Appendix D. PRZM/EXAMS and AgDRIFT

Part I. PRZM/EXAMS

Selection of the Date of Application

Use-specific management practices for all of the assessed uses of bifenthrin were utilized for modeling, including application rates, number of applications per year, application intervals, buffer widths and resulting spray drift values modeled from AgDRIFT (*i.e.*, the buffer zones of 25 ft or 150 ft, for ground or aerial, respectively). The date of first application was developed based on several sources of information including data provided by BEAD, a summary of individual applications from the CDPR PUR data, and Crop Profiles maintained by the USDA. More detail on the crop profiles and the previous assessments may be found at: http://www.ipmcenters.org/CropProfiles/. After evaluating the crop profiles, additionally, EFED conducted runs using the Multi-Run feature of the PE5 shell, bracketing the time period during which the chemical can be applied. Applications were simulated approximately every 15 days, usually the 1st and 15th of the month throughout the period, to identify the period during which the peak, 21-day and 60-day EECs were the highest. Applications were simulated usually from post-emergence to pre-harvest, except where otherwise indicated in the label (taking in consideration the pre-harvest interval (PHI)). An example of the output Summary Report from the shell (PE5) is provided in **Table D1**. As shown in the table, the selected date of application is February 1. The peak EEC is 0.196 ppb and the 21- and 60-day values are 0.0275 and 0.0220 ppb, respectively. Since the solubility of bifenthrin in water is very low (0.0140 ppb), and all the EECs exceed the solubility limit, the EECs are reported as, *i.e.*, capped at, 0.0140 ppb. The pore water concentrations associated with the same date of application were as follows: peak 0.00748 ppb and 21-day value 0.00744 ppb.

Table D1. Example Output File from PE5 Summary Report for California Citrus, Water Column Concentrations (ppb)

DATE	peak	96 hr	21 day	60 day	90 day	yearly	Overall avg
15-01	0.196	0.0621	0.0273	0.0217	0.0205	0.0175	0.0119
01-02	**0.196**	0.0622	**0.0275**	**0.0220**	0.0208	0.0179	0.0119
15-02	0.189	0.0557	0.0211	0.0156	0.0145	0.0121	0.0102
01-03	0.190	0.0557	0.0215	0.0156	0.0145	0.0121	0.0102
15-03	0.189	0.0557	0.0212	0.0156	0.0145	0.0121	0.0102
01-04	0.191	0.0568	0.0216	0.0161	0.0149	0.0126	0.0103
15-04	0.190	0.0562	0.0218	0.0161	0.0150	0.0127	0.0103
01-05	0.190	0.0558	0.0214	0.0159	0.0148	0.0127	0.0102
15-05	0.191	0.0566	0.0223	0.0168	0.0157	0.0135	0.0105
01-06	0.191	0.0564	0.0222	0.0167	0.0156	0.0135	0.0104
15-06	0.191	0.0564	0.0221	0.0166	0.0155	0.0135	0.0103
01-07	0.190	0.0561	0.0220	0.0166	0.0155	0.0135	0.0103
15-07	0.190	0.0561	0.0221	0.0166	0.0155	0.0136	0.0103
01-08	0.190	0.0563	0.0221	0.0165	0.0155	0.0136	0.0103
15-08	0.191	0.0581	0.0221	0.0165	0.0155	0.0136	0.0102

DATE	peak	96 hr	21 day	60 day	90 day	yearly	Overall avg
01-09	0.192	0.0578	0.0234	0.0180	0.0169	0.0151	0.0106
15-09	0.192	0.0579	0.0236	0.0182	0.0171	0.0153	0.0107
01-10	0.193	0.0598	0.0239	0.0185	0.0174	0.0156	0.0108
15-10	0.192	0.0584	0.0239	0.0185	0.0172	0.0156	0.0108
01-11	0.192	0.0590	0.0242	0.0188	0.0171	0.0158	0.0109
15-11	0.193	0.0592	0.0244	0.0186	0.0171	0.0160	0.0110
01-12	0.193	0.0595	0.0246	0.0182	0.0169	0.0161	0.0110
15-12	0.193	0.0596	0.0242	0.0178	0.0171	0.0161	0.0110

Urban Uses

At the present time, EFED considers the use of the CA impervious scenario as the most suitable available modeling approach for impervious runoff. The PRZM CA impervious scenario may be used in the tier 2 coupled aquatic models PRZM/EXAMS along with a CA residential or other appropriate scenario such as CA rights-of-way (ROW) to obtain EECs (refer to **Table 3-1** of the endangered species assessment (ESA)). The "residential" (and various other urban) use patterns require the PRZM scenarios CA residential and CA impervious. Both scenarios are run separately.

