Appendix D Aquatic Environmental Concentrations

D.1 Modeling Approach

The EECs (Environmental Effects Concentrations) were calculated using the EPA Tier II (Pesticide Root Zone Model) and EXAMS (Exposure Analysis Modeling System) with the EFED Standard Pond environment, (Pesticide Root Zone Model) and EXAMS (Exposure Analysis Modeling System) is used to simulate pesticide transport as a result of runoff and erosion from an agricultural field, and EXAMS estimates environmental fate and transport of pesticides in surface water. The reported EECs are values that are only expected to be reached once every ten years.

The most recent /EXAMS linkage program (PE4-PL, version 01) was used for all surface water simulations. Linked crop-specific scenarios and meteorological data were used to estimate exposure resulting from use on crops and turf. Simulations were conducted using the Index Reservoir scenario in EXAMS. The model predictions are based on maximum labeled application rates of liquid imazapyre. Scenarios developed specifically for this Red legged Frog Endangered Species assessment, and a California turf scenarios developed for OP Cumulative assessment have been used to estimate surface water concentrations.

The default assumption of a two meter deep standard ecological effects pond does not provide aquatic concentration values for typical red legged frog aquatic habitat.

In the absence of data concerning the toxicity of the two major imazapyr transformation products, the assumption that these two degradates were of equal toxicity to the parent compound was made. When the parent compound degraded under aqueous photolysis, the sum of residues for the parent compound and for the major degradate were taken at each sampling interval and plotted verses time, and regressed in order to obtain a total toxic residue half-life. When the parent compound did not degrade, the modeling input value for a stable compound was chosen, in spite of data indicating that the

degradates were not stable under aerobic conditions. This value provides more conservative EECs than attempting to model each toxic moiety separately.

D.1.1 Label Application Rates and Intervals

The aqueous model predictions are based on maximum labeled application rates, date of application, and the chemical, physical and environmental fate properties for imazapyr. Maximum labeled application rates of liquid formulations were used in this assessment. Granular formulations of imazapyr are marketed. However, due to the contribution from spray drift, the liquid formulations produce higher Estimated Environmental Concentrations (EECs) for surface water, and therefore the most conservative estimates of risk. The residential and right of way scenarios were developed for use with the impervious surface scenarios, and the impervious surface scenario was developed for use with the residential and right of way scenarios. Post processing procedures are outlined in **Section D.1.3**, below. Specific aspects concerning imazapyr application are in **Table D.1.1**.

Table D.1.1 Imazapyr Label Application Information (by Tier 2 modeling scenarios) for the Endangered Red Legged Frog[1]

Scenario	Maximum Application Rate (lbs/acre)	Maximum Number of Applications[2]	Method of Application Modeled	Interval Between Applications
CAforestry	1.5	1	aerial and ground	NA
CAimpervious surfaces [3]	1.5	1	aerial and ground	NA
CArangeland-hay	1.5	1	aerial and ground	NA
CAresidential [4]	0.91	1	ground	NA
CAright-of-way [4]	1.5	1	aerial and ground	NA
CAturf	1.5	1	ground	NA
non-crop aquatic	1.5	1	applied directly to water	NA

[1-] Based on 2005 RED and new label submissions subsequent to the 2005 RED.
[2-] April 1 application date used for all modeling
[3-] Must be post processed with either the residential or right of way surface scenarios
[4-] Must be post processed with impervious surface scenario

D.1.2 Assigning Modeling Scenarios to Imazapyr Uses

Scenarios developed specifically for this Red legged Frog Endangered Species assessment, and a California turf scenarios developed for OP Cumulative assessment have been used to estimate surface water concentrations, **Table D.1.2.a.**

Table D.1.2,a. Scenarios Used to Estimate Concentrations of Imazapyr Total Toxic Residues in Surface Water

California Forestry	Trinity, Shasta, Modoc, and Humboldt Counties
California Impervious Surfaces[1]	San Francisco Bay area of California
California Rangeland	Alameda, Contra Costa, Solano, Sonoma, and Santa Clara Counties, CA
California Residential [2]	San Francisco Bay area of California
California Rights-of-Way[2]	Central/Coastal California
California Turf	Central/Northern California

[1-] Must be post processed with either the residential or right of way surface scenarios
[2-] Must be post processed with impervious surface scenario

The imazapyr labels indicate that, with limited restrictions, imazapyr could be applied to virtually every non-agricultural and non-ornamental use within California. Attempting to match categories of use with individual Tier 2 scenarios revealed a lack of a straightforward correlation between a general use category and one specific scenario. In other words, different scenarios were needed to best describe the specific uses within a single general category. As a result, individual uses, not general use categories, were mapped to the available non-agricultural scenarios tabulated above. This mixing and matching specific uses within general use categories with differing scenarios was possible because, with the exception of the residential uses, maximum labeled use rates for imazapyr were specified at 1.5 lb/acre.

Golf course rough uses were modeled using the new California turf scenario, and adjusted according to the EFED golf course adjustment factor. Forestry, rangeland and pastureland were modeled with the new California forestry and the new California rangeland scenarios. Residential uses were modeled with the new California residential scenario, and post processed with the new California impervious surface scenario at differing ratios of pervious, to impervious surfaces, and varying percents of treated area within an average ¼ acre residential lot.

The new California right of way scenario was chosen as a surrogate for most of the right of ways, non-food non-residential and industrial use patterns. In order to best characterize the varying use situations, these uses were modeled, and then post processed with differing ratios of pervious to impervious surfaces, and up to 10% of the area within a watershed treated. The right of way scenario is a good choice as a surrogate because, in general, the locations represented by these use patterns have been graded to facilitate runoff, and are not expected to be well described by either natural or golf course runoff patterns. Additionally, the low organic carbon content of the soil modeled in the right of way scenario, and the assumption of bare ground

that has been cleared of most vegetation, describe conditions that would be expected to be found at locations typical of these use sites. Scenario choices for specific use patterns are tabulated below (**Table D.1.2,b**).

Table D.1.2,b. Available Standard Tier 2 Modeling Scenarios Used to Represent Imazapyr Use Specific, Individual Patterns

Model Scenarios	Specific Use Areas
California Forestry	timber production, and non-irrigation ditchbanks
California Rangeland	pasture and rangeland
California Residential / Impervious Surfaces[1]	brick walks, gravel pathways, patios, along fences, along curbs, along cracks in sidewalks and overgrown pervious surfaces
California Turf	golf course roughs
California Rights-of-Way / Impervious SurfacesP[1]	For Right Of Way Uses: forest roads, driveways, highway rights-of ways, interchange ramps, railroad and utility rights-of-way, roads, transmission lines, parking areas, and utility rights-of-way For Industrial Uses: bareground areas, storage areas, tank farms, pumping stations, pipelines under paved surfaces, industrial parks, plant sites, fencerows, under asphalt, pond liners and other paved areas For Non-Food Non-Residential Uses: airports, military installations, schools/universities, libraries, hospitals, waysides, service areas, unpaved roads, sewage disposal areas, farmyards, fuel storage areas, fence rows, non-irrigation ditchbanks, barrier strips (including grazed or hayed areas), and establishment and maintenance of wildlife openings

[P1-] Must be post processed together, using percentages outlined in Section D.1.3

D.1.3 Post Processing to Account for Impervious Surfaces

The new California residential and California right of way scenarios were each developed to be used with the new California impervious surface scenario. Post processing is required to combine the EECs from the respective modeling run. Imazapyr use patterns are so diverse, that a definitive endpoint is difficult to pinpoint for the individual use patterns. Therefore, a matrix of values bracketing expected percent impervious surfaces to percent pervious surfaces for reasonable assumptions of percent watershed treated were developed for the residential and the right of way scenarios. The matrices are also useful for gauging the sensitivity the variables outlined within the matrix.

For the residential scenario, the assumption concerning a ¼ acre residential lot size, with a 750square foot driveway, a 250 square foot sidewalk, and a 300 square foot deck were adopted from the 8/3/06 Chesapeake Bay Endangered Species Assessment. It was also assumed that the 300 square foot deck could be a 300 square foot patio, resulting in 12% of the ¼ acre lot covered with impervious surfaces. Unlike in the 2006 assessment, imazapyr is primarily applied to impervious surfaces. The conceptual model of overspray was adjusted to apply to the concept of "overspray" to direct application to the 12% of impervious surfaces on the ¼ acre residential lot, with no overspray onto the 50% of paved streets within the residential watershed. Application of imazapyr could be

made to overgrown pervious portions of the ¼ acre lot in order to eliminate all vegetation. Overgrown pervious surfaces treated with imazapyr were modeled at 0%, 1% and 10% the total area of the ¼ acre lot. Additionally, the percentages of the 12% of the ¼ acre lot that consists of impervious surfaces that were actually treated were modeled as 1%, 10%, 25%, and 50% of the impervious surfaces. This area is not a percent of the total area of the lot or of impervious streets within the watershed. A maximum value for impervious ¼ acre lot surfaces treated was assumed to be 50%, reasoning that a greater percentage would only need to be treated on lots where the impervious surfaces were in need replacement. It was assumed that homeowners who did not have the financial means to repair and/or replace dilapidated driveways, sidewalks and patios would not have the means to apply imazapyr.

Additionally, the watershed modeled for residential uses assumed that the 50% of the watershed consists of paved streets that would not be expected to be treated with imazapyr. A similar rational was used to reach the assumption that paved streets would not be treated. Any residential streets that had become cracked enough to require application of imazapyr would be either repaired or replaced instead of treated with herbicide. In light of the amount of uncertainty associated with the assumptions made in the assessment of residential aquatic EECs, a simplifying assumption that the amount of water running off of the residential streets would be roughly equal to the amount of water running off of the ¼ acre lots, and the resulting EECs were divided by two. The algorithm used to calculate the post processed EEC values was:

((residential EECs x % overspray to pervious surfaces) + (impervious EECs x % impervious surface treated x 12% lot assumed impervious)) /2

For the right of was scenario, the assumption that up to 10% of a watershed could exist as right of ways made in the Barton Springs Endangered Species Assessment were applied to modeling aquatic exposures for the California red legged frog endangered species assessment. While subsequent information provided to EFED indicated that this figure overestimates the percent of right of ways within a watershed, the right of way scenario has also been used as a surrogate for industrial and non-food non-residential use sites. As a result, EECs resulting from 1%, 5%, and 10% of the watershed being treated were calculated in the post processing. In order to bracket the diverse uses patterns modeled with the rights of way scenario, EECs for 1%, 10%, 25%, and 50% of the right of way consisting of impervious surfaces were calculated by post processing. Conceptually, 1% of the right of way treated could be used as a surrogate for a treated chain link fence line where the fence posts had been set into Portland cement. The 50% impervious surface value acts as a surrogate for a one lane, paved road with a minimal shoulder of pervious ground. All other use patterns can be conceptualized to fall between those two extremes. The algorithm used to calculate the post processed EEC values was:

((right of way EECs x % pervious surfaces in right of way) +
(impervious EECs x % impervious surfaces in right of way)) x
% of watershed represented by the right of way scenario

D.1.4 Water Modeling Input Parameters

The appropriate input parameters for total toxic residues (imazapyr, CL9140 and CL 119060) were selected from the environmental fate data submitted by the registrant and in accordance with US EPA-OPP EFED water model parameter selection guidelines, Guidance for Selecting Input Parameters in Modeling the Environmental Fate and Transport of Pesticides, Version II, February 28, 2002. When data are not available for total toxic residues, values for the parent compound, imazapyr, are used for modeling purposes. The environmental fate data used to estimate the modeling input values appear in **Table D.4**.

