U. S. ENVIRONMENTAL PROTECTION AGENCY
Washington, D.C. 20460

OFFICE OF
PREVENTION, PESTICIDES
AND TOXIC SUBSTANCES

Date: March 10, 2010
Chemical: Pyraclostrobin
PC Code: 099100
DP Barcodes: 372398, 372400 and 372401

MEMORANDUM

SUBJECT: Potential Impacts to Ecological Risk Assessment and Drinking Water Exposure Assessment as a Result of the Proposed Label Change to Reduce the Spray Volume to 1 Gallon Per Acre on Corn, Wheat, Triticale, and Soybean

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1. Introduction

The Environmental Fate and Effects Division (EFED) has completed its review of the impact of the proposed label change of reducing the spray volume of aerial applications of pyraclostrobin in Headline® fungicide to corn, wheat, triticale, and soybean to 1 gallon per acre (GPA) (Data Packages 372398, 372400 and 372401).

Previous EFED drinking water and ecological risk assessments used the default spray drift assumption of 5% for aerial applications. However, 1 gallon per acre is considered to be an ultra low volume application. Therefore, default assumptions of spray drift are expected to underestimate off-site movement of the chemical. This memorandum estimates the impact of using a 1 gallon per acre spray volume on the drinking water and ecological risk assessments. The amount of spray drift that may enter ecological water bodies was estimated using AgDRIFT (version 2.01). Potential impacts to aquatic and terrestrial ecological risk assessments are described in **Sections 2** and **3**, respectively. Potential impacts to drinking water assessments are described in **Section 4**.

2. Potential Impact to the Aquatic Ecological Risk Assessment

2.1. AgDRIFT Modeling

EFED employed Tier II aerial AgDRIFT (version 2.01) modeling to estimate potential changes in offsite deposition of pyraclostrobin at the edge of field that may result from use of the 1 GPA spray volume. The resulting spray drift fraction was input into PRZM/EXAMS to provide estimated environmental concentrations (EECs) for use in ecological risk assessments and drinking water assessments. EFED also modeled PRZM/EXAMS at the 5% default aerial spray drift fraction to compare with the AgDRIFT generated spray drift fraction for evaluating potential changes to aquatic EECs from using a lower spray volume.

Droplet size distribution (DSD) is an important variable in controlling off-site drift of pesticides (Bird et al. 1996). The registrant conducted a spray drift analysis using a VMD_{50} of 211 um based on results of a wind tunnel study (DP 370130). Since no policy/guidance has been established by the Agency to estimate alternative drift fractions at this time EFED modeled the ASABE Very Fine to Fine ($D_{V0.5}$ = 179.59 µm), ASABE Fine ($D_{V0.5}$ = 179.59 µm) and ASABE Fine to Medium (($D_{V0.5}$ = 254.72 µm) DSDs in AgDRIFT to characterize the potential impact droplets on spray drift deposition from ultra low volume spray applications. The ASABE Very Fine to Fine DSD was modeled to capture the potential smaller droplets from ULV spray applications. The suggested 211 VMD_{50} droplet size is bounded ASABE Fine and ASABE Fine to Medium spectra. EFED notes that the results of this wind tunnel study may be valuable for future uses in the risk assessment processes. All other AgDRIFT default input parameters were used except for the following:

Wind speed: 15 mph (per label directions)
Spray Volume: 1 gallon per acre (per label directions)
Nonvol rate: Corn/Soybean: 0.63
Wheat/Triticale: 0.47

Active rate: Corn/Soybean: 0.20
Wheat/Triticale: 0.15

A summary of AgDRIFT input data is included in **Appendix A**.

2.2 AgDRIFT Results

2.2. AgDRIFT Modeling

Aquatic deposition for the corn/soybean application rate is 0.19 (19%), 0.28 (28%) and 0.37 (37%) aerial drift for a downwind pond that is adjacent to a treated field for ASABE Fine, ASABE Very Fine to Fine and ASABE Fine to Medium DSDs, respectively. The respective aquatic deposition fractions of applied for the wheat/triticale application rate are (0.19) (19%), (0.27) (27%), and 0.36 (36%). The pond-integrated deposition plots for wheat/triticale are similar to corn/soybean plots and are located in **Appendix B**. Plots of the Tier II pond-integrated deposition for the ASABE drop size distributions are displayed in **Figures 1, 2 and 3**. The AgDRIFT output files are presented in **Appendix B**.

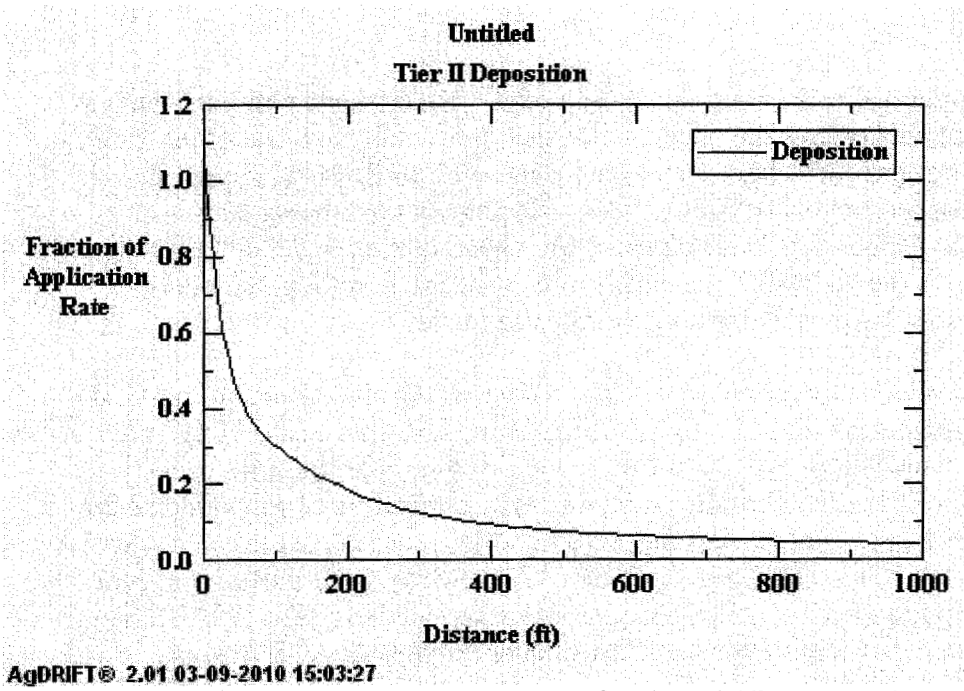

Figure 1. Tier II Pond-integrated Deposition for the ASABE Very Fine to Fine DSD for the Corn/soybean application rate