This approach assumes that no watershed is completely covered by either the ¼ acre lot (the basis for the residential scenario) or undeveloped land (the basis for the ROW scenario), for residential and ROW use patterns, respectively. Therefore, differential amounts of runoff will occur within the watershed. The impervious scenario was developed to represent the paved areas within a watershed not including roads, parking lots, sidewalks, and buildings outside the ¼ acre lot (the ¼-acre lot scenario accounts for impervious surfaces such as buildings within the represented area). By modeling a separate scenario for impervious surfaces, it is also possible to estimate that amount of exposure that could occur when the pesticide is over-sprayed onto this surface. Using two scenarios in tandem requires post-processing of the modeled output in order to derive a weighted EEC that represents the contribution of both the pervious (*i.e.*, residential and ROW scenarios) and the impervious surfaces. Exposure from both scenarios can also be weighted and aggregated. The daily time series from each model run are copied from the times series file (*i.e.*, "NAME_TS.out") generated from the PRZM graphical user interface (PE5.pl) into a spreadsheet. The time series data are then weighted based on percentage of impervious surface, the percentage of the pervious surface treated, and an adjusted time series is created. Rolling averages for the relevant durations of exposure (*e.g.*, 21-day and 60-day averages) are calculated, and the relevant one-in-ten year return EEC is generated from these distributions. The intention is to couple the edge-of-field concentrations from the impervious scenario with the edge-of-field concentrations from the residential scenario to generate weighted concentrations for areas of a certain impervious cover.

The use of a ¼-acre residential lot was justified, based on data from the latest "American Housing Survey of the U.S.: 2009," from the Census Bureau (AHS), which was accessed 08/22/2012 at the following site: http://www.census.gov/housing/ahs/data/index.html. The latter survey was issued in March 2011, and covers data for the year 2009. In order to test the assumption of the ¼-acre lot as the best representation for residential housing, the AHS data for

suburban homes that list total number of houses by lot size and by square footage of house was evaluated (Table 1-3 from the AHS website above, was provided as an Excel spreadsheet entitled "Size of Unit and Lot–All Housing Units"). With a total of 130,112,000 total units reported nationally for all suburban areas, 25,008,000 units (the largest class or 19%) were on lots between 1/8 acre and ¼ acre, while 17,825,000 units (the third largest class or 14%) were on lots between ¼ acre and ½ acre. Taken as a whole, these two lot size categories cover 33% of all housing units. The second largest class was for units between 1 to 5 acres (15%) and the fourth largest class was for units less than 1/8 acre (11%). Overall, the median lot size was 0.26 acre. The vast majority of the houses were one unit structures, or 95,216,000 units (73%). Furthermore, another survey, the "American Housing Survey of Selected Metropolitan Areas: 2009" (issued in July 2011), was also evaluated. According to the survey, the median lot size out of several metropolitan areas is 0.18 acres (noted, however, that it did not include any location in California). The majority of the units were between 1/8 and ¼ acres. This analysis suggests that the ¼-acre lot is a reasonable approximation of suburban pesticide use.

The second critical assumption is that 50% of a ¼ acre lot will be pervious and 50% impervious. This assumption was based partially on data from the AHS website data (see above) and partially from professional judgment about typical features and the percentage of a typical lot those features might require. For example, the AHS survey data reports that of a total of 91,241,000 reported single detached homes in suburban areas, 21,224,000 (the largest group at 23.3%) were between 1,000 and 1,500 square feet, while 20,636,000 (the second largest group at 22.6%) were between 1,500 and 2,000 square feet, and 14,361,000 (the third largest group at 15.7%) were between 2,000 and 2,500 square feet. The median lot size was 1700 square feet. From these data, it was assumed that a typical house is 2,000 square feet with a 1,000 square foot footprint. The lower sized houses less than 1,500 square feet are more likely to represent single floor structures; thus, the 1,000 square foot estimate for a house footprint is reasonable.

In addition to the footprint of the typical house, it was assumed that a typical house would have a driveway of approximately 25 by 30 feet or 750 square feet and roughly 250 square feet of sidewalk. A typical suburban home was also assumed to have roughly 300 square feet of deck space and 900 square feet of garage. Finally, it was assumed that a substantial portion of the typical home would be planted in landscaping (*e.g.*, residential lawn and/or ornamentals) with an estimate of 2,000 square feet. All of the previous estimates are based on professional judgment and are not derived from the AHS data. The sum of all these areas is 5,200 square feet. Taking a total ¼-acre lot size of 10,890 square feet and subtracting the house square footage yields a total remaining area of 5,690, or roughly 50% of the total lot untreated area. Based upon these assumptions, the impervious area is 5,200 square feet, which is roughly 48% of the ¼-acre lot. EFED's approximation appears to be reasonable, given that the impervious surface cover coefficient (ISC) for residential land use in California (*i.e.*, California specific) and a lot density of four dwelling units per acre, is 0.46 (or 46% impervious acres/acre). The "Impervious Surface Coefficients User's Guide and Calculator" (dated 12/31/2010) are available at http://www.oehha.ca.gov/ecotox/iscug123110.html, accessed 08/22/2012).

