenia	andrei	Earthworm	GRO	GRO	WGHT	NOAEL		28 d			ppm	100	160452
Glyphosate isopropylamine salt	Eisenia	andrei	Earthworm	BEH	FDB	FCNS	NOAEL		7 d			ppm	100	160452
Glyphosate isopropylamine salt	Brassica	rapa	Bird Rape	REP	REP	GERM	NOAEL	LOAEL	28 d			ppm	100	160452
Glyphosate isopropylamine salt	Brassica	rapa	Bird Rape	GRO	GRO	LGTH	NOAEL		28 d			ppm	100	160452
Glyphosate isopropylamine salt	Porcellio nides	pruinus	Tropical Isopod	MOR	MOR	SURV	NOAEL		28 d			ppm	100	160452
Glyphosate isopropylamine salt	Porcellio nides	pruinus	Tropical Isopod	PHY	PHY	LDPX	NOAEL		28 d			ppm	100	160452
Glyphosate isopropylamine salt	Porcellio nides	pruinus	Tropical Isopod	BCM	ENZ	ACHE	NOAEL		28 d			ppm	100	160452
Glyphosate isopropylamine salt	Cyprinus	carpio	Common Carp	MOR	MOR	SURV	NOAEL	LOAEL	2 d	0.001	0.01 mg/dm3		100	161361
Glyphosate isopropylamine salt	Cyprinus	carpio	Common Carp	MOR	MOR	SURV	LOAEL		3 d	0.001	mg/dm3		100	161361
Glyphosate isopropylamine salt	Cyprinus	carpio	Common Carp	MOR	MOR	MORT	NOAEL	LOAEL	1 d	0.08	0.8 mg/dm3		100	161361
Glyphosate isopropylamine salt	Cyprinus	carpio	Common Carp	MOR	MOR	MORT	NOAEL	LOAEL	1 d	0.04	0.08 mg/dm3		100	161361
Glyphosate isopropylamine salt	Cyprinus	carpio	Common Carp	MOR	MOR	SURV	NOAEL	LOAEL	4 d	0.001	0.01 mg/dm3		100	161361

Glyphosate	Coturnix	japonica	Japanese Quail	GRO	GRO	WGHT	NOAEL		8 d	3470		ppm	100	161959
Glyphosate	Coturnix	japonica	Japanese Quail	BEH	FDB	FCNS	NOAEL		8 d	3470		ppm	100	161959
Glyphosate	Coturnix	japonica	Japanese Quail	GRO	MPH	WGHT	NOAEL		8 d	3470		ppm	100	161959
Glyphosate	Coturnix	japonica	Japanese Quail	GRO	MPH	WGHT	NOAEL		8 d	3470		ppm	100	161959
Glyphosate	Coturnix	japonica	Japanese Quail	BCM	BCM	LIPD	NOAEL		8 d	3470		ppm	100	161959
Glyphosate	Coturnix	japonica	Japanese Quail	BCM	BCM	LIPD	NOAEL		8 d	3470		ppm	100	161959
Glyphosate	Daucus	carota	Wild Carrot	PHY	INJ	GINJ	LOAEL		21 d	0.06244		lb/acre	100	157165
Glyphosate	Daucus	carota	Wild Carrot	POP	POP	BMAS	NOAEL		85 d	0.06244		lb/acre	100	157165
Glyphosate	Cuscuta	gronovii	Swamp Dodder	POP	POP	CNTL	LOAEL		21 d	0.06244		lb/acre	100	157165
Glyphosate	Kochia	scoparia	Kochia	PHY	INJ	GINJ	LOAEL		17 d	1.7		ae kg/ha	100	157230
Glyphosate	Kochia	scoparia	Kochia	POP	POP	CNTL	LOAEL		32 d	1.7		ae kg/ha	100	157230
Glyphosate	Kochia	scoparia	Kochia	PHY	INJ	GINJ	LOAEL		14 d	1.7		ae kg/ha	100	157230
Glyphosate	Kochia	scoparia	Kochia	POP	POP	CNTL	LOAEL		30 d	1.7		ae kg/ha	100	157230
Glyphosate	Kochia	scoparia	Kochia	POP	POP	COVR	LOAEL		39 d	1.7		ae kg/ha	100	157230
Glyphosate	Kochia	scoparia	Kochia	POP	POP	COVR	LOAEL		41 d	1.7		ae kg/ha	100	157230
Glyphosate	Kochia	scoparia	Kochia	POP	POP	COVR	NOAEL		90 d	1.7		ae kg/ha	100	157230
Glyphosate	Cuscuta	campestris	Field Dodder	POP	POP	ABND	LOAEL		5 d	0.011125		lb/acre	100	157176
Glyphosate	Cuscuta	campestris	Field Dodder	POP	POP	ABND	LOAEL		5 d	0.011125		lb/acre	100	157176
Glyphosate	Guizotia	abyssinica	Ramtilia	POP	POP	BMAS	NOAEL		hv	0.0445		lb/acre	100	157176
Glyphosate	Guizotia	abyssinica	Ramtilia	POP	POP	BMAS	NOAEL		hv	0.0445		lb/acre	100	157176
Glyphosate isopropylamine salt	Euseius	victoriensis	Victorian Predator Mite	MOR	MOR	MORT	NOAEL		7 d	2187		ppm	100	156426
Glyphosate isopropylamine salt	Euseius	victoriensis	Victorian Predator Mite	REP	REP	FCND	NOAEL		d	2187		ppm	100	156426
Glyphosate isopropylamine salt	Goodea	atripinnis	Blackfin Goodea	MOR	MOR	MORT	LC50		4 d	38.95		mg/L	100	161311
Glyphosate isopropylamine salt	Goodea	atripinnis	Blackfin Goodea	BCM	BCM	MLDH	NOAEL	LOAEL	4 d	3.89	7.79	mg/L	100	161311
Glyphosate isopropylamine salt	Goodea	atripinnis	Blackfin Goodea	BCM	BCM	MLDH	LOAEL		4 d	3.89		mg/L	100	161311
Glyphosate isopropylamine salt	Goodea	atripinnis	Blackfin Goodea	BCM	ENZ	CTLS	NOAEL	LOAEL	4 d	3.89	7.79	mg/L	100	161311
Glyphosate isopropylamine salt	Goodea	atripinnis	Blackfin Goodea	BCM	ENZ	CTLS	LOAEL		4 d	3.89		mg/L	100	161311

Glyphosate isopropylamine salt	Goodea	atripinnis	Blackfin Goodea	BCM	BCM	GLYC	NOAEL	LOAEL		4 d	3.89	7.79	mg/L	100	161311
Glyphosate isopropylamine salt	Leporinus	obtusidens	Characin	BCM	BCM	PRCO	LOAEL			4 d	3		mg/L	100	161768
Glyphosate isopropylamine salt	Leporinus	obtusidens	Characin	BCM	BCM	PRCO	LOAEL			4 d	3		mg/L	100	161768
Glyphosate isopropylamine salt	Leporinus	obtusidens	Characin	BCM	BCM	MLDH	LOAEL			4 d	3		mg/L	100	161768
Glyphosate isopropylamine salt	Leporinus	obtusidens	Characin	BCM	BCM	MLDH	LOAEL			4 d	3		mg/L	100	161768
Glyphosate isopropylamine salt	Leporinus	obtusidens	Characin	BCM	BCM	PCAR	LOAEL			4 d	3		mg/L	100	161768
Glyphosate isopropylamine salt	Leporinus	obtusidens	Characin	BCM	ENZ	CTLS	NOAEL	LOAEL		4 d	3	6	mg/L	100	161768
Glyphosate isopropylamine salt	Leporinus	obtusidens	Characin	BCM	BCM	GLUC	LOAEL			4 d	3		mg/L	100	161768
Glyphosate isopropylamine salt	Leporinus	obtusidens	Characin	BCM	BCM	GLUC	LOAEL			4 d	3		mg/L	100	161768
Glyphosate isopropylamine salt	Leporinus	obtusidens	Characin	BCM	BCM	LACT	LOAEL			4 d	3		mg/L	100	161768
Glyphosate isopropylamine salt	Leporinus	obtusidens	Characin	BCM	BCM	MLDH	NOAEL			4 d	20		mg/L	100	161768
Glyphosate	Cherax	quadricarinatus	Australian Redclaw Crayfish	MOR	MOR	MORT	NR-ZERO			50 d	22.5		mg/L	100	161792
Glyphosate	Cherax	quadricarinatus	Australian Redclaw Crayfish	GRO	GRO	GAIN	NOAEL			50 d	22.5		mg/L	100	161792
Glyphosate	Cherax	quadricarinatus	Australian Redclaw Crayfish	PHY	PHY	OXYG	LOAEL			50 d	22.5		mg/L	100	161792
Glyphosate	Cherax	quadricarinatus	Australian Redclaw Crayfish	BCM	BCM	GLYC	LOAEL			50 d	22.5		mg/L	100	161792

Glyphosate	Cherax	quadricarin atus	Australian Redclaw Crayfish	BCM	BCM	GLYC	LOAEL		50	d	22.5		mg/L	100	161792
Glyphosate	Cherax	quadricarin atus	Australian Redclaw Crayfish	BCM	BCM	PRTL	NOAEL		50	d	22.5		mg/L	100	161792
Glyphosate	Cherax	quadricarin atus	Australian Redclaw Crayfish	BCM	BCM	PRTL	NOAEL		50	d	22.5		mg/L	100	161792
Glyphosate	Cherax	quadricarin atus	Australian Redclaw Crayfish	BCM	BCM	LIPD	NOAEL		50	d	22.5		mg/L	100	161792
Glyphosate	Cherax	quadricarin atus	Australian Redclaw Crayfish	BCM	BCM	LIPD	NOAEL		50	d	22.5		mg/L	100	161792
Glyphosate	Cherax	quadricarin atus	Australian Redclaw Crayfish	BCM	BCM	GLUC	NOAEL		50	d	22.5		mg/L	100	161792
Glyphosate	Cherax	quadricarin atus	Australian Redclaw Crayfish	BCM	BCM	PRTL	NOAEL		50	d	22.5		mg/L	100	161792
Glyphosate	Cherax	quadricarin atus	Australian Redclaw Crayfish	BCM	BCM	LIPD	NOAEL		50	d	22.5		mg/L	100	161792
Glyphosate isopropylamine salt	Rattus	norvegicus	Norway Rat	REP	REP	COUR	LOAEL		63	d	50		mg/kg bdwt	100	161810
Glyphosate isopropylamine salt	Rattus	norvegicus	Norway Rat	BCM	HRM	TSTR	LOAEL		63	d	50		mg/kg bdwt	100	161810
Glyphosate isopropylamine salt	Rattus	norvegicus	Norway Rat	CEL	GEN	LHMR	LOAEL		63	d	50		mg/kg bdwt	100	161810
Glyphosate isopropylamine salt	Rattus	norvegicus	Norway Rat	BCM	BCM	PRCO	LOAEL		63	d	50		mg/kg bdwt	100	161810
Glyphosate isopropylamine salt	Rattus	norvegicus	Norway Rat	GRO	MPH	WGHT	LOAEL		63	d	50		mg/kg bdwt	100	161810
Glyphosate isopropylamine salt	Rattus	norvegicus	Norway Rat	GRO	DVP	SXDP	LOAEL		46	d	50		mg/kg bdwt	100	161810
Glyphosate isopropylamine salt	Rattus	norvegicus	Norway Rat	GRO	GRO	WGHT	LOAEL		46	d	50		mg/kg bdwt	100	161810
Glyphosate	NR	Ostreoida	Bivalve Order	CEL	GEN	DAMG	NOAEL		0.0417	d	0.005		mg/L	100	161689

Glyphosate isopropylamine salt	NR	Ostreoida	Bivalve Order	CEL	GEN	DAMG	NOAEL		0.0417	d	0.005		mg/L	100	161689
Glyphosate	NR	Ostreoida	Bivalve Order	GRO	DVP	ABNM	NOAEL			ma	5		AI ug/L	100	161689
Glyphosate isopropylamine salt	NR	Ostreoida	Bivalve Order	GRO	DVP	ABNM	NOAEL			ma	5		AI ug/L	100	161689
Glyphosate isopropylamine salt	NR	Ostreoida	Bivalve Order	GRO	DVP	ABNM	NOAEL			ma	5		AI ug/L	100	161689
Glyphosate	NR	Ostreoida	Bivalve Order	GRO	DVP	ABNM	NOAEL			ma	5		AI ug/L	100	161689
Glyphosate isopropylamine salt	NR	Ostreoida	Bivalve Order	GRO	DVP	ABNM	NOAEL			ma	5		AI ug/L	100	161689
Glyphosate	NR	Ostreoida	Bivalve Order	GRO	DVP	ABNM	NOAEL	LOAEL		ma	1.5	2.5	AI ug/L	100	161689
Glyphosate	Jenynsia	multidentata	Onesided Livebearer	CEL	HIS	ATPH,N CRO	NOAEL	LOAEL	4	d	3.735	7.47	mg/L	74.7	161672
Glyphosate	Jenynsia	multidentata	Onesided Livebearer	CEL	HIS	ATPH,N CRO	LOAEL		4	d	3.735		mg/L	74.7	161672
Glyphosate	Jenynsia	multidentata	Onesided Livebearer	CEL	HIS	EDMA,IFLM	NOAEL		4	d	26.145		mg/L	74.7	161672
Glyphosate	Jenynsia	multidentata	Onesided Livebearer	CEL	HIS	ATPH,C NGT,ED MA,HE MR,HY PL,HYP T,IFLM, NCRO	LOAEL		4	d	3.735		mg/L	74.7	161672
Glyphosate	Jenynsia	multidentata	Onesided Livebearer	CEL	HIS	ATPH,C NGT,ED MA,HE MR,HY PL,HYP T,IFLM, NCRO	LOAEL		4	d	3.735		mg/L	74.7	161672
Glyphosate	Jenynsia	multidentata	Onesided Livebearer	CEL	HIS	ATPH,C NGT,ED MA,HE MR,HY PL,HYP T,IFLM, NCRO	LOAEL		4	d	3.735		mg/L	74.7	161672
Glyphosate	Jenynsia	multidentata	Onesided Livebearer	CEL	HIS	LMLL	NOAEL	LOAEL	4	d	7.47	14.94	mg/L	74.7	161672

Glyphosate	Jenynsia	multidentat a	Onesided Livebearer	CEL	HIS	GHIS	NOAEL	LOAEL	4 d	14.94	26.145	mg/L	74.7	161672
Glyphosate	Jenynsia	multidentat a	Onesided Livebearer	CEL	CEL	LMFI	NOAEL	LOAEL	4 d	7.47	14.94	mg/L	74.7	161672
Glyphosate	Jenynsia	multidentat a	Onesided Livebearer	MOR	MOR	MORT	LC50		4 d	14.20794		mg/L	74.7	161672
Glyphosate	Jenynsia	multidentat a	Onesided Livebearer	MOR	MOR	MORT	NR- ZERO		4 d	3.735		mg/L	74.7	161672
Glyphosate	Jenynsia	multidentat a	Onesided Livebearer	MOR	MOR	MORT	NR- LETH		4 d	44.82		mg/L	74.7	161672
Glyphosate	Jenynsia	multidentat a	Onesided Livebearer	CEL	HIS	CNGT,H EMR	NOAEL		4 d	26.145		mg/L	74.7	161672
Glyphosate	Jenynsia	multidentat a	Onesided Livebearer	CEL	HIS	HYPL,H YPT	NOAEL	LOAEL	4 d	3.735	7.47	mg/L	74.7	161672
Glyphosate	Jenynsia	multidentat a	Onesided Livebearer	CEL	HIS	EDMA,I FLM	NOAEL		4 d	26.145		mg/L	74.7	161672
Glyphosate	Jenynsia	multidentat a	Onesided Livebearer	CEL	HIS	CNGT,H EMR	LOAEL		4 d	3.735		mg/L	74.7	161672
Glyphosate	Jenynsia	multidentat a	Onesided Livebearer	CEL	HIS	LMLL	LOAEL		4 d	3.735		mg/L	74.7	161672
Glyphosate	Jenynsia	multidentat a	Onesided Livebearer	CEL	HIS	LMLL	LOAEL		4 d	3.735		mg/L	74.7	161672
Glyphosate	Jenynsia	multidentat a	Onesided Livebearer	REP	REP	MONT	LOAEL		28 d	0.3735		mg/L	74.7	161672
Glyphosate	Jenynsia	multidentat a	Onesided Livebearer	CEL	HIS	CNGT,H EMR	NOAEL		7 d	0.3735		mg/L	74.7	161672
Glyphosate	Jenynsia	multidentat a	Onesided Livebearer	CEL	HIS	CNGT,H EMR	NOAEL		28 d	0.3735		mg/L	74.7	161672
Glyphosate	Jenynsia	multidentat a	Onesided Livebearer	CEL	HIS	ATPH,N CRO	NOAEL		7 d	0.3735		mg/L	74.7	161672
Glyphosate	Jenynsia	multidentat a	Onesided Livebearer	CEL	HIS	ATPH,N CRO	NOAEL		28 d	0.3735		mg/L	74.7	161672
Glyphosate	Jenynsia	multidentat a	Onesided Livebearer	CEL	HIS	HYPL,H YPT	NOAEL		7 d	0.3735		mg/L	74.7	161672
Glyphosate	Jenynsia	multidentat a	Onesided Livebearer	CEL	HIS	HYPL,H YPT	NOAEL		28 d	0.3735		mg/L	74.7	161672
Glyphosate	Jenynsia	multidentat a	Onesided Livebearer	CEL	HIS	EDMA,I FLM	NOAEL		7 d	0.3735		mg/L	74.7	161672
Glyphosate	Jenynsia	multidentat a	Onesided Livebearer	CEL	HIS	EDMA,I FLM	NOAEL		28 d	0.3735		mg/L	74.7	161672
Glyphosate	Jenynsia	multidentat a	Onesided Livebearer	CEL	HIS	CNGT,H EMR	NOAEL		7 d	0.3735		mg/L	74.7	161672
Glyphosate	Jenynsia	multidentat a	Onesided Livebearer	CEL	HIS	CNGT,H EMR	NOAEL		7 d	0.3735		mg/L	74.7	161672
Glyphosate	Jenynsia	multidentat a	Onesided Livebearer	CEL	HIS	ATPH,N CRO	NOAEL		28 d	0.3735		mg/L	74.7	161672