Table D.1.4. Summary of /EZAMS Environmental Fate Data Used for Aquatic Exposure Inputs[1] for Total Toxic Residues of Imazapyr[3] for the Endangered Red Legged Frog Assessment

Fate Property	Value	MRID (or source)
Molecular Weight [2]	261.28	2003 Science Chapter for Aquatic Uses of Imazapyr
Henry's constant at 25 °C [2]	$<10^{-17}$ atm x m^3/mol	2005 Science Chapter in support of RED
Vapor Pressure at 60 °C [3]	$<10^{-7}$ mm Hg	(< 1.3 x 10^{-5} Pa; method limit); 2003 Science Chapter for New Aquatic Uses of Imazapyr
Aqueous Solubility at 25 °C [2]	11.1 g/L	2003 Science Chapter for New Aquatic Uses
Photolysis in Water	19.9 days	MRID 00131617 (t ½ = 5.3 days for parent only)
Aerobic Soil Metabolism Half-lives	stable	MRID 00131619
Hydrolysis	stable	MRID 00132359
Aerobic Aquatic Metabolism (water column)	stable	MRID 40003712
Anaerobic Aquatic Metabolism (benthic)	stable	MRID 00131619
K_{oc}	99.8	lowest non-sand (silt loam) value (parent) for total toxic residues (K_{oc} = 6053 and 1020 for CL 119060 and CL 9140); MRID 45119705
Application Efficiency	0.95 (0.99)	EFED Guidance for aerial (ground) application
Spray Drift Fraction	0.05 (0.01)	EFED Guidance for aerial (ground) application

[1] – Inputs determined in accordance with EFED "*Guidance for Chemistry and Management Practice Input Parameters for Use in Modeling the Environmental Fate and Transport of Pesticides"* dated February 28, 2002

[2] – Imazapyr value used in absence of data for degradation products: CL 119060 and CL 9140

[3] – Imazapyr value for acid moiety and the two major degradation products are used in this assessment

D.1.5 Golf Course Adjustment Factors

Exposures resulting from use on golf course roughs, were adjusted by 60%, as per December, 7, 2005 EFED golf course adjustment factor. (F:\USER\SHARE\Policies, Guidance, and Formats\EFED Policies\Final Policies\Regional PCA\ Revised Golf Course Adjustment Factor Guidance).

D.1.6 Direct Application to Water

The direct application of imazapyr to water was calculated as application of the maximum application rate directly to the surface of the standard pond. The EXAMS model was used to estimate acute and chronic concentrations resulting from 30 years of direct application to water. EFED currently has no approved method to account for the label mandated ½ mile setback from drinking water intakes. As a result, the setback was not taken into consideration when estimating EECs.

D.2 Modeling Results

D.2.1 Forestry Uses

The estimated Environmental Effects Concentrations (EECs) in the standard two meter pond depth resulting from forestry uses were 18.5 and 14.1 ppb for acute concentrations resulting from aerial and ground spray applications, respectively. Chronic 21 day concentrations were 18.0 and 13.8 ppb, and chronic 60 day concentrations were at 17.2 and 13.1 ppb for aerial and ground spray applications, respectively.

Table D.2.1. Tier 2 Environmental Effects Concentrations (EECs) for Forestry Uses of Imazapyr

	Peak (ppb)	21 Day (ppb)	60-Day (ppb)
Aerial Application	18.5	18.0	17.2
Ground Spray Application	14.1	13.8	13.1

D.2.2 Rangeland and Hay Uses

The estimated Environmental Effects Concentrations (EECs) in the standard two meter pond depth resulting from rangeland and hay productions uses were 33.0 and 26.1 ppb for acute concentrations resulting from aerial and ground spray applications, respectively. Chronic 21 day concentrations were 32.1 and 25.6 ppb, and chronic 60 day concentrations were at 30.5 and 24.7 ppb for aerial and ground spray applications, respectively.

Table D.2.2, Tier 2 Environmental Effects Concentrations (EECs) for Rangeland/Hay Uses of Imazapyr			
	Peak (ppb)	**21 Day (ppb)**	**60-Day (ppb)**
Aerial Application	33.0	32.1	30.5
Ground Spray Application	26.1	25.6	24.7

D.2.2 Golf Course Rough Uses

The estimated Environmental Effects Concentrations (EECs) in the standard two meter pond depth resulting from ground spray application of imazapyr on golf course roughs (60% golf course adjustment factor for roughs) were 8.9 ppb for acute concentrations, 8.6 ppb for chronic 21 day concentrations, and 8.2 ppb for chronic 60 day concentrations.

Table D.2.2. Tier 2 Environmental Effects Concentrations (EECs) for Use of Imazapyr on Golf Course Roughs (CA turf scenario)			
	Peak (ppb)	**21 Day (ppb)**	**60-Day (ppb)**
Ground Spray Application	8.9	8.6	8.2

D.2.3 Direct Application to Water

One direct application of 1.5 lbs./acre of imazapyr to the surface of the standard two meter ecological pond were calculated using EXAMS. Direct application of imazapyr to water will result in EECs that increase in a pattern which can be described mathematically (SigmaPlot 10.0) as an exponential rise to a maximum value:

$$y = a(1-e^{-bx})$$

EXAMS estimated EEC values for the 30 years of available weather data are plotted in **Figure D.1**., and tabulated, **Table D.2.3**. Acute EECs were 84.0 ppb, chronic 21 day EECs were 82.1 ppb, and chronic 60 day EECs were 79.6 ppb. Thirty yearly direct applications of 1.5 lbs./acre of imazapyr to the surface of the standard two meter ecological pond were calculated using EXAMS. Acute EECs were 971 ppb, chronic 21 day EECs were 968 ppb, and chronic 60 day EECs were 962 ppb. Because the EEC values are steadily rising, the one in ten year value, which is normally reported as the value that is only expected to be exceeded every ten years is meaningless, and is not reported here.

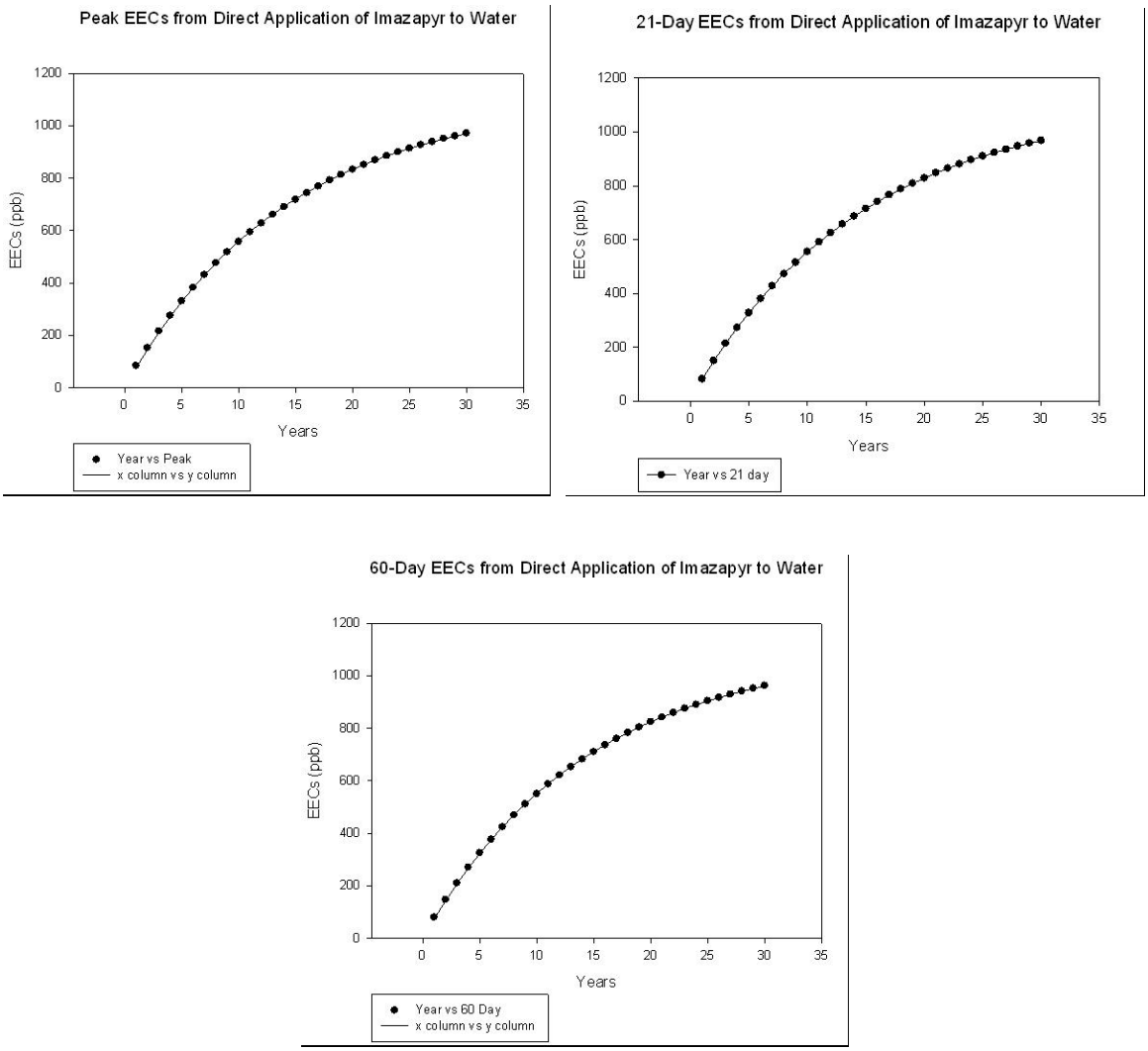

Figure D.1. Peak, 21-Day and 60-Day EECs for Direct Application of Imazapyr to Water

Table D.2.3. Tier 2 EXAMS Environmental Effects Concentrations (EECs) Resulting from the Yearly Application of Imazapyr to Water (Aerial or Ground Spray Application)			
	Peak (ppb)	**21 Day (ppb)**	**60-Day (ppb)**
1 application	84.0	82.1	79.1
2 yearly applications	152	150	147
3 yearly applications	216	214	210
4 yearly applications	275	273	270
5 yearly applications	331	328	325
6 yearly applications	382	380	376
7 yearly applications	431	428	424
8 yearly applications	476	473	469
9 yearly applications	518	515	511
10 yearly applications	557	555	550
11 yearly applications	594	591	587
12 yearly applications	628	625	621
13 yearly applications	661	657	653
14 yearly applications	690	687	682
15 yearly applications	718	715	710
16 yearly applications	744	741	736
17 yearly applications	769	766	760
18 yearly applications	792	788	783
19 yearly applications	813	809	804
20 yearly applications	833	829	824
21 yearly applications	851	848	842
22 yearly applications	869	865	859
23 yearly applications	885	881	875
24 yearly applications	900	896	890
15 yearly applications	914	910	904
26 yearly applications	927	923	917
27 yearly applications	939	935	929
28 yearly applications	951	947	941
29 yearly applications	961	958	952
30 yearly applications	971	968	962

D.2.4 Percent Impervious Surfaces and Percent of Watershed Treated

The impervious surface scenario was developed to be used in conjunction with the residential and rights-of-way scenarios. A post processing step is required to merge the impervious surface output values with the output values from the residential and rights-of-way scenarios. In order to combine these values in a way that depicts actual environmental conditions, the percent of the watershed actually treated and the percent of that treated area existing as impervious surfaces needs to be determined. In the absence of data to make that determination, modeling was conducted at 50%, 25%, 10% and 1% of the impervious surfaces on the ¼ acre residential lot treated, and 10%, 1%, and 0% of the pervious surfaces on the ¼ acre lot treated. A calculation for the ¼ acre residential lot appears in **Appendices D.5**. Finally, it was also assumed that the untreated, paved streets composed 50% of the residential watershed. To account for the 50% of the residential

watershed composed of untreated, paved streets, the aquatic EECs were divided by two. The resulting matrices (**Tables D.2.4.a.** and **D.2.4.b.**, below) were used to characterize the effects of imazapyr under the array of differing conditions.

Residential Uses:

Table D.2.4.a. Tier 2 PRZM/EXAMS Environmental Effects Concentrations (EECs) for the Standard, 2 Meter Deep Pond Resulting from the Residential Use of Imazapyr (ppb) With 12% Impervious Surface

	0% of pervious surface treated			1% of pervious surface treated			10% of pervious surface treated		
	Peak	**21-Day**	**60-Day**	**Peak**	**21-Day**	**60-Day**	**Peak**	**21-Day**	**60-Day**
1% of impervious area treated	0.16	0.16	0.15	0.21	0.20	0.18	0.58	0.57	0.57
10% of impervious area treated	1.6	1.6	1.5	1.7	1.6	1.5	2.1	2.1	1.9
25% of impervious area treated	4.1	3.9	3.7	4.1	40	3.7	4.6	4.5	4.2
50% of impervious area treated	8.1	7.9	7.4	8.2	7.9	7.4	8.7	8.4	8.0

The right-of-way, industrial, and non-food, non-residential imazapyr uses have been modeled using the right of way scenario. Modeling was conducted at 50%, 25%, 10% and 1% of the impervious surfaces on the actual use site treated, with the assumption that 10%, 5%, and 1% of the of the watershed actually consisted of these modeled imazapyr use sites. Calculations for the use sites modeled by the right of way scenarios appear in **Appendices D.7 and D.8**. The resulting matrices (below) were used to characterize the effects of imazapyr under the array of differing conditions.