The rights-of-way scenario is intended to represent areas including those associated with roads, power lines, and railroads in Central/Coastal California. Unlike most of EFED existing scenarios, the scenario is conceptually different in that it represents a linear surface that drains

into an adjacent water body (drainage ditch). However, for this exercise, EFED assumes that while conceptually different, the scenario is for practicality purposes developed in a similar manner as a standard scenario that assumes a 10-hectare field draining into a 1-hectare static pond. Crop cover parameters for this scenario were based on typical plants found adjacent to state maintained highway right-of ways. In most cases rights-of-way areas are generally bare ground kept clear of vegetation. Rights-of-way occur throughout the state. For the rights-of-way scenario, it was assumed that rights-of-way consist of 50% impervious and 50% pervious cover. In addition, it was assumed that no single watershed will be completely covered by a rights-of-way use. This assumption seems reasonable given that rights-of-way (roads, rail and utility lines) are typically long linear features that traverse a watershed. For the screening-level assessment, it was assumed that no more than 10% of the watershed is covered in rights-of-way.[1]

Example Output File for California Citrus

Water Column

stored as Bifenthrin_01-02.out
Chemical: Bifenthrin
PRZM environment: CAcitrus_WirrigSTD.txt modified Tueday, 29 May 2007 at 13:41:26
EXAMS environment: pond298.exv modified Tueday, 26 August 2008 at 06:14:07
Metfile: w23155.dvf modified Tueday, 26 August 2008 at 06:15:34
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	0.1785	0.04503	0.0104	0.005003	0.004016	0.002284
1962	0.1803	0.0468	0.0194	0.01129	0.00975	0.006822
1963	0.1845	0.05075	0.01882	0.01262	0.0114	0.008861
1964	0.1862	0.0527	0.01803	0.01255	0.01148	0.009225
1965	0.1865	0.05286	0.01822	0.01296	0.01191	0.009628
1966	0.1869	0.05332	0.01926	0.01349	0.01235	0.01
1967	0.1873	0.05386	0.01912	0.01357	0.01252	0.01033
1968	0.1877	0.05411	0.01939	0.01394	0.01289	0.01068
1969	0.188	0.0545	0.01976	0.01458	0.01349	0.01106
1970	0.1881	0.05438	0.02028	0.01457	0.01346	0.01109
1971	0.1882	0.05471	0.02001	0.01445	0.01334	0.01113
1972	0.1882	0.05449	0.0199	0.01436	0.01325	0.01101
1973	0.1882	0.05421	0.01978	0.01436	0.01326	0.01101
1974	0.188	0.05455	0.01986	0.01515	0.014	0.01158
1975	0.1888	0.05573	0.02074	0.0151	0.014	0.01158
1976	0.1885	0.05467	0.02038	0.01481	0.0137	0.01129
1977	0.1883	0.05447	0.01992	0.01464	0.01356	0.01134
1978	0.4777	0.1557	0.05345	0.03464	0.03104	0.02292

[1] More information about these scenarios is found at the following site accessed10/03/2012: http://www.epa.gov/oppefed1/models/water/pe5_rlf.htm.

1979	0.1984	0.06491	0.03017	0.02451	0.02329	0.02012
1980	0.196	0.06234	0.02766	0.02211	0.02099	0.01803
1981	0.1944	0.0609	0.02611	0.0206	0.01944	0.01664
1982	0.1931	0.05951	0.02483	0.01934	0.01826	0.0155
1983	0.1922	0.05853	0.02387	0.01834	0.01721	0.01455
1984	0.1913	0.05778	0.02303	0.01745	0.01633	0.0136
1985	0.1904	0.05692	0.02213	0.01658	0.01546	0.01288
1986	0.1897	0.0561	0.02143	0.01592	0.01482	0.01224
1987	0.1892	0.05568	0.02098	0.01542	0.01431	0.01187
1988	0.1885	0.05388	0.01985	0.01436	0.01326	0.01083
1989	0.1876	0.05439	0.01947	0.01375	0.01258	0.00996
1990	0.1867	0.05257	0.01828	0.01276	0.0116	0.008994

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258065	0.4777	0.1557	0.05345	0.03464	0.03104	0.02292
0.064516129	0.1984	0.06491	0.03017	0.02451	0.02329	0.02012
0.096774194	0.196	0.06234	0.02766	0.02211	0.02099	0.01803
0.129032258	0.1944	0.0609	0.02611	0.0206	0.01944	0.01664
0.161290323	0.1931	0.05951	0.02483	0.01934	0.01826	0.0155
0.193548387	0.1922	0.05853	0.02387	0.01834	0.01721	0.01455
0.225806452	0.1913	0.05778	0.02303	0.01745	0.01633	0.0136
0.258064516	0.1904	0.05692	0.02213	0.01658	0.01546	0.01288
0.290322581	0.1897	0.0561	0.02143	0.01592	0.01482	0.01224
0.322580645	0.1892	0.05573	0.02098	0.01542	0.01431	0.01187
0.35483871	0.1888	0.05568	0.02074	0.01515	0.014	0.01158
0.387096774	0.1885	0.05471	0.02038	0.0151	0.014	0.01158
0.419354839	0.1885	0.05467	0.02028	0.01481	0.0137	0.01134
0.451612903	0.1883	0.05455	0.02001	0.01464	0.01356	0.01129
0.483870968	0.1882	0.0545	0.01992	0.01458	0.01349	0.01113
0.516129032	0.1882	0.05449	0.0199	0.01457	0.01346	0.01109
0.548387097	0.1882	0.05447	0.01986	0.01445	0.01334	0.01106
0.580645161	0.1881	0.05439	0.01985	0.01436	0.01326	0.01101
0.612903226	0.188	0.05438	0.01978	0.01436	0.01326	0.01101
0.64516129	0.188	0.05421	0.01976	0.01436	0.01325	0.01083
0.677419355	0.1877	0.05411	0.01947	0.01394	0.01289	0.01068
0.709677419	0.1876	0.05388	0.0194	0.01375	0.01258	0.01033
0.741935484	0.1873	0.05386	0.01939	0.01357	0.01252	0.01
0.774193548	0.1869	0.05332	0.01926	0.01349	0.01235	0.00996
0.806451613	0.1867	0.05286	0.01912	0.01296	0.01191	0.009628
0.838709677	0.1865	0.0527	0.01882	0.01276	0.0116	0.009225
0.870967742	0.1862	0.05257	0.01828	0.01262	0.01148	0.008994
0.903225806	0.1845	0.05075	0.01822	0.01255	0.0114	0.008861
0.935483871	0.1803	0.0468	0.01803	0.01129	0.00975	0.006822