Glyphosate	Jenynsia	multidentat a	Onesided Livebearer	CEL	HIS	EDMA,I FLM	NOAEL		7 d	0.3735		mg/L	74.7	161672
Glyphosate	Jenynsia	multidentat a	Onesided Livebearer	CEL	HIS	ATPH,C NGT,ED MA,HE MR,HY PL,HYP T,IFLM, NCRO	LOAEL		7 d	0.3735		mg/L	74.7	161672
Glyphosate	Jenynsia	multidentat a	Onesided Livebearer	CEL	HIS	ATPH,C NGT,ED MA,HE MR,HY PL,HYP T,IFLM, NCRO	LOAEL		7 d	0.3735		mg/L	74.7	161672
Glyphosate	Jenynsia	multidentat a	Onesided Livebearer	CEL	HIS	ATPH,C NGT,ED MA,HE MR,HY PL,HYP T,IFLM, NCRO	LOAEL		28 d	0.3735		mg/L	74.7	161672
Glyphosate	Jenynsia	multidentat a	Onesided Livebearer	CEL	HIS	ATPH,C NGT,ED MA,HE MR,HY PL,HYP T,IFLM, NCRO	LOAEL		7 d	0.3735		mg/L	74.7	161672
Glyphosate	Jenynsia	multidentat a	Onesided Livebearer	CEL	HIS	LMLL	NOAEL		7 d	0.3735		mg/L	74.7	161672
Glyphosate	Jenynsia	multidentat a	Onesided Livebearer	CEL	HIS	LMLL	NOAEL		7 d	0.3735		mg/L	74.7	161672
Glyphosate	Jenynsia	multidentat a	Onesided Livebearer	CEL	HIS	LMLL	NOAEL		28 d	0.3735		mg/L	74.7	161672
Glyphosate	Jenynsia	multidentat a	Onesided Livebearer	CEL	HIS	LMLL	NOAEL		7 d	0.3735		mg/L	74.7	161672
Glyphosate	Jenynsia	multidentat a	Onesided Livebearer	CEL	HIS	LMLL	NOAEL		28 d	0.3735		mg/L	74.7	161672
Glyphosate	Jenynsia	multidentat a	Onesided Livebearer	CEL	HIS	LMLL	NOAEL		7 d	0.3735		mg/L	74.7	161672

Glyphosate	Jenynsia	multidentat a	Onesided Livebearer	CEL	HIS	LMLL	NOAEL		28	d	0.3735		mg/L	74.7	161672
Glyphosate	Jenynsia	multidentat a	Onesided Livebearer	CEL	CEL	LMFI	LOAEL		7	d	0.3735		mg/L	74.7	161672
Glyphosate	Jenynsia	multidentat a	Onesided Livebearer	CEL	CEL	LMFI	LOAEL		28	d	0.3735		mg/L	74.7	161672
Glyphosate	Jenynsia	multidentat a	Onesided Livebearer	REP	REP	MONT	NOAEL		7	d	0.3735		mg/L	74.7	161672
Glyphosate	Jenynsia	multidentat a	Onesided Livebearer	REP	REP	MONT	NOAEL		28	d	0.3735		mg/L	74.7	161672
Glyphosate	Jenynsia	multidentat a	Onesided Livebearer	REP	REP	MONT	NOAEL		7	d	0.3735		mg/L	74.7	161672
Glyphosate	Jenynsia	multidentat a	Onesided Livebearer	REP	REP	MONT	NOAEL		28	d	0.3735		mg/L	74.7	161672
Glyphosate	Jenynsia	multidentat a	Onesided Livebearer	REP	REP	MONT	LOAEL		7	d	0.3735		mg/L	74.7	161672
Glyphosate	Jenynsia	multidentat a	Onesided Livebearer	REP	REP	MONT	LOAEL		28	d	0.3735		mg/L	74.7	161672
Glyphosate	Jenynsia	multidentat a	Onesided Livebearer	REP	REP	MONT	LOAEL		7	d	0.3735		mg/L	74.7	161672
Glyphosate	Jenynsia	multidentat a	Onesided Livebearer	MOR	MOR	MORT	NR- ZERO		28	d	0.3735		mg/L	74.7	161672
Glyphosate	Jenynsia	multidentat a	Onesided Livebearer	CEL	HIS	ATPH,N CRO	NOAEL		7	d	0.3735		mg/L	74.7	161672
Glyphosate	Jenynsia	multidentat a	Onesided Livebearer	CEL	HIS	ATPH,C NGT,ED MA,HE MR,HY PL,HYP T,IFLM, NCRO	LOAEL		28	d	0.3735		mg/L	74.7	161672
Glyphosate	Jenynsia	multidentat a	Onesided Livebearer	CEL	HIS	LMLL	NOAEL		28	d	0.3735		mg/L	74.7	161672
Glyphosate	Jenynsia	multidentat a	Onesided Livebearer	CEL	HIS	EDMA,I FLM	NOAEL		28	d	0.3735		mg/L	74.7	161672
Glyphosate	Jenynsia	multidentat a	Onesided Livebearer	CEL	HIS	ATPH,C NGT,ED MA,HE MR,HY PL,HYP T,IFLM, NCRO	LOAEL		28	d	0.3735		mg/L	74.7	161672
Glyphosate	Cnestero don	decemmacu latus	Ten-Spotted Livebearer	BCM	ENZ	ACHE	LOAEL		4	d	1		mg/L	95	161670

Glyphosate	Cnesterodon	decemmaculatus	Ten-Spotted Livebearer	GRO	GRO	COND	NOAEL		4 d			mg/L	95	161670
Glyphosate	Cnesterodon	decemmaculatus	Ten-Spotted Livebearer	BCM	ENZ	ACHE	NOAEL		4 d			mg/L	95	161670
Glyphosate	Cnesterodon	decemmaculatus	Ten-Spotted Livebearer	MOR	MOR	MORT	NR-ZERO		4 d			mg/L	95	161670
Glyphosate	Cnesterodon	decemmaculatus	Ten-Spotted Livebearer	BCM	ENZ	ACHE	NOAEL		4 d			mg/L	95	161670
Glyphosate	Hydra	attenuata	Hydra	MOR	MOR	MORT	LC01		4 d	10.7		mg/L	100	159864
Glyphosate	Hydra	attenuata	Hydra	MOR	MOR	MORT	LC05		4 d	13.3		mg/L	100	159864
Glyphosate	Hydra	attenuata	Hydra	MOR	MOR	MORT	LC10		4 d	14.8		mg/L	100	159864
Glyphosate	Hydra	attenuata	Hydra	MOR	MOR	MORT	LC15		4 d	15.9		mg/L	100	159864
Glyphosate	Hydra	attenuata	Hydra	MOR	MOR	MORT	LC50		4 d	21.8		mg/L	100	159864
Glyphosate	Hydra	attenuata	Hydra	MOR	MOR	MORT	LC85		4 d	29.9		mg/L	100	159864
Glyphosate	Hydra	attenuata	Hydra	MOR	MOR	MORT	LC01		4 d	14.8		mg/L	100	159864
Glyphosate	Hydra	attenuata	Hydra	MOR	MOR	MORT	LC05		4 d	15.7		mg/L	100	159864
Glyphosate	Hydra	attenuata	Hydra	MOR	MOR	MORT	LC10		4 d	16.2		mg/L	100	159864
Glyphosate	Hydra	attenuata	Hydra	MOR	MOR	MORT	LC15		4 d	16.6		mg/L	100	159864
Glyphosate	Hydra	attenuata	Hydra	MOR	MOR	MORT	LC50		4 d	18.2		mg/L	100	159864
Glyphosate	Hydra	attenuata	Hydra	MOR	MOR	MORT	LC85		4 d	20		mg/L	100	159864
Glyphosate isopropylamine salt	Lithobates	pipiens	Leopard Frog	MOR	MOR	MORT	LOEC		4 d	1.32		ae mg/L	29.7	161774
Glyphosate isopropylamine salt	Lithobates	pipiens	Leopard Frog	MOR	MOR	MORT	NOEC		4 d	1.29		ae mg/L	29.7	161774
Glyphosate isopropylamine salt	Lithobates	pipiens	Leopard Frog	MOR	MOR	MORT	MATC		4 d	1.31		ae mg/L	29.7	161774
Glyphosate isopropylamine salt	Lithobates	pipiens	Leopard Frog	MOR	MOR	MORT	LC50		4 d	1.8		ae mg/L	29.7	161774
Glyphosate isopropylamine salt	Lithobates	sphenoccephalus ssp. sphenoccephalus	Florida Leopard Frog	MOR	MOR	MORT	MATC		4 d	1.67		ae mg/L	29.7	161774
Glyphosate isopropylamine salt	Lithobates	sphenoccephalus ssp. sphenoccephalus	Florida Leopard Frog	MOR	MOR	MORT	LC50		4 d	2.05		ae mg/L	29.7	161774
Glyphosate isopropylamine salt	Lithobates	sphenoccephalus ssp. sphenoccephalus	Florida Leopard Frog	MOR	MOR	MORT	NOEC		4 d	1.52		ae mg/L	29.7	161774

Glyphosate isopropylamine salt	Lithobates	sphenocephalus ssp. sphenocephalus	Florida Leopard Frog	MOR	MOR	MORT	LOEC		4 d	1.81		ae mg/L	29.7	161774
Glyphosate isopropylamine salt	Hyla	chrysoscelis	Southern Grey Tree Frog	MOR	MOR	MORT	LC50		4 d	2.5		ae mg/L	29.7	161774
Glyphosate isopropylamine salt	Hyla	chrysoscelis	Southern Grey Tree Frog	MOR	MOR	MORT	NOEC		4 d	1.74		ae mg/L	29.7	161774
Glyphosate isopropylamine salt	Hyla	chrysoscelis	Southern Grey Tree Frog	MOR	MOR	MORT	LOEC		4 d	2.1		ae mg/L	29.7	161774
Glyphosate isopropylamine salt	Hyla	chrysoscelis	Southern Grey Tree Frog	MOR	MOR	MORT	MATC		4 d	1.92		ae mg/L	29.7	161774
Glyphosate isopropylamine salt	Rana	catesbeiana	Bullfrog	MOR	MOR	MORT	MATC		4 d	2.27		ae mg/L	29.7	161774
Glyphosate isopropylamine salt	Rana	catesbeiana	Bullfrog	MOR	MOR	MORT	LC50		4 d	2.77		ae mg/L	29.7	161774
Glyphosate isopropylamine salt	Rana	catesbeiana	Bullfrog	MOR	MOR	MORT	NOEC		4 d	2.02		ae mg/L	29.7	161774
Glyphosate isopropylamine salt	Rana	catesbeiana	Bullfrog	MOR	MOR	MORT	LOEC		4 d	2.52		ae mg/L	29.7	161774
Glyphosate isopropylamine salt	Anaxyrus	fowleri	Fowler's Toad	MOR	MOR	MORT	MATC		4 d	3.68		ae mg/L	29.7	161774
Glyphosate isopropylamine salt	Anaxyrus	fowleri	Fowler's Toad	MOR	MOR	MORT	LC50		4 d	4.21		ae mg/L	29.7	161774
Glyphosate isopropylamine salt	Anaxyrus	fowleri	Fowler's Toad	MOR	MOR	MORT	NOEC		4 d	3.4		ae mg/L	29.7	161774
Glyphosate isopropylamine salt	Anaxyrus	fowleri	Fowler's Toad	MOR	MOR	MORT	LOEC		4 d	3.95		ae mg/L	29.7	161774
Glyphosate isopropylamine salt	Lithobates	clamitans ssp. clamitans	Bronze Frog	MOR	MOR	MORT	MATC		4 d	3.48		ae mg/L	29.7	161774
Glyphosate isopropylamine salt	Lithobates	clamitans ssp. clamitans	Bronze Frog	MOR	MOR	MORT	LC50		4 d	4.22		ae mg/L	29.7	161774

Glyphosate isopropylamine salt	Lithobates	clamitans ssp. clamitans	Bronze Frog	MOR	MOR	MORT	NOEC		4 d	3.27		ae mg/L	29.7	161774
Glyphosate isopropylamine salt	Lithobates	clamitans ssp. clamitans	Bronze Frog	MOR	MOR	MORT	LOEC		4 d	3.68		ae mg/L	29.7	161774
Glyphosate, Monopotassium salt	Lithobates	sphenocephalus ssp. sphenocephalus	Florida Leopard Frog	MOR	MOR	MORT	MATC		4 d	0.83		ae mg/L	39.9	161774
Glyphosate, Monopotassium salt	Lithobates	sphenocephalus ssp. sphenocephalus	Florida Leopard Frog	MOR	MOR	MORT	LC50		4 d	1.33		ae mg/L	39.9	161774
Glyphosate, Monopotassium salt	Lithobates	sphenocephalus ssp. sphenocephalus	Florida Leopard Frog	MOR	MOR	MORT	NOEC		4 d	0.68		ae mg/L	39.9	161774
Glyphosate, Monopotassium salt	Lithobates	sphenocephalus ssp. sphenocephalus	Florida Leopard Frog	MOR	MOR	MORT	LOEC		4 d	0.98		ae mg/L	39.9	161774
Glyphosate, Monopotassium salt	Anaxyrus	fowleri	Fowler's Toad	MOR	MOR	MORT	MATC		4 d	1.55		ae mg/L	39.9	161774
Glyphosate, Monopotassium salt	Anaxyrus	fowleri	Fowler's Toad	MOR	MOR	MORT	LC50		4 d	1.96		ae mg/L	39.9	161774
Glyphosate, Monopotassium salt	Anaxyrus	fowleri	Fowler's Toad	MOR	MOR	MORT	NOEC		4 d	1.54		ae mg/L	39.9	161774
Glyphosate, Monopotassium salt	Anaxyrus	fowleri	Fowler's Toad	MOR	MOR	MORT	LOEC		4 d	1.56		ae mg/L	39.9	161774
Glyphosate, Monopotassium salt	Rana	catesbeiana	Bullfrog	MOR	MOR	MORT	LC50		4 d	1.97		ae mg/L	39.9	161774
Glyphosate, Monopotassium salt	Rana	catesbeiana	Bullfrog	MOR	MOR	MORT	NOEC		4 d	1.33		ae mg/L	39.9	161774
Glyphosate, Monopotassium salt	Rana	catesbeiana	Bullfrog	MOR	MOR	MORT	LOEC		4 d	1.37		ae mg/L	39.9	161774
Glyphosate, Monopotassium salt	Rana	catesbeiana	Bullfrog	MOR	MOR	MORT	MATC		4 d	1.35		ae mg/L	39.9	161774

Glyphosate, Monopotassium salt	Lithobates	pipiens	Leopard Frog	MOR	MOR	MORT	LC50			4 d	2.27		ae mg/L	39.9	161774
Glyphosate, Monopotassium salt	Lithobates	pipiens	Leopard Frog	MOR	MOR	MORT	NOEC			4 d	1.65		ae mg/L	39.9	161774
Glyphosate, Monopotassium salt	Lithobates	pipiens	Leopard Frog	MOR	MOR	MORT	LOEC			4 d	1.68		ae mg/L	39.9	161774
Glyphosate, Monopotassium salt	Lithobates	pipiens	Leopard Frog	MOR	MOR	MORT	MATC			4 d	1.67		ae mg/L	39.9	161774
Glyphosate, Monopotassium salt	Lithobates	clamitans ssp. clamitans	Bronze Frog	MOR	MOR	MORT	MATC			4 d	2.14		ae mg/L	39.9	161774
Glyphosate, Monopotassium salt	Lithobates	clamitans ssp. clamitans	Bronze Frog	MOR	MOR	MORT	LC50			4 d	2.77		ae mg/L	39.9	161774
Glyphosate, Monopotassium salt	Lithobates	clamitans ssp. clamitans	Bronze Frog	MOR	MOR	MORT	NOEC			4 d	1.91		ae mg/L	39.9	161774
Glyphosate, Monopotassium salt	Lithobates	clamitans ssp. clamitans	Bronze Frog	MOR	MOR	MORT	LOEC			4 d	2.37		ae mg/L	39.9	161774
Glyphosate, Monopotassium salt	Hyla	chrysoscelis	Southern Grey Tree Frog	MOR	MOR	MORT	LC50			4 d	3.26		ae mg/L	39.9	161774
Glyphosate, Monopotassium salt	Hyla	chrysoscelis	Southern Grey Tree Frog	MOR	MOR	MORT	NOEC			4 d	2.48		ae mg/L	39.9	161774
Glyphosate, Monopotassium salt	Hyla	chrysoscelis	Southern Grey Tree Frog	MOR	MOR	MORT	LOEC			4 d	2.87		ae mg/L	39.9	161774
Glyphosate, Monopotassium salt	Hyla	chrysoscelis	Southern Grey Tree Frog	MOR	MOR	MORT	MATC			4 d	2.68		ae mg/L	39.9	161774
Glyphosate	Plankton	sp.	Blue-green Algae	POP	POP	ABND	NOAEL			2 d	1		uM	100	161943
Glyphosate	Aulacoseira	sp.	Diatom	POP	POP	ABND	NOAEL			2 d	1		uM	100	161943
Glyphosate	Microcystis	sp.	Blue-Green Algae	POP	POP	ABND	LOAEL			2 d	1		uM	100	161943
Glyphosate	Aquatic	community	Aquatic Community	POP	POP	CHLA	NOAEL			2 d	1		uM	100	161943
Glyphosate	Aquatic	community	Aquatic Community	POP	POP	CHLA	NOAEL			2 d	1		uM	100	161943