Rights-Of-Way Uses:

Table D.2.4.b. Tier 2 PRZM/EXAMS Environmental Effects Concentrations (EECs) for the Standard, 2 Meter Deep Pond Resulting from the Use of Imazapyr on Rights-of-Way (ppb)

	1% of impervious surfaces treated			10 % of impervious surfaces treated			25 % of impervious surfaces treated			50 % of impervious surfaces treated		
Aerial Application	**Peak**	**21-Day**	**60-Day**	**Peak**	**21-Day**	**60-Day**	**Peak**	**21-Day**	**60-Day**	**Peak**	**21-Day**	**60-Day**
1% of watershed	0.36	0.35	0.33	0.69	0.65	0.62	1.3	1.2	1.2	2.3	2.2	2.1
5% of watershed	1.8	1.7	1.6	3.4	3.3	3.1	6.5	6.2	5.9	11.6	11.0	10.5
10% of watershed	3.6	3.5	3.3	6.9	6.5	6.2	13.0	12.4	11.7	23.2	22.1	21.1
Ground Spray Application	**Peak**	**21-Day**	**60-Day**	**Peak**	**21-Day**	**60-Day**	**Peak**	**21-Day**	**60-Day**	**Peak**	**21-Day**	**60-Day**
1% of watershed	0.32	0.32	0.29	0.65	0.63	0.59	1.3	1.2	1.2	2.3	2.2	2.1
5% of watershed	1.6	1.6	1.5	3.3	3.1	2.9	6.4	6.2	5.8	11.6	11.2	10.5
10% of watershed	3.2	3.2	2.9	6.5	6.3	5.9	12.8	12.3	11.5	23.2	22.4	20.9

stored as forestgGr.out
Chemical: imazapyr total toxics
PRZM environment: CAForestry.txt modified Tueday, 20 February 2007 at 13:06:11
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 16:33:30
Metfile: w24283.dvf modified Wedday, 3 July 2002 at 10:04:24
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	12.11	12.01	11.64	10.96	10.54	6.372
1962	9.013	8.972	8.788	8.411	8.171	7.198
1963	27.36	27.19	26.67	25.13	24.04	16.08
1964	14.56	14.49	14.22	13.64	13.23	11.04
1965	14.37	14.3	14.02	13.39	13.02	10.77
1966	9.939	9.908	9.775	9.478	9.253	8.354
1967	9.756	9.715	9.6	9.344	9.128	7.998
1968	7.225	7.193	7.062	6.801	6.608	5.959
1969	5.212	5.186	5.078	4.89	4.765	4.321
1970	4.057	4.04	3.97	3.822	3.719	3.271
1971	5.073	5.041	4.918	4.659	4.495	3.479
1972	3.509	3.492	3.423	3.293	3.214	2.812
1973	3.505	3.497	3.447	3.311	3.262	2.501
1974	6.549	6.507	6.338	5.997	5.792	4.492
1975	4.691	4.672	4.588	4.474	4.377	3.873
1976	5.318	5.291	5.182	4.968	4.831	3.901
1977	4.021	4.005	3.951	3.842	3.75	3.489
1978	6.183	6.144	5.99	5.704	5.523	4.401
1979	9.085	9.047	8.916	8.61	8.348	6.332
1980	11.8	11.73	11.45	10.91	10.57	8.199
1981	7.673	7.646	7.534	7.298	7.122	6.32
1982	7.194	7.169	7.065	6.749	6.54	5.395
1983	11.77	11.7	11.43	10.88	10.52	7.699
1984	7.537	7.501	7.425	7.247	7.082	6.381
1985	5.315	5.296	5.218	5.044	4.918	4.564
1986	4.669	4.649	4.569	4.411	4.348	3.886
1987	3.603	3.59	3.533	3.409	3.318	2.98
1988	3.188	3.174	3.121	3.006	2.983	2.637
1989	2.796	2.785	2.742	2.644	2.574	2.234
1990	2.879	2.865	2.823	2.727	2.662	2.268

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	27.36	27.19	26.67	25.13	24.04	16.08
0.0645161290322581		14.56	14.49	14.22	13.64	13.23	11.04
0.0967741935483871		14.37	14.3	14.02	13.39	13.02	10.77
0.129032258064516	12.11	12.01	11.64	10.96	10.57	8.354
0.161290322580645	11.8	11.73	11.45	10.91	10.54	8.199
0.193548387096774	11.77	11.7	11.43	10.88	10.52	7.998
0.225806451612903	9.939	9.908	9.775	9.478	9.253	7.699
0.258064516129032	9.756	9.715	9.6	9.344	9.128	7.198
0.290322580645161	9.085	9.047	8.916	8.61	8.348	6.381
0.32258064516129	9.013	8.972	8.788	8.411	8.171	6.372
0.354838709677419	7.673	7.646	7.534	7.298	7.122	6.332
0.387096774193548	7.537	7.501	7.425	7.247	7.082	6.32
0.419354838709677	7.225	7.193	7.065	6.801	6.608	5.959

```
0.451612903225806 7.194 7.169 7.062 6.749 6.54  5.395
0.483870967741936 6.549 6.507 6.338 5.997 5.792 4.564
0.516129032258065 6.183 6.144 5.99  5.704 5.523 4.492
0.548387096774194 5.318 5.296 5.218 5.044 4.918 4.401
0.580645161290323 5.315 5.291 5.182 4.968 4.831 4.321
0.612903225806452 5.212 5.186 5.078 4.89  4.765 3.901
0.645161290322581 5.073 5.041 4.918 4.659 4.495 3.886
0.67741935483871  4.691 4.672 4.588 4.474 4.377 3.873
0.709677419354839 4.669 4.649 4.569 4.411 4.348 3.489
0.741935483870968 4.057 4.04  3.97  3.842 3.75  3.479
0.774193548387097 4.021 4.005 3.951 3.822 3.719 3.271
0.806451612903226 3.603 3.59  3.533 3.409 3.318 2.98
0.838709677419355 3.509 3.497 3.447 3.311 3.262 2.812
0.870967741935484 3.505 3.492 3.423 3.293 3.214 2.637
0.903225806451613 3.188 3.174 3.121 3.006 2.983 2.501
0.935483870967742 2.879 2.865 2.823 2.727 2.662 2.268
0.967741935483871 2.796 2.785 2.742 2.644 2.574 2.234

0.1   14.144      14.071      13.782      13.147      12.775
      10.5284
                              Average of yearly averages:   5.6402

Inputs generated by pe4.pl - 8-August-2003
Data used for this run:
Output File: forestgGr
Metfile:    w24283.dvf
PRZM scenario:    CAForestry.txt
EXAMS environment file: pond298.exv
Chemical Name:    imazapyr total toxics
Description Variable Name     Value Units Comments
Molecular weight  mwt   261   g/mol
Henry's Law Const.      henry 7E-7  atm-m^3/mol
Vapor Pressure    vapr  1E-7  torr
Solubility  sol   11100 mg/L
Kd    Kd          mg/L
Koc   Koc   99.8  mg/L
Photolysis half-life    kdp   19.9  days  Half-life
Aerobic Aquatic Metabolism    kbacw 0     days  Halfife
Anaerobic Aquatic Metabolism  kbacs 0     days  Halfife
Aerobic Soil Metabolism asm   0     days  Halfife
Hydrolysis: pH 7  0     days  Half-life
Method:     CAM   2     integer     See PRZM manual
Incorporation Depth:    DEPI  0     cm
Application Rate: TAPP  1.68  kg/ha
Application Efficiency: APPEFF      0.99  fraction
Spray Drift DRFT  0.01  fraction of application rate applied to pond
Application Date  Date  01-04 dd/mm or dd/mmm or dd-mm or dd-mmm
Record 17:  FILTRA
      IPSCND      1
      UPTKF
Record 18:  PLVKRT
      PLDKRT
      FEXTRC      0.5
Flag for Index Res. Run IR    Pond
Flag for runoff calc.   RUNOFF      none  none, monthly or
total(average of entire run)
```

stored as forestAr.out
Chemical: imazapyr total toxics
PRZM environment: CAForestry.txt modified Tueday, 20 February 2007 at 13:06:11
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 16:33:30
Metfile: w24283.dvf modified Wedday, 3 July 2002 at 10:04:24
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	14.74	14.62	14.18	13.36	12.85	7.951
1962	13.31	13.25	12.96	12.39	12.08	10.22
1963	32	31.79	31.26	29.45	28.18	19.33
1964	18.33	18.22	17.79	16.91	16.38	14.69
1965	20.18	20.08	19.68	18.8	18.32	15.15
1966	16.26	16.19	15.92	15.33	14.91	13.33
1967	16.83	16.76	16.62	16.09	15.69	13.57
1968	14.43	14.36	14.04	13.41	12.99	11.5
1969	12.35	12.28	12.08	11.53	11.2	9.614
1970	11.61	11.56	11.33	10.85	10.53	8.768
1971	12.09	12.02	11.73	11.14	10.79	8.627
1972	10.6	10.54	10.31	9.869	9.604	7.933
1973	9.773	9.717	9.492	9.048	8.756	7.554
1974	13.54	13.45	13.12	12.44	12.02	9.594
1975	11.87	11.8	11.55	11.23	10.9	9.125
1976	12.27	12.21	11.97	11.49	11.2	9.147
1977	11.33	11.27	11.04	10.61	10.34	8.897
1978	13.28	13.19	12.91	12.29	11.91	9.66
1979	16.02	15.96	15.79	15.18	14.72	11.65
1980	18.54	18.44	18.03	17.22	16.71	13.46
1981	14.7	14.62	14.33	13.76	13.37	11.52
1982	14	13.91	13.74	13.09	12.69	10.39
1983	17.97	17.87	17.5	16.71	16.2	12.55
1984	14.41	14.33	14.17	13.59	13.19	11.37
1985	12.49	12.43	12.21	11.74	11.41	9.806
1986	11.64	11.58	11.34	11.1	10.88	9.189
1987	10.86	10.81	10.61	10.19	9.891	8.317
1988	10.56	10.51	10.31	9.896	9.658	8.055
1989	10.29	10.24	10.06	9.673	9.401	7.827
1990	10.27	10.22	10.03	9.722	9.593	8.019