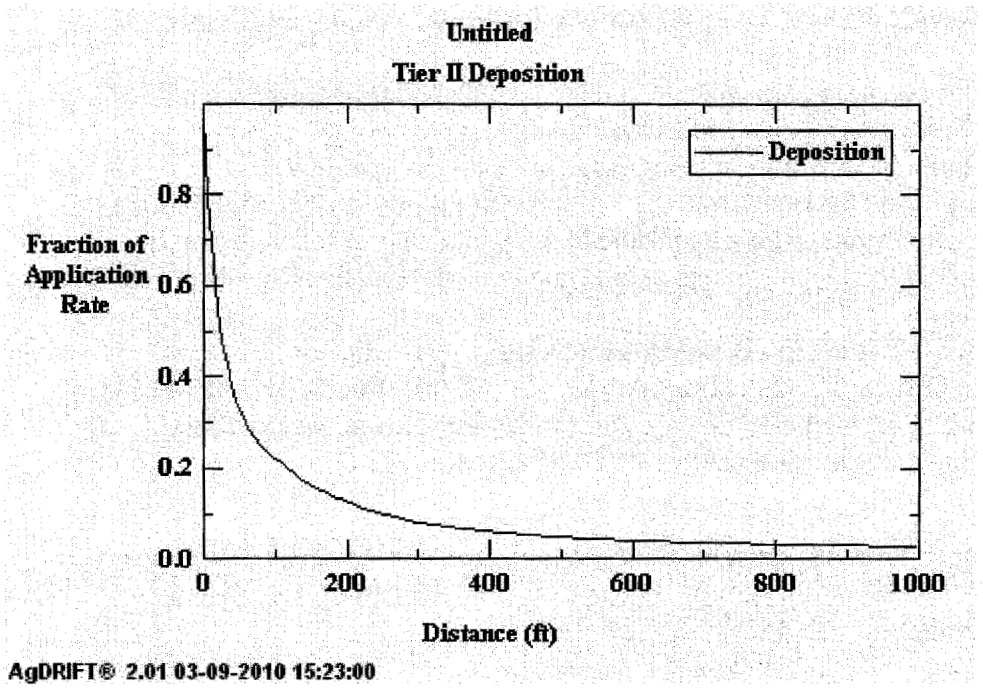

Figure 2. Tier II Pond-integrated Deposition for the ASABE Fine DSD for the Corn/soybean application rate

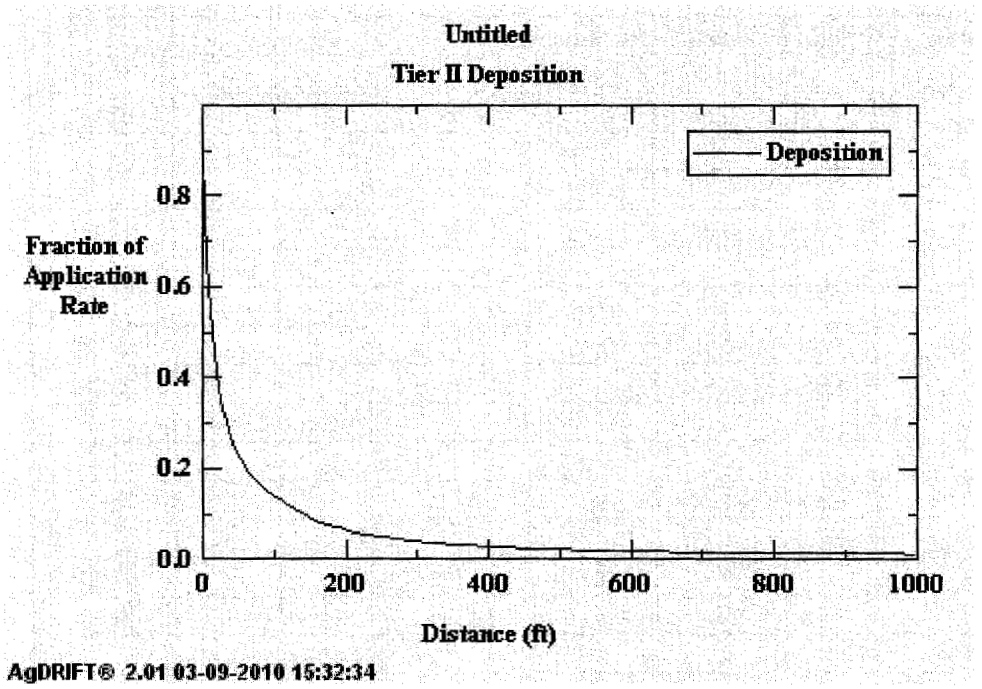

Figure 3. Tier II Pond-integrated Deposition for the ASABE Fine to Medium DSD for the Corn/soybean application rate

2.3. PRZM/EXAMS Modeling and Potential Effects on Aquatic Ecological Risks

For the aquatic assessment, aquatic EECs were calculated for the Headline® formulation of pyraclostrobin using the Tier II PRZM/EXAMS model. Additional information on PRZM/EXAMS can be found in the PE5 User's Manual (http://www.epa.gov/oppefed1/models/water/pe5_user_manual.htm). The maximum proposed label application rates for pyraclostrobin on corn, soybeans, wheat and triticale were modeled in several scenarios representative of each crop. Triticale is a wheat hybrid and is modeled using the wheat scenario.

Each scenario was modeled using PRZM/EXAMS default spray drift value of 5% and the AgDRIFT generated edge of field drift fractions. All other inputs remained constant and are listed in **Appendix C**. The resulting peak, 21-day, and 60-day EECs are listed in **Table 1**. The input parameters and example output files used in PRZM/EXAMS modeling are presented in **Appendix C**.