Glyphosate	Planktotrix	sp.	Blue-green Algae	POP	POP	ABND	NOAEL		2 d	1		uM	100	161943
Glyphosate	Microcystis	sp.	Blue-Green Algae	POP	POP	ABND	NOAEL		2 d	1		uM	100	161943
Glyphosate	Aulacoseira	sp.	Diatom	POP	POP	ABND	LOAEL		2 d	1		uM	100	161943
Glyphosate isopropylamine salt	Pardosa	agricola	Shore Wolf Spider	BEH	FDB	FCNS	NOAEL		0.25 d	0.0385		%	100	162000
Glyphosate isopropylamine salt	Pardosa	agricola	Shore Wolf Spider	BEH	BEH	LOCO	NOAEL		0.0833 d	0.0385		%	100	162000
Glyphosate isopropylamine salt	Pterostichus	cupreus	Ground Beetle	BEH	FDB	FCNS	NOAEL		0.25 d	0.0385		%	100	162000
Glyphosate isopropylamine salt	Pterostichus	cupreus	Ground Beetle	BEH	BEH	LOCO	LOAEL		0.0833 d	0.0385		%	100	162000
Glyphosate isopropylamine salt	Pardosa	agricola	Shore Wolf Spider	BEH	AVO	CHEM	NOAEL		0.0833 d	0.0385		%	100	162000
Glyphosate isopropylamine salt	Pterostichus	cupreus	Ground Beetle	BEH	AVO	CHEM	LOAEL		0.0833 d	0.0385		%	100	162000
Glyphosate isopropylamine salt	Pardosa	agricola	Shore Wolf Spider	BEH	BEH	PRVU	NOAEL		0.0938 d	0.0385		%	100	162000
Glyphosate isopropylamine salt	Pardosa	agricola	Shore Wolf Spider	REP	REP	MIDX	NOAEL		0.1111 d	0.0385		%	100	162000
Glyphosate isopropylamine salt	Telenomus	remus	Parasitoid Wasp	POP	POP	ABND	LOAEL		2 d	1200		ae g/200 L	100	157409
Glyphosate isopropylamine salt	Telenomus	remus	Parasitoid Wasp	GRO	DVP	EMRG	NOAEL		2 d	1200		ae g/200 L	100	157409
Glyphosate	Telenomus	remus	Parasitoid Wasp	POP	POP	ABND	LOAEL		2 d	2880		ae g/200 L	100	157409
Glyphosate	Telenomus	remus	Parasitoid Wasp	GRO	DVP	EMRG	NOAEL		1 d	2880		ae g/200 L	100	157409
Glyphosate isopropylamine salt	Telenomus	remus	Parasitoid Wasp	GRO	DVP	EMRG	NOAEL		1 d	1920		ae g/200 L	100	157409
Glyphosate isopropylamine salt	Telenomus	remus	Parasitoid Wasp	POP	POP	ABND	LOAEL		2 d	1920		ae g/200 L	100	157409

Glyphosate isopropylamine salt	Lithobates	pipiens	Leopard Frog	GRO	GRO	LGTH	LOAEL		21	d			mg/L	100	160519
Glyphosate isopropylamine salt	Lithobates	pipiens	Leopard Frog	GRO	GRO	WGHT	NOAEL		21	d			mg/L	100	160519
Glyphosate isopropylamine salt	Lithobates	pipiens	Leopard Frog	GRO	MPH	SMIX	NOAEL		21	d			mg/L	100	160519
Glyphosate isopropylamine salt	Lithobates	pipiens	Leopard Frog	GRO	MPH	SMIX	NOAEL		21	d			mg/L	100	160519
Glyphosate isopropylamine salt	Lithobates	pipiens	Leopard Frog	MOR	MOR	SURV	NOAEL		21	d			mg/L	100	160519
Glyphosate isopropylamine salt	Lithobates	pipiens	Leopard Frog	CEL	~HIS	MELM	NOAEL		94	d			mg/L	100	160519
Glyphosate isopropylamine salt	Lithobates	pipiens	Leopard Frog	CEL	~HIS	MELM	NOAEL		94	d			mg/L	100	160519
Glyphosate isopropylamine salt	Lithobates	pipiens	Leopard Frog	CEL	~HIS	GRNM	NOAEL		94	d			mg/L	100	160519
Glyphosate isopropylamine salt	Lithobates	pipiens	Leopard Frog	CEL	~HIS	GRNM	NOAEL		94	d			mg/L	100	160519
Glyphosate isopropylamine salt	Lithobates	pipiens	Leopard Frog	CEL	~HIS	MELM	NOAEL		94	d			mg/L	100	160519
Glyphosate isopropylamine salt	Lithobates	pipiens	Leopard Frog	CEL	~HIS	MELM	NOAEL		94	d			mg/L	100	160519
Glyphosate isopropylamine salt	Lithobates	pipiens	Leopard Frog	CEL	~CEL	NLCR	NOAEL		94	d			mg/L	100	160519
Glyphosate isopropylamine salt	Enallagma	cyathigerum	Damselfly	BEH	~BEH	LOCO	LOAEL		1.0118	d		1.5	mg/L	100	160532
Glyphosate isopropylamine salt	Enallagma	cyathigerum	Damselfly	BEH	~BEH	LOCO	LOAEL		1.0236	d		1.5	mg/L	100	160532
Glyphosate isopropylamine salt	Enallagma	cyathigerum	Damselfly	BEH	~BEH	ORNT	LOAEL		1.0236	d		1.5	mg/L	100	160532

Glyphosate isopropylamine salt	Enallagma	cyathigerum	Damselfly	BEH	~BEH	ORNT	LOAEL		1.0118	d	1.5		mg/L	100	160532
Glyphosate isopropylamine salt	Enallagma	cyathigerum	Damselfly	BEH	~FDB	STRK	LOAEL		1.0118	d	1.5		mg/L	100	160532
Glyphosate isopropylamine salt	Enallagma	cyathigerum	Damselfly	BEH	~FDB	STRK	LOAEL		1.0236	d	1.5		mg/L	100	160532
Glyphosate isopropylamine salt	Enallagma	cyathigerum	Damselfly	BEH	~BEH	SWIM	LOAEL		1.0069	d	1.5		mg/L	100	160532
Glyphosate isopropylamine salt	Enallagma	cyathigerum	Damselfly	BEH	~BEH	SWIM	LOAEL		1.0069	d	1.5		mg/L	100	160532
Glyphosate isopropylamine salt	Enallagma	cyathigerum	Damselfly	BEH	~BEH	PRVU	NOAEL			d	1.5		mg/L	100	160532
Glyphosate isopropylamine salt	Enallagma	cyathigerum	Damselfly	BEH	BEH	LOCO	NOAEL	LOAEL	1	d	1		2 mg/L	100	160532
Glyphosate isopropylamine salt	Enallagma	cyathigerum	Damselfly	BEH	FDB	STRK	LOEC		1	d	1		mg/L	100	160532
Glyphosate	Trigonella	foenum-graecum	Fenugreek	CEL	GEN	MITI	LOAEL		3.0833	d	0.1		%	100	161292
Glyphosate	Trigonella	foenum-graecum	Fenugreek	CEL	GEN	CABR	LOAEL		3.25	d	0.1		%	100	161292
Glyphosate	Trigonella	foenum-graecum	Fenugreek	CEL	GEN	CABR	NOAEL	LOAEL	3.0417	d	0.1		0.2 %	100	161292
Glyphosate isopropylamine salt	Aquatic	community	Aquatic Community	PHY	PHY	PSYN	EC50		0.25	d	11.7		mg/L	100	159498
Glyphosate isopropylamine salt	Aquatic	community	Aquatic Community	PHY	PHY	PSYN	NOAEL		0.25	d	1000		mg/L	100	159498
Glyphosate isopropylamine salt	Aquatic	community	Aquatic Community	BCM	ENZ	CTLS	NOAEL		0.25	d	1000		mg/L	100	159498
Glyphosate isopropylamine salt	Aquatic	community	Aquatic Community	BCM	ENZ	SODA	NOAEL		0.25	d	1000		mg/L	100	159498
Glyphosate isopropylamine salt	Aquatic	community	Aquatic Community	PHY	PHY	PSYN	EC50		0.25	d	67.4		mg/L	100	159498

Glyphosate isopropylamine salt	Aquatic	community	Aquatic Community	PHY	PHY	PSYN	NOAEL		0.25	d	1000		mg/L	100	159498
Glyphosate isopropylamine salt	Aquatic	community	Aquatic Community	PHY	PHY	PSYN	NOAEL		0.25	d	1000		mg/L	100	159498
Glyphosate isopropylamine salt	Aquatic	community	Aquatic Community	PHY	PHY	PSYN	EC50		0.25	d	6.1		mg/L	100	159498
Glyphosate isopropylamine salt	Aquatic	community	Aquatic Community	PHY	PHY	PSYN	EC50		0.25	d	9.8		mg/L	100	159498
Glyphosate isopropylamine salt	Aquatic	community	Aquatic Community	PHY	PHY	PSYN	NOAEL		0.25	d	1000		mg/L	100	159498
Glyphosate isopropylamine salt	Aquatic	community	Aquatic Community	PHY	PHY	PSYN	NOAEL		0.25	d	1000		mg/L	100	159498
Glyphosate isopropylamine salt	Aquatic	community	Aquatic Community	PHY	PHY	PSYN	NOAEL		0.25	d	1000		mg/L	100	159498
Glyphosate isopropylamine salt	Aquatic	community	Aquatic Community	PHY	PHY	PSYN	NOAEL	LOAEL	0.25	d	1	10	mg/L	100	159498
Glyphosate isopropylamine salt	Aquatic	community	Aquatic Community	BCM	ENZ	CTLS	NOAEL		0.25	d	1000		mg/L	100	159498
Glyphosate isopropylamine salt	Aquatic	community	Aquatic Community	BCM	ENZ	SODA	NOAEL		0.25	d	1000		mg/L	100	159498
Glyphosate isopropylamine salt	Aquatic	community	Aquatic Community	PHY	PHY	PSYN	EC50		0.25	d	35.6		mg/L	100	159498
Glyphosate isopropylamine salt	Aquatic	community	Aquatic Community	PHY	PHY	PSYN	EC50		0.25	d	1066.9		mg/L	100	159498
Glyphosate isopropylamine salt	Aquatic	community	Aquatic Community	PHY	PHY	PSYN	NOAEL		0.25	d	1000		mg/L	100	159498
Glyphosate isopropylamine salt	Aquatic	community	Aquatic Community	PHY	PHY	PSYN	NOAEL		0.25	d	1000		mg/L	100	159498
Glyphosate isopropylamine salt	Aquatic	community	Aquatic Community	PHY	PHY	PSYN	NOAEL		0.25	d	1000		mg/L	100	159498

Glyphosate isopropylamine salt	Aquatic	community	Aquatic Community	PHY	PHY	PSYN	NOAEL		0.25	d	1000		mg/L	100	159498
Glyphosate isopropylamine salt	Aquatic	community	Aquatic Community	BCM	ENZ	CTLS	NOAEL		0.25	d	1000		mg/L	100	159498
Glyphosate isopropylamine salt	Aquatic	community	Aquatic Community	BCM	ENZ	SODA	NOAEL		0.25	d	1000		mg/L	100	159498
AMPA	Aquatic	community	Aquatic Community	PHY	PHY	PSYN	NOAEL		0.25	d	500		mg/L	100	159498
AMPA	Aquatic	community	Aquatic Community	BCM	ENZ	CTLS	NOAEL		0.25	d	500		mg/L	100	159498
AMPA	Aquatic	community	Aquatic Community	BCM	ENZ	SODA	NOAEL		0.25	d	500		mg/L	100	159498
AMPA	Aquatic	community	Aquatic Community	PHY	PHY	PSYN	NOAEL		0.25	d	500		mg/L	100	159498
AMPA	Aquatic	community	Aquatic Community	PHY	PHY	PSYN	NOAEL		0.25	d	500		mg/L	100	159498
AMPA	Aquatic	community	Aquatic Community	PHY	PHY	PSYN	NOAEL		0.25	d	500		mg/L	100	159498
AMPA	Aquatic	community	Aquatic Community	PHY	PHY	PSYN	NOAEL		0.25	d	500		mg/L	100	159498
AMPA	Aquatic	community	Aquatic Community	PHY	PHY	PSYN	NOAEL		0.25	d	500		mg/L	100	159498
AMPA	Aquatic	community	Aquatic Community	PHY	PHY	PSYN	NOAEL		0.25	d	500		mg/L	100	159498
AMPA	Aquatic	community	Aquatic Community	PHY	PHY	PSYN	NOAEL		0.25	d	500		mg/L	100	159498
AMPA	Aquatic	community	Aquatic Community	BCM	ENZ	CTLS	NOAEL		0.25	d	500		mg/L	100	159498
AMPA	Aquatic	community	Aquatic Community	BCM	ENZ	SODA	NOAEL		0.25	d	500		mg/L	100	159498
AMPA	Aquatic	community	Aquatic Community	PHY	PHY	PSYN	NOAEL		0.25	d	500		mg/L	100	159498
AMPA	Aquatic	community	Aquatic Community	PHY	PHY	PSYN	NOAEL		0.25	d	500		mg/L	100	159498
AMPA	Aquatic	community	Aquatic Community	PHY	PHY	PSYN	NOAEL		0.25	d	500		mg/L	100	159498
AMPA	Aquatic	community	Aquatic Community	PHY	PHY	PSYN	NOAEL		0.25	d	500		mg/L	100	159498
AMPA	Aquatic	community	Aquatic Community	BCM	ENZ	CTLS	NOAEL		0.25	d	500		mg/L	100	159498
AMPA	Aquatic	community	Aquatic Community	BCM	ENZ	SODA	NOAEL		0.25	d	500		mg/L	100	159498

Glyphosate isopropylamine salt	Lithobates	pipiens	Leopard Frog	MOR	MOR	MORT	NOAEL			4 d	41.48		ae mg/L	100	161671
Glyphosate isopropylamine salt	Hyla	chrysoscelis	Southern Grey Tree Frog	MOR	MOR	MORT	NOAEL			4 d	41.48		ae mg/L	100	161671
Glyphosate isopropylamine salt	Rana	catesbeiana	Bullfrog	MOR	MOR	MORT	NOAEL			4 d	41.48		ae mg/L	100	161671
Glyphosate isopropylamine salt	Anaxyrus	fowleri	Fowler's Toad	MOR	MOR	MORT	NOAEL			4 d	41.48		ae mg/L	100	161671
Glyphosate isopropylamine salt	Lithobates	clamitans ssp. clamitans	Bronze Frog	MOR	MOR	MORT	NOAEL			4 d	41.48		ae mg/L	100	161671
Glyphosate isopropylamine salt	Lithobates	pipiens	Leopard Frog	MOR	MOR	MORT	NOEC			4 d	1.29		ae mg/L	46	161671
Glyphosate isopropylamine salt	Lithobates	pipiens	Leopard Frog	MOR	MOR	MORT	LC50			4 d	1.8		ae mg/L	46	161671
Glyphosate isopropylamine salt	Hyla	chrysoscelis	Southern Grey Tree Frog	MOR	MOR	MORT	NOEC			4 d	1.74		ae mg/L	46	161671
Glyphosate isopropylamine salt	Hyla	chrysoscelis	Southern Grey Tree Frog	MOR	MOR	MORT	LC50			4 d	2.5		ae mg/L	46	161671
Glyphosate isopropylamine salt	Rana	catesbeiana	Bullfrog	MOR	MOR	MORT	NOEC			4 d	2.02		ae mg/L	46	161671
Glyphosate isopropylamine salt	Rana	catesbeiana	Bullfrog	MOR	MOR	MORT	LC50			4 d	2.77		ae mg/L	46	161671
Glyphosate isopropylamine salt	Anaxyrus	fowleri	Fowler's Toad	MOR	MOR	MORT	NOEC			4 d	3.4		ae mg/L	46	161671
Glyphosate isopropylamine salt	Anaxyrus	fowleri	Fowler's Toad	MOR	MOR	MORT	LC50			4 d	4.21		ae mg/L	46	161671
Glyphosate isopropylamine salt	Lithobates	clamitans ssp. clamitans	Bronze Frog	MOR	MOR	MORT	NOEC			4 d	3.27		ae mg/L	46	161671
Glyphosate isopropylamine salt	Lithobates	clamitans ssp. clamitans	Bronze Frog	MOR	MOR	MORT	LC50			4 d	4.22		ae mg/L	46	161671
Glyphosate	Apis	mellifera	Honey Bee	CEL	GEN	PPOM	LOAEL			4 d	200		ppm	100	157769