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	32	31.79	31.26	29.45	28.18	19.33
0.0645161290322581		20.18	20.08	19.68	18.8	18.32 15.15
0.0967741935483871		18.54	18.44	18.03	17.22	16.71 14.69
0.129032258064516	18.33	18.22	17.79	16.91	16.38	13.57
0.161290322580645	17.97	17.87	17.5	16.71	16.2	13.46
0.193548387096774	16.83	16.76	16.62	16.09	15.69	13.33
0.225806451612903	16.26	16.19	15.92	15.33	14.91	12.55
0.258064516129032	16.02	15.96	15.79	15.18	14.72	11.65
0.290322580645161	14.74	14.62	14.33	13.76	13.37	11.52
0.32258064516129	14.7	14.62	14.18	13.59	13.19	11.5
0.354838709677419	14.43	14.36	14.17	13.41	12.99	11.37
0.387096774193548	14.41	14.33	14.04	13.36	12.85	10.39
0.419354838709677	14	13.91	13.74	13.09	12.69	10.22
0.451612903225806	13.54	13.45	13.12	12.44	12.08	9.806

```
0.483870967741936 13.31 13.25 12.96 12.39 12.02 9.66
0.516129032258065 13.28 13.19 12.91 12.29 11.91 9.614
0.548387096774194 12.49 12.43 12.21 11.74 11.41 9.594
0.580645161290323 12.35 12.28 12.08 11.53 11.2  9.189
0.612903225806452 12.27 12.21 11.97 11.49 11.2  9.147
0.645161290322581 12.09 12.02 11.73 11.23 10.9  9.125
0.67741935483871  11.87 11.8  11.55 11.14 10.88 8.897
0.709677419354839 11.64 11.58 11.34 11.1  10.79 8.768
0.741935483870968 11.61 11.56 11.33 10.85 10.53 8.627
0.774193548387097 11.33 11.27 11.04 10.61 10.34 8.317
0.806451612903226 10.86 10.81 10.61 10.19 9.891 8.055
0.838709677419355 10.6  10.54 10.31 9.896 9.658 8.019
0.870967741935484 10.56 10.51 10.31 9.869 9.604 7.951
0.903225806451613 10.29 10.24 10.06 9.722 9.593 7.933
0.935483870967742 10.27 10.22 10.03 9.673 9.401 7.827
0.967741935483871 9.773 9.717 9.492 9.048 8.756 7.554

0.1   18.519      18.418      18.006      17.189      16.677
      14.578
                              Average of yearly averages:
      10.5604333333333

Inputs generated by pe4.pl - 8-August-2003

Data used for this run:
Output File: forestAr
Metfile:    w24283.dvf
PRZM scenario:    CAForestry.txt
EXAMS environment file: pond298.exv
Chemical Name:    imazapyr total toxics
Description Variable Name     Value Units Comments
Molecular weight  mwt   261   g/mol
Henry's Law Const.      henry 7E-7  atm-m^3/mol
Vapor Pressure    vapr  1E-7  torr
Solubility  sol   11100 mg/L
Kd    Kd          mg/L
Koc   Koc   99.8  mg/L
Photolysis half-life    kdp   19.9  days  Half-life
Aerobic Aquatic Metabolism    kbacw 0     days  Halfife
Anaerobic Aquatic Metabolism  kbacs 0     days  Halfife
Aerobic Soil Metabolism asm   0     days  Halfife
Hydrolysis: pH 7  0     days  Half-life
Method:     CAM   2     integer     See PRZM manual
Incorporation Depth:    DEPI  0     cm
Application Rate: TAPP  1.68  kg/ha
Application Efficiency: APPEFF      0.95  fraction
Spray Drift DRFT  0.05  fraction of application rate applied to pond
Application Date  Date  01-04 dd/mm or dd/mmm or dd-mm or dd-mmm
Record 17:  FILTRA
      IPSCND      1
      UPTKF
Record 18:  PLVKRT
      PLDKRT
      FEXTRC      0.5
Flag for Index Res. Run IR    Pond
Flag for runoff calc.   RUNOFF      none  none, monthly or
total(average of entire run)
```

stored as rangelandAr.out
Chemical: imazapyr total toxics
PRZM environment: CArangelandhay.txt modified Tueday, 20 February 2007 at 13:04:47
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 16:33:30
Metfile: w23232.dvf modified Wedday, 3 July 2002 at 10:04:22
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	6.507	6.472	6.349	4.767	3.959	2.554
1962	43.56	43.27	42.13	40.19	36.13	13.91
1963	44.22	44	43.09	41.29	40.16	34.66
1964	29.11	29.01	28.58	27.59	26.77	23.22
1965	25.66	25.52	24.95	23.64	22.72	18.86
1966	21.66	21.56	21.21	19.99	16.96	14.58
1967	26.65	26.5	26.32	25.44	24.63	20.18
1968	18.47	18.36	17.93	17.04	16.45	14.34
1969	18.77	18.64	18.17	17.24	16.54	13.16
1970	13.96	13.88	13.56	12.89	12.41	10.83
1971	12.89	12.81	12.5	11.88	11.45	9.523
1972	10.54	10.48	10.21	9.687	9.341	7.511
1973	9.202	9.139	8.941	8.689	8.075	7.003
1974	11.2	11.13	10.87	10.33	9.968	8.77
1975	10.64	10.57	10.28	9.697	9.309	7.663
1976	13.04	12.95	12.6	11.83	11.3	8.527
1977	11.21	11.14	10.86	10.4	10.22	8.56
1978	13.16	13.09	12.81	12.32	11.93	9.603
1979	11.44	11.38	11.12	10.64	10.19	8.987
1980	12.49	12.42	12.2	11.64	11.22	9.287
1981	11.28	11.21	10.98	10.6	10.3	8.614
1982	25.52	25.32	24.53	23.02	22.01	15.35
1983	22.93	22.78	22.24	21.05	20.27	16.13
1984	15.75	15.65	15.27	14.49	14	12.57
1985	14.11	14.04	13.72	13.04	12.56	10.68
1986	13.12	13.04	12.75	12.22	11.81	9.484
1987	14.16	14.11	13.97	13.67	12.14	9.188
1988	18.97	18.88	18.57	17.94	17.33	14.03
1989	22.35	22.22	21.72	20.87	20.38	13.97
1990	20.63	20.5	20.03	19.06	19.12	16.94

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	44.22	44	43.09	41.29	40.16	34.66
0.0645161290322581		43.56	43.27	42.13	40.19	36.13	23.22
0.0967741935483871		29.11	29.01	28.58	27.59	26.77	20.18
0.129032258064516	26.65	26.5	26.32	25.44	24.63	18.86
0.161290322580645	25.66	25.52	24.95	23.64	22.72	16.94
0.193548387096774	25.52	25.32	24.53	23.02	22.01	16.13
0.225806451612903	22.93	22.78	22.24	21.05	20.38	15.35
0.258064516129032	22.35	22.22	21.72	20.87	20.27	14.58
0.290322580645161	21.66	21.56	21.21	19.99	19.12	14.34
0.32258064516129	20.63	20.5	20.03	19.06	17.33	14.03
0.354838709677419	18.97	18.88	18.57	17.94	16.96	13.97
0.387096774193548	18.77	18.64	18.17	17.24	16.54	13.91
0.419354838709677	18.47	18.36	17.93	17.04	16.45	13.16
0.451612903225806	15.75	15.65	15.27	14.49	14	12.57

```
0.483870967741936 14.16 14.11 13.97 13.67 12.56 10.83
0.516129032258065 14.11 14.04 13.72 13.04 12.41 10.68
0.548387096774194 13.96 13.88 13.56 12.89 12.14 9.603
0.580645161290323 13.16 13.09 12.81 12.32 11.93 9.523
0.612903225806452 13.12 13.04 12.75 12.22 11.81 9.484
0.645161290322581 13.04 12.95 12.6  11.88 11.45 9.287
0.67741935483871  12.89 12.81 12.5  11.83 11.3  9.188
0.709677419354839 12.49 12.42 12.2  11.64 11.22 8.987
0.741935483870968 11.44 11.38 11.12 10.64 10.3  8.77
0.774193548387097 11.28 11.21 10.98 10.6  10.22 8.614
0.806451612903226 11.21 11.14 10.87 10.4  10.19 8.56
0.838709677419355 11.2  11.13 10.86 10.33 9.968 8.527
0.870967741935484 10.64 10.57 10.28 9.697 9.341 7.663
0.903225806451613 10.54 10.48 10.21 9.687 9.309 7.511
0.935483870967742 9.202 9.139 8.941 8.689 8.075 7.003
0.967741935483871 6.507 6.472 6.349 4.767 3.959 2.554

0.1   28.864      28.759      28.354      27.375      26.556
      20.048
                              Average of yearly averages:   12.6228

Inputs generated by pe4.pl - 8-August-2003

Data used for this run:
Output File: rangelandAr
Metfile:    w23232.dvf
PRZM scenario:    CArangelandhay.txt
EXAMS environment file: pond298.exv
Chemical Name:    imazapyr total toxics
Description Variable Name     Value Units Comments
Molecular weight  mwt   261   g/mol
Henry's Law Const.      henry 7E-7  atm-m^3/mol
Vapor Pressure    vapr  1E-7  torr
Solubility  sol   11100 mg/L
Kd    Kd          mg/L
Koc   Koc   99.8  mg/L
Photolysis half-life    kdp   19.9  days  Half-life
Aerobic Aquatic Metabolism    kbacw 0     days  Halfife
Anaerobic Aquatic Metabolism  kbacs 0     days  Halfife
Aerobic Soil Metabolism asm   0     days  Halfife
Hydrolysis: pH 7  0     days  Half-life
Method:     CAM   2     integer     See PRZM manual
Incorporation Depth:    DEPI  0     cm
Application Rate: TAPP  1.68  kg/ha
Application Efficiency: APPEFF      0.95  fraction
Spray Drift DRFT  0.05  fraction of application rate applied to pond
Application Date  Date  01-04 dd/mm or dd/mmm or dd-mm or dd-mmm
Record 17:  FILTRA
      IPSCND      1
      UPTKF
Record 18:  PLVKRT
      PLDKRT
      FEXTRC      0.5
Flag for Index Res. Run IR    Pond
Flag for runoff calc.   RUNOFF      none  none, monthly or
total(average of entire run)
```

stored as rangelandGr.out
Chemical: imazapyr total toxics
PRZM environment: CArangelandhay.txt modified Tueday, 20 February 2007 at 13:04:47
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 16:33:30
Metfile: w23232.dvf modified Wedday, 3 July 2002 at 10:04:22
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	4.971	4.94	4.826	3.151	2.257	0.8714
1962	42.25	41.96	40.81	38.86	34.63	11.38
1963	40.21	40.01	39.21	37.59	36.51	31.99
1964	26.58	26.48	26.09	25.19	24.44	19.81
1965	20.42	20.31	19.88	18.86	18.1	15.38
1966	18.79	18.7	18.34	17.13	13.88	10.85
1967	21.5	21.39	21.16	20.55	19.91	16.53
1968	13.32	13.28	13.11	12.75	12.47	10.39
1969	13.07	12.98	12.66	12.05	11.57	9.336
1970	8.5	8.464	8.313	8.01	7.792	6.919
1971	7.348	7.317	7.192	6.92	6.707	5.592
1972	4.392	4.369	4.272	4.084	3.953	3.457
1973	5.481	5.451	5.393	5.259	4.539	2.968
1974	5.874	5.842	5.71	5.436	5.261	4.753
1975	4.559	4.541	4.472	4.304	4.159	3.68
1976	7.207	7.155	6.95	6.513	6.21	4.536
1977	5.937	5.913	5.808	5.272	4.996	4.511
1978	7.399	7.359	7.215	6.881	6.664	5.565
1979	7.476	7.44	7.327	7.091	6.15	4.794
1980	6.571	6.542	6.422	6.156	5.951	5.232
1981	5.109	5.084	5.012	4.952	4.868	4.5
1982	20.14	19.98	19.32	18.08	17.26	11.52
1983	17.77	17.66	17.23	16.29	15.67	12.33
1984	10.43	10.41	10.31	10.04	9.781	8.615
1985	8.156	8.141	8.08	7.893	7.694	6.562
1986	6.985	6.95	6.806	6.498	6.29	5.316
1987	10.57	10.53	10.41	10.08	8.482	4.983
1988	13.23	13.16	12.98	12.62	12.2	9.911
1989	18.75	18.63	18.17	17.39	16.95	9.877
1990	15.58	15.48	15.12	14.58	14.19	12.92