Table 1. EFED Aquatic Modeling EECs for Headline Pyraclostrobin at the PRZM/EXAMS Default and AgDRIFT Generated Spray Drift Fractions

PRZM crop scenario (Spray Drift Fraction)	App. Date (dd-mm)	Peak Conc. (µg/L)	Acute fish RQ (LC50: 6.2 ug/L)	Acute Daphnid RQ (EC50: 15.7 ug/L)	21day Conc. (µg/L)	Chronic Daphnid RQ (NOAEC: 4 ug/L)	60 day Conc. (µg/L)	Chronic Fish RQ (NOAEC: 2.4 ug/L)
Corn, 2 Applications of Headline at 0.19 lbs a.i./Acre, 7 day Interval								
IL Corn								
IL Corn (Default)	20-Jul	1.95	0.31	0.12	0.69	0.17	0.38	0.16
IL Corn (19%)		3.05	0.49	0.19	1.39	0.35	0.65	0.27
IL Corn (28%)		4.26	0.69	0.27	1.84	0.46	0.82	0.34
IL Corn (37%)		5.48	0.88	0.35	2.29	0.57	1.00	0.42
IN Corn								
IN Corn (Default)	8-Apr	1.04	0.17	0.07	0.49	0.12	0.26	0.11
IN Corn (19%)		2.8	0.45	0.18	1.12	0.28	0.52	0.22
IN Corn (28%)		4.01	0.65	0.26	1.57	0.39	0.70	0.29
IN Corn (37%)		5.23	0.84	0.33	2.02	0.51	0.87	0.36
MN Corn								
MN Corn (Default)	8-Apr	0.89	0.14	0.06	0.42	0.11	0.25	0.10
MN Corn (19%)		2.65	0.43	0.17	1.07	0.27	0.54	0.23
MN Corn (28%)		3.87	0.62	0.25	1.54	0.39	0.72	0.30
MN Corn (37%)		5.08	0.82	0.32	2.01	0.50	0.91	0.38
MS Corn								
MS Corn (Default)	1-Jul	3.31	0.53	0.21	0.95	0.24	0.38	0.16
MS Corn (19%)		3.94	0.64	0.25	1.41	0.35	0.65	0.27
MS Corn (28%)		4.68	0.75	0.30	1.86	0.47	0.82	0.34
MS Corn (37%)		5.64	0.91	0.36	2.31	0.58	0.99	0.41
NC Corn								

NC Corn (Default)	7-Apr	1.83	0.30	0.12	0.69	0.17	0.33	0.14
NC Corn (19%)		3.01	0.49	0.19	1.32	0.33	0.60	0.25
NC Corn (28%)		4	0.65	0.25	1.77	0.44	0.77	0.32
NC Corn (37%)		5.21	0.84	0.33	2.22	0.56	0.95	0.40
NE Corn								
NE Corn (Default)	14-08	1.53	0.25	0.10	0.58	0.15	0.33	0.14
NE Corn (19%)		2.9	0.47	0.18	1.27	0.32	0.60	0.25
NE Corn (28%)		4.11	0.66	0.26	1.61	0.40	0.78	0.33
NE Corn (37%)		5.27	0.85	0.34	2.07	0.52	0.95	0.40
TX Corn								
TX Corn (Default)	6-May	4.04	0.65	0.26	1.49	0.37	0.68	0.28
TX Corn (19%)		4.86	0.78	0.31	2.11	0.53	0.93	0.39
TX Corn (28%)		5.78	0.93	0.37	2.56	0.64	1.09	0.45
TX Corn (37%)		6.77	1.09	0.43	3.01	0.75	1.26	0.53
Soybean, 2 Applications of Headline at 0.19 lbs a.i./Acre, 21-Day Interval								
MS Soybean (Def)	7-Jun	1.52	0.25	0.10	0.48	0.12	0.26	0.11
MS Soybean (19%)		2.44	0.39	0.16	0.82	0.21	0.51	0.21
MS Soybean (28%)		3.44	0.55	0.22	1.05	0.26	0.68	0.28
MS Soybean (37%)		4.28	0.69	0.27	1.28	0.32	0.84	0.35
Wheat, Triticale - 2 Applications of Headline at 0.14 lbs a.i./Acre, 7-Day Interval								
CA Wheat								
CA Wheat (Default)	2-May	1.16	0.19	0.07	0.42	0.11	0.23	0.10
CA Wheat (19%)		2.36	0.38	0.15	0.94	0.24	0.44	0.18
CA Wheat (27%)		3.59	0.58	0.23	1.34	0.34	0.60	0.25
CA Wheat (36%)		4.77	0.77	0.30	1.70	0.43	0.74	0.31
ND Wheat								
ND Wheat (Default)	16-Jun	0.58	0.09	0.04	0.25	0.06	0.13	0.05
ND Wheat (19%)		1.97	0.32	0.13	0.78	0.20	0.33	0.14
ND Wheat (27%)		2.76	0.45	0.18	1.09	0.27	0.44	0.18
ND Wheat (36%)		3.65	0.59	0.23	1.43	0.36	0.58	0.24
OR Wheat								
OR Wheat (Def.)	10-May	0.63	0.10	0.04	0.25	0.06	0.15	0.06
OR Wheat (19%)		1.93	0.31	0.12	0.78	0.20	0.38	0.16
OR Wheat (27%)		2.72	0.44	0.17	1.09	0.27	0.51	0.21
OR Wheat (36%)		3.62	0.58	0.23	1.45	0.36	0.66	0.28
TX Wheat								
TX Wheat (Default)	15-Nov	0.96	0.15	0.06	0.32	0.08	0.17	0.07
TX Wheat (19%)		1.9	0.31	0.12	0.79	0.20	0.33	0.14
TX Wheat (27%)		2.71	0.44	0.17	1.12	0.28	0.48	0.20
TX Wheat (36%)		3.58	0.58	0.23	1.45	0.36	0.61	0.25

Peak EECs and RQs based on drift assumptions of were 1.7- to 6.3 -fold higher than peak EECs calculated assuming the default 5% drift fraction. Impacts to chronic EECs were similar. 21- and 60-Day EECs were approximately 2- to 6-fold higher when incorporating drift values. Based on **Table 1**, impacts on RQs resulting from the changes in EECs are summarized below:

Fish, Acute: Acute RQs based on default drift assumptions: **0.09 to 0.65**
Acute RQs based on alternative drift assumptions: **0.31 to 1.1**

Conclusions: LOCs for listed species (0.05) are exceeded for all scenarios, and the acute LOC of 0.5 is exceeded for MS and TX corn scenarios based on the default assumptions of drift. The acute risk LOC (0.5) is exceeded for at least one scenario for all uses considered in this assessment based on EECs that incorporated 28% and 37% drift fractions.

Daphnid, Acute: Acute RQs based on default drift assumptions: **0.04 to 0.26**
Acute RQs based on 27% to 36% drift: **0.12 to 0.43**

Conclusions: The LOC for listed species (0.05) is exceeded for most scenarios based on default drift assumptions and for all scenarios based on higher drift assumptions. The acute risk LOC of 0.5 is not exceeded for any scenario or drift assumption modeled.

Fish and Daphnid, Chronic: Chronic RQs range from **0.06 to 0.75** for all drift assumptions for fish and daphnids.