Glyphosate isopropylamine salt	Poecilia	reticulata	Guppy	MOR	MOR	MORT	NR-ZERO		4 d	0.36		mg/L	100	161706
Glyphosate isopropylamine salt	Poecilia	reticulata	Guppy	MOR	MOR	MORT	NR-LETH		4 d	36		mg/L	100	161706
Glyphosate isopropylamine salt	Poecilia	reticulata	Guppy	MOR	MOR	MORT	LC50		1 d	15.81		mg/L	100	161706
Glyphosate isopropylamine salt	Poecilia	reticulata	Guppy	MOR	MOR	MORT	LC50		4 d	9		mg/L	100	161706
Glyphosate isopropylamine salt	Poecilia	reticulata	Guppy	MOR	MOR	MORT	LC50		4 d	10.08		mg/L	100	161706
Glyphosate isopropylamine salt	Poecilia	reticulata	Guppy	MOR	MOR	MORT	LC50		4 d	9.76		mg/L	100	161706
Glyphosate isopropylamine salt	Poecilia	reticulata	Guppy	BEH	BEH	SURF	LOAEL		1 d	3.6		mg/L	100	161706
Glyphosate isopropylamine salt	Poecilia	reticulata	Guppy	MOR	MOR	MORT	LC50		1 d	14.37		mg/L	100	161706
Glyphosate isopropylamine salt	Poecilia	reticulata	Guppy	MOR	MOR	MORT	LC50		1 d	15		mg/L	100	161706
Glyphosate isopropylamine salt	Poecilia	reticulata	Guppy	MOR	MOR	MORT	LC50		4 d	10.25		mg/L	100	161706
Glyphosate isopropylamine salt	Poecilia	reticulata	Guppy	MOR	MOR	MORT	LC50		1 d	15.14		mg/L	100	161706
Glyphosate	Lithobates	sylvaticus	Wood Frog	MOR	MOR	MORT	LC50		20 d	2.63		ae mg/L	100	159327
Glyphosate	Lithobates	sylvaticus	Wood Frog	MOR	MOR	MORT	NOAEL	LOAEL	20 d	1.8	3.4	ae mg/L	100	159327
Glyphosate	Lithobates	sylvaticus	Wood Frog	GRO	GRO	WGHT	NOAEL		20 d	3.4		ae mg/L	100	159327
Glyphosate	Lithobates	pipiens	Leopard Frog	MOR	MOR	MORT	LC50		20 d	2.91		ae mg/L	100	159327
Glyphosate	Lithobates	pipiens	Leopard Frog	MOR	MOR	MORT	NOAEL	LOAEL	20 d	1.8	3.4	ae mg/L	100	159327
Glyphosate	Lithobates	pipiens	Leopard Frog	GRO	GRO	WGHT	NOAEL		20 d	3.4		ae mg/L	100	159327
Glyphosate	Lithobates	pipiens	Leopard Frog	MOR	MOR	MORT	LC50		20 d	3.26		ae mg/L	100	159327

Glyphosate	Lithobates	pipiens	Leopard Frog	MOR	MOR	MORT	NOAEL	LOAEL	20	d	1.8	3.4	ae mg/L	100	159327
Glyphosate	Lithobates	pipiens	Leopard Frog	GRO	GRO	WGHT	NOAEL	LOAEL	20	d	1.8	3.4	ae mg/L	100	159327
Glyphosate	Bufo	americanus	American Toad	MOR	MOR	MORT	LC50		20	d	2.46		ae mg/L	100	159327
Glyphosate	Bufo	americanus	American Toad	GRO	GRO	WGHT	NOEC		20	d	3.4		ae mg/L	100	159327
Glyphosate	Bufo	americanus	American Toad	MOR	MOR	MORT	LC50		20	d	2.44		ae mg/L	100	159327
Glyphosate	Bufo	americanus	American Toad	GRO	GRO	WGHT	NOAEL		20	d	3.4		ae mg/L	100	159327
Glyphosate	Lithobates	sylvaticus	Wood Frog	MOR	MOR	MORT	LC50		20	d	2.95		ae mg/L	100	159327
Glyphosate	Lithobates	sylvaticus	Wood Frog	GRO	GRO	WGHT	NOAEL	LOAEL	20	d	1.8	3.4	ae mg/L	100	159327
Glyphosate	Lithobates	sylvaticus	Wood Frog	MOR	MOR	MORT	NOAEL	LOAEL	20	d	1.8	3.4	ae mg/L	100	159327
Glyphosate	Lithobates	sylvaticus	Wood Frog	GRO	GRO	THIK	NOAEL	LOAEL	20	d	0.9	1.8	ae mg/L	100	159327
Glyphosate	Lithobates	sylvaticus	Wood Frog	GRO	GRO	THIK	NOAEL	LOAEL	20	d	0.9	1.8	ae mg/L	100	159327
Glyphosate	Lithobates	sylvaticus	Wood Frog	GRO	GRO	THIK	NOAEL		20	d	1.8		ae mg/L	100	159327
Glyphosate	Lithobates	sylvaticus	Wood Frog	GRO	GRO	LGTH	NOAEL		20	d	1.8		ae mg/L	100	159327
Glyphosate	Lithobates	sylvaticus	Wood Frog	GRO	GRO	WGHT	NOAEL	LOAEL	20	d	1.8	3.4	ae mg/L	100	159327
Glyphosate	Lithobates	sylvaticus	Wood Frog	MOR	MOR	MORT	LC50		20	d	3.09		ae mg/L	100	159327
Glyphosate	Lithobates	sylvaticus	Wood Frog	MOR	MOR	MORT	NOAEL	LOAEL	20	d	1.8	3.4	ae mg/L	100	159327
Glyphosate	Lithobates	pipiens	Leopard Frog	GRO	GRO	WGHT	NOAEL		20	d	3.4		ae mg/L	100	159327
Glyphosate	Lithobates	pipiens	Leopard Frog	MOR	MOR	MORT	LC50		20	d	3.02		ae mg/L	100	159327
Glyphosate	Lithobates	pipiens	Leopard Frog	MOR	MOR	MORT	NOAEL	LOAEL	20	d	1.8	3.4	ae mg/L	100	159327
Glyphosate	Lithobates	pipiens	Leopard Frog	GRO	GRO	THIK	NOAEL	LOAEL	20	d	0.9	1.8	ae mg/L	100	159327
Glyphosate	Lithobates	pipiens	Leopard Frog	GRO	GRO	THIK	NOAEL	LOAEL	20	d	0.9	1.8	ae mg/L	100	159327
Glyphosate	Lithobates	pipiens	Leopard Frog	GRO	GRO	LGTH	NOAEL		20	d	1.8		ae mg/L	100	159327
Glyphosate	Bufo	americanus	American Toad	MOR	MOR	SURV	NOAEL	LOAEL	20	d	0.9	1.8	ae mg/L	100	159327

Glyphosate	Bufo	americanus	American Toad	GRO	GRO	WGHT	NOAEL		20	d	3.4		ae mg/L	100	159327
Glyphosate	Bufo	americanus	American Toad	MOR	MOR	MORT	LC50		20	d	2.82		ae mg/L	100	159327
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	NOAEL		1	d	0.116		mg/L	100	159190
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	LOAEL		1	d	0.058		mg/L	100	159190
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	LOAEL		1	d	0.058		mg/L	100	159190
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	LOAEL		1	d	0.058		mg/L	100	159190
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	LOAEL		3	d	0.058		mg/L	100	159190
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	NOAEL		3	d	0.116		mg/L	100	159190
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	LOAEL		1	d	0.058		mg/L	100	159190
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	LOAEL		1	d	0.058		mg/L	100	159190
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	NOAEL	LOAEL	3	d	0.058	0.116	mg/L	100	159190
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	NOAEL	LOAEL	3	d	0.058	0.116	mg/L	100	159190
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	NOAEL		1	d	0.116		mg/L	100	159190
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	NOAEL		1	d	0.116		mg/L	100	159190
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	NOAEL	LOAEL	1	d	0.058	0.116	mg/L	100	159190
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	NOAEL	LOAEL	1	d	0.058	0.116	mg/L	100	159190

Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	LOAEL			3 d	0.058		mg/L	100	159190
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	NOAEL	LOAEL		1 d	0.058	0.116	mg/L	100	159190
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	LOAEL			1 d	0.058		mg/L	100	159190
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	LOAEL			3 d	0.058		mg/L	100	159190
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	NOAEL			3 d	0.116		mg/L	100	159190
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	NOAEL			1 d	0.116		mg/L	100	159190
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	LOAEL			1 d	0.058		mg/L	100	159190
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	NOAEL	LOAEL		3 d	0.058	0.116	mg/L	100	159190
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	NOAEL	LOAEL		3 d	0.058	0.116	mg/L	100	159190
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	NOAEL	LOAEL		3 d	0.058	0.116	mg/L	100	159190
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	BCM	ENZ	SODA	NOAEL			1 d	0.116		mg/L	100	159190
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	BCM	ENZ	GSTR	NOAEL			3 d	0.116		mg/L	100	159190
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	BCM	ENZ	GLPX	NOAEL			1 d	0.116		mg/L	100	159190
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	BCM	BCM	GLTH	NOAEL			3 d	0.116		mg/L	100	159190
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	BCM	BCM	GLTH	NOAEL			1 d	0.116		mg/L	100	159190

Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	BCM	ENZ	GLRE	NOAEL			1 d	0.116		mg/L	100	159190
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	BCM	ENZ	CTLS	NOAEL	LOAEL		3 d	0.058	0.116	mg/L	100	159190
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	BCM	ENZ	CTLS	NOAEL			3 d	0.116		mg/L	100	159190
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	BCM	ENZ	SODA	NOAEL			1 d	0.116		mg/L	100	159190
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	BCM	ENZ	GSTR	NOAEL			3 d	0.116		mg/L	100	159190
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	BCM	ENZ	GLPX	NOAEL			1 d	0.116		mg/L	100	159190
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	BCM	ENZ	GLPX	NOAEL			3 d	0.116		mg/L	100	159190
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	BCM	BCM	GLTH	NOAEL			3 d	0.116		mg/L	100	159190
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	BCM	BCM	GLTH	NOAEL			1 d	0.116		mg/L	100	159190
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	BCM	ENZ	GLRE	NOAEL			1 d	0.116		mg/L	100	159190
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	BCM	ENZ	GLRE	NOAEL			3 d	0.116		mg/L	100	159190
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	BCM	ENZ	CTLS	NOAEL			3 d	0.116		mg/L	100	159190
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	BCM	ENZ	CTLS	NOAEL			1 d	0.116		mg/L	100	159190
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	NOAEL	LOAEL		3 d	0.058	0.116	mg/L	100	159190
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	LOAEL			3 d	0.058		mg/L	100	159190

Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	NOAEL	LOAEL	3 d	0.058	0.116	mg/L	100	159190
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	NOAEL		1 d	0.116		mg/L	100	159190
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	LOAEL		1 d	0.058		mg/L	100	159190
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	NOAEL	LOAEL	3 d	0.058	0.116	mg/L	100	159190
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	NOAEL		3 d	0.116		mg/L	100	159190
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	NOAEL		3 d	0.116		mg/L	100	159190
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	BCM	ENZ	SODA	NOAEL		3 d	0.116		mg/L	100	159190
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	BCM	ENZ	GSTR	NOAEL		1 d	0.116		mg/L	100	159190
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	BCM	ENZ	GLPX	NOAEL		3 d	0.116		mg/L	100	159190
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	BCM	ENZ	GLRE	NOAEL		3 d	0.116		mg/L	100	159190
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	BCM	ENZ	GSTR	NOAEL		1 d	0.116		mg/L	100	159190
Sulfosate	Caenorh abditis	elegans	Nematode	CEL	HIS	DEGN	NOAEL	LOAEL	1 d	7	10	AI %	100	161953
Sulfosate	Caenorh abditis	elegans	Nematode	CEL	HIS	DEGN	NOAEL	LOAEL	1 d	5.5	9.8	AI %	100	161953
Sulfosate	Caenorh abditis	elegans	Nematode	CEL	HIS	DEGN	NOAEL	LOAEL	1 d	3	7	AI %	100	161953
Sulfosate	Caenorh abditis	elegans	Nematode	CEL	HIS	DEGN	LOAEL		1 d	2.7		AI %	100	161953
Glyphosate	Capoeta	capoeta	Barb	BCM	BCM	NOCO	NOAEL		10 d	0.02		mg/L	100	159407
Glyphosate	Capoeta	capoeta	Barb	BCM	BCM	MLDH	NOAEL	LOAEL	10 d	0.01	0.02	mg/L	100	159407
Glyphosate	Asterion ella	formosa	Diatom	PHY	PHY	PSII	LOAEL		0.0556 d	89.1		uM	99	158970

Glyphosate	Chlamydomonas reinhardtii	Green Algae	PHY	PHY	PSII	LOAEL			0.0556	d	435.6		uM	99	158970
Glyphosate	Synura petersenii	Algae	PHY	PHY	PSII	LOAEL			0.0556	d	435.6		uM	99	158970
Glyphosate	Pseudokirchneriella subcapitata	Green Algae	PHY	PHY	PSII	LOAEL			0.0556	d	435.6		uM	99	158970
Glyphosate	Navicula pelliculosa	Diatom	PHY	PHY	PSII	LOAEL			0.0556	d	217.8		uM	99	158970
Glyphosate	Cryptomonas erosa	Cryptomonad	PHY	PHY	PSII	LOAEL			0.0556	d	217.8		uM	99	158970
Glyphosate isopropylamine salt	Caridina nilotica	Shrimp	PHY	PHY	LDPX	NOAEL	LOAEL		4	d	25.6	40	mg/L	100	159402
Glyphosate isopropylamine salt	Caridina nilotica	Shrimp	PHY	PHY	LDPX	NOAEL	LOAEL		21	d	2.8	3.4	mg/L	100	159402
Glyphosate isopropylamine salt	Algae	NR	Algae	POP	POP	CHLA	NOAEL		8	d	0.225		mg/L	100	161755
Glyphosate isopropylamine salt	Algae	NR	Algae	POP	POP	CHLA	LOAEL		21	d	0.225		mg/L	100	161755
Glyphosate isopropylamine salt	Aquatic	community	Aquatic Community	SYS	PRS	PPRO	LOAEL		22	d	0.225		mg/L	100	161755
Glyphosate isopropylamine salt	Aquatic	community	Aquatic Community	SYS	PRS	PPRO	LOAEL		1	d	0.225		mg/L	100	161755
Glyphosate isopropylamine salt	Algae	NR	Algae	POP	POP	CHLA	LOAEL		22	d	0.225		mg/L	100	161755
Glyphosate isopropylamine salt	Aquatic	community	Aquatic Community	SYS	PRS	PPRO	LOAEL		8	d	0.225		mg/L	100	161755
Glyphosate isopropylamine salt	Aquatic	community	Aquatic Community	SYS	PRS	PPRO	LOAEL		21	d	0.225		mg/L	100	161755
Glyphosate isopropylamine salt	Anguilla anguilla	Common Eel	CEL	GEN	DAMG	LOAEL			3	d	0.058		mg/L	100	160185
Glyphosate isopropylamine salt	Anguilla anguilla	Common Eel	CEL	GEN	DAMG	NOAEL			1	d	0.116		mg/L	100	160185
Glyphosate isopropylamine salt	Anguilla anguilla	Common Eel	CEL	GEN	DAMG	NOAEL			3	d	0.116		mg/L	100	160185

Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	LOAEL			3 d	0.058		mg/L	100	160185
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	NOAEL			1 d	0.058		mg/L	100	160185
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	LOAEL			1 d	0.116		mg/L	100	160185
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	LOAEL			3 d	0.116		mg/L	100	160185
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	NOAEL			3 d	0.116		mg/L	100	160185
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	NOAEL			1 d	0.116		mg/L	100	160185
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	NOAEL			1 d	0.116		mg/L	100	160185
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	LOAEL			1 d	0.116		mg/L	100	160185
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	LOAEL			1 d	0.116		mg/L	100	160185
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	NOAEL			1 d	0.058		mg/L	100	160185
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	NOAEL			1 d	0.058		mg/L	100	160185
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	LOAEL			3 d	0.116		mg/L	100	160185
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	NOAEL			3 d	0.058		mg/L	100	160185
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	NOAEL			3 d	0.116		mg/L	100	160185
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	LOAEL			1 d	0.058		mg/L	100	160185

Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	NOAEL		3 d	0.116		mg/L	100	160185
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	NOAEL		1 d	0.116		mg/L	100	160185
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	NOAEL		1 d	0.058		mg/L	100	160185
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	LOAEL		1 d	0.116		mg/L	100	160185
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	LOAEL		3 d	0.116		mg/L	100	160185
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	NOAEL		3 d	0.058		mg/L	100	160185
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	NOAEL		3 d	0.058		mg/L	100	160185
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	LOAEL		3 d	0.116		mg/L	100	160185
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	NOAEL		3 d	0.116		mg/L	100	160185
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	NOAEL		3 d	0.116		mg/L	100	160185
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	LOAEL		3 d	0.058		mg/L	100	160185
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	LOAEL		1 d	0.058		mg/L	100	160185
Glyphosate isopropylamine salt	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	LOAEL		1 d	0.058		mg/L	100	160185
Glyphosate	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	LOAEL		1 d	0.0179		mg/L	100	160185
Glyphosate	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	LOAEL		1 d	0.0179		mg/L	100	160185
Glyphosate	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	LOAEL		3 d	0.0179		mg/L	100	160185
Glyphosate	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	LOAEL		3 d	0.0179		mg/L	100	160185
Glyphosate	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	LOAEL		3 d	0.0179		mg/L	100	160185
Glyphosate	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	NOAEL		3 d	0.0357		mg/L	100	160185
Glyphosate	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	NOAEL		3 d	0.0357		mg/L	100	160185
Glyphosate	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	NOAEL		3 d	0.0357		mg/L	100	160185