0.967741935	0.1785	0.04503	0.0104	0.005003	0.004016	0.002284
0.1	**0.19584**	0.062196	**0.027505**	**0.021959**	0.020835	0.017891

Average of yearly averages: 0.011902

Inputs generated by pe5.pl - Novemeber 2006

Data used for this run:
Output File: Bifenthrin_01-02

Metfile:	w23155.dvf			
PRZM scenario:	CAcitrus_WirrigSTD.txt			
EXAMS environment file:	pond298.exv			
Chemical Name:	Bifenthrin			
Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	422.9	g/mol	
Henry's Law Const.	henry	7.20E-03	atm-m^3/mol	
Vapor Pressure	vapr	1.80E-07	torr	
Solubility	sol	0.000014	mg/L	
Kd	Kd		mg/L	
Koc	Koc	236750	mg/L	
Photolysis half-life	kdp	0	days	Half-life
Aerobic Aquatic Metabolism	kbacw	358.1	days	Halfife
Anaerobic Aquatic Metabolism	kbacs	0	days	Halfife
Aerobic Soil Metabolism	asm	179	days	Halfife
Hydrolysis:	pH 7	0	days	Half-life
Method:	CAM	2	integer	See PRZM manual
Incorporation Depth:	DEPI	0	cm	
Application Rate:	TAPP	0.56	kg/ha	
Application Efficiency:	APPEFF	0.99	fraction	
Spray Drift	DRFT	0.01	fraction of application rate applied to pond	
Application Date	Date	2-Jan	dd/mm or dd/mmm or dd-mm or dd-mmm	
Record 17:	FILTRA			
	IPSCND	1		
	UPTKF	0		
Record 18:	PLVKRT	0		
	PLDKRT	0		
	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)	

Pore Water

stored as Bifenthrin_01-02ben.out
Chemical: Bifenthrin
PRZM environment: CAcitrus_WirrigSTD.txt modified Tueday, 29 May 2007 at 13:41:26
EXAMS environment: pond298.exv modified Tueday, 26 August 2008 at 06:14:07
Metfile: w23155.dvf modified Tueday, 26 August 2008 at 06:15:34
Benthic segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	0.000828	0.000827	0.000824	0.000815	0.000808	0.000699
1962	0.002687	0.002686	0.002676	0.002647	0.002622	0.002319
1963	0.003539	0.003537	0.00352	0.003478	0.003475	0.003192
1964	0.003783	0.003782	0.003767	0.00373	0.003697	0.003402
1965	0.003879	0.003876	0.003858	0.003842	0.003827	0.003549
1966	0.004108	0.004106	0.00409	0.004046	0.004009	0.003693
1967	0.004183	0.004182	0.004167	0.004123	0.00409	0.003809
1968	0.0043	0.004298	0.004282	0.004249	0.004223	0.003937
1969	0.004488	0.004486	0.004469	0.004437	0.004416	0.004097
1970	0.004552	0.004551	0.004531	0.004487	0.004448	0.004121
1971	0.004546	0.004544	0.004527	0.004477	0.004434	0.004139
1972	0.004542	0.00454	0.00452	0.004465	0.004419	0.004102
1973	0.004542	0.00454	0.004518	0.004464	0.004423	0.004098
1974	0.004691	0.004689	0.004668	0.00461	0.004564	0.004276
1975	0.004787	0.004786	0.004767	0.004713	0.004671	0.004317
1976	0.004687	0.004685	0.004665	0.004614	0.004571	0.004213
1977	0.004561	0.004558	0.004538	0.004501	0.004484	0.004207
1978	0.009643	0.009638	0.009596	0.009496	0.009411	0.008182
1979	0.008472	0.008468	0.008437	0.008351	0.008276	0.007654
1980	0.007543	0.007539	0.007509	0.007432	0.007371	0.006817
1981	0.006884	0.006881	0.006856	0.006795	0.006748	0.006273
1982	0.00641	0.006407	0.006385	0.006321	0.006289	0.005835
1983	0.006068	0.006065	0.00604	0.005978	0.005926	0.005468
1984	0.005701	0.005699	0.005678	0.00562	0.005571	0.005111
1985	0.005344	0.005342	0.005323	0.005271	0.005227	0.004815
1986	0.005112	0.00511	0.005089	0.005037	0.004994	0.004578
1987	0.00492	0.004919	0.004899	0.004847	0.004803	0.004426
1988	0.004699	0.004696	0.004666	0.004589	0.004527	0.00412
1989	0.004386	0.004383	0.004356	0.004283	0.004225	0.003773
1990	0.003995	0.003993	0.003971	0.003909	0.003855	0.003408