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	42.25	41.96	40.81	38.86	36.51	31.99
0.0645161290322581		40.21	40.01	39.21	37.59	34.63	19.81
0.0967741935483871		26.58	26.48	26.09	25.19	24.44	16.53
0.129032258064516	21.5	21.39	21.16	20.55	19.91	15.38
0.161290322580645	20.42	20.31	19.88	18.86	18.1	12.92
0.193548387096774	20.14	19.98	19.32	18.08	17.26	12.33
0.225806451612903	18.79	18.7	18.34	17.39	16.95	11.52
0.258064516129032	18.75	18.63	18.17	17.13	15.67	11.38
0.290322580645161	17.77	17.66	17.23	16.29	14.19	10.85
0.32258064516129	15.58	15.48	15.12	14.58	13.88	10.39
0.354838709677419	13.32	13.28	13.11	12.75	12.47	9.911
0.387096774193548	13.23	13.16	12.98	12.62	12.2	9.877
0.419354838709677	13.07	12.98	12.66	12.05	11.57	9.336
0.451612903225806	10.57	10.53	10.41	10.08	9.781	8.615

```
0.483870967741936 10.43 10.41 10.31 10.04 8.482 6.919
0.516129032258065 8.5   8.464 8.313 8.01  7.792 6.562
0.548387096774194 8.156 8.141 8.08  7.893 7.694 5.592
0.580645161290323 7.476 7.44  7.327 7.091 6.707 5.565
0.612903225806452 7.399 7.359 7.215 6.92  6.664 5.316
0.645161290322581 7.348 7.317 7.192 6.881 6.29  5.232
0.67741935483871  7.207 7.155 6.95  6.513 6.21  4.983
0.709677419354839 6.985 6.95  6.806 6.498 6.15  4.794
0.741935483870968 6.571 6.542 6.422 6.156 5.951 4.753
0.774193548387097 5.937 5.913 5.808 5.436 5.261 4.536
0.806451612903226 5.874 5.842 5.71  5.272 4.996 4.511
0.838709677419355 5.481 5.451 5.393 5.259 4.868 4.5
0.870967741935484 5.109 5.084 5.012 4.952 4.539 3.68
0.903225806451613 4.971 4.94  4.826 4.304 4.159 3.457
0.935483870967742 4.559 4.541 4.472 4.084 3.953 2.968
0.967741935483871 4.392 4.369 4.272 3.151 2.257 0.8714

0.1   26.072      25.971      25.597      24.726      23.987
      16.415
                              Average of yearly averages:
      8.83594666666667

Inputs generated by pe4.pl - 8-August-2003

Data used for this run:
Output File: rangelandGr
Metfile:    w23232.dvf
PRZM scenario:    CArangelandhay.txt
EXAMS environment file: pond298.exv
Chemical Name:    imazapyr total toxics
Description Variable Name     Value Units Comments
Molecular weight  mwt   261   g/mol
Henry's Law Const.      henry 7E-7  atm-m^3/mol
Vapor Pressure    vapr  1E-7  torr
Solubility  sol   11100 mg/L
Kd    Kd          mg/L
Koc   Koc   99.8  mg/L
Photolysis half-life    kdp   19.9  days  Half-life
Aerobic Aquatic Metabolism    kbacw 0     days  Halfife
Anaerobic Aquatic Metabolism  kbacs 0     days  Halfife
Aerobic Soil Metabolism asm   0     days  Halfife
Hydrolysis: pH 7  0     days  Half-life
Method:     CAM   2     integer     See PRZM manual
Incorporation Depth:    DEPI  0     cm
Application Rate: TAPP  1.68  kg/ha
Application Efficiency: APPEFF      0.99  fraction
Spray Drift DRFT  0.01  fraction of application rate applied to pond
Application Date  Date  01-04 dd/mm or dd/mmm or dd-mm or dd-mmm
Record 17:  FILTRA
      IPSCND      1
      UPTKF
Record 18:  PLVKRT
      PLDKRT
      FEXTRC      0.5
Flag for Index Res. Run IR    Pond
Flag for runoff calc.   RUNOFF      none  none, monthly or
total(average of entire run)
```

stored as residentalirg.out
Chemical: imazapyr total toxics
PRZM environment: CAresidential no_irrig.txt modified Monday, 16 April 2007 at 08:57:20
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 16:33:30
Metfile: w23234.dvf modified Wedday, 3 July 2002 at 10:04:22
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	2.237	2.221	2.166	1.311	0.9627	0.4327
1962	15.42	15.28	14.7	13.7	12.31	4.766
1963	13.12	13.05	12.79	12.42	12.16	9.32
1964	7.352	7.329	7.181	6.818	6.625	5.019
1965	4.876	4.842	4.704	4.402	4.216	3.578
1966	4.459	4.434	4.353	3.551	3.444	3.017
1967	8.039	7.976	7.816	7.261	6.877	5.294
1968	4.047	4.022	3.965	3.9	3.835	3.103
1969	4.353	4.323	4.26	4.029	3.956	3.186
1970	5.17	5.138	5.047	3.918	3.822	3.139
1971	4.806	4.779	4.673	4.434	4.263	3.239
1972	8.197	8.147	7.984	7.669	7.039	3.12
1973	7.338	7.294	7.185	6.964	6.73	5.5
1974	7.885	7.832	7.614	7.122	6.777	5.549
1975	4.817	4.79	4.679	4.443	4.459	3.52
1976	5.754	3.729	3.217	3.071	2.996	2.343
1977	7.521	7.472	7.281	6.888	6.633	5.113
1978	6.973	6.936	6.811	6.579	6.39	5.139
1979	6.803	6.767	5.103	4.876	4.812	4.022
1980	7.206	7.167	7.018	6.775	6.591	4.94
1981	8.739	8.457	8.159	7.35	6.146	5.242
1982	11.46	11.39	11.07	10.49	10.13	8.747
1983	8.575	8.539	8.394	8.213	7.987	6.174
1984	5.466	5.429	5.305	4.861	4.668	3.905
1985	4.982	4.954	4.858	4.798	4.692	3.78
1986	4.624	4.592	4.474	4.381	4.316	3.386
1987	5.113	5.08	4.946	4.764	4.669	3.603
1988	4.221	4.193	4.105	3.822	3.697	3.114
1989	3.056	3.042	2.985	2.86	2.771	2.401
1990	3.034	3.013	2.929	2.765	2.75	2.305

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	15.42	15.28	14.7	13.7	12.31	9.32
0.0645161290322581		13.12	13.05	12.79	12.42	12.16	8.747
0.0967741935483871		11.46	11.39	11.07	10.49	10.13	6.174
0.129032258064516	8.739	8.539	8.394	8.213	7.987	5.549
0.161290322580645	8.575	8.457	8.159	7.669	7.039	5.5
0.193548387096774	8.197	8.147	7.984	7.35	6.877	5.294
0.225806451612903	8.039	7.976	7.816	7.261	6.777	5.242
0.258064516129032	7.885	7.832	7.614	7.122	6.73	5.139
0.290322580645161	7.521	7.472	7.281	6.964	6.633	5.113
0.32258064516129	7.352	7.329	7.185	6.888	6.625	5.019
0.354838709677419	7.338	7.294	7.181	6.818	6.591	4.94
0.387096774193548	7.206	7.167	7.018	6.775	6.39	4.766
0.419354838709677	6.973	6.936	6.811	6.579	6.146	4.022

```
0.451612903225806 6.803 6.767 5.305 4.876 4.812 3.905
0.483870967741936 5.754 5.429 5.103 4.861 4.692 3.78
0.516129032258065 5.466 5.138 5.047 4.798 4.669 3.603
0.548387096774194 5.17  5.08  4.946 4.764 4.668 3.578
0.580645161290323 5.113 4.954 4.858 4.443 4.459 3.52
0.612903225806452 4.982 4.842 4.704 4.434 4.316 3.386
0.645161290322581 4.876 4.79  4.679 4.402 4.263 3.239
0.67741935483871  4.817 4.779 4.673 4.381 4.216 3.186
0.709677419354839 4.806 4.592 4.474 4.029 3.956 3.139
0.741935483870968 4.624 4.434 4.353 3.918 3.835 3.12
0.774193548387097 4.459 4.323 4.26  3.9   3.822 3.114
0.806451612903226 4.353 4.193 4.105 3.822 3.697 3.103
0.838709677419355 4.221 4.022 3.965 3.551 3.444 3.017
0.870967741935484 4.047 3.729 3.217 3.071 2.996 2.401
0.903225806451613 3.056 3.042 2.985 2.86  2.771 2.343
0.935483870967742 3.034 3.013 2.929 2.765 2.75  2.305
0.967741935483871 2.237 2.221 2.166 1.311 0.9627      0.4327

0.1   11.1879     11.1049     10.8024     10.2623     9.9157
      6.1115
                              Average of yearly averages:   4.19989

Inputs generated by pe4.pl - 8-August-2003

Data used for this run:
Output File: residentalirg
Metfile:    w23234.dvf
PRZM scenario:    CAresidential no_irrig.txt
EXAMS environment file: pond298.exv
Chemical Name:    imazapyr total toxics
Description Variable Name     Value Units Comments
Molecular weight  mwt   261   g/mol
Henry's Law Const.      henry 7E-7  atm-m^3/mol
Vapor Pressure    vapr  1E-7  torr
Solubility  sol   11100 mg/L
Kd    Kd          mg/L
Koc   Koc   99.8  mg/L
Photolysis half-life    kdp   19.9  days  Half-life
Aerobic Aquatic Metabolism    kbacw 0     days  Halfife
Anaerobic Aquatic Metabolism  kbacs 0     days  Halfife
Aerobic Soil Metabolism asm   0     days  Halfife
Hydrolysis: pH 7  0     days  Half-life
Method:     CAM   2     integer     See PRZM manual
Incorporation Depth:    DEPI  0     cm
Application Rate: TAPP  1.02  kg/ha
Application Efficiency: APPEFF      0.99  fraction
Spray Drift DRFT  0.01  fraction of application rate applied to pond
Application Date  Date  01-04 dd/mm or dd/mmm or dd-mm or dd-mmm
Record 17:  FILTRA
      IPSCND      1
      UPTKF
Record 18:  PLVKRT
      PLDKRT
      FEXTRC      0.5
Flag for Index Res. Run IR    Pond
Flag for runoff calc.   RUNOFF      none  none, monthly or
total(average of entire run)
```

stored as imperviousGRlow.out
Chemical: imazapyr total toxics
PRZM environment: CAImpervious.txt modified Tueday, 20 February 2007 at 13:05:45
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 16:33:30
Metfile: w23234.dvf modified Wedday, 3 July 2002 at 10:04:22
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day		60 Day		90 Day		Yearly
1961	87.52	87.07	85.42	70.62	66.24	42.28			
1962	275	273	263	246	224	104			
1963	305	303	298	284	273	215			
1964	167	166	163	154	147	128			
1965	242	240	235	221	210	160			
1966	183	182	180	156	132	119			
1967	282	281	277	262	250	182			
1968	155	154	149	143	138	118			
1969	168	166	163	155	147	117			
1970	134	133	131	119	103	89.78			
1971	123	122	120	114	110	91.81			
1972	166	165	162	158	149	104			
1973	210	209	205	196	167	120			
1974	270	268	264	254	242	185			
1975	185	184	181	172	164	137			
1976	138	136	133	125	119	106			
1977	140	139	134	116	112	97.47			
1978	236	234	226	215	205	151			
1979	149	148	143	141	124	104			
1980	168	167	163	155	148	123			
1981	178	177	176	163	139	111			
1982	271	269	262	244	232	177			
1983	223	221	215	202	192	150			
1984	167	166	163	154	141	110			
1985	147	147	144	139	133	111			
1986	137	136	135	129	124	93.82			
1987	143	142	139	118	96.48	74.96			
1988	227	226	218	205	198	149			
1989	149	148	145	140	135	118			
1990	164	163	158	148	141	126			

Sorted results

Prob.	Peak	96 hr	21 Day		60 Day		90 Day		Yearly
0.032258064516129	305	303	298	284	273	215			
0.0645161290322581		282	281	277	262	250	185		
0.0967741935483871		275	273	264	254	242	182		
0.129032258064516	271	269	263	246	232	177			
0.161290322580645	270	268	262	244	224	160			
0.193548387096774	242	240	235	221	210	151			
0.225806451612903	236	234	226	215	205	150			
0.258064516129032	227	226	218	205	198	149			
0.290322580645161	223	221	215	202	192	137			
0.32258064516129	210	209	205	196	167	128			
0.354838709677419	185	184	181	172	164	126			
0.387096774193548	183	182	180	163	149	123			
0.419354838709677	178	177	176	158	148	120			
0.451612903225806	168	167	163	156	147	119			

```
0.483870967741936 168   166   163   155   147   118
0.516129032258065 167   166   163   155   141   118
0.548387096774194 167   166   163   154   141   117
0.580645161290323 166   165   162   154   139   111
0.612903225806452 164   163   158   148   138   111
0.645161290322581 155   154   149   143   135   110
0.67741935483871  149   148   145   141   133   106
0.709677419354839 149   148   144   140   132   104
0.741935483870968 147   147   143   139   124   104
0.774193548387097 143   142   139   129   124   104
0.806451612903226 140   139   135   125   119   97.47
0.838709677419355 138   136   134   119   112   93.82
0.870967741935484 137   136   133   118   110   91.81
0.903225806451613 134   133   131   116   103   89.78
0.935483870967742 123   122   120   114   96.48 74.96
0.967741935483871 87.52 87.07 85.42 70.62 66.24 42.28

0.1   274.6 272.6 263.9 253.2 241   181.5
                            Average of yearly averages:
      123.837333333333

Inputs generated by pe4.pl - 8-August-2003

Data used for this run:
Output File: imperviousGRlow
Metfile:    w23234.dvf
PRZM scenario:    CAImpervious.txt
EXAMS environment file: pond298.exv
Chemical Name:    imazapyr total toxics
Description Variable Name     Value Units Comments
Molecular weight  mwt   261   g/mol
Henry's Law Const.      henry 7E-7  atm-m^3/mol
Vapor Pressure    vapr  1E-7  torr
Solubility  sol   11100 mg/L
Kd    Kd          mg/L
Koc   Koc   99.8  mg/L
Photolysis half-life    kdp   19.9  days  Half-life
Aerobic Aquatic Metabolism    kbacw 0     days  Halfife
Anaerobic Aquatic Metabolism  kbacs 0     days  Halfife
Aerobic Soil Metabolism asm   0     days  Halfife
Hydrolysis: pH 7  0     days  Half-life
Method:     CAM   4     integer     See PRZM manual
Incorporation Depth:    DEPI  0.1   cm
Application Rate: TAPP  1.02  kg/ha
Application Efficiency: APPEFF      0.99  fraction
Spray Drift DRFT  0.01  fraction of application rate applied to pond
Application Date  Date  01-04 dd/mm or dd/mmm or dd-mm or dd-mmm
Record 17:  FILTRA
      IPSCND      1
      UPTKF
Record 18:  PLVKRT
      PLDKRT
      FEXTRC      0.5
Flag for Index Res. Run IR    Pond
Flag for runoff calc.   RUNOFF      none  none, monthly or
total(average of entire run)
```