Glyphosate	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	LOAEL		3	d	0.0179		mg/L	100	160185
Glyphosate	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	LOAEL		1	d	0.0179		mg/L	100	160185
Glyphosate	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	NOAEL		1	d	0.0357		mg/L	100	160185
Glyphosate	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	NOAEL		3	d	0.0357		mg/L	100	160185
Glyphosate	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	LOAEL		3	d	0.0179		mg/L	100	160185
Glyphosate	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	LOAEL		1	d	0.0179		mg/L	100	160185
Glyphosate	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	NOAEL		1	d	0.0357		mg/L	100	160185
Glyphosate	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	LOAEL		3	d	0.0179		mg/L	100	160185
Glyphosate	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	LOAEL		1	d	0.0179		mg/L	100	160185
Glyphosate	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	NOAEL		1	d	0.0357		mg/L	100	160185
Glyphosate	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	NOAEL		1	d	0.0357		mg/L	100	160185
Glyphosate	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	LOAEL		1	d	0.0179		mg/L	100	160185
Glyphosate	Anguilla	anguilla	Common Eel	CEL	GEN	DAMG	LOAEL		1	d	0.0179		mg/L	100	160185
Glyphosate	Panicum	coloratum	Kleingrass	POP	POP	BMAS	LOAEL		190	d	0.9812		lb/acre	100	159593
Glyphosate	NR	Plantae	Plant Kingdom	POP	POP	BMAS	NOAEL		190	d	0.9812		lb/acre	100	159593
Glyphosate	NR	Poaceae	Grass Family	POP	POP	BMAS	NOAEL		190	d	0.9812		lb/acre	100	159593
Glyphosate	Caladium	bicolor	Heart of Jesus	PHY	INJ	GINJ	LOAEL		20	d	0.74928		lb/acre	100	159712
Glyphosate	NR	Plantae	Plant Kingdom	POP	POP	COVR	LOAEL			d	0.99904		lb/acre	100	159615
Glyphosate	Rubus	sp.	Brambles	PHY	INJ	GINJ	LOAEL		1095	d	0.99904		lb/acre	100	159615
Glyphosate isopropylamine salt	Malva	sp.	Cheeseweed	POP	POP	ABND	NOAEL		27	d	2		Al lb/acre	100	159670
Glyphosate isopropylamine salt	Avena	sp.	Oat	POP	POP	ABND	LOAEL		27	d	2		Al lb/acre	100	159670
Glyphosate isopropylamine salt	Malva	sp.	Cheeseweed	POP	POP	ABND	NOAEL		8	d	2		Al lb/acre	100	159670
Glyphosate isopropylamine salt	Avena	sp.	Oat	POP	POP	ABND	NOAEL		8	d	2		Al lb/acre	100	159670
Glyphosate	Lantana	camara	Largeleaf Lantana	MOR	MOR	MORT	LOAEL		30	d	0.8		L/ha	100	159692
Glyphosate	Lantana	camara	Largeleaf Lantana	GRO	GRO	BMAS	LOAEL		2	gs	0.8		L/ha	100	159692
Glyphosate	Lantana	camara	Largeleaf Lantana	GRO	MPH	AREA	LOAEL		2	gs	0.8		L/ha	100	159692
Glyphosate	Lantana	camara	Largeleaf Lantana	MOR	MOR	MORT	LOAEL		30	d	0.8		L/ha	100	159692
Glyphosate	Lantana	camara	Largeleaf Lantana	GRO	GRO	BMAS	LOAEL		2	gs	0.8		L/ha	100	159692
Glyphosate	Lantana	camara	Largeleaf Lantana	GRO	MPH	AREA	LOAEL		2	gs	0.8		L/ha	100	159692

Glyphosate	Artemisi a	roxburghian a	Artemisia	MOR	MOR	MORT	LOAEL		30	d	0.8		L/ha	100	159692
Glyphosate	Artemisi a	roxburghian a	Artemisia	GRO	GRO	BMAS	LOAEL		2	gs	0.8		L/ha	100	159692
Glyphosate	Artemisi a	roxburghian a	Artemisia	GRO	MPH	AREA	LOAEL		2	gs	0.8		L/ha	100	159692
Glyphosate	Lantana	camara	Largeleaf Lantana	MOR	MOR	MORT	LOAEL		30	d	0.8		L/ha	100	159692
Glyphosate	Lantana	camara	Largeleaf Lantana	GRO	GRO	BMAS	LOAEL		2	gs	0.8		L/ha	100	159692
Glyphosate	Lantana	camara	Largeleaf Lantana	GRO	MPH	AREA	LOAEL		2	gs	0.8		L/ha	100	159692
Glyphosate	Artemisi a	roxburghian a	Artemisia	MOR	MOR	MORT	LOAEL		30	d	0.8		L/ha	100	159692
Glyphosate	Artemisi a	roxburghian a	Artemisia	GRO	GRO	BMAS	LOAEL		2	gs	0.8		L/ha	100	159692
Glyphosate	Artemisi a	roxburghian a	Artemisia	GRO	MPH	AREA	LOAEL		2	gs	0.8		L/ha	100	159692
Glyphosate	Artemisi a	roxburghian a	Artemisia	MOR	MOR	MORT	LOAEL		30	d	0.8		L/ha	100	159692
Glyphosate	Artemisi a	roxburghian a	Artemisia	GRO	GRO	BMAS	LOAEL		2	gs	0.8		L/ha	100	159692
Glyphosate	Artemisi a	roxburghian a	Artemisia	MOR	MOR	MORT	LOAEL		30	d	0.8		L/ha	100	159692
Glyphosate	Artemisi a	roxburghian a	Artemisia	GRO	GRO	BMAS	LOAEL		2	gs	0.8		L/ha	100	159692
Glyphosate	Artemisi a	roxburghian a	Artemisia	GRO	MPH	AREA	LOAEL		2	gs	0.8		L/ha	100	159692
Glyphosate	Arachis	pinto	Peanut	POP	POP	BMAS	LOAEL		28	d	0.5352		lb/acre	100	159743
Glyphosate	Arachis	pinto	Peanut	GRO	GRO	WGHT	LOAEL		56	d	0.36		ae kg/ha	100	159729
Glyphosate potassium salt	Chlamyd omonas	reinhardtii	Green Algae	POP	POP	ABND	NOAEL		3	d	14.5		uM	100	161957
Glyphosate potassium salt	Chlamyd omonas	reinhardtii	Green Algae	POP	POP	PSII	NOAEL		3	d	14.5		uM	100	161957
Glyphosate isopropylamine salt	Ecclitota rsus	catarinensis	Plant Bug	MOR	MOR	MORT	LC50		1	d	10.1		% v/v	100	161287
Glyphosate isopropylamine salt	Ecclitota rsus	catarinensis	Plant Bug	MOR	MOR	MORT	LC50		5	d	7.8		% v/v	100	161287
Sulfosate	Ecclitota rsus	catarinensis	Plant Bug	MOR	MOR	MORT	LC50		1	d	0.01		% v/v	100	161287
Sulfosate	Ecclitota rsus	catarinensis	Plant Bug	MOR	MOR	MORT	LC50		5	d	1.46		% v/v	100	161287
Glyphosate isopropylamine salt	Ecclitota rsus	catarinensis	Plant Bug	MOR	MOR	MORT	LC50		1	d	18		% v/v	100	161287

Glyphosate isopropylamine salt	Ecclitotarsus	catarinensis	Plant Bug	MOR	MOR	MORT	LC50		5 d	18	% v/v	100	161287
Glyphosate isopropylamine salt	Ecclitotarsus	catarinensis	Plant Bug	MOR	MOR	MORT	LC50		1 d	4.38	% v/v	100	161287
Glyphosate isopropylamine salt	Ecclitotarsus	catarinensis	Plant Bug	MOR	MOR	MORT	LC50		5 d	2	% v/v	100	161287
Sulfosate	Neochetina	eichhorniae	Weevil	MOR	MOR	MORT	LC50		1 d	10.73	% v/v	100	161287
Sulfosate	Neochetina	eichhorniae	Weevil	MOR	MOR	MORT	LC50		5 d	8.54	% v/v	100	161287
Glyphosate isopropylamine salt	Ecclitotarsus	catarinensis	Plant Bug	MOR	MOR	MORT	LC50		1 d	26	% v/v	100	161287
Glyphosate isopropylamine salt	Ecclitotarsus	catarinensis	Plant Bug	MOR	MOR	MORT	LC50		5 d	26	% v/v	100	161287
Glyphosate isopropylamine salt	Ecclitotarsus	catarinensis	Plant Bug	MOR	MOR	MORT	LC50		1 d	8.56	% v/v	100	161287
Glyphosate isopropylamine salt	Ecclitotarsus	catarinensis	Plant Bug	MOR	MOR	MORT	LC50		5 d	4.2	% v/v	100	161287
Sulfosate	Ecclitotarsus	catarinensis	Plant Bug	MOR	MOR	MORT	LC50		1 d	20	% v/v	100	161287
Sulfosate	Ecclitotarsus	catarinensis	Plant Bug	MOR	MOR	MORT	LC50		5 d	0.01	% v/v	100	161287
Glyphosate isopropylamine salt	Ecclitotarsus	catarinensis	Plant Bug	MOR	MOR	MORT	LC50		1 d	10.48	% v/v	100	161287
Glyphosate isopropylamine salt	Ecclitotarsus	catarinensis	Plant Bug	MOR	MOR	MORT	LC50		5 d	3.61	% v/v	100	161287
Glyphosate isopropylamine salt	Neochetina	eichhorniae	Weevil	MOR	MOR	MORT	LC50		1 d	26	% v/v	100	161287
Glyphosate isopropylamine salt	Neochetina	eichhorniae	Weevil	MOR	MOR	MORT	LC50		5 d	18.89	% v/v	100	161287
Glyphosate isopropylamine salt	Pimephales	promelas	Fathead Minnow	MOR	MOR	MORT	LC50		4 d	7.33	ae mg/L	100	160505
Glyphosate isopropylamine salt	Ceriodaphnia	dubia	Water Flea	MOR	MOR	MORT	LC50		2 d	7.33	ae mg/L	100	160505

Glyphosate isopropylamine salt	Ceriodaphnia	dubia	Water Flea	MOR	MOR	MORT	LC50		2 d	5.5		ae mg/L	100	160505
Glyphosate isopropylamine salt	Pimephales	promelas	Fathead Minnow	MOR	MOR	MORT	LC50		4 d	5.5		ae mg/L	100	160505
Glyphosate	Folsomia	candida	Springtail	REP	REP	RSUC	EC50		28 d	0.54		AI mg/kg d soil	30.8	160179
Glyphosate	Folsomia	candida	Springtail	MOR	MOR	MORT	LC50		28 d	1.13		AI mg/kg d soil	30.8	160179
Glyphosate isopropylamine salt	Eisenia	fetida ssp. andrei	Earthworm	BEH	FDB	FCNS	LOAEL		3 d	0.05		ppm	100	160273
Glyphosate isopropylamine salt	Eisenia	fetida ssp. andrei	Earthworm	MOR	MOR	MORT	NOAEL		28 d	0.05		ppm	100	160273
Glyphosate isopropylamine salt	Eisenia	fetida ssp. andrei	Earthworm	REP	REP	PROG	NOAEL		56 d	0.05		ppm	100	160273
Glyphosate isopropylamine salt	Eisenia	fetida ssp. andrei	Earthworm	MOR	MOR	HTCH	NOAEL		56 d	0.05		ppm	100	160273
Glyphosate isopropylamine salt	Eisenia	fetida ssp. andrei	Earthworm	MOR	MOR	HTCH	LOAEL		56 d	0.05		ppm	100	160273
Glyphosate isopropylamine salt	Eisenia	fetida ssp. andrei	Earthworm	REP	REP	PROG	LOAEL		56 d	0.05		ppm	100	160273
Glyphosate isopropylamine salt	Eisenia	fetida ssp. andrei	Earthworm	REP	REP	PROG	NOAEL		56 d	0.05		ppm	100	160273
Glyphosate isopropylamine salt	Eisenia	fetida ssp. andrei	Earthworm	MOR	MOR	MORT	NR-ZERO		28 d	0.05		ppm	100	160273
Glyphosate isopropylamine salt	Eisenia	fetida ssp. andrei	Earthworm	BEH	AVO	CHEM	LOAEL		3 d	0.05		ppm	100	160273
Glyphosate isopropylamine salt	Eisenia	fetida ssp. andrei	Earthworm	BEH	AVO	CHEM	LOAEL		3 d	0.05		ppm	100	160273
Glyphosate isopropylamine salt	Eisenia	fetida ssp. andrei	Earthworm	BEH	AVO	CHEM	LOAEL		3 d	0.05		ppm	100	160273
Glyphosate isopropylamine salt	Eisenia	fetida ssp. andrei	Earthworm	CEL	GEN	DAMG	NOAEL		7 d	0.05		ppm	100	160273

Glyphosate isopropylamine salt	Eisenia	fetida ssp. andrei	Earthworm	CEL	GEN	DAMG	NOAEL		7 d	0.05		ppm	100	160273
Glyphosate isopropylamine salt	Eisenia	fetida ssp. andrei	Earthworm	PHY	PHY	NRUP	LOAEL		7 d	0.05		ppm	100	160273
Glyphosate isopropylamine salt	Eisenia	fetida ssp. andrei	Earthworm	PHY	PHY	NRUP	LOAEL		28 d	0.05		ppm	100	160273
Glyphosate isopropylamine salt	Eisenia	fetida ssp. andrei	Earthworm	PHY	PHY	NRUP	NOAEL		7 d	0.05		ppm	100	160273
Glyphosate isopropylamine salt	Eisenia	fetida ssp. andrei	Earthworm	PHY	PHY	NRUP	LOAEL		28 d	0.05		ppm	100	160273
Glyphosate	Eisenia	fetida	Earthworm	MOR	MOR	MORT	LC50		2 d	566.1		ug/cm2	95	159988
Glyphosate	Eisenia	fetida	Earthworm	MOR	MOR	MORT	LC50		14 d	327.8		mg/kg d soil	95	159988
Glyphosate	Eisenia	fetida	Earthworm	MOR	MOR	MORT	LC50		7 d	345.8		mg/kg d soil	95	159988
Glyphosate isopropylamine salt	Allium	cepa	Common Onion	CEL	GEN	MUTA	NOAEL	LOAEL	0.8333 d	0.073	0.146	%	100	160334
Glyphosate	Eisenia	fetida	Earthworm	MOR	MOR	MORT	NR-ZERO		2 d	2000		ppm	100	161836
Glyphosate	Eisenia	fetida	Earthworm	BCM	ENZ	SODA	NOAEL		2 d	2000		ppm	100	161836
Glyphosate	Eisenia	fetida	Earthworm	BCM	BCM	GLTH	NOAEL		2 d	2000		ppm	100	161836
Glyphosate	Eisenia	fetida	Earthworm	BCM	ENZ	ACHE	NOAEL		2 d	2000		ppm	100	161836
Glyphosate	Cyperus	entrerianus	Woodrush Flatsedge	POP	POP	BMAS	LOAEL		42 d	1.9624		lb/acre	100	160465
Glyphosate isopropylamine salt	Arundina	tecta	Cane	POP	POP	ABND	LOAEL		456.6 d	2		AI %	100	160468
Glyphosate isopropylamine salt	Kyllinga	polyphylla	Navua Sedge	POP	POP	ABND	LOAEL		112 d	2160		ae g/ha	100	160474
Glyphosate isopropylamine salt	Kyllinga	polyphylla	Navua Sedge	POP	POP	ABND	LOAEL		135 d	2160		ae g/ha	100	160474
Glyphosate isopropylamine salt	Kyllinga	polyphylla	Navua Sedge	POP	POP	ABND	LOAEL		114 d	1080		ae g/ha	100	160474
Glyphosate isopropylamine salt	Kyllinga	polyphylla	Navua Sedge	MOR	MOR	MORT	LC50		d	113		ae g/ha	100	160474

Glyphosate isopropylamine salt	Kyllinga	polyphylla	Navua Sedge	MOR	MOR	MORT	LC90			d	2132		ae g/ha	100	160474
Glyphosate isopropylamine salt	Kyllinga	polyphylla	Navua Sedge	MOR	MOR	MORT	LC99			d	23386		ae g/ha	100	160474
Glyphosate isopropylamine salt	NR	Chlorophyta	Green Algae Division	POP	POP	ABND	LOAEL			1 d	3.45		mg/L	48	162056
Glyphosate isopropylamine salt	Hexarthra	sp.	Rotifer	POP	POP	ABND	NOAEL			21 d	3.45		mg/L	48	162056
Glyphosate isopropylamine salt	Asplanchna	sp.	Rotifer	POP	POP	ABND	NOAEL			21 d	3.45		mg/L	48	162056
Glyphosate isopropylamine salt	Moina	sp.	Water Flea	POP	POP	ABND	NOAEL			21 d	3.45		mg/L	48	162056
Glyphosate isopropylamine salt	Algae	NR	Algae	BCM	BCM	MLDH	LOAEL			21 d	3.45		mg/L	48	162056
Glyphosate isopropylamine salt	Algae	NR	Algae	BCM	ENZ	SODA	LOAEL			1 d	3.45		mg/L	48	162056
Glyphosate isopropylamine salt	Algae	NR	Algae	POP	POP	BMAS	NOAEL			21 d	3.45		mg/L	48	162056
Glyphosate isopropylamine salt	NR	Cyanophyta	Blue-Green Algae Phylum	POP	POP	ABND	NOAEL			21 d	3.45		mg/L	48	162056
Glyphosate isopropylamine salt	NR	Animalia	Animal Kingdom	POP	POP	ABND	NOAEL			21 d	3.45		mg/L	48	162056
Glyphosate isopropylamine salt	NR	Cyclopoida	Copepod Order	POP	POP	ABND	NOAEL			21 d	3.45		mg/L	48	162056
Glyphosate isopropylamine salt	NR	Cyclopoida	Copepod Order	POP	POP	ABND	NOAEL			21 d	3.45		mg/L	48	162056
Glyphosate isopropylamine salt	NR	Calanoida	Copepod Order	POP	POP	ABND	NOAEL			21 d	3.45		mg/L	48	162056
Glyphosate isopropylamine salt	NR	Calanoida	Copepod Order	POP	POP	ABND	LOAEL			21 d	3.45		mg/L	48	162056