Conclusions: LOCs are not exceeded for any assumption of drift modeled.

In addition, the most sensitive aquatic plant EC_{50} is 1500 ug/L (MRID 45118721). The highest peak EEC of approximately 6 ug/L does not approach 1500 ug/L. Therefore, potential risks to aquatic plants are lower than concern levels.

3. Potential Impacts on Terrestrial Ecological Risk Assessment

Inputs into the T-REX model (ver. 1.4.1), which is used to estimate exposure and risks to non-target terrestrial animals, include the application rate, interval, and number of applications. These parameters are not impacted by the proposed action to lower the spray volume to 1 GPA. Therefore, RQs are not impacted by the proposed action. However, the distance from the field to which terrestrial animals may be exposed to the chemical at concentrations of concern may increase (i.e., risk may extend farther from the treated area).

No LOC exceedances are expected for birds. LD50s for mallard ducks and bobwhite are >5000 mg/kg-bw (MRIDs 45118424 and 45118425). No mortality or signs of sublethal toxicity occurred at doses up to the limit dose. Therefore, risk to birds based on acute exposure is not expected. Also, LC50s in bobwhite quail and mallard ducks are >5000 mg/kg-diet (MRIDs 45118424 and 45118425). Based on EECs presented in **Table 2** and **Appendix D**, LOCs would not be exceeded (EEC: 82 / LC50: 5000 mg/kg-diet = 0.02). In addition, the reproduction NOAEC in both mallard ducks and bobwhite quail is 1062 mg/kg-diet (MRIDs 45118426 and 45118427). Based on estimated exposure concentrations for soybeans (0.19 lbs a.i./Acre, 2 applications, 7-day interval) RQs are well below chronic LOCs for birds (EEC: 82 / NOAEC: 1062 = 0.08).

Table 2. Estimated Dietary Concentrations After 2 Applications of 0.19 lbs a.i/Acre, 7-day interval.	
Dietary-based EECs (ppm)	**Kenaga Values**
Short Grass	**81.55**
Tall Grass	**37.38**
Broadleaf plants/sm Insects	**45.87**
Fruits/pods/seeds/lg insects	**5.10**

As presented in previous assessments, chronic RQs exceed concern levels for mammals. Mammal RQs are similar across the uses included in this assessment. RQs for soybeans are presented in **Table 3**. RQs for wheat and corn are similar but are slightly lower than those presented in **Table 3**. These RQs are based on 2-generation reproduction toxicity study in which no effects occurred at up to 300 mg/kg-diet (29 mg/kg-bw; MRID 45118327). As noted in previous assessments, pyraclostrobin induced developmental effects including increased incidents of resorptions, post implantation loss, and dams with total resorptions at 10 mg/kg-bw and higher (NOAEL = 5 mg/kg-bw; MRID 45118326). EFED's policy is to use 2-generation reproduction toxicity studies when available; however, RQs based on the developmental toxicity study would be approximately 6-times higher than those presented in **Table 3**.

Table 3. Mammalian Chronic RQ Values for Uses of Pyraclostrobin; Based on Rat NOAEL of 29 mg/kg bw (dose-based) and NOAEC of 300 mg ai/kg-diet (dietary-based) and Upper-Bound Kenaga Residues.

Use	Application Rate lbs ai/A #app/interval(d)	Body Weight (g)	Mammalian Chronic RQs for Specified Food Items				
			Short Grass	Tall Grass	Broadleaf Plants/Small Insects	Fruits/Pods / Lg Insects	Seeds
Corn	0.19 lbs ai/A (2/7)	15	**1.22**[1]	0.60	0.70	0.08	0.02
		35	**1.04**[1]	0.50	0.60	0.07	0.01
		1000	0.60	0.30	0.31	0.03	0.01

1. Chronic levels of concern exceeded are presented in bold print.

AgDRIFT was used to estimate reduction of spray drift deposition as a function of distance from the treated field using methodology described in **Section 2.1**. Based on an RQ of 1.2 and assuming an LOC of 1.0, spray drift deposition of 83% (1 / 1.2) or more of the application rate would result in LOC exceedances for mammals. AgDRIFT estimates that drift deposition would be sufficient to result in LOC exceedances for approximately up to 13 ft from the edge of a treated field assuming very fine to fine droplets, a spray volume of 1 GPA, and a wind speed of 15 mph (**Figure 3**). Assuming default assumptions of drift would not result in LOC exceedances off the treated field.

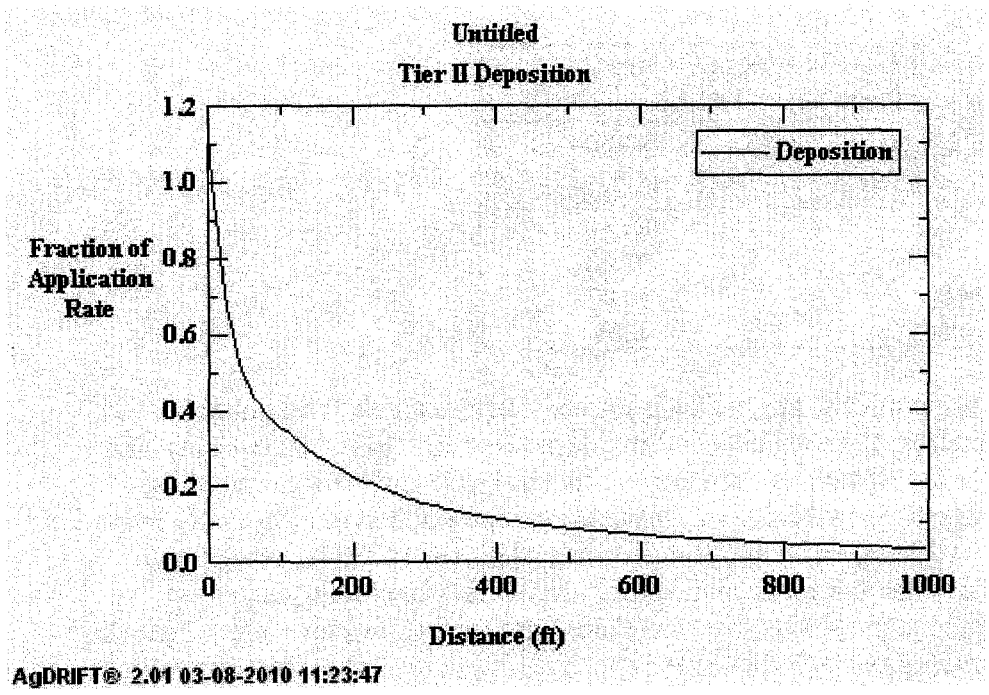

Figure 3. Spray Drift Deposition Estimated from AgDRIFT Assuming Fine to Very Fine Droplets, 1 GPA Spray Volume, and 15 mph wind.