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258065	0.009643	0.009638	0.009596	0.009496	0.009411	0.008182
0.064516129	0.008472	0.008468	0.008437	0.008351	0.008276	0.007654
0.096774194	0.007543	0.007539	0.007509	0.007432	0.007371	0.006817
0.129032258	0.006884	0.006881	0.006856	0.006795	0.006748	0.006273
0.161290323	0.00641	0.006407	0.006385	0.006321	0.006289	0.005835
0.193548387	0.006068	0.006065	0.00604	0.005978	0.005926	0.005468
0.225806452	0.005701	0.005699	0.005678	0.00562	0.005571	0.005111
0.258064516	0.005344	0.005342	0.005323	0.005271	0.005227	0.004815
0.290322581	0.005112	0.00511	0.005089	0.005037	0.004994	0.004578
0.322580645	0.00492	0.004919	0.004899	0.004847	0.004803	0.004426
0.35483871	0.004787	0.004786	0.004767	0.004713	0.004671	0.004317
0.387096774	0.004699	0.004696	0.004668	0.004614	0.004571	0.004276
0.419354839	0.004691	0.004689	0.004666	0.00461	0.004564	0.004213
0.451612903	0.004687	0.004685	0.004665	0.004589	0.004527	0.004207
0.483870968	0.004561	0.004558	0.004538	0.004501	0.004484	0.004139
0.516129032	0.004552	0.004551	0.004531	0.004487	0.004448	0.004121
0.548387097	0.004546	0.004544	0.004527	0.004477	0.004434	0.00412
0.580645161	0.004542	0.00454	0.00452	0.004465	0.004423	0.004102
0.612903226	0.004542	0.00454	0.004518	0.004464	0.004419	0.004098
0.64516129	0.004488	0.004486	0.004469	0.004437	0.004416	0.004097
0.677419355	0.004386	0.004383	0.004356	0.004283	0.004225	0.003937
0.709677419	0.0043	0.004298	0.004282	0.004249	0.004223	0.003809
0.741935484	0.004183	0.004182	0.004167	0.004123	0.00409	0.003773
0.774193548	0.004108	0.004106	0.00409	0.004046	0.004009	0.003693
0.806451613	0.003995	0.003993	0.003971	0.003909	0.003855	0.003549
0.838709677	0.003879	0.003876	0.003858	0.003842	0.003827	0.003408
0.870967742	0.003783	0.003782	0.003767	0.00373	0.003697	0.003402
0.903225806	0.003539	0.003537	0.00352	0.003478	0.003475	0.003192
0.935483871	0.002687	0.002686	0.002676	0.002647	0.002622	0.002319
0.967741935	0.000828	0.000827	0.000824	0.000815	0.000808	0.000699
0.1	**0.007477**	0.007473	**0.007444**	**0.007368**	0.007309	0.006763
					Average of yearly averages:	0.004421

Inputs generated by pe5.pl - Novemeber 2006

Data used for this run:
Output File: Bifenthrin_01-02

Metfile:	w23155.dvf
PRZM scenario:	CAcitrus_WirrigSTD.txt
EXAMS environment file:	pond298.exv
Chemical Name:	Bifenthrin

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	422.9	g/mol	
Henry's Law Const.	henry	7.20E-03	atm-m^3/mol	
Vapor Pressure	vapr	1.80E-07	torr	
Solubility	sol	0.000014	mg/L	
Kd	Kd		mg/L	
Koc	Koc	236750	mg/L	
Photolysis half-life	kdp	0	days	Half-life
Aerobic Aquatic Metabolism	kbacw	358.1	days	Halfife
Anaerobic Aquatic Metabolism	kbacs	0	days	Halfife
Aerobic Soil Metabolism	asm	179	days	Halfife
Hydrolysis:	pH 7	0	days	Half-life
Method:	CAM	2	integer	See PRZM manual
Incorporation Depth:	DEPI	0	cm	
Application Rate:	TAPP	0.56	kg/ha	
Application Efficiency:	APPEFF	0.99	fraction	
Spray Drift	DRFT	0.01	fraction of application rate applied to pond	
Application Date	Date	2-Jan	dd/mm or dd/mmm or dd-mm or dd-mmm	
Record 17:	FILTRA			
	IPSCND	1		
	UPTKF	0		
Record 18:	PLVKRT	0		
	PLDKRT	0		
	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)	

Benthic Sediment

CA Citrus Concentration

BENTHIC SEDIMENT CONCENTRATION (ug/kg)

YEAR	PEAK	24HOUR	96HOUR	21 DAY	60 DAY	90 DAY	ANNUAL
1961	7.838	7.837	7.834	7.804	7.722	7.654	6.620
1962	25.450	25.450	25.440	25.350	25.070	24.830	21.960
1963	33.520	33.520	33.500	33.340	32.940	32.910	30.230
1964	35.830	35.830	35.820	35.680	35.320	35.020	32.220
1965	36.730	36.730	36.710	36.540	36.390	36.250	33.620
1966	38.910	38.900	38.890	38.740	38.330	37.970	34.970