Glyphosate isopropylamine salt	Euchlani s	sp.	Rotifer	POP	POP	ABND	NOAEL		21	d	3.45		mg/L	48	162056
Glyphosate isopropylamine salt	Mytilina	sp.	Rotifer	POP	POP	ABND	NOAEL		21	d	3.45		mg/L	48	162056
Glyphosate isopropylamine salt	Platytas	sp.	Rotifer	POP	POP	ABND	NOAEL		21	d	3.45		mg/L	48	162056
Glyphosate isopropylamine salt	Brachionus	sp.	Rotifer	POP	POP	ABND	NOAEL		21	d	3.45		mg/L	48	162056
Glyphosate isopropylamine salt	Keratella	sp.	Rotifer	POP	POP	ABND	NOAEL		21	d	3.45		mg/L	48	162056
Glyphosate isopropylamine salt	Lecane	sp.	Rotifer	POP	POP	ABND	NOAEL		21	d	3.45		mg/L	48	162056
Glyphosate isopropylamine salt	Alona	sp.	Water Flea	POP	POP	ABND	NOAEL		21	d	3.45		mg/L	48	162056
Glyphosate potassium salt	Lithobates	clamitans	Green Frog	GRO	GRO	SIZE	NOAEL		365	d			ae ug/L	100	161200
Glyphosate potassium salt	Lithobates	clamitans	Green Frog	GRO	GRO	SIZE	NOAEL			d			ae ug/L	100	161200
Glyphosate potassium salt	Lithobates	clamitans	Green Frog	GRO	GRO	LGTH	NOAEL		365	d			ae ug/L	100	161200
Glyphosate potassium salt	Lithobates	clamitans	Green Frog	POP	POP	ABND	NOAEL		365	d			ae ug/L	100	161200
Glyphosate potassium salt	Lithobates	clamitans	Green Frog	POP	POP	ABND	NOAEL		365	d			ae ug/L	100	161200
Glyphosate potassium salt	Lithobates	clamitans	Green Frog	POP	POP	ABND	NOAEL			d			ae ug/L	100	161200
Glyphosate isopropylamine salt	Biomphalaria	alexandrina	Snail	BCM	BCM	GLUC	LOAEL		28	d	0.84		ppm	100	161199
Glyphosate isopropylamine salt	Biomphalaria	alexandrina	Snail	BCM	BCM	LACT	LOAEL		28	d	0.84		ppm	100	161199
Glyphosate isopropylamine salt	Biomphalaria	alexandrina	Snail	BCM	BCM	PRTL	LOAEL		28	d	0.84		ppm	100	161199
Glyphosate isopropylamine salt	Biomphalaria	alexandrina	Snail	BCM	BCM	GLYC	LOAEL		28	d	0.84		ppm	100	161199

Glyphosate isopropylamine salt	Biomphalaria	alexandrina	Snail	BCM	BCM	PYRV	LOAEL		28 d	0.84		ppm	100	161199
Glyphosate isopropylamine salt	Biomphalaria	alexandrina	Snail	BCM	BCM	TTAA	LOAEL		28 d	0.84		ppm	100	161199
Glyphosate isopropylamine salt	Biomphalaria	alexandrina	Snail	CEL	GEN	DNAC	LOAEL		28 d	0.84		ppm	100	161199
Glyphosate isopropylamine salt	Biomphalaria	alexandrina	Snail	CEL	GEN	RNAC	LOAEL		28 d	0.84		ppm	100	161199
Glyphosate isopropylamine salt	Biomphalaria	alexandrina	Snail	BCM	ENZ	GLPP	LOAEL		28 d	0.84		ppm	100	161199
Glyphosate isopropylamine salt	Biomphalaria	alexandrina	Snail	BCM	ENZ	G6PT	LOAEL		28 d	0.84		ppm	100	161199
Glyphosate isopropylamine salt	Biomphalaria	alexandrina	Snail	BCM	ENZ	LADH	LOAEL		28 d	0.84		ppm	100	161199
Glyphosate isopropylamine salt	Biomphalaria	alexandrina	Snail	BCM	ENZ	SCDH	LOAEL		28 d	0.84		ppm	100	161199
Glyphosate isopropylamine salt	Biomphalaria	alexandrina	Snail	BCM	ENZ	ACHE	LOAEL		28 d	0.84		ppm	100	161199
Glyphosate isopropylamine salt	Biomphalaria	alexandrina	Snail	BCM	ENZ	ACPH	LOAEL		28 d	0.84		ppm	100	161199
Glyphosate isopropylamine salt	Biomphalaria	alexandrina	Snail	BCM	ENZ	ALPH	LOAEL		28 d	0.84		ppm	100	161199
Glyphosate isopropylamine salt	Biomphalaria	alexandrina	Snail	BCM	ENZ	GOTR	LOAEL		28 d	0.84		ppm	100	161199
Glyphosate isopropylamine salt	Biomphalaria	alexandrina	Snail	BCM	ENZ	GPTR	LOAEL		28 d	0.84		ppm	100	161199
Glyphosate isopropylamine salt	Biomphalaria	alexandrina	Snail	BCM	ENZ	GLRE	LOAEL		28 d	0.84		ppm	100	161199
Glyphosate isopropylamine salt	Biomphalaria	alexandrina	Snail	BCM	BCM	LDPO	LOAEL		28 d	0.84		ppm	100	161199

Glyphosate isopropylamine salt	Biomphalaria	alexandrina	Snail	BCM	ENZ	SODA	LOAEL		28 d	0.84		ppm	100	161199
Glyphosate isopropylamine salt	Biomphalaria	alexandrina	Snail	BCM	ENZ	CTLS	LOAEL		28 d	0.84		ppm	100	161199
Glyphosate isopropylamine salt	Biomphalaria	alexandrina	Snail	REP	REP	ABNM	LOAEL		21 d	0.84		mg/L	100	161199
Glyphosate isopropylamine salt	Biomphalaria	alexandrina	Snail	MOR	MOR	MORT	LOAEL		7 d	0.84		mg/L	100	161199
Glyphosate isopropylamine salt	Biomphalaria	alexandrina	Snail	MOR	MOR	MORT	LOAEL		14 d	0.84		mg/L	100	161199
Glyphosate isopropylamine salt	Biomphalaria	alexandrina	Snail	MOR	MOR	MORT	LOAEL		21 d	0.84		mg/L	100	161199
Glyphosate isopropylamine salt	Biomphalaria	alexandrina	Snail	MOR	MOR	MORT	LOAEL		28 d	0.84		mg/L	100	161199
Glyphosate isopropylamine salt	Biomphalaria	alexandrina	Snail	MOR	MOR	MORT	LOAEL		35 d	0.84		mg/L	100	161199
Glyphosate isopropylamine salt	Biomphalaria	alexandrina	Snail	REP	REP	PROG	LOAEL		7 d	0.84		mg/L	100	161199
Glyphosate isopropylamine salt	Biomphalaria	alexandrina	Snail	REP	REP	PROG	LOAEL		14 d	0.84		mg/L	100	161199
Glyphosate isopropylamine salt	Biomphalaria	alexandrina	Snail	REP	REP	PROG	LOAEL		21 d	0.84		mg/L	100	161199
Glyphosate isopropylamine salt	Biomphalaria	alexandrina	Snail	REP	REP	ABNM	LOAEL		7 d	0.84		mg/L	100	161199
Glyphosate isopropylamine salt	Biomphalaria	alexandrina	Snail	REP	REP	ABNM	LOAEL		14 d	0.84		mg/L	100	161199
Glyphosate isopropylamine salt	Biomphalaria	alexandrina	Snail	MOR	MOR	HTCH	NOAEL		7 d	0.84		mg/L	100	161199
Glyphosate isopropylamine salt	Biomphalaria	alexandrina	Snail	MOR	MOR	HTCH	LOAEL		14 d	0.84		mg/L	100	161199

Glyphosate isopropylamine salt	Biomphalaria	alexandrina	Snail	MOR	MOR	MORT	NR-LETH		35	d	0.84		mg/L	100	161199
Glyphosate isopropylamine salt	Biomphalaria	alexandrina	Snail	REP	REP	PROG	LOAEL		28	d	0.84		mg/L	100	161199
Glyphosate isopropylamine salt	Biomphalaria	alexandrina	Snail	MOR	MOR	HTCH	LOAEL		21	d	0.84		mg/L	100	161199
Glyphosate monoammonium salt	Piaractus	mesopotamicus	Pacu	MOR	MOR	MORT	NR-LETH		1	d			mg/L	48	161196
Glyphosate monoammonium salt	Piaractus	mesopotamicus	Pacu	CEL	CEL	NCEL	LOAEL		2	d			mg/L	48	161196
Glyphosate monoammonium salt	Piaractus	mesopotamicus	Pacu	MOR	MOR	MORT	LC50		2	d	3.74		mg/L	48	161196
Glyphosate	Paspalum	notatum	Bahiagrass	PHY	INJ	GINJ	LOAEL		14	d	0.24976		lb/acre	100	161278
Glyphosate	Paspalum	notatum	Bahiagrass	PHY	INJ	GINJ	LOAEL		28	d	0.24976		lb/acre	100	161278
Glyphosate	Paspalum	notatum	Bahiagrass	PHY	INJ	GINJ	LOAEL		84	d	0.24976		lb/acre	100	161278
Glyphosate	Tetraodon	urogallus	Western Capercaillie	GRO	GRO	GRRT	NOAEL		35	d	3000		ppm	100	161502
Glyphosate	Tetraodon	urogallus	Western Capercaillie	GRO	GRO	GRRT	NOAEL		28	d	3000		ppm	100	161502
Glyphosate	Tetraodon	urogallus	Western Capercaillie	GRO	GRO	GRRT	NOAEL		28	d	3000		ppm	100	161502
Glyphosate	Tetraodon	urogallus	Western Capercaillie	GRO	GRO	GRRT	NOAEL	LOAEL	35	d	1000	3000	ppm	100	161502
Glyphosate	Lithobates	catesbeiana	Bullfrog	GRO	GRO	LGTH	NOAEL		45	d	2.1		ae mg/L	100	161314
Glyphosate	Lithobates	catesbeiana	Bullfrog	MOR	MOR	MORT	NR-ZERO		16	d	2.1		ae mg/L	100	161314
Glyphosate	Lithobates	catesbeiana	Bullfrog	GRO	GRO	WGHT	NOAEL		45	d	2.1		ae mg/L	100	161314
Glyphosate	Lithobates	catesbeiana	Bullfrog	MOR	MOR	MORT	LOAEL		45	d	2.1		ae mg/L	100	161314
Glyphosate	Lithobates	catesbeiana	Bullfrog	GRO	DVP	STGE	NOAEL		45	d	2.1		ae mg/L	100	161314
Glyphosate isopropylamine salt	Rhinella	arenarum	Toad	MOR	MOR	MORT	NR-LETH		2	d	50		ae mg/L	100	161313

Glyphosate isopropylamine salt	Daphnia	magna	Water Flea	PHY	ITX	IMBL	EC50			2 d				mg/L	40	161204
Glyphosate isopropylamine salt	Daphnia	magna	Water Flea	PHY	ITX	IMBL	EC50			2 d				mg/L	40	161204
Glyphosate isopropylamine salt	Daphnia	magna	Water Flea	PHY	ITX	IMBL	EC50			2 d				mg/L	40	161204
Glyphosate isopropylamine salt	Daphnia	magna	Water Flea	PHY	ITX	IMBL	EC50			2 d				mg/L	40	161204
Glyphosate isopropylamine salt	Daphnia	magna	Water Flea	PHY	ITX	IMBL	EC50			2 d				mg/L	40	161204
Glyphosate isopropylamine salt	Daphnia	magna	Water Flea	PHY	ITX	IMBL	EC50			2 d				mg/L	40	161204
Glyphosate isopropylamine salt	Daphnia	magna	Water Flea	PHY	ITX	IMBL	EC50			2 d				mg/L	40	161204
Glyphosate isopropylamine salt	Daphnia	magna	Water Flea	PHY	ITX	IMBL	EC50			2 d		10		mg/L	40	161204
Glyphosate isopropylamine salt	Daphnia	magna	Water Flea	PHY	ITX	IMBL	EC50			2 d		22		mg/L	40	161204
Glyphosate isopropylamine salt	Daphnia	magna	Water Flea	GRO	GRO	LGTH	NOEC	LOEC		36 d		0.45	1.35	mg/L	40	161204
Glyphosate isopropylamine salt	Daphnia	magna	Water Flea	MOR	MOR	SURV	NOEC	LOEC		55 d		1.35	4.05	mg/L	40	161204
Glyphosate isopropylamine salt	Daphnia	magna	Water Flea	GRO	GRO	LGTH	NOAEL			6 d		4.05		mg/L	40	161204
Glyphosate isopropylamine salt	Daphnia	magna	Water Flea	GRO	GRO	LGTH	NOAEL			12 d		4.05		mg/L	40	161204
Glyphosate isopropylamine salt	Daphnia	magna	Water Flea	GRO	GRO	LGTH	NOAEL	LOAEL		24 d		1.35	4.05	mg/L	40	161204
Glyphosate isopropylamine salt	Daphnia	magna	Water Flea	REP	REP	FCND	NOEC	LOEC		55 d		0.45	1.35	mg/L	40	161204
Glyphosate isopropylamine salt	Daphnia	magna	Water Flea	REP	REP	ABRT	NOEC			55 d		0.45		mg/L	40	161204

Glyphosate isopropylamine salt	Daphnia	magna	Water Flea	GRO	GRO	SIZE	NOAEL	LOAEL	55	d	1.35	4.05	mg/L	40	161204
Glyphosate isopropylamine salt	Cnesterodon	decemmaculatus	Ten-Spotted Livebearer	MOR	MOR	MORT	LC50		1	d	8.016		mg/L	48	161770
Glyphosate isopropylamine salt	Cnesterodon	decemmaculatus	Ten-Spotted Livebearer	MOR	MOR	MORT	LC50		2	d	7.752		mg/L	48	161770
Glyphosate isopropylamine salt	Cnesterodon	decemmaculatus	Ten-Spotted Livebearer	MOR	MOR	MORT	LC50		3	d	7.7136		mg/L	48	161770
Glyphosate isopropylamine salt	Cnesterodon	decemmaculatus	Ten-Spotted Livebearer	MOR	MOR	MORT	LC50		4	d	7.5264		mg/L	48	161770
Glyphosate isopropylamine salt	Cnesterodon	decemmaculatus	Ten-Spotted Livebearer	MOR	MOR	MORT	LOAEL		1	d	0.048		mg/L	48	161770
Glyphosate isopropylamine salt	Cnesterodon	decemmaculatus	Ten-Spotted Livebearer	MOR	MOR	MORT	LOAEL		2	d	0.048		mg/L	48	161770
Glyphosate isopropylamine salt	Cnesterodon	decemmaculatus	Ten-Spotted Livebearer	MOR	MOR	MORT	LOAEL		3	d	0.048		mg/L	48	161770
Glyphosate isopropylamine salt	Cnesterodon	decemmaculatus	Ten-Spotted Livebearer	MOR	MOR	MORT	LOAEL		4	d	0.048		mg/L	48	161770
Glyphosate isopropylamine salt	Cnesterodon	decemmaculatus	Ten-Spotted Livebearer	MOR	MOR	MORT	LC50		1	d	47.28		mg/L	48	161770
Glyphosate isopropylamine salt	Cnesterodon	decemmaculatus	Ten-Spotted Livebearer	MOR	MOR	MORT	LC50		2	d	44.9904		mg/L	48	161770
Glyphosate isopropylamine salt	Cnesterodon	decemmaculatus	Ten-Spotted Livebearer	MOR	MOR	MORT	LC50		3	d	44.0304		mg/L	48	161770
Glyphosate isopropylamine salt	Cnesterodon	decemmaculatus	Ten-Spotted Livebearer	MOR	MOR	MORT	LC50		4	d	44.0304		mg/L	48	161770
Glyphosate isopropylamine salt	Cnesterodon	decemmaculatus	Ten-Spotted Livebearer	MOR	MOR	MORT	NR-ZERO		4	d	5.664		mg/L	48	161770
Glyphosate isopropylamine salt	Cnesterodon	decemmaculatus	Ten-Spotted Livebearer	CEL	CEL	NCEL	NOAEL		2	d	5.664		mg/L	48	161770