However, the highest RQ based on the developmental toxicity NOAEL of 5 mg/kg-bw (MRID 45118326) would be 4.6 as shown in Appendix D. Based on an LOC of 1.0, spray drift deposition of 22% of the application rate or higher would result in LOC exceedances (1 / 4.6 = 0.22). AgDRIFT estimates that spray drift could be sufficient to result in LOC exceedances for up to 100 feet from the treated site assuming default spray inputs. Changing inputs to reflect a 1 GPA spray volume, 15 mph wind speed, and fine to very fine droplets results in a modest increase in the distance from a treated field to which risk extends to approximately 160 feet.

4. Potential Impacts to Drinking Water Assessments

EFED policy assumes 16% spray drift directly into the reservoir. Currently, there is no standard method used to estimate drift fractions into the standard reservoir. Drift fractions were estimated by assuming a 13-hectare reservoir that is 9 feet deep (EFED's standard reservoir). Based on this assumption and inputs previously described for AgDRIFT, deposition of spray drift into the reservoir was estimated to be 14%, 22%, and 29% for fine to medium, fine, and fine to very fine droplet sizes, respectively. These values were input into PRZM/EXAMS to calculate EDWCs. The TX corn scenario was modeled because this scenario produced the highest peak EECs in PRZM/EXAMS aquatic modeling. EDWCs calculated using spray drift values (14%, 22% and 29% deposition) were similar to EDWCs calculated using the default assumption of 16% deposition (**Table 4**). Peak EDWCs ranged from 9.8 ug/L to 10.5 ug/L, annual average values ranged from 4.5 ug/L to 5.1 ug/L, and 30-yr mean values ranged from 2.1 ug/L to 2.5 ug/L.

Table 4. Tier II Estimated Drinking Water Concentrations for Aerial Spraying of Pyraclostrobin at 1 GPA			
Crop Scenario (Spray Drift Fraction)	**PRZM/EXAMS Estimated Concentrations in Surface Water (µg/L)**		
	1-in-10 year Annual Peak	**1-in-10 year Annual Mean**	**30 year annual mean**
TX Corn			
TX Corn (16%)	9.8	4.7	2.1
TX Corn (14%)	9.7	4.6	2.2
TX Corn (22%)	10.1	4.9	2.4
TX Corn (29%)	10.5	5.1	2.5

Appendix A. Example AgDRIFT® Input Data Summary

AgDRIFT® Input Data Summary

--General--
Tier: II
Title: Untitled
Notes:

Calculations Done: Yes
Run ID: AgDRIFT® 2.01 03-09-2010 15:32:34

Default values appear when they differ from the Current values.

--Aircraft--	----------Current----------	----------Default----------
Name	Air Tractor AT-401	
Type	Slow Fixed-wing	
Boom Length (%)	76.3	
Boom Height (ft)	10	
Flight Lines	20	

--Drop Size Distribution--	----------Current----------		----------Default----------	
Name	ASAE Fine to Medium			
Type	Basic			
Drop Categories	#	Diam (um)	Frac	Diam (um)	Frac
	1	10.77	0.0010		
	2	16.73	0.0003	16.73	0.0003
	3	19.39	0.0007	19.39	0.0007
	4	22.49	0.0003	22.49	0.0003
	5	26.05	0.0007	26.05	0.0007
	6	30.21	0.0010		
	7	35.01	0.0010		
	8	40.57	0.0020		
	9	47.03	0.0033	47.03	0.0033
	10	54.50	0.0053	54.50	0.0053
	11	63.16	0.0067	63.16	0.0067
	12	73.23	0.0090		
	13	84.85	0.0133	84.85	0.0133
	14	98.12	0.0223	98.12	0.0223
	15	113.71	0.0330		
	16	131.73	0.0393	131.73	0.0393
	17	152.79	0.0480		
	18	177.84	0.0647	177.84	0.0647
	19	205.84	0.0830		
	20	238.45	0.1147	238.45	0.1147
	21	276.48	0.1283	276.48	0.1283
	22	320.60	0.1380		
	23	372.18	0.1127	372.18	0.1127
	24	430.74	0.0640		
	25	498.91	0.0440		
	26	578.54	0.0317	578.54	0.0317
	27	670.72	0.0203	670.72	0.0203
	28	777.39	0.0093	777.39	0.0093
	29	900.61	0.0010		
	30	1044.42	0.0007	1044.42	0.0007
	31	1210.66	0.0003	1210.66	0.0003

--Swath--	----------Current----------	----------Default----------
Swath Width	60 ft	
Swath Displacement	0.3702 x Swath Width	

--Spray Material--	----------Current----------	----------Default----------
Nonvolatile Rate (lb/ac)	0.63	0.501
Active Rate (lb/ac)	0.195	0.2505
Spray Volume Rate (gal/ac)	1	2
Carrier Type	Water	

--Meteorology--	----------Current----------	----------Default----------
Wind Speed (mph)	15	10
Temperature (deg F)	86	
Relative Humidity (%)	50	

--Transport--	----------Current----------	----------Default----------
Flux Plane (ft)	0	

Appendix B. AgDRIFT Output Files and Wheat/soybean Deposition Graphs

Corn/soybean Output Files

ASABE Very Fine to Fine

AgDRIFT® Aquatic Assessment

Aquatic Body: EPA-Defined Pond
  Downwind Water Body Width: 208.7 ft
  Average Depth: 6.56 ft

Calculations:
  Distance To Water Body From Edge of Field: 0 ft (input)
  Initial Average Deposition: 0.3679 Fraction of Applied
  Initial Average Deposition: 80.38 g/ha
  Initial Average Concentration: 0.0717 lb/ac

Tier: II
RunID:
  AgDRIFT® 2.01 03-09-2010 15:03:27

ASABE Fine

AgDRIFT® Aquatic Assessment

Aquatic Body: EPA-Defined Pond
  Downwind Water Body Width: 208.7 ft
  Average Depth: 6.56 ft

Calculations:
  Distance To Water Body From Edge of Field: 0 ft (input)
  Initial Average Deposition: 0.2796 Fraction of Applied
  Initial Average Deposition: 61.08 g/ha
  Initial Average Concentration: 0.0545 lb/ac