1967	39.620	39.620	39.610	39.470	39.050	38.740	36.080
1968	40.730	40.720	40.710	40.560	40.250	40.000	37.290
1969	42.510	42.500	42.490	42.320	42.020	41.820	38.800
1970	43.120	43.120	43.100	42.920	42.500	42.130	39.030
1971	43.060	43.060	43.040	42.880	42.400	42.000	39.200
1972	43.020	43.010	43.000	42.810	42.290	41.860	38.850
1973	43.020	43.020	43.000	42.790	42.280	41.890	38.820
1974	44.430	44.430	44.410	44.210	43.660	43.230	40.500
1975	45.340	45.340	45.330	45.150	44.640	44.240	40.890
1976	44.400	44.390	44.370	44.180	43.700	43.290	39.900
1977	43.190	43.190	43.170	42.980	42.630	42.470	39.850
1978	91.330	91.320	91.280	90.890	89.930	89.130	77.500
1979	80.240	80.230	80.200	79.910	79.090	78.390	72.490
1980	71.440	71.430	71.400	71.120	70.390	69.810	64.570
1981	65.200	65.190	65.170	64.940	64.360	63.920	59.420
1982	60.710	60.710	60.690	60.470	59.870	59.570	55.270
1983	57.470	57.460	57.440	57.210	56.620	56.120	51.780
1984	54.000	53.990	53.980	53.780	53.230	52.770	48.410
1985	50.610	50.610	50.600	50.420	49.930	49.510	45.610
1986	48.410	48.410	48.390	48.200	47.710	47.300	43.360
1987	46.600	46.600	46.580	46.400	45.910	45.490	41.920
1988	44.510	44.500	44.470	44.190	43.470	42.870	39.020
1989	41.540	41.540	41.520	41.260	40.560	40.010	35.740
1990	37.840	37.840	37.820	37.610	37.020	36.510	32.280

SORTED FOR PLOTTING

PROB	PEAK	24HOUR	96HOUR	21 DAY	60 DAY	90 DAY	ANNUAL
0.032	91.330	91.320	91.280	90.890	89.930	89.130	77.500
0.065	80.240	80.230	80.200	79.910	79.090	78.390	72.490
0.097	71.440	71.430	71.400	71.120	70.390	69.810	64.570
0.129	65.200	65.190	65.170	64.940	64.360	63.920	59.420
0.161	60.710	60.710	60.690	60.470	59.870	59.570	55.270
0.194	57.470	57.460	57.440	57.210	56.620	56.120	51.780
0.226	54.000	53.990	53.980	53.780	53.230	52.770	48.410
0.258	50.610	50.610	50.600	50.420	49.930	49.510	45.610
0.290	48.410	48.410	48.390	48.200	47.710	47.300	43.360
0.323	46.600	46.600	46.580	46.400	45.910	45.490	41.920
0.355	45.340	45.340	45.330	45.150	44.640	44.240	40.890
0.387	44.510	44.500	44.470	44.210	43.700	43.290	40.500
0.419	44.430	44.430	44.410	44.190	43.660	43.230	39.900
0.452	44.400	44.390	44.370	44.180	43.470	42.870	39.850
0.484	43.190	43.190	43.170	42.980	42.630	42.470	39.200
0.516	43.120	43.120	43.100	42.920	42.500	42.130	39.030
0.548	43.060	43.060	43.040	42.880	42.400	42.000	39.020
0.581	43.020	43.020	43.000	42.810	42.290	41.890	38.850
0.613	43.020	43.010	43.000	42.790	42.280	41.860	38.820
0.645	42.510	42.500	42.490	42.320	42.020	41.820	38.800
0.677	41.540	41.540	41.520	41.260	40.560	40.010	37.290
0.710	40.730	40.720	40.710	40.560	40.250	40.000	36.080
0.742	39.620	39.620	39.610	39.470	39.050	38.740	35.740

0.774	38.910	38.900	38.890	38.740	38.330	37.970	34.970
0.806	37.840	37.840	37.820	37.610	37.020	36.510	33.620
0.839	36.730	36.730	36.710	36.540	36.390	36.250	32.280
0.871	35.830	35.830	35.820	35.680	35.320	35.020	32.220
0.903	33.520	33.520	33.500	33.340	32.940	32.910	30.230
0.935	25.450	25.450	25.440	25.350	25.070	24.830	21.960
0.968	7.838	7.837	7.834	7.804	7.722	7.654	6.620
1/10	**70.816**	70.806	**70.777**	70.502	69.787	69.221	64.055

Part II. AgDRIFT

AgDRIFT® Input Data Summary

--General--
Tier: III
Title: Bifenthrin ESA (Brigade 2EC) Cotton, 6.4 oz, product, 1 gal/A
Notes:

Calculations Done: Yes
Run ID: AgDRIFT® Bifenthrin ESA Runs_Cotton.agd 2.1.1 10-24-2012 09:54:40

Default values appear when they differ from the Current values.