Glyphosate isopropylamine salt	Cnesterodon	decemmaculatus	Ten-Spotted Livebearer	CEL	CEL	NCEL	NOAEL		4 d	5.664		mg/L	48	161770
Glyphosate isopropylamine salt	Cnesterodon	decemmaculatus	Ten-Spotted Livebearer	MOR	MOR	MORT	NR-ZERO		4 d	33.024		mg/L	48	161770
Glyphosate isopropylamine salt	Cnesterodon	decemmaculatus	Ten-Spotted Livebearer	CEL	GEN	MNUC	NOAEL		2 d	33.024		mg/L	48	161770
Glyphosate isopropylamine salt	Cnesterodon	decemmaculatus	Ten-Spotted Livebearer	CEL	GEN	MNUC	LOAEL		4 d	10.992		mg/L	48	161770
Glyphosate isopropylamine salt	Cnesterodon	decemmaculatus	Ten-Spotted Livebearer	CEL	CEL	NCEL	NOAEL		2 d	33.024		mg/L	48	161770
Glyphosate isopropylamine salt	Cnesterodon	decemmaculatus	Ten-Spotted Livebearer	CEL	CEL	NCEL	NOAEL		4 d	33.024		mg/L	48	161770
Glyphosate	Gasterosteus	aculeatus	Threespine Stickleback	GRO	GRO	COND	NOAEL		42 d	0.096		mg/L	>=96	161769
Glyphosate	Gasterosteus	aculeatus	Threespine Stickleback	GRO	GRO	COND	NOAEL		42 d	0.078		mg/L	>=96	161769
Glyphosate	Gasterosteus	aculeatus	Threespine Stickleback	GRO	MPH	IMPS	NOAEL		42 d			mg/L	>=96	161769
Glyphosate isopropylamine salt	Corydoras	paleatus	Peppered Corydoras	CEL	GEN	DAMG	NOAEL		3 d	0.0032		mg/L	48	161192
Glyphosate isopropylamine salt	Corydoras	paleatus	Peppered Corydoras	CEL	GEN	DAMG	NOAEL		6 d	0.0032		mg/L	48	161192
Glyphosate isopropylamine salt	Corydoras	paleatus	Peppered Corydoras	CEL	GEN	DAMG	NOAEL		9 d	0.0032		mg/L	48	161192
Glyphosate isopropylamine salt	Corydoras	paleatus	Peppered Corydoras	CEL	GEN	DAMG	LOAEL		3 d	0.0032		mg/L	48	161192
Glyphosate isopropylamine salt	Corydoras	paleatus	Peppered Corydoras	CEL	GEN	DAMG	LOAEL		6 d	0.0032		mg/L	48	161192
Glyphosate isopropylamine salt	Corydoras	paleatus	Peppered Corydoras	CEL	GEN	DAMG	LOAEL		9 d	0.0032		mg/L	48	161192
Glyphosate isopropylamine salt	Corydoras	paleatus	Peppered Corydoras	CEL	GEN	DAMG	LOAEL		3 d	0.0032		mg/L	48	161192

Glyphosate isopropylamine salt	Corydoras	paleatus	Peppered Corydoras	CEL	GEN	DAMG	LOAEL		6 d	0.0032		mg/L	48	161192
Glyphosate isopropylamine salt	Corydoras	paleatus	Peppered Corydoras	CEL	GEN	DAMG	LOAEL		9 d	0.0032		mg/L	48	161192
Glyphosate isopropylamine salt	Corydoras	paleatus	Peppered Corydoras	MOR	MOR	MORT	NR-ZERO		9 d	0.0032		mg/L	48	161192
Glyphosate isopropylamine salt	Rhinella	arenarum	Toad	MOR	MOR	MORT	NOEC	LOEC	2 d	10	20	mg/L	74.7	161310
Glyphosate isopropylamine salt	Rhinella	arenarum	Toad	BCM	ENZ	ACHE	LOAEL		2 d	10		mg/L	74.7	161310
Glyphosate isopropylamine salt	Rhinella	arenarum	Toad	BCM	ENZ	BCHE	LOAEL		2 d	10		mg/L	74.7	161310
Glyphosate isopropylamine salt	Rhinella	arenarum	Toad	BCM	ENZ	GSTR	LOAEL		2 d	10		mg/L	74.7	161310
Glyphosate isopropylamine salt	Rhinella	arenarum	Toad	MOR	MOR	MORT	LC50		2 d	13.2		mg/L	74.7	161310
Glyphosate isopropylamine salt	Rhinella	arenarum	Toad	CEL	GEN	NABN	NOAEL		2 d	10		mg/L	74.7	161310
Glyphosate isopropylamine salt	Callinectes	sapidus	Blue Crab	MOR	MOR	MORT	LC50		1 d	6.279		mg/L	50.2	161498
Glyphosate isopropylamine salt	Callinectes	sapidus	Blue Crab	MOR	MOR	MORT	LC50		1 d	316		mg/L	50.2	161498
Glyphosate isopropylamine salt	Callinectes	sapidus	Blue Crab	GRO	DVP	MMPH	LOAEL		2.6408 d	5.5		mg/L	50.2	161498
Glyphosate isopropylamine salt	Callinectes	sapidus	Blue Crab	GRO	DVP	MMPH	ET50		2.1692 d	5.5		mg/L	50.2	161498
Glyphosate isopropylamine salt	Callinectes	sapidus	Blue Crab	GRO	DVP	MOLT	NOAEL		2.6408 d	5.5		mg/L	50.2	161498
Glyphosate isopropylamine salt	Callinectes	sapidus	Blue Crab	MOR	MOR	MORT	LOAEL		2.6408 d	5.5		mg/L	50.2	161498

Glyphosate isopropylamine salt	Frankliniella	fusca	Tobacco Thrip	POP	POP	ABND	LOAEL		21 d	9.4		AI kg/ha	100	161500
Glyphosate isopropylamine salt	Frankliniella	fusca	Tobacco Thrip	POP	POP	ABND	LOAEL		21 d	9.4		AI kg/ha	100	161500
Glyphosate isopropylamine salt	Frankliniella	fusca	Tobacco Thrip	POP	POP	ABND	LOAEL		42 d	9.4		AI kg/ha	100	161500
Glyphosate isopropylamine salt	Frankliniella	fusca	Tobacco Thrip	POP	POP	ABND	LOAEL		28 d	9.4		AI kg/ha	100	161500
Glyphosate isopropylamine salt	Frankliniella	fusca	Tobacco Thrip	POP	POP	ABND	NOAEL		28 d	9.4		AI kg/ha	100	161500
Glyphosate isopropylamine salt	Frankliniella	fusca	Tobacco Thrip	POP	POP	ABND	LOAEL		21 d	9.4		AI kg/ha	100	161500
Glyphosate isopropylamine salt	Frankliniella	fusca	Tobacco Thrip	POP	POP	ABND	LOAEL		29 d	9.4		AI kg/ha	100	161500
Glyphosate isopropylamine salt	Oryzias	latipes	Japanese Medaka	MOR	MOR	MORT	LC50		4 d	76.8		mg/L	100	161318
Glyphosate	Oryzias	latipes	Japanese Medaka	MOR	MOR	MORT	LC50		4 d	158.88		mg/L	>99.3	161318
Glyphosate	Oryzias	latipes	Japanese Medaka	CEL	GEN	GEXP	NOAEL		2 d	15.888		mg/L	>99.3	161318
Glyphosate isopropylamine salt	Pseudacris	regilla	Pacific Chorus Frog	MOR	MOR	MORT	LC50		1 d	0.43		mg/L	50.2	161728
Glyphosate isopropylamine salt	Pseudacris	regilla	Pacific Chorus Frog	MOR	MOR	MORT	LC50		7 d	0.32		mg/L	50.2	161728
Glyphosate isopropylamine salt	Pseudacris	regilla	Pacific Chorus Frog	MOR	MOR	MORT	LC50		15 d	0.3		mg/L	50.2	161728
Glyphosate isopropylamine salt	Rana	luteiventris	Spotted Frog	MOR	MOR	MORT	LC50		1 d	1.65		mg/L	50.2	161728
Glyphosate isopropylamine salt	Rana	luteiventris	Spotted Frog	MOR	MOR	MORT	LC50		7 d	1.08		mg/L	50.2	161728
Glyphosate isopropylamine salt	Rana	luteiventris	Spotted Frog	MOR	MOR	MORT	LC50		15 d	0.98		mg/L	50.2	161728

Glyphosate isopropylamine salt	Rana	cascadae	Cascades Frog	MOR	MOR	MORT	LC50		1 d	2.11		mg/L	50.2	161728
Glyphosate isopropylamine salt	Rana	cascadae	Cascades Frog	MOR	MOR	MORT	LC50		7 d	1.4		mg/L	50.2	161728
Glyphosate isopropylamine salt	Rana	cascadae	Cascades Frog	MOR	MOR	MORT	LC50		15 d	1.33		mg/L	50.2	161728
Glyphosate isopropylamine salt	Anaxyrus	boreas	Western Toad	MOR	MOR	MORT	LC50		1 d	2.66		mg/L	50.2	161728
Glyphosate isopropylamine salt	Anaxyrus	boreas	Western Toad	MOR	MOR	MORT	LC50		7 d	2.08		mg/L	50.2	161728
Glyphosate isopropylamine salt	Anaxyrus	boreas	Western Toad	MOR	MOR	MORT	LC50		15 d	1.95		mg/L	50.2	161728
Glyphosate isopropylamine salt	Ambystoma	macrodictyum	Long-Toed Salamander	MOR	MOR	MORT	LC50		7 d	1.85		mg/L	50.2	161728
Glyphosate isopropylamine salt	Ambystoma	macrodictyum	Long-Toed Salamander	MOR	MOR	MORT	LC50		15 d	1.55		mg/L	50.2	161728
Glyphosate isopropylamine salt	Ambystoma	gracile	Northwestern Salamander	MOR	MOR	MORT	LC50		7 d	1.73		mg/L	50.2	161728
Glyphosate isopropylamine salt	Ambystoma	gracile	Northwestern Salamander	MOR	MOR	MORT	LC50		15 d	1.83		mg/L	50.2	161728
Glyphosate isopropylamine salt	Huso	huso	Beluga	MOR	MOR	MORT	LC50		0.5 d	27.5479		mg/L	41	161205
Glyphosate isopropylamine salt	Huso	huso	Beluga	MOR	MOR	MORT	LC50		7 d	3.4071		mg/L	41	161205
Glyphosate isopropylamine salt	Huso	huso	Beluga	MOR	MOR	MORT	LC50		0.25 d	30.5122		mg/L	41	161205
Glyphosate isopropylamine salt	Huso	huso	Beluga	MOR	MOR	MORT	LC50		4 d	8.1303		mg/L	41	161205
Glyphosate isopropylamine salt	Huso	huso	Beluga	MOR	MOR	MORT	LC50		1 d	16.933		mg/L	41	161205

Glyphosate isopropylamine salt	Huso	huso	Beluga	MOR	MOR	MORT	LC50			2 d	11.0372		mg/L	41	161205
Glyphosate isopropylamine salt	Acipenser	stellatus	Sevruga, Stellate Sturgeon	MOR	MOR	MORT	LC50			7 d	5.3218		mg/L	41	161205
Glyphosate isopropylamine salt	Acipenser	stellatus	Sevruga, Stellate Sturgeon	MOR	MOR	MORT	LC50			0.25 d	28.5852		mg/L	41	161205
Glyphosate isopropylamine salt	Acipenser	stellatus	Sevruga, Stellate Sturgeon	MOR	MOR	MORT	LC50			0.5 d	25.0715		mg/L	41	161205
Glyphosate isopropylamine salt	Acipenser	stellatus	Sevruga, Stellate Sturgeon	MOR	MOR	MORT	LC50			1 d	18.9297		mg/L	41	161205
Glyphosate isopropylamine salt	Acipenser	stellatus	Sevruga, Stellate Sturgeon	MOR	MOR	MORT	LC50			2 d	16.277		mg/L	41	161205
Glyphosate isopropylamine salt	Acipenser	stellatus	Sevruga, Stellate Sturgeon	MOR	MOR	MORT	LC50			4 d	10.1352		mg/L	41	161205
Glyphosate isopropylamine salt	Acipenser	persicus	Persian Sturgeon	MOR	MOR	MORT	LC50			0.25 d	31.6561		mg/L	41	161205
Glyphosate isopropylamine salt	Acipenser	persicus	Persian Sturgeon	MOR	MOR	MORT	LC50			0.5 d	25.1494		mg/L	41	161205
Glyphosate isopropylamine salt	Acipenser	persicus	Persian Sturgeon	MOR	MOR	MORT	LC50			1 d	18.3762		mg/L	41	161205
Glyphosate isopropylamine salt	Acipenser	persicus	Persian Sturgeon	MOR	MOR	MORT	LC50			2 d	14.0138		mg/L	41	161205
Glyphosate isopropylamine salt	Acipenser	persicus	Persian Sturgeon	MOR	MOR	MORT	LC50			4 d	10.6805		mg/L	41	161205
Glyphosate isopropylamine salt	Acipenser	persicus	Persian Sturgeon	MOR	MOR	MORT	LC50			7 d	4.3419		mg/L	41	161205
Glyphosate isopropylamine salt	Euphyctis	cyanophlyctis	Indian Skittering Frog	MOR	MOR	MORT	LC50			10 d	2.12		ae mg/L	41	161702
Glyphosate isopropylamine salt	Euphyctis	cyanophlyctis	Indian Skittering Frog	MOR	MOR	MORT	LC50			4 d	3.76		ae mg/L	41	161702

Glyphosate isopropylamine salt	Euphyctis	cyanophlyctis	Indian Skittering Frog	MOR	MOR	MORT	LC50		4 d	3.39		ae mg/L	41	161702
Glyphosate isopropylamine salt	Euphyctis	cyanophlyctis	Indian Skittering Frog	MOR	MOR	MORT	LC50		10 d	1.91		ae mg/L	41	161702
Glyphosate isopropylamine salt	Euphyctis	cyanophlyctis	Indian Skittering Frog	CEL	GEN	MNUC	NOAEL	LOAEL	2 d	1	2	ae mg/L	41	161702
Glyphosate isopropylamine salt	Euphyctis	cyanophlyctis	Indian Skittering Frog	CEL	GEN	MNUC	NOAEL	LOAEL	3 d	1	2	ae mg/L	41	161702
Glyphosate isopropylamine salt	Euphyctis	cyanophlyctis	Indian Skittering Frog	CEL	GEN	MNUC	NOAEL	LOAEL	4 d	1	2	ae mg/L	41	161702
Glyphosate isopropylamine salt	Euphyctis	cyanophlyctis	Indian Skittering Frog	CEL	GEN	MNUC	NOAEL	LOAEL	1 d	1	2	ae mg/L	41	161702
Glyphosate isopropylamine salt	Euphyctis	cyanophlyctis	Indian Skittering Frog	CEL	GEN	MNUC	NOAEL	LOAEL	1 d	1	2	ae mg/L	41	161702
Glyphosate isopropylamine salt	Euphyctis	cyanophlyctis	Indian Skittering Frog	CEL	GEN	MNUC	NOAEL	LOAEL	2 d	1	2	ae mg/L	41	161702
Glyphosate isopropylamine salt	Euphyctis	cyanophlyctis	Indian Skittering Frog	CEL	GEN	MNUC	NOAEL	LOAEL	3 d	1	2	ae mg/L	41	161702
Glyphosate isopropylamine salt	Euphyctis	cyanophlyctis	Indian Skittering Frog	CEL	GEN	MNUC	NOAEL	LOAEL	4 d	1	2	ae mg/L	41	161702
Glyphosate isopropylamine salt	Caiman	latirostris	Broad-Snouted Caiman	CEL	GEN	MNUC	LOAEL		60 d			ppm	100	161703
Glyphosate isopropylamine salt	Caiman	latirostris	Broad-Snouted Caiman	GRO	GRO	LGTH	NOAEL		60 d			ppm	100	161703
Glyphosate isopropylamine salt	Caiman	latirostris	Broad-Snouted Caiman	GRO	GRO	WGHT	NOAEL		60 d			ppm	100	161703
Glyphosate	Orius	sp.	Minute Pirate Bug	POP	POP	ABND	NOAEL		1 gs	1.08		AI kg/ha	100	161690
Glyphosate	Orius	sp.	Minute Pirate Bug	POP	POP	ABND	NOAEL		1 gs	1.08		AI kg/ha	100	161690
Glyphosate	Nabis	sp.	Damsel Bug	POP	POP	ABND	NOAEL		1 gs	1.08		AI kg/ha	100	161690
Glyphosate	NR	Insecta	Insect Class	POP	POP	ABND	NOAEL		1 gs	1.08		AI kg/ha	100	161690
Glyphosate	NR	Aphididae	Aphid Family	POP	POP	ABND	NOAEL		1 gs	1.08		AI kg/ha	100	161690
Glyphosate	NR	Aphididae	Aphid Family	POP	POP	ABND	NOAEL		1 gs	1.08		AI kg/ha	100	161690