stored as turfirg.out
Chemical: imazapyr total toxics
PRZM environment: CATurf no_irrig.txt modified Monday, 16 April 2007 at 08:56:44
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 16:33:30
Metfile: w23234.dvf modified Wedday, 3 July 2002 at 10:04:22
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	2.714	2.697	2.63	1.623	1.223	0.6139
1962	22.62	22.4	21.55	20.08	18.01	6.642
1963	18.94	18.84	18.46	17.98	17.59	13.34
1964	10.22	10.18	9.979	9.479	9.237	7.027
1965	6.545	6.5	6.317	5.932	5.675	4.789
1966	5.603	5.576	5.475	4.544	4.411	3.935
1967	10.73	10.64	10.37	9.619	9.105	6.946
1968	5.421	5.382	5.221	5.071	5.004	4.091
1969	5.496	5.462	5.368	5.069	5.012	4.14
1970	6.823	6.783	6.648	5.134	5.031	4.183
1971	6.291	6.256	6.118	5.805	5.582	4.317
1972	10.9	10.85	10.62	10.3	9.444	4.184
1973	9.623	9.572	9.519	9.205	8.893	7.306
1974	10.33	10.26	9.975	9.329	8.851	7.226
1975	6.33	6.293	6.135	5.811	5.872	4.655
1976	8.02	5.14	4.325	4.047	3.969	3.122
1977	10.33	10.26	10	9.457	9.106	7.079
1978	9.309	9.268	9.096	8.793	8.541	6.817
1979	9.114	9.065	6.814	6.353	6.29	5.329
1980	9.54	9.489	9.295	8.979	8.718	6.601
1981	11.54	11.27	10.97	9.842	8.287	7.084
1982	15.11	15.01	14.6	13.88	13.41	11.57
1983	11.37	11.32	11.13	10.85	10.55	8.166
1984	7.017	6.97	6.84	6.241	6.011	5.089
1985	6.374	6.348	6.24	6.154	6.013	4.928
1986	6.046	6.003	5.826	5.626	5.567	4.41
1987	6.496	6.454	6.285	6.097	6.018	4.667
1988	5.563	5.532	5.385	5.004	4.83	3.998
1989	3.955	3.932	3.839	3.617	3.495	3.108
1990	4.159	4.13	4.012	3.785	3.694	3.116

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	22.62	22.4	21.55	20.08	18.01	13.34
0.0645161290322581		18.94	18.84	18.46	17.98	17.59	11.57
0.0967741935483871		15.11	15.01	14.6	13.88	13.41	8.166
0.129032258064516	11.54	11.32	11.13	10.85	10.55	7.306
0.161290322580645	11.37	11.27	10.97	10.3	9.444	7.226
0.193548387096774	10.9	10.85	10.62	9.842	9.237	7.084
0.225806451612903	10.73	10.64	10.37	9.619	9.106	7.079
0.258064516129032	10.33	10.26	10	9.479	9.105	7.027
0.290322580645161	10.33	10.26	9.979	9.457	8.893	6.946
0.32258064516129	10.22	10.18	9.975	9.329	8.851	6.817
0.354838709677419	9.623	9.572	9.519	9.205	8.718	6.642
0.387096774193548	9.54	9.489	9.295	8.979	8.541	6.601
0.419354838709677	9.309	9.268	9.096	8.793	8.287	5.329
0.451612903225806	9.114	9.065	6.84	6.353	6.29	5.089

```
0.483870967741936 8.02  6.97  6.814 6.241 6.018 4.928
0.516129032258065 7.017 6.783 6.648 6.154 6.013 4.789
0.548387096774194 6.823 6.5   6.317 6.097 6.011 4.667
0.580645161290323 6.545 6.454 6.285 5.932 5.872 4.655
0.612903225806452 6.496 6.348 6.24  5.811 5.675 4.41
0.645161290322581 6.374 6.293 6.135 5.805 5.582 4.317
0.67741935483871  6.33  6.256 6.118 5.626 5.567 4.184
0.709677419354839 6.291 6.003 5.826 5.134 5.031 4.183
0.741935483870968 6.046 5.576 5.475 5.071 5.012 4.14
0.774193548387097 5.603 5.532 5.385 5.069 5.004 4.091
0.806451612903226 5.563 5.462 5.368 5.004 4.83  3.998
0.838709677419355 5.496 5.382 5.221 4.544 4.411 3.935
0.870967741935484 5.421 5.14  4.325 4.047 3.969 3.122
0.903225806451613 4.159 4.13  4.012 3.785 3.694 3.116
0.935483870967742 3.955 3.932 3.839 3.617 3.495 3.108
0.967741935483871 2.714 2.697 2.63  1.623 1.223 0.6139

0.1   14.753      14.641      14.253      13.577      13.124      8.08
                              Average of yearly averages:
      5.61596333333333

Inputs generated by pe4.pl - 8-August-2003

Data used for this run:
Output File: turfirg
Metfile:    w23234.dvf
PRZM scenario:    CATurf no_irrig.txt
EXAMS environment file: pond298.exv
Chemical Name:    imazapyr total toxics
Description Variable Name     Value Units Comments
Molecular weight  mwt   261   g/mol
Henry's Law Const.      henry 7E-7  atm-m^3/mol
Vapor Pressure    vapr  1E-7  torr
Solubility  sol   11100 mg/L
Kd    Kd          mg/L
Koc   Koc   99.8  mg/L
Photolysis half-life    kdp   19.9  days  Half-life
Aerobic Aquatic Metabolism    kbacw 0     days  Halfife
Anaerobic Aquatic Metabolism  kbacs 0     days  Halfife
Aerobic Soil Metabolism asm   0     days  Halfife
Hydrolysis: pH 7  0     days  Half-life
Method:     CAM   2     integer     See PRZM manual
Incorporation Depth:    DEPI  0     cm
Application Rate: TAPP  1.68  kg/ha
Application Efficiency: APPEFF      0.99  fraction
Spray Drift DRFT  0.01  fraction of application rate applied to pond
Application Date  Date  01-04 dd/mm or dd/mmm or dd-mm or dd-mmm
Record 17:  FILTRA
      IPSCND      1
      UPTKF
Record 18:  PLVKRT
      PLDKRT
      FEXTRC      0.5
Flag for Index Res. Run IR    Pond
Flag for runoff calc.   RUNOFF      none  none, monthly or
total(average of entire run)
```

stored as rightofwayGr.out
Chemical: imazapyr total toxics
PRZM environment: CArightofway.txt modified Tueday, 20 February 2007 at 13:04:23
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 16:33:30
Metfile: w23234.dvf modified Wedday, 3 July 2002 at 10:04:22
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	10.41	10.35	9.975	9.101	8.515	4.58
1962	19.13	18.95	18.3	17.1	15.34	6.551
1963	28.73	28.49	28.12	26.3	24.98	17.82
1964	13.84	13.78	13.55	13	12.54	10.48
1965	19.13	19.02	18.42	17.01	16.09	11.19
1966	9.015	8.99	8.884	8.616	8.377	6.893
1967	28.16	27.9	27.24	25.05	23.55	14.53
1968	15.55	15.42	14.91	13.87	13.15	10.23
1969	13.64	13.51	12.99	11.95	11.24	7.842
1970	5.583	5.555	5.437	5.199	5.021	4.182
1971	3.506	3.481	3.406	3.23	3.086	2.566
1972	5.015	4.97	4.79	4.446	4.219	2.959
1973	5.856	5.821	5.655	5.421	4.946	3.008
1974	51.11	50.62	48.88	44.9	42.13	24.76
1975	30.56	30.32	29.38	27.4	26.04	20.07
1976	15.26	15.17	14.85	14	13.58	11.34
1977	7.897	7.873	7.776	7.534	7.3	5.773
1978	16.09	15.96	15.59	14.52	13.71	8.698
1979	7.002	6.973	6.854	6.582	6.37	5.478
1980	9.664	9.612	9.313	8.624	8.134	5.785
1981	5.073	5.041	4.966	4.801	4.663	3.934
1982	23.15	22.98	22.16	20.89	19.79	12.03
1983	14.11	14	13.64	12.79	12.14	9.551
1984	7.397	7.338	7.096	6.63	6.379	5.733
1985	5.111	5.094	5.024	4.846	4.679	3.939
1986	3.639	3.613	3.509	3.285	3.176	2.634
1987	5.138	5.101	4.969	4.849	3.866	2.241
1988	28.63	28.37	27.34	25.14	23.67	14.07
1989	12.75	12.7	12.52	12.07	11.69	9.71
1990	11.3	11.22	10.83	10.04	9.537	7.487

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	51.11	50.62	48.88	44.9	42.13	24.76
0.0645161290322581		30.56	30.32	29.38	27.4	26.04	20.07
0.0967741935483871		28.73	28.49	28.12	26.3	24.98	17.82
0.129032258064516	28.63	28.37	27.34	25.14	23.67	14.53
0.161290322580645	28.16	27.9	27.24	25.05	23.55	14.07
0.193548387096774	23.15	22.98	22.16	20.89	19.79	12.03
0.225806451612903	19.13	19.02	18.42	17.1	16.09	11.34
0.258064516129032	19.13	18.95	18.3	17.01	15.34	11.19
0.290322580645161	16.09	15.96	15.59	14.52	13.71	10.48
0.32258064516129	15.55	15.42	14.91	14	13.58	10.23
0.354838709677419	15.26	15.17	14.85	13.87	13.15	9.71
0.387096774193548	14.11	14	13.64	13	12.54	9.551
0.419354838709677	13.84	13.78	13.55	12.79	12.14	8.698
0.451612903225806	13.64	13.51	12.99	12.07	11.69	7.842

```
0.483870967741936 12.75 12.7  12.52 11.95 11.24 7.487
0.516129032258065 11.3  11.22 10.83 10.04 9.537 6.893
0.548387096774194 10.41 10.35 9.975 9.101 8.515 6.551
0.580645161290323 9.664 9.612 9.313 8.624 8.377 5.785
0.612903225806452 9.015 8.99  8.884 8.616 8.134 5.773
0.645161290322581 7.897 7.873 7.776 7.534 7.3   5.733
0.67741935483871  7.397 7.338 7.096 6.63  6.379 5.478
0.709677419354839 7.002 6.973 6.854 6.582 6.37  4.58
0.741935483870968 5.856 5.821 5.655 5.421 5.021 4.182
0.774193548387097 5.583 5.555 5.437 5.199 4.946 3.939
0.806451612903226 5.138 5.101 5.024 4.849 4.679 3.934
0.838709677419355 5.111 5.094 4.969 4.846 4.663 3.008
0.870967741935484 5.073 5.041 4.966 4.801 4.219 2.959
0.903225806451613 5.015 4.97  4.79  4.446 3.866 2.634
0.935483870967742 3.639 3.613 3.509 3.285 3.176 2.566
0.967741935483871 3.506 3.481 3.406 3.23  3.086 2.241

0.1   28.72 28.478      28.042      26.184      24.849      17.491
                              Average of yearly averages:
      8.53546666666667

Inputs generated by pe4.pl - 8-August-2003

Data used for this run:
Output File: rightofwayGr
Metfile:    w23234.dvf
PRZM scenario:    CArightofway.txt
EXAMS environment file: pond298.exv
Chemical Name:    imazapyr total toxics
Description Variable Name     Value Units Comments
Molecular weight  mwt   261   g/mol
Henry's Law Const.      henry 7E-7  atm-m^3/mol
Vapor Pressure    vapr  1E-7  torr
Solubility  sol   11100 mg/L
Kd    Kd          mg/L
Koc   Koc   99.8  mg/L
Photolysis half-life    kdp   19.9  days  Half-life
Aerobic Aquatic Metabolism    kbacw 0     days  Halfife
Anaerobic Aquatic Metabolism  kbacs 0     days  Halfife
Aerobic Soil Metabolism asm   0     days  Halfife
Hydrolysis: pH 7  0     days  Half-life
Method:     CAM   2     integer     See PRZM manual
Incorporation Depth:    DEPI  0     cm
Application Rate: TAPP  1.68  kg/ha
Application Efficiency: APPEFF      0.99  fraction
Spray Drift DRFT  0.01  fraction of application rate applied to pond
Application Date  Date  01-04 dd/mm or dd/mmm or dd-mm or dd-mmm
Record 17:  FILTRA
      IPSCND      1
      UPTKF
Record 18:  PLVKRT
      PLDKRT
      FEXTRC      0.5
Flag for Index Res. Run IR    Pond
Flag for runoff calc.   RUNOFF      none  none, monthly or
total(average of entire run)
```