Tier: II
RunID:
  AgDRIFT® 2.01 03-09-2010 15:23:00

ASABE Fine to Medium

AgDRIFT® Aquatic Assessment

Aquatic Body: EPA-Defined Pond
  Downwind Water Body Width: 208.7 ft
  Average Depth: 6.56 ft

Calculations:
  Distance To Water Body From Edge of Field: 0 ft (input)
  Initial Average Deposition: 0.192 Fraction of Applied
  Initial Average Deposition: 41.94 g/ha
  Initial Average Concentration: 0.0374 lb/ac

Tier: II
RunID:
  AgDRIFT® 2.01 03-09-2010 15:32:34

Wheat/triticale Output Files

ASABE Very Fine to Fine

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AgDRIFT®  2.01 03-10-2010 10:57:00                                    Page 1


AgDRIFT® Aquatic Assessment

Aquatic Body: EPA-Defined Pond
  Downwind Water Body Width: 208.7 ft
  Average Depth: 6.56 ft

Calculations:
  Distance To Water Body From Edge of Field: 0 ft (input)
  Initial Average Deposition: 0.3577 Fraction of Applied
  Initial Average Deposition: 78.15 g/ha
  Initial Average Concentration: 0.0697 lb/ac

Tier: II
RunID:
  AgDRIFT®  2.01 03-10-2010 10:57:00
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ASABE Fine

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AgDRIFT®  2.01 03-10-2010 11:33:14                                    Page 1


AgDRIFT® Aquatic Assessment

Aquatic Body: EPA-Defined Pond
  Downwind Water Body Width: 208.7 ft
  Average Depth: 6.56 ft

Calculations:
  Distance To Water Body From Edge of Field: 0 ft (input)
  Initial Average Deposition: 0.2729 Fraction of Applied
  Initial Average Deposition: 59.63 g/ha
  Initial Average Concentration: 0.0532 lb/ac

Tier: II
RunID:
  AgDRIFT®  2.01 03-10-2010 11:33:14
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ASABE Fine to Medium


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AgDRIFT® Aquatic Assessment

Aquatic Body: EPA-Defined Pond
  Downwind Water Body Width: 208.7 ft
  Average Depth: 6.56 ft

Calculations:
  Distance To Water Body From Edge of Field: 0 ft (input)
  Initial Average Deposition: 0.1898 Fraction of Applied
  Initial Average Deposition: 41.47 g/ha
  Initial Average Concentration: 0.037 lb/ac

Tier: II
RunID:
  AgDRIFT® 2.01 03-10-2010 11:41:05
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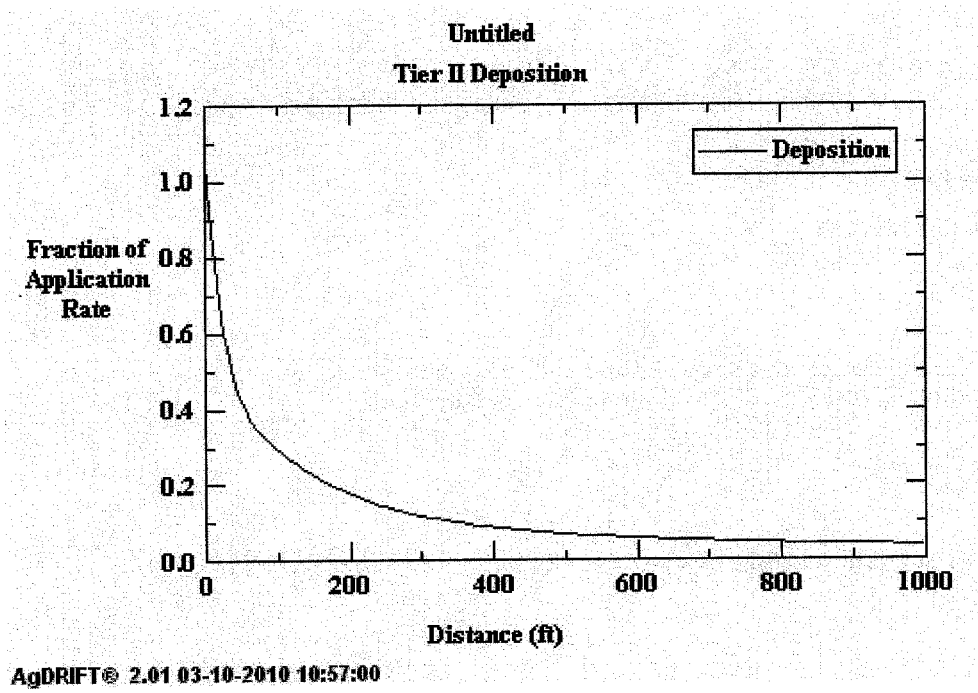
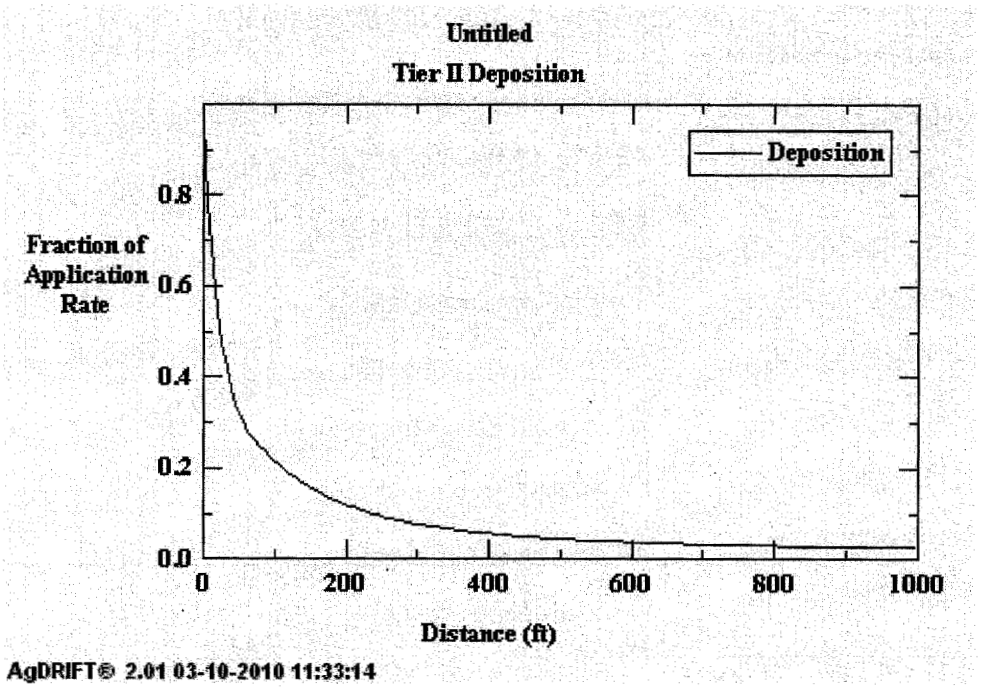
Wheat/triticale Pond-integrated Deposition Graphs