Glyphosate	NR	Thysanoptera	Thrip Order	POP	POP	ABND	NOAEL		1	gs	1.08		Al kg/ha	100	161690
Glyphosate	NR	Plantae	Plant Kingdom	POP	POP	ABND	LOAEL		1	gs	0.96336		lb/acre	100	161690
Glyphosate	NR	Plantae	Plant Kingdom	POP	POP	ABND	LOAEL		1	gs	0.96336		lb/acre	100	161690
Glyphosate	Nabis	sp.	Damsel Bug	POP	POP	ABND	LOAEL		1	gs	1.08		Al kg/ha	100	161690
Glyphosate	NR	Insecta	Insect Class	POP	POP	ABND	NOAEL		1	gs	1.08		Al kg/ha	100	161690
Glyphosate	NR	Thysanoptera	Thrip Order	POP	POP	ABND	NOAEL		1	gs	1.08		Al kg/ha	100	161690
Glyphosate	Lolium	multiflorum	Annual Ryegrass	MOR	MOR	SURV	LOAEL		7	d	0.8		L/ha	100	161696
Glyphosate	Lolium	multiflorum	Annual Ryegrass	BCM	BCM	CHLO	LOAEL		7	d	0.8		L/ha	100	161696
Glyphosate	NR	Fungi	Fungi Kingdom	MOR	MOR	SURV	LOAEL		10	d	0.8		L/ha	100	161696
Glyphosate	NR	Fungi	Fungi Kingdom	POP	POP	RCLN	LOAEL		10	d	0.8		L/ha	100	161696
AMPA	Crassostraea	gigas	Pacific Oyster	MOR	MOR	MORT	NR-ZERO		2	d	100000		ae ug/L	100	161544
AMPA	Crassostraea	gigas	Pacific Oyster	GRO	DVP	NORM	NOAEL	LOAEL	2	d	10000	20000	ae ug/L	100	161544
AMPA	Crassostraea	gigas	Pacific Oyster	GRO	DVP	ABNM	EC10		2	d	10299		ae ug/L	100	161544
AMPA	Crassostraea	gigas	Pacific Oyster	GRO	DVP	ABNM	EC50		2	d	40617		ae ug/L	100	161544
AMPA	Crassostraea	gigas	Pacific Oyster	GRO	DVP	ABNM	EC50		2	d	46105		ae ug/L	100	161544
AMPA	Crassostraea	gigas	Pacific Oyster	GRO	DVP	ABNM	EC10		2	d	11032		ae ug/L	100	161544
Glyphosate	Crassostraea	gigas	Pacific Oyster	GRO	DVP	NORM	NOAEL	LOAEL	2	d	20000	40000	ae ug/L	100	161544
Glyphosate	Crassostraea	gigas	Pacific Oyster	GRO	DVP	ABNM	EC10		2	d	13347		ae ug/L	100	161544
Glyphosate	Crassostraea	gigas	Pacific Oyster	MOR	MOR	MORT	NR-ZERO		2	d	100000		ae ug/L	100	161544
Glyphosate	Crassostraea	gigas	Pacific Oyster	GRO	DVP	ABNM	EC50		2	d	27175		ae ug/L	100	161544
Glyphosate	Crassostraea	gigas	Pacific Oyster	GRO	DVP	ABNM	EC10		2	d	13457		ae ug/L	100	161544
Glyphosate	Crassostraea	gigas	Pacific Oyster	GRO	DVP	ABNM	EC50		2	d	28315		ae ug/L	100	161544
Glyphosate isopropylamine salt	Crassostraea	gigas	Pacific Oyster	GRO	DVP	ABNM	EC50		2	d	1168		ae ug/L	100	161544
Glyphosate isopropylamine salt	Crassostraea	gigas	Pacific Oyster	MOR	MOR	MORT	NR-LETH		2	d	10000		ae ug/L	100	161544
Glyphosate isopropylamine salt	Crassostraea	gigas	Pacific Oyster	GRO	DVP	NORM	NOAEL	LOAEL	2	d	1100	1200	ae ug/L	100	161544

Glyphosate isopropylamine salt	Crassostr ea	gigas	Pacific Oyster	GRO	DVP	ABNM	EC10			2 d	1006		ae ug/L	100	161544
Glyphosate isopropylamine salt	Crassostr ea	gigas	Pacific Oyster	GRO	DVP	ABNM	EC50			2 d	1133		ae ug/L	100	161544
Glyphosate isopropylamine salt	Crassostr ea	gigas	Pacific Oyster	GRO	DVP	ABNM	EC10			2 d	1037		ae ug/L	100	161544
Glyphosate	Crassostr ea	gigas	Pacific Oyster	GRO	DVP	ABNM	EC10			2 d	1628		ae ug/L	100	161544
Glyphosate	Crassostr ea	gigas	Pacific Oyster	GRO	DVP	ABNM	EC50			2 d	1672		ae ug/L	100	161544
Glyphosate	Crassostr ea	gigas	Pacific Oyster	GRO	DVP	NORM	NOAEL	LOAEL		2 d	1600	1700	ae ug/L	100	161544
Glyphosate	Crassostr ea	gigas	Pacific Oyster	GRO	DVP	ABNM	EC50			2 d	2001		ae ug/L	100	161544
Glyphosate	Crassostr ea	gigas	Pacific Oyster	MOR	MOR	MORT	NR- LETH			2 d	10000		ae ug/L	100	161544
Glyphosate	Crassostr ea	gigas	Pacific Oyster	GRO	DVP	ABNM	EC10			2 d	1951		ae ug/L	100	161544
Glyphosate	Crassostr ea	gigas	Pacific Oyster	MOR	MOR	MORT	EC10			1 d	100000		ae ug/L	100	161544
Glyphosate	Crassostr ea	gigas	Pacific Oyster	MOR	MOR	MORT	EC50			1 d	100000		ae ug/L	100	161544
Glyphosate	Crassostr ea	gigas	Pacific Oyster	GRO	DVP	MMPH	EC10			1 d	100000		ae ug/L	100	161544
Glyphosate	Crassostr ea	gigas	Pacific Oyster	GRO	DVP	MMPH	EC50			1 d	100000		ae ug/L	100	161544
Glyphosate	Crassostr ea	gigas	Pacific Oyster	GRO	DVP	MMPH	EC10			1 d	100000		ae ug/L	100	161544
Glyphosate	Crassostr ea	gigas	Pacific Oyster	GRO	DVP	MMPH	EC50			1 d	100000		ae ug/L	100	161544
Glyphosate	Crassostr ea	gigas	Pacific Oyster	GRO	DVP	MMPH	NOAEL	LOAEL		1 d	10000	100000	ae ug/L	100	161544
Glyphosate isopropylamine salt	Crassostr ea	gigas	Pacific Oyster	GRO	DVP	MMPH	NOAEL	LOAEL		1 d	6400	6600	ae ug/L	100	161544
Glyphosate isopropylamine salt	Crassostr ea	gigas	Pacific Oyster	GRO	DVP	MMPH	EC10			1 d	5215		ae ug/L	100	161544
Glyphosate isopropylamine salt	Crassostr ea	gigas	Pacific Oyster	GRO	DVP	MMPH	EC50			1 d	6366		ae ug/L	100	161544
Glyphosate isopropylamine salt	Crassostr ea	gigas	Pacific Oyster	MOR	MOR	MORT	EC10			1 d	6601		ae ug/L	100	161544

Glyphosate isopropylamine salt	Crassostraea	gigas	Pacific Oyster	MOR	MOR	MORT	EC50		1 d	8502		ae ug/L	100	161544
Glyphosate isopropylamine salt	Crassostraea	gigas	Pacific Oyster	GRO	DVP	MMPH	EC50		1 d	6940		ae ug/L	100	161544
Glyphosate isopropylamine salt	Crassostraea	gigas	Pacific Oyster	GRO	DVP	MMPH	EC10		1 d	5778		ae ug/L	100	161544
AMPA	Crassostraea	gigas	Pacific Oyster	GRO	DVP	MMPH	EC10		1 d	100000		ae ug/L	100	161544
AMPA	Crassostraea	gigas	Pacific Oyster	GRO	DVP	MMPH	EC50		1 d	100000		ae ug/L	100	161544
AMPA	Crassostraea	gigas	Pacific Oyster	GRO	DVP	MMPH	NOAEL		1 d	100000		ae ug/L	100	161544
AMPA	Crassostraea	gigas	Pacific Oyster	MOR	MOR	MORT	EC10		1 d	100000		ae ug/L	100	161544
AMPA	Crassostraea	gigas	Pacific Oyster	MOR	MOR	MORT	EC50		1 d	100000		ae ug/L	100	161544
AMPA	Crassostraea	gigas	Pacific Oyster	GRO	DVP	MMPH	EC10		1 d	100000		ae ug/L	100	161544
AMPA	Crassostraea	gigas	Pacific Oyster	GRO	DVP	MMPH	EC50		1 d	100000		ae ug/L	100	161544
Glyphosate	Crassostraea	gigas	Pacific Oyster	GRO	DVP	MMPH	NOAEL	LOAEL	1 d	6000	6200	ae ug/L	100	161544
Glyphosate	Crassostraea	gigas	Pacific Oyster	GRO	DVP	MMPH	EC50		1 d	7550		ae ug/L	100	161544
Glyphosate	Crassostraea	gigas	Pacific Oyster	GRO	DVP	MMPH	EC10		1 d	5244		ae ug/L	100	161544
Glyphosate	Crassostraea	gigas	Pacific Oyster	GRO	DVP	MMPH	EC10		1 d	4150		ae ug/L	100	161544
Glyphosate	Crassostraea	gigas	Pacific Oyster	GRO	DVP	MMPH	EC50		1 d	6060		ae ug/L	100	161544
Glyphosate	Crassostraea	gigas	Pacific Oyster	MOR	MOR	MORT	EC10		1 d	4991		ae ug/L	100	161544
Glyphosate	Crassostraea	gigas	Pacific Oyster	MOR	MOR	MORT	EC50		1 d	7934		ae ug/L	100	161544
Glyphosate isopropylamine salt	Microcystis	wesenbergii	Blue-green Algae	POP	POP	CHLA	EC50		4 d	6.84		umol/L	41	161739
Glyphosate isopropylamine salt	Microcystis	wesenbergii	Blue-green Algae	POP	POP	PSII	NOAEL	LOAEL	0.25 d	132.17	329.53	nmol/L	41	161739
Glyphosate, Monopotassium salt	Lithobates	sylvaticus	Wood Frog	GRO	DVP	MMPH	NOAEL		63 d	0.21		ae mg/L	100	161997

Glyphosate potassium salt	Caiman	latirostris	Broad-Snouted Caiman	CEL	GEN	MNUC	NOAEL	LOAEL		d	264.8	331	ug/egg	66.2	161735
Glyphosate potassium salt	Caiman	latirostris	Broad-Snouted Caiman	CEL	GEN	DAMG	NOAEL	LOAEL		d	264.8	331	ug/egg	66.2	161735
Glyphosate potassium salt	Caiman	latirostris	Broad-Snouted Caiman	CEL	GEN	MNUC	LOAEL			d	331		ug/egg	66.2	161735
Glyphosate potassium salt	Caiman	latirostris	Broad-Snouted Caiman	CEL	GEN	DAMG	LOAEL			d	331		ug/egg	66.2	161735
Glyphosate isopropylamine salt	NR	Arthropoda	Arthropod Phylum	POP	POP	ABND	NOAEL			30 d	7200		ppm	100	161775
Glyphosate isopropylamine salt	NR	Diptera	Fly/Mosquito/Midge Order	POP	POP	ABND	NOAEL			3 d	7200		ppm	100	161775
Glyphosate isopropylamine salt	NR	Formicidae	Ant Family	POP	POP	ABND	NOAEL			30 d	7200		ppm	100	161775
Glyphosate	Amaranthus	sp.	Amaranth	POP	POP	ABND	LOAEL			1 gs	0.96336		lb/acre	100	162049
Glyphosate	Capsella	bursa-pastoris	Shepherd's Purse	POP	POP	ABND	NOAEL			1 gs	0.96336		lb/acre	100	162049
Glyphosate	Chenopodium	album	Lamb's-Quarters	POP	POP	ABND	LOAEL			1 gs	0.96336		lb/acre	100	162049
Glyphosate	Rumex	sp.	Dock Species	POP	POP	ABND	NOAEL			1 gs	0.96336		lb/acre	100	162049
Glyphosate	Veronica	sp.	Speedwell	POP	POP	ABND	NOAEL			1 gs	0.96336		lb/acre	100	162049
Glyphosate	NR	Plantae	Plant Kingdom	POP	POP	ABND	LOAEL			1 gs	0.96336		lb/acre	100	162049
Glyphosate	NR	Cicadellidae	Leafhopper Family	POP	POP	ABND	NOAEL			1 gs	1.08		AI kg/ha	100	162049
Glyphosate	NR	Thysanoptera	Thrip Order	POP	POP	ABND	NOAEL			1 gs	1.08		AI kg/ha	100	162049
Glyphosate	Nabis	sp.	Damsel Bug	POP	POP	ABND	LOAEL			1 gs	1.08		AI kg/ha	100	162049
Glyphosate	NR	Miridae	Leaf Bug Family	POP	POP	ABND	NOAEL			1 gs	1.08		AI kg/ha	100	162049
Glyphosate	NR	Collembola	Springtail Order	POP	POP	ABND	NOAEL			1 gs	1.08		AI kg/ha	100	162049
Glyphosate	NR	Insecta	Insect Class	POP	POP	ABND	NOAEL			1 gs	1.08		AI kg/ha	100	162049
Glyphosate	NR	Braconidae	Braconid Wasp Family	POP	POP	ABND	NOAEL			1 gs	1.08		AI kg/ha	100	162049
Glyphosate	NR	Ichneumonidae	Wasp Family	POP	POP	ABND	NOAEL			1 gs	1.08		AI kg/ha	100	162049
Glyphosate	NR	Chloropidae	Chloropid Fly Family	POP	POP	ABND	NOAEL			1 gs	1.08		AI kg/ha	100	162049
Glyphosate	NR	Insecta	Insect Class	POP	POP	ABND	NOAEL			1 gs	1.08		AI kg/ha	100	162049
Glyphosate	NR	Myriapoda	Arthropod Subphylum	POP	POP	ABND	NOAEL			1 gs	1.08		AI kg/ha	100	162049

Glyphosate	Abutilon	theophrasti	Butter Print	POP	POP	ABND	NOAEL		1	gs	0.96336		lb/acre	100	162049
Glyphosate	Datura	stramonium	Jimsonweed	POP	POP	ABND	NOAEL		1	gs	0.96336		lb/acre	100	162049
Glyphosate	Cyperus	rotundus	Purple Nutsedge	POP	POP	ABND	NOAEL		1	gs	0.96336		lb/acre	100	162049
Glyphosate	NR	Poaceae	Grass Family	POP	POP	ABND	LOAEL		1	gs	0.96336		lb/acre	100	162049
Glyphosate	Lolium	sp.	Ryegrass	POP	POP	ABND	LOAEL		1	gs	0.96336		lb/acre	100	162049
Glyphosate	Medicago	sativa	Alfalfa	POP	POP	ABND	NOAEL		1	gs	0.96336		lb/acre	100	162049
Glyphosate	Portulaca	oleracea	Wild Portulaca	POP	POP	ABND	NOAEL		1	gs	0.96336		lb/acre	100	162049
Glyphosate	NR	Aphididae	Aphid Family	POP	POP	ABND	NOAEL		1	gs	1.08		AI kg/ha	100	162049
Glyphosate	Orius	sp.	Minute Pirate Bug	POP	POP	ABND	LOAEL		1	gs	1.08		AI kg/ha	100	162049
Glyphosate	NR	Coccinellidae	Ladybird Beetle Family	POP	POP	ABND	NOAEL		1	gs	1.08		AI kg/ha	100	162049
Glyphosate	NR	Carabidae	Ground Beetle Family	POP	POP	ABND	LOAEL		1	gs	1.08		AI kg/ha	100	162049
Glyphosate	NR	Staphylinidae	Rove Beetle Family	POP	POP	ABND	NOAEL		1	gs	1.08		AI kg/ha	100	162049
Glyphosate	NR	Chrysopidae	Lacewing Family	POP	POP	ABND	NOAEL		1	gs	1.08		AI kg/ha	100	162049
Glyphosate	NR	Syrphidae	Syrphid Fly Family	POP	POP	ABND	NOAEL		1	gs	1.08		AI kg/ha	100	162049
Glyphosate	NR	Thysanoptera	Thrip Order	POP	POP	ABND	NOAEL		1	gs	1.08		AI kg/ha	100	162049
Glyphosate	NR	Trombididae	Mite Tick Family	POP	POP	ABND	NOAEL		1	gs	1.08		AI kg/ha	100	162049
Glyphosate	NR	Insecta	Insect Class	POP	POP	ABND	NOAEL		1	gs	1.08		AI kg/ha	100	162049
Glyphosate	NR	Araneae	Araneoid Spider Order	POP	POP	ABND	LOAEL		1	gs	1.08		AI kg/ha	100	162049
Glyphosate	NR	Collembola	Springtail Order	POP	POP	ABND	NOAEL		1	gs	1.08		AI kg/ha	100	162049
Glyphosate	NR	Dermaptera	Earwig Order	POP	POP	ABND	NOAEL		1	gs	1.08		AI kg/ha	100	162049
Glyphosate	NR	Thysanoptera	Thrip Order	POP	POP	ABND	LOAEL		1	gs	1.08		AI kg/ha	100	162049
Glyphosate	NR	Chalcididae	Chalcidid Wasp Family	POP	POP	ABND	NOAEL		1	gs	1.08		AI kg/ha	100	162049
Glyphosate	NR	Mymaridae	Fairyfly Family	POP	POP	ABND	NOAEL		1	gs	1.08		AI kg/ha	100	162049
Glyphosate isopropylamine salt	Mus	musculus	House Mouse	GRO	GRO	WGHT	NOAEL		1	d	600		mg/kg bdwt	100	161750
Glyphosate isopropylamine salt	Mus	musculus	House Mouse	GRO	MPH	WGHT	LOAEL		1	d	600		mg/kg bdwt	100	161750

Glyphosate	NR	Plantae	Plant Kingdom	POP	POP	COVR	NOAEL		974.08	d	1.9624		lb/acre	100	162026
Glyphosate	NR	Plantae	Plant Kingdom	POP	POP	BMAS	LOAEL		397	d	1.9624		lb/acre	100	162026
Glyphosate	Anthonomus	grandis ssp. grandis	Boll Weevil	MOR	MOR	SURV	LOAEL		273.96	d	2.2		AI kg/ha	100	162026
Glyphosate	Quercus	harvardii	Oak, Sand Shinn	POP	POP	COVR	LOAEL		608.8	d	1.9624		lb/acre	100	162026
Glyphosate	NR	Plantae	Plant Kingdom	POP	POP	COVR	NOAEL		974.08	d	1.9624		lb/acre	100	162026