stored as rightofwayAr.out
Chemical: imazapyr total toxics
PRZM environment: CArightofway.txt modified Tueday, 20 February 2007 at 13:04:23
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 16:33:30
Metfile: w23234.dvf modified Wedday, 3 July 2002 at 10:04:22
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	13.05	12.98	12.51	11.43	10.71	5.936
1962	20.59	20.41	19.74	18.5	16.8	8.724
1963	32.25	32.04	31.62	29.54	28.06	19.95
1964	16.66	16.52	15.97	14.83	14.74	12.96
1965	23.33	23.21	22.47	20.77	19.64	13.73
1966	13.54	13.46	13.12	12.39	11.83	9.838
1967	32.27	31.98	31.25	28.77	27.07	17.08
1968	20.2	20.03	19.35	17.95	17	12.81
1969	18.13	17.96	17.26	15.87	14.93	10.35
1970	10.1	10.01	9.613	8.861	8.494	6.776
1971	8.458	8.389	8.133	7.599	7.218	5.375
1972	9.793	9.708	9.388	8.722	8.298	5.918
1973	8.351	8.293	8.08	7.829	7.403	6.086
1974	54.46	53.94	52.09	47.89	44.96	26.9
1975	34.52	34.25	33.17	30.91	29.36	22.36
1976	19.82	19.71	19.27	18.13	17.29	14.03
1977	12.54	12.45	12.06	11.23	10.65	8.696
1978	20.65	20.48	19.95	18.62	17.58	11.4
1979	11.59	11.5	11.12	10.75	10.29	8.287
1980	14.53	14.45	14	12.96	12.23	8.649
1981	10.28	10.2	9.883	9.203	8.731	6.946
1982	27.42	27.22	26.41	24.85	23.55	14.72
1983	18.46	18.33	17.85	16.74	15.91	12.31
1984	12	11.9	11.48	10.99	10.47	8.502
1985	10.01	9.926	9.605	8.94	8.491	6.799
1986	8.793	8.721	8.432	7.833	7.426	5.624
1987	7.65	7.604	7.433	7.213	6.435	5.299
1988	32.38	32.09	31.01	28.54	26.89	16.61
1989	16.31	16.22	15.78	15.47	14.84	12.43
1990	15.16	15.05	14.55	13.51	12.85	10.35

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	54.46	53.94	52.09	47.89	44.96	26.9
0.0645161290322581		34.52	34.25	33.17	30.91	29.36	22.36
0.0967741935483871		32.38	32.09	31.62	29.54	28.06	19.95
0.129032258064516	32.27	32.04	31.25	28.77	27.07	17.08
0.161290322580645	32.25	31.98	31.01	28.54	26.89	16.61
0.193548387096774	27.42	27.22	26.41	24.85	23.55	14.72
0.225806451612903	23.33	23.21	22.47	20.77	19.64	14.03
0.258064516129032	20.65	20.48	19.95	18.62	17.58	13.73
0.290322580645161	20.59	20.41	19.74	18.5	17.29	12.96
0.32258064516129	20.2	20.03	19.35	18.13	17	12.81
0.354838709677419	19.82	19.71	19.27	17.95	16.8	12.43
0.387096774193548	18.46	18.33	17.85	16.74	15.91	12.31
0.419354838709677	18.13	17.96	17.26	15.87	14.93	11.4
0.451612903225806	16.66	16.52	15.97	15.47	14.84	10.35

```
0.483870967741936 16.31 16.22 15.78 14.83 14.74 10.35
0.516129032258065 15.16 15.05 14.55 13.51 12.85 9.838
0.548387096774194 14.53 14.45 14    12.96 12.23 8.724
0.580645161290323 13.54 13.46 13.12 12.39 11.83 8.696
0.612903225806452 13.05 12.98 12.51 11.43 10.71 8.649
0.645161290322581 12.54 12.45 12.06 11.23 10.65 8.502
0.67741935483871  12    11.9  11.48 10.99 10.47 8.287
0.709677419354839 11.59 11.5  11.12 10.75 10.29 6.946
0.741935483870968 10.28 10.2  9.883 9.203 8.731 6.799
0.774193548387097 10.1  10.01 9.613 8.94  8.494 6.776
0.806451612903226 10.01 9.926 9.605 8.861 8.491 6.086
0.838709677419355 9.793 9.708 9.388 8.722 8.298 5.936
0.870967741935484 8.793 8.721 8.432 7.833 7.426 5.918
0.903225806451613 8.458 8.389 8.133 7.829 7.403 5.624
0.935483870967742 8.351 8.293 8.08  7.599 7.218 5.375
0.967741935483871 7.65  7.604 7.433 7.213 6.435 5.299

0.1   32.369      32.085      31.583      29.463      27.961
      19.663
                              Average of yearly averages:   11.1815

Inputs generated by pe4.pl - 8-August-2003

Data used for this run:
Output File: rightofwayAr
Metfile:    w23234.dvf
PRZM scenario:    CArightofway.txt
EXAMS environment file: pond298.exv
Chemical Name:    imazapyr total toxics
Description Variable Name     Value Units Comments
Molecular weight  mwt   261   g/mol
Henry's Law Const.      henry 7E-7  atm-m^3/mol
Vapor Pressure    vapr  1E-7  torr
Solubility  sol   11100 mg/L
Kd    Kd          mg/L
Koc   Koc   99.8  mg/L
Photolysis half-life    kdp   19.9  days  Half-life
Aerobic Aquatic Metabolism    kbacw 0     days  Halfife
Anaerobic Aquatic Metabolism  kbacs 0     days  Halfife
Aerobic Soil Metabolism asm   0     days  Halfife
Hydrolysis: pH 7  0     days  Half-life
Method:     CAM   2     integer     See PRZM manual
Incorporation Depth:    DEPI  0     cm
Application Rate: TAPP  1.68  kg/ha
Application Efficiency: APPEFF      0.95  fraction
Spray Drift DRFT  0.05  fraction of application rate applied to pond
Application Date  Date  01-04 dd/mm or dd/mmm or dd-mm or dd-mmm
Record 17:  FILTRA
      IPSCND      1
      UPTKF
Record 18:  PLVKRT
      PLDKRT
      FEXTRC      0.5
Flag for Index Res. Run IR    Pond
Flag for runoff calc.   RUNOFF      none  none, monthly or
total(average of entire run)
```

stored as imperviousGr.out
Chemical: imazapyr total toxics
PRZM environment: CAImpervious.txt modified Tueday, 20 February 2007 at 13:05:45
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 16:33:30
Metfile: w23234.dvf modified Wedday, 3 July 2002 at 10:04:22
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day		60 Day		90 Day		Yearly
1961	144	143	141	116	109	69.62			
1962	453	449	433	405	369	171			
1963	502	498	491	468	450	354			
1964	275	274	268	254	242	210			
1965	398	395	387	365	346	264			
1966	301	300	296	256	217	196			
1967	464	463	456	432	411	299			
1968	256	254	246	235	228	194			
1969	276	274	269	256	243	193			
1970	220	219	216	196	169	148			
1971	203	202	198	188	181	151			
1972	274	272	266	260	245	171			
1973	346	344	338	322	275	197			
1974	445	442	434	418	398	306			
1975	305	303	298	283	270	226			
1976	226	225	219	205	195	175			
1977	230	229	220	190	184	161			
1978	388	385	373	354	338	249			
1979	245	244	235	233	204	171			
1980	277	275	269	256	244	203			
1981	294	292	289	269	228	182			
1982	447	443	431	402	382	291			
1983	367	364	354	333	316	248			
1984	275	273	268	254	232	181			
1985	243	242	238	228	220	182			
1986	226	225	222	212	204	155			
1987	235	234	228	194	159	123			
1988	375	372	359	338	326	245			
1989	245	244	240	230	222	195			
1990	270	268	261	244	232	207			

Sorted results

Prob.	Peak	96 hr	21 Day		60 Day		90 Day		Yearly
0.032258064516129	502	498	491	468	450	354			
0.0645161290322581		464	463	456	432	411	306		
0.0967741935483871		453	449	434	418	398	299		
0.129032258064516	447	443	433	405	382	291			
0.161290322580645	445	442	431	402	369	264			
0.193548387096774	398	395	387	365	346	249			
0.225806451612903	388	385	373	354	338	248			
0.258064516129032	375	372	359	338	326	245			
0.290322580645161	367	364	354	333	316	226			
0.32258064516129	346	344	338	322	275	210			
0.354838709677419	305	303	298	283	270	207			
0.387096774193548	301	300	296	269	245	203			
0.419354838709677	294	292	289	260	244	197			
0.451612903225806	277	275	269	256	243	196			

```
0.483870967741936 276   274   269   256   242   195
0.516129032258065 275   274   268   256   232   194
0.548387096774194 275   273   268   254   232   193
0.580645161290323 274   272   266   254   228   182
0.612903225806452 270   268   261   244   228   182
0.645161290322581 256   254   246   235   222   181
0.67741935483871  245   244   240   233   220   175
0.709677419354839 245   244   238   230   217   171
0.741935483870968 243   242   235   228   204   171
0.774193548387097 235   234   228   212   204   171
0.806451612903226 230   229   222   205   195   161
0.838709677419355 226   225   220   196   184   155
0.870967741935484 226   225   219   194   181   151
0.903225806451613 220   219   216   190   169   148
0.935483870967742 203   202   198   188   159   123
0.967741935483871 144   143   141   116   109   69.62

0.1   452.4 448.4 433.9 416.7 396.4 298.2
                            Average of yearly averages:
      203.920666666667

Inputs generated by pe4.pl - 8-August-2003

Data used for this run:
Output File: imperviousGr
Metfile:    w23234.dvf
PRZM scenario:    CAImpervious.txt
EXAMS environment file: pond298.exv
Chemical Name:    imazapyr total toxics
Description Variable Name     Value Units Comments
Molecular weight  mwt   261   g/mol
Henry's Law Const.      henry 7E-7  atm-m^3/mol
Vapor Pressure    vapr  1E-7  torr
Solubility  sol   11100 mg/L
Kd    Kd          mg/L
Koc   Koc   99.8  mg/L
Photolysis half-life    kdp   19.9  days  Half-life
Aerobic Aquatic Metabolism    kbacw 0     days  Halfife
Anaerobic Aquatic Metabolism  kbacs 0     days  Halfife
Aerobic Soil Metabolism asm   0     days  Halfife
Hydrolysis: pH 7  0     days  Half-life
Method:     CAM   4     integer     See PRZM manual
Incorporation Depth:    DEPI  0.1   cm
Application Rate: TAPP  1.68  kg/ha
Application Efficiency: APPEFF      0.99  fraction
Spray Drift DRFT  0.01  fraction of application rate applied to pond
Application Date  Date  01-04 dd/mm or dd/mmm or dd-mm or dd-mmm
Record 17:  FILTRA
      IPSCND      1
      UPTKF
Record 18:  PLVKRT
      PLDKRT
      FEXTRC      0.5
Flag for Index Res. Run IR    Pond
Flag for runoff calc.   RUNOFF      none  none, monthly or
total(average of entire run)
```

stored as imperviousAr.out
Chemical: imazapyr total toxics
PRZM environment: CAImpervious.txt modified Tueday, 20 February 2007 at 13:05:45
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 16:33:30
Metfile: w23234.dvf modified Wedday, 3 July 2002 at 10:04:22
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day		60 Day		90 Day		Yearly
1961	140	139	136	113	107	68.36			
1962	437	433	417	391	356	166			
1963	486	483	475	453	436	343			
1964	267	265	260	246	234	205			
1965	387	384	376	354	337	256			
1966	292	291	286	249	211	192			
1967	450	449	443	419	399	290			
1968	251	249	241	230	223	189			
1969	270	268	263	250	237	188			
1970	213	213	209	191	165	145			
1971	197	196	192	182	175	148			
1972	265	264	258	252	238	167			
1973	335	332	327	312	267	192			
1974	433	430	422	406	386	296			
1975	298	296	291	276	263	220			
1976	222	221	215	201	192	171			
1977	223	222	214	185	179	157			
1978	377	374	362	344	329	242			
1979	237	236	228	226	198	167			
1980	271	270	263	250	239	198			
1981	285	283	280	260	222	178			
1982	434	431	418	390	371	282			
1983	357	354	344	324	308	241			
1984	266	265	259	246	225	177			
1985	235	234	230	221	213	178			
1986	219	218	215	206	198	151			
1987	228	227	221	189	155	122			
1988	364	361	349	329	317	238			
1989	237	236	232	224	216	190			
1990	264	262	255	238	227	202			