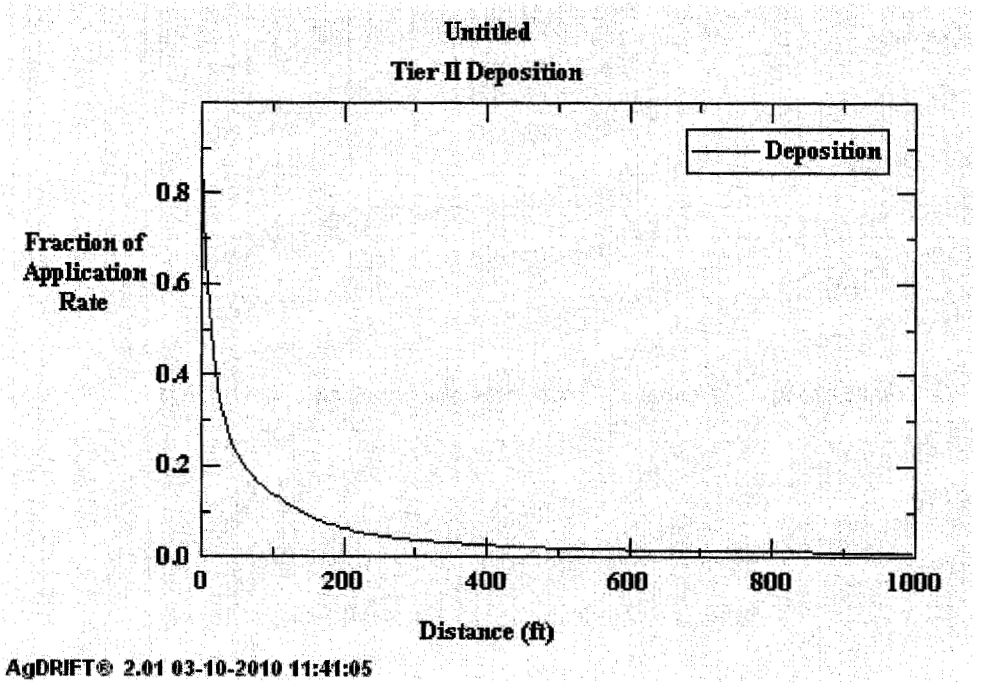
ASABE Very Fine to Fine



ASABE Fine



ASABE Fine to Medium



APPENDIX C. PRZM/EXAMS Inputs and Example Output File

PRZM/EXAMS Environmental Fate Input Parameter Values in All Scenarios			
PRZM/EXAMS Input Parameter	**Input Value and Unit**	**Comment**	**Source**
Molecular Weight	388 g/mol		Product Chemistry
Aerobic aquatic metabolism ($t_{1/2}$)	496.28 days	No data available and stable to hydrolysis. Used twice the aerobic soil metabolism half-life of 248.14 days (based on the upper 90th percentile of the mean of half lives in six studies)	EFED Guidance MRID 45118631 MRID 45118632
Anaerobic aquatic metabolism ($t_{1/2}$)	6.6 days	No data available. Used twice the anaerobic soil half-life of 3.3 days (based on the upper 90th percentile of the mean of half lives in six studies)	EFED Guidance MRID 45118635 MRID 45118636
Aerobic soil metabolism ($t_{1/2}$)	248.14 days	Upper 90th percentile of the mean of half-lives in six studies	MRID 45118631 MRID 45118632 MRID 45367504
Vapor Pressure at 20 °C	1.95 x 10^{-8} torr		Product Chemistry
Solubility in Water at 20°C	24.1 mg/L	Product Chemistry x 10	EFED Guidance
K_{oc}	9,304 ml/g	Mean of Kocs in six studies	MRID 45160502
Henry's Law Constant	4.13 x 10^{-9} atm·m^3/mol	Based on solubility and vapor pressure	EFED Guidance
Aqueous Photolysis ($t_{1/2}$)	0.08 days	Maximum dark controlled aqueous photolysis half-life of two studies	EFED Guidance MRID 45118629
Application Date	MS Corn – 20/07 IL Corn – 01/08	EFED Guidelines	EFED Guidelines
Application Rate	1.32 Kg/ha	Label	Label
Number of Applications	1	Label	Label
Aerial Spray Drift	0.05 (Default) 0.20 (AgDRIFT)	EFED Guidelines	EFED Guidelines

TX Corn Scenario with 37% AgDRIFT Generated Spray Drift Fraction Output File

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stored as TXCo37.out
Chemical: Pyraclostrobin
PRZM environment: TXcornOP.txt      modified Thuday, 14 June 2007 at 10:24:04
EXAMS environment: pond298.exv      modified Tueday, 26 August 2008 at
05:14:08
Metfile: w13958.dvf     modified Tueday, 26 August 2008 at 05:14:44
Water segment concentrations (ppb)