--Aircraft--	----------Current----------	----------Default----------
Name	Air Tractor AT-401	
Type	Basic	
Boom Height (ft)	10	
Flight Lines	20	
Wing Type	Fixed-Wing	
Semispan (ft)	24.5	
Typical Speed (mph)	119.99	
Biplane Separation (ft)	0	
Weight (lbs)	6000	6000
Planform Area (ft²)	294	
Propeller RPM	2000	
Propeller Radius (ft)	4.5	
Engine Vert Distance (ft)	-1.2	
Engine Fwd Distance (ft)	11.9	

-Drop Size Distribution 1-	----------Current----------		----------Default----------	
Name	ASAE Medium		ASAE Fine to Medium	
Type	Basic			
Drop Categories #	Diam (um)	Frac	Diam (um)	Frac
1	10.77	0.0005	10.77	0.0010
2	16.73	0.0002	16.73	0.0003
3	19.39	0.0003	19.39	0.0007
4	22.49	0.0002	22.49	0.0003
5	26.05	0.0003	26.05	0.0007
6	30.21	0.0005	30.21	0.0010
7	35.01	0.0007	35.01	0.0010
8	40.57	0.0012	40.57	0.0020
9	47.03	0.0022	47.03	0.0033
10	54.50	0.0040	54.50	0.0053
11	63.16	0.0058	63.16	0.0067
12	73.23	0.0077	73.23	0.0090
13	84.85	0.0095	84.85	0.0133
14	98.12	0.0147	98.12	0.0223
15	113.71	0.0227	113.71	0.0330
16	131.73	0.0305	131.73	0.0393
17	152.79	0.0403	152.79	0.0480
18	177.84	0.0513	177.84	0.0647
19	205.84	0.0630	205.84	0.0830
20	238.45	0.0890	238.45	0.1147
21	276.48	0.1077	276.48	0.1283
22	320.60	0.1308	320.60	0.1380
23	372.18	0.1262	372.18	0.1127
24	430.74	0.0993	430.74	0.0640
25	498.91	0.0795	498.91	0.0440
26	578.54	0.0567	578.54	0.0317
27	670.72	0.0278	670.72	0.0203
28	777.39	0.0110	777.39	0.0093
29	900.61	0.0055	900.61	0.0010
30	1044.42	0.0045	1044.42	0.0007
31	1210.66	0.0035	1210.66	0.0003
32	1403.04	0.0030	0.00	0.0000

--Nozzle Distribution--	----------Current----------				----------Default----------			
Boom Length (%)				76.3				
Nozzle DSD & Locations #	DSD	H(ft)	V(ft)	F(ft)	DSD	H(ft)	V(ft)	F(ft)
1	1	-18.7	0	0				
2	1	-17.79	0	0				
3	1	-16.87	0	0				
4	1	-15.96	0	0				

5	1	-15.05	0	0
6	1	-14.14	0	0
7	1	-13.22	0	0
8	1	-12.31	0	0
9	1	-11.4	0	0
10	1	-10.49	0	0
11	1	-9.58	0	0
12	1	-8.66	0	0
13	1	-7.75	0	0
14	1	-6.84	0	0
15	1	-5.93	0	0
16	1	-5.02	0	0
17	1	-4.1	0	0
18	1	-3.19	0	0
19	1	-2.28	0	0
20	1	-1.37	0	0
21	1	-0.456	0	0
22	1	0.456	0	0
23	1	1.37	0	0
24	1	2.28	0	0
25	1	3.19	0	0
26	1	4.1	0	0
27	1	5.02	0	0
28	1	5.93	0	0
29	1	6.84	0	0
30	1	7.75	0	0
31	1	8.66	0	0
32	1	9.58	0	0
33	1	10.49	0	0
34	1	11.4	0	0
35	1	12.31	0	0
36	1	13.22	0	0
37	1	14.14	0	0
38	1	15.05	0	0
39	1	15.96	0	0
40	1	16.87	0	0
41	1	17.79	0	0
42	1	18.7	0	0

--Swath--	Current	Default
Swath Width	60 ft	
Swath Displacement	0.3722 x Swath Width	
Half Boom	No	

--Spray Material--	Current	Default
Name	Water	
Type	User-defined	Basic
Nonvolatile Rate (lb/ac)	0.395	0.501
Active Rate (lb/ac)	0.1	0.2505
Spray Volume		
Rate (gal/ac)	1	2
Specific Gravity	1	
Evaporation		
Rate (µm²/deg C/sec)	84.76	

--Meteorology--	Current	Default
Wind Speed (mph)	15	10
Wind Direction (deg)	-90	
Temperature (deg F)	86	
Relative Humidity (%)	50	

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

--Terrain--	Current	Default
Surface Roughness (ft)	0.0246	

--Advanced--	Current	Default
Wind Speed Height (ft)	6.56	
Max Compute Time (sec)	600	
Max Downwind Dist (ft)	2608.24	
Vortex Decay Rate (mph)	1.25	
Aircraft Drag Coeff	0.1	
Propeller Efficiency	0.8	
Ambient Pressure (in hg)	29.91	