Year  Peak  96 hr 21 Day      60 Day      90 Day      Yearly
1961  5.975 4.564 3.053 1.382 0.9248      0.2398
1962  5.433 3.795 2.055 0.8265      0.665 0.1987
1963  4.943 3.387 1.877 0.705 0.4818      0.1333
```

1964	8.417	6.049	3.232	1.27	0.8521	0.2623	
1965	4.956	3.399	1.838	0.7332	0.4969	0.2117	
1966	4.928	3.427	1.833	0.7035	0.6091	0.1652	
1967	4.908	3.331	1.78	0.6796	0.5008	0.1938	
1968	4.97	3.426	1.88	0.8863	0.6126	0.1933	
1969	4.916	3.342	1.857	0.7396	0.626	0.1888	
1970	4.936	3.367	1.813	0.7203	0.483	0.163	
1971	4.948	3.394	1.925	0.7738	0.646	0.1817	
1972	4.923	3.355	2.067	0.8042	0.5649	0.1584	
1973	6.159	4.257	2.18	0.9562	0.639	0.2413	
1974	4.895	3.311	1.767	0.6731	0.6483	0.203	
1975	5.486	3.768	2.132	1.053	0.7217	0.2081	
1976	4.913	3.338	1.795	0.9567	0.6525	0.2006	
1977	4.923	3.357	1.803	0.6712	0.4665	0.1434	
1978	5.136	3.494	1.965	0.7719	0.5608	0.1788	
1979	4.93	3.357	1.806	1.143	0.8262	0.2298	
1980	4.887	3.3	1.755	0.6598	0.4482	0.1567	
1981	10.57	7.808	3.89	1.591	1.069	0.2968	
1982	5.22	3.561	1.893	0.7456	0.5153	0.1407	
1983	4.987	3.406	1.862	0.7801	0.5406	0.1633	
1984	4.936	3.358	1.809	0.6756	0.452	0.1695	
1985	5.245	3.587	2.281	0.9324	0.6222	0.202	
1986	4.942	3.382	1.821	0.7011	0.4823	0.1996	
1987	6.838	5.095	2.623	1.078	0.7266	0.2065	
1988	4.907	3.322	1.78	0.6894	0.4727	0.1246	
1989	5.099	4.163	2.155	0.8365	0.5757	0.1663	
1990	4.901	3.309	1.768	0.7451	0.5096	0.1674	

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly	
0.032258064516129	10.57	7.808	3.89	1.591	1.069	0.2968	
0.0645161290322581		8.417	6.049	3.232	1.382	0.9248	0.2623
0.0967741935483871		6.838	5.095	3.053	1.27	0.8521	0.2413
0.129032258064516	6.159	4.564	2.623	1.143	0.8262	0.2398	
0.161290322580645	5.975	4.257	2.281	1.078	0.7266	0.2298	
0.193548387096774	5.486	4.163	2.18	1.053	0.7217	0.2117	
0.225806451612903	5.433	3.795	2.155	0.9567	0.665	0.2081	
0.258064516129032	5.245	3.768	2.132	0.9562	0.6525	0.2065	
0.290322580645161	5.22	3.587	2.067	0.9324	0.6483	0.203	
0.32258064516129	5.136	3.561	2.055	0.8863	0.646	0.202	
0.354838709677419	5.099	3.494	1.965	0.8365	0.639	0.2006	
0.387096774193548	4.987	3.427	1.925	0.8265	0.626	0.1996	
0.419354838709677	4.97	3.426	1.893	0.8042	0.6222	0.1987	
0.451612903225806	4.956	3.406	1.88	0.7801	0.6126	0.1938	
0.483870967741936	4.948	3.399	1.877	0.7738	0.6091	0.1933	
0.516129032258065	4.943	3.394	1.862	0.7719	0.5757	0.1888	
0.548387096774194	4.942	3.387	1.857	0.7456	0.5649	0.1817	
0.580645161290323	4.936	3.382	1.838	0.7451	0.5608	0.1788	
0.612903225806452	4.936	3.367	1.833	0.7396	0.5406	0.1695	
0.645161290322581	4.93	3.358	1.821	0.7332	0.5153	0.1674	
0.67741935483871	4.928	3.357	1.813	0.7203	0.5096	0.1663	
0.709677419354839	4.923	3.357	1.809	0.705	0.5008	0.1652	
0.741935483870968	4.923	3.355	1.806	0.7035	0.4969	0.1633	
0.774193548387097	4.916	3.342	1.803	0.7011	0.483	0.163	
0.806451612903226	4.913	3.338	1.795	0.6894	0.4823	0.1584	
0.838709677419355	4.908	3.331	1.78	0.6796	0.4818	0.1567	
0.870967741935484	4.907	3.322	1.78	0.6756	0.4727	0.1434	

0.903225806451613 4.901 3.311 1.768 0.6731 0.4665 0.1407
0.935483870967742 4.895 3.309 1.767 0.6712 0.452 0.1333
0.967741935483871 4.887 3.3 1.755 0.6598 0.4482 0.1246

0.1 6.7701 5.0419 3.01 1.2573 0.84951 0.24115
Average of yearly averages: 0.189613333333333

Inputs generated by pe5.pl - Novemeber 2006

Data used for this run:
Output File: TXCo37
Metfile: w13958.dvf
PRZM scenario: TXcornOP.txt
EXAMS environment file: pond298.exv
Chemical Name: Pyraclostrobin

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	388	g/mol	
Henry's Law Const.	henry	4.13E-9	atm-m^3/mol	
Vapor Pressure	vapr	1.95E-8	torr	
Solubility	sol	2.41	mg/L	
Kd	Kd		mg/L	
Koc	Koc	9304	mg/L	
Photolysis half-life	kdp	.08	days	Half-life
Aerobic Aquatic Metabolism	kbacw	496.28	days	Halfife
Anaerobic Aquatic Metabolism	kbacs	6.6	days	Halfife
Aerobic Soil Metabolism	asm	248.14	days	Halfife
Hydrolysis: pH 7	0	days	Half-life	
Method:	CAM	2	integer	See PRZM manual
Incorporation Depth:	DEPI	0.0	cm	
Application Rate:	TAPP	0.22	kg/ha	
Application Efficiency:	APPEFF	0.95	fraction	
Spray Drift	DRFT	0.37	fraction of application rate applied to pond	
Application Date	Date	05-06	dd/mm or dd/mmm or dd-mm or dd-mmm	
Interval 1	interval	7	days	Set to 0 or delete line for single app.
app. rate 1	apprate	0.22	kg/ha	

Record 17: FILTRA
IPSCND 1
UPTKF
Record 18: PLVKRT
PLDKRT
FEXTRC 0.5

Flag for Index Res. Run	IR	EPA Pond	
Flag for runoff calc.	RUNOFF	none	none, monthly or total(average of entire run)

Appendix D. T-REX Outputs

0.19 lbs a.i./Acre, 2 applications, 7-day interval

Dietary-based EECs (ppm)	Kenaga Values
Short Grass	81.55
Tall Grass	37.38
Broadleaf plants/sm Insects	45.87
Fruits/pods/seeds/lg insects	5.10

Dose-Based EECs to Mammals (mg/kg-bw)	Mammalian Classes and Body weight					
	Herbivores/ insectivores (grams)			Granivores(grams)		
	15	35	1000	15	35	1000
Short Grass	77.76	53.74	12.46			
Tall Grass	35.64	24.63	5.71			
Broadleaf plants/sm Insects	43.74	30.23	7.01			
Fruits/pods/seeds/lg insects	4.86	3.36	0.78	1.08	0.75	0.17

Dose-based RQs (Dose-based EEC/LD50 or NOAEL)	Small mammal 15 grams	
		Chronic
Short Grass		1.22
Tall Grass		0.56
Broadleaf plants/sm insects		0.69
Fruits/pods/lg insects		0.08
Seeds (granivore)		0.02