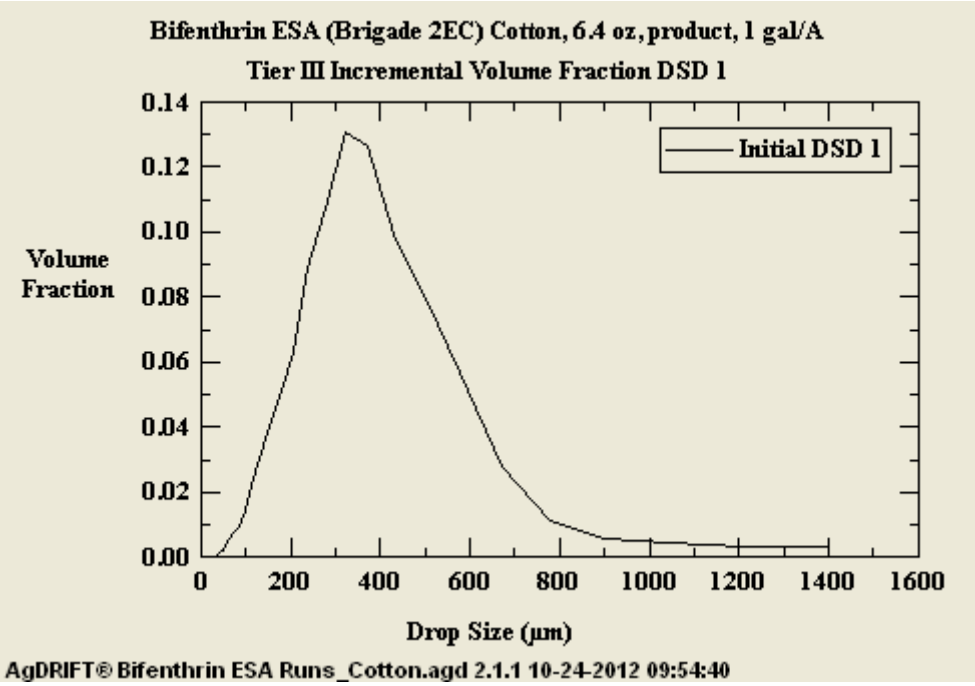
AgDRIFT® Numerical Values

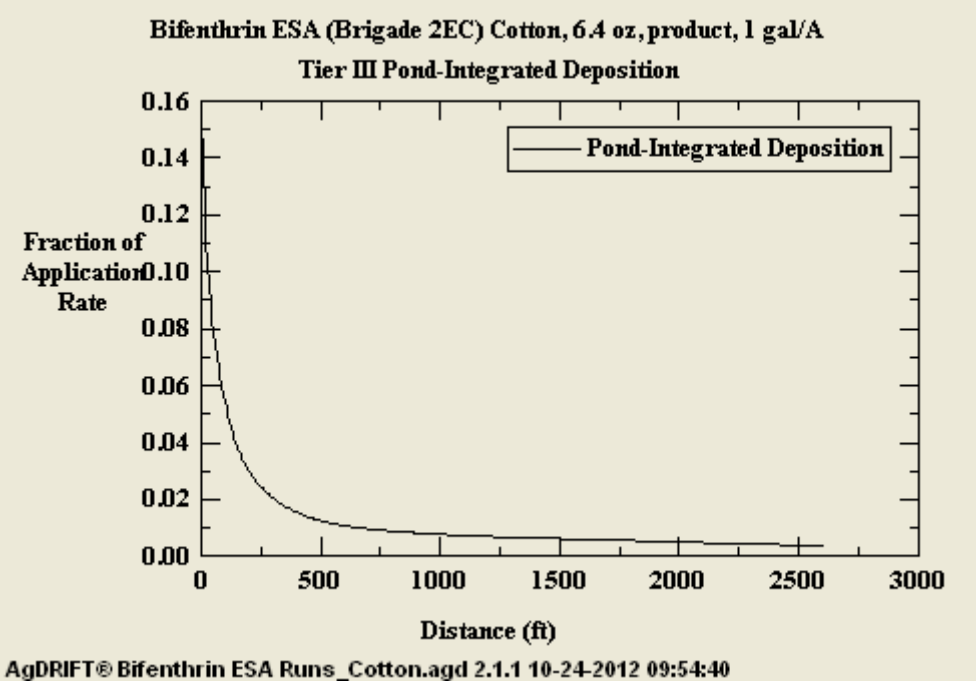
Drop Size Distribution:
Initial DSD 1
Dv0.1 131.29 µm
Dv0.5 294.15 µm
Dv0.9 517.84 µm
Relative Span: 1.31
< 141 µm: 11.71 %

Deposition:
Swath Displacement: 22.33 ft

Accountancy of Active:
Application Efficiency: 94.55 %
Downwind Deposition: 4.57 %
Airborne Drift: 0.8825 %
Carrier Evaporated: 16.05 %

Tier: III
RunID:
  AgDRIFT® Bifenthrin ESA Runs_Cotton.agd 2.1.1 10-24-2012 09:54:40




Bifenthrin ESA (Brigade 2EC) Cotton, 6.4 oz, product, 1 gal/A
Tier III Pond-Integrated Deposition
Pond-Integrated Deposition
Fraction of Application Rate
0.16
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
0
500
1000
1500
2000
2500
3000
Distance (ft)
AgDRIFT® Bifenthrin ESA Runs_Cotton.agd 2.1.1 10-24-2012 09:54:40