Sorted results

Prob.	Peak	96 hr	21 Day		60 Day		90 Day		Yearly
0.032258064516129	486	483	475	453	436	343			
0.0645161290322581		450	449	443	419	399	296		
0.0967741935483871		437	433	422	406	386	290		
0.129032258064516	434	431	418	391	371	282			
0.161290322580645	433	430	417	390	356	256			
0.193548387096774	387	384	376	354	337	242			
0.225806451612903	377	374	362	344	329	241			
0.258064516129032	364	361	349	329	317	238			
0.290322580645161	357	354	344	324	308	220			
0.32258064516129	335	332	327	312	267	205			
0.354838709677419	298	296	291	276	263	202			
0.387096774193548	292	291	286	260	239	198			
0.419354838709677	285	283	280	252	238	192			
0.451612903225806	271	270	263	250	237	192			

```
0.483870967741936 270   268   263   250   234   190
0.516129032258065 267   265   260   249   227   189
0.548387096774194 266   265   259   246   225   188
0.580645161290323 265   264   258   246   223   178
0.612903225806452 264   262   255   238   222   178
0.645161290322581 251   249   241   230   216   177
0.67741935483871  237   236   232   226   213   171
0.709677419354839 237   236   230   224   211   167
0.741935483870968 235   234   228   221   198   167
0.774193548387097 228   227   221   206   198   166
0.806451612903226 223   222   215   201   192   157
0.838709677419355 222   221   215   191   179   151
0.870967741935484 219   218   214   189   175   148
0.903225806451613 213   213   209   185   165   145
0.935483870967742 197   196   192   182   155   122
0.967741935483871 140   139   136   113   107   68.36

0.1   436.7 432.8 421.6 404.5 384.5 289.2
                            Average of yearly averages:
      198.645333333333

Inputs generated by pe4.pl - 8-August-2003

Data used for this run:
Output File: imperviousAr
Metfile:    w23234.dvf
PRZM scenario:    CAImpervious.txt
EXAMS environment file: pond298.exv
Chemical Name:    imazapyr total toxics
Description Variable Name     Value Units Comments
Molecular weight  mwt   261   g/mol
Henry's Law Const.      henry 7E-7  atm-m^3/mol
Vapor Pressure    vapr  1E-7  torr
Solubility  sol   11100 mg/L
Kd    Kd          mg/L
Koc   Koc   99.8  mg/L
Photolysis half-life    kdp   19.9  days  Half-life
Aerobic Aquatic Metabolism    kbacw 0     days  Halfife
Anaerobic Aquatic Metabolism  kbacs 0     days  Halfife
Aerobic Soil Metabolism asm   0     days  Halfife
Hydrolysis: pH 7  0     days  Half-life
Method:     CAM   4     integer     See PRZM manual
Incorporation Depth:    DEPI  0.1   cm
Application Rate: TAPP  1.68  kg/ha
Application Efficiency: APPEFF      0.95  fraction
Spray Drift DRFT  0.05  fraction of application rate applied to pond
Application Date  Date  01-04 dd/mm or dd/mmm or dd-mm or dd-mmm
Record 17:  FILTRA
      IPSCND      1
      UPTKF
Record 18:  PLVKRT
      PLDKRT
      FEXTRC      0.5
Flag for Index Res. Run IR    Pond
Flag for runoff calc.   RUNOFF      none  none, monthly or
total(average of entire run)
```

EXAMS Exposure Analysis for Direct Application to Water

```
1Exposure Analysis Modeling System -- EXAMS Version 2.98.04, Mode 3
 Chemical: 1) imazapyr
 ------------------------------------------------------------------------------
 Table 1.1.1  Chemical input data for neutral molecule (Sp.#1).
 *** Chemical-specific data: SET via "entry(1)"
 MWT:   2.61E+02 VAPR:           HENRY:          KOW:
 MP:   -9.90E+01 EVPR:           EHEN:           KOC:   9.98E+01
 AerMet (half-life, days):           AnaerM (half-life, days):
 *** Ion-specific data: "entry(1,1)"
 SOL:   1.11E+04 KPB:            KPS:
 ESOL:           KPDOC:
 *** Reactivity of dissolved species: SET via "entry(1,1,1)
 KAH:            EAH:            KNH:            ENH:
 KBH:            EBH:            KRED:           ERED:
 KBACW:          QTBAW: 2.00     KBACS:          QTBAS: 2.00
 *** Reactivity of solids-sorbed species:     "entry(2,1,1)
 KAH:            EAH:            KNH:            ENH:
 KBH:            EBH:            KRED:           ERED:
 KBACW:          QTBAW: 2.00     KBACS:          QTBAS: 2.00
 *** Reactivity of "DOC"-complexed species:   "entry(3,1,1)
 KAH:            EAH:            KNH:            ENH:
 KBH:            EBH:            KRED:           ERED:
 KBACW:          QTBAW: 2.00     KBACS:          QTBAS: 2.00
 *** Reactivity of biosorbed species:         "entry(4,1,1)
 KBACW:          QTBAW: 2.00     KBACS:          QTBAS: 2.00

 Photochemical process data;  Ion-specific data: "entry(1,1)"
 KDP(1,1): 1.45E-03 RFLAT(1,1):   0.0    LAMAX(1,1):   0.0
 *** Reactivity of dissolved species: SET via "entry(1,1,1)
 K1O2:           EK1O2:          KOX:            EOX:
 *** Reactivity of solids-sorbed species:     "entry(2,1,1)
 K1O2:           EK1O2:          KOX:            EOX:
 *** Reactivity of "DOC"-complexed species:   "entry(3,1,1)
 K1O2:           EK1O2:          KOX:            EOX:
 QYield(1,1,1)          QYield(2,1,1)          QYield(3,1,1)
 Light ABSORption (n,1,1):        (1)             (2)
  (3)             (4)             (5)             (6)
  (7)             (8)             (9)            (10)
 (11)            (12)            (13)            (14)
 (15)            (16)            (17)            (18)
 (19)            (20)            (21)            (22)
 (23)            (24)            (25)            (26)
 (27)            (28)            (29)            (30)
 (31)            (32)            (33)            (34)
 (35)            (36)            (37)            (38)
 (39)            (40)            (41)            (42)
 (43)            (44)            (45)            (46)
1Exposure Analysis Modeling System -- EXAMS Version 2.98.04, Mode 3
 Chemical: 1) imazapyr
 ------------------------------------------------------------------------------
 Table 2.  Chemical input data: product chemistry.
 ------------------------------------------------------------------------------
 No product chemistry specified.
 ------------------------------------------------------------------------------
1Exposure Analysis Modeling System -- EXAMS Version 2.98.04, Mode 3
 Ecosystem: Mississippi OPP Farm Pond (MLRA P134, WBAN 03940)
 Chemical: 1) imazapyr
 ------------------------------------------------------------------------------
 Table 3.  Chemical input data: pulse loadings.*
 ------------------------------------------------------------------------------
```

```
 IMONth         5
 IDAY           1
 ICHEM-ADB#     1
 ISEGment       1
 IMASS (kg)  1.68
 ------------------------------------------------------------------------------
 * N.B.: Input data only; may be revised during simulation.
1Exposure Analysis Modeling System -- EXAMS Version 2.98.04, Mode 3
 Ecosystem: Mississippi OPP Farm Pond (MLRA P134, WBAN 03940)
 ------------------------------------------------------------------------------
 Table 6.13.  Mean environmental inputs: sediment properties.**
 ------------------------------------------------------------------------------
 Seg  T*    SUSED    BULKD    PCTWA    FROC      CEC       AEC
  #   y     mg/L     g/cm3      %                meq/100g (dry)
 ------------------------------------------------------------------------------
   1  L    3.00E+01                   4.00E-02 1.00E-02 1.00E-02
   2  B            1.85     1.37E+02 4.00E-02 1.00E-02 1.00E-02
 ------------------------------------------------------------------------------
  * Segment types: Littoral, Epilimnetic, Hypolimnetic, Benthic.
 ** Average of 12 monthly mean values.
1Exposure Analysis Modeling System -- EXAMS Version 2.98.04, Mode 3
 Ecosystem: Mississippi OPP Farm Pond (MLRA P134, WBAN 03940)
 ------------------------------------------------------------------------------
 Table 7.  Environmental input data: physical geometry.
 ------------------------------------------------------------------------------
 Seg  T*   VOLume    AREA     DEPTH    XSA      LENGth   WIDTH
  #   y      m3       m2         m       m2        m        m
 ------------------------------------------------------------------------------
   1  L    2.00E+04 1.00E+04 2.00              1.00E+02 1.00E+02
   2  B    5.00E+02 1.00E+04 5.00E-02          1.00E+02 1.00E+02
 ------------------------------------------------------------------------------
  * Segment types: Littoral, Epilimnetic, Hypolimnetic, Benthic.
1Exposure Analysis Modeling System -- EXAMS Version 2.98.04, Mode 3
 Ecosystem: Mississippi OPP Farm Pond (MLRA P134, WBAN 03940)
 ------------------------------------------------------------------------------
 Table 8.13.  Mean miscellaneous environmental input data.**
 ------------------------------------------------------------------------------
 Seg  T*    DFAC     DISO2     KO2     WIND     DOC     CHL pgmt
  #   y     m/m      mg/L    cm/hr@20 m/s@10cm  mg/L      mg/L
 ------------------------------------------------------------------------------
   1  L    1.19     5.00             1.80     5.00     5.00E-03
   2  B                                      1.00E+01
 ------------------------------------------------------------------------------
  * Segment types: Littoral, Epilimnetic, Hypolimnetic, Benthic.
 ** Average of 12 monthly mean values.
1Exposure Analysis Modeling System -- EXAMS Version 2.98.04, Mode 3
 Ecosystem: Mississippi OPP Farm Pond (MLRA P134, WBAN 03940)
 ------------------------------------------------------------------------------
 Table 9.  Input specifications -- advective transport field.
 ------------------------------------------------------------------------------

 J FR AD        1         2
 I TO AD        0         1
 ADV PR      1.00      1.00
 ------------------------------------------------------------------------------
1Exposure Analysis Modeling System -- EXAMS Version 2.98.04, Mode 3
 Ecosystem: Mississippi OPP Farm Pond (MLRA P134, WBAN 03940)
 ------------------------------------------------------------------------------
 Table 10.13.  Mean dispersive transport field.
 ------------------------------------------------------------------------------

 J TURB           1
 I TURB           2
 XS TUR m2    1.000E+04
```

```
 CHARL m       1.02
 DSP m2/hr*   3.000E-05
 ------------------------------------------------------------------------------
 * Average of 12 monthly mean values.
1Exposure Analysis Modeling System -- EXAMS Version 2.98.04, Mode 3
 Ecosystem: Mississippi OPP Farm Pond (MLRA P134, WBAN 03940)
 ------------------------------------------------------------------------------
 Table 11.13.  Mean environmental data:  global parameters.*
 ------------------------------------------------------------------------------
 OXRAD (M)  0.0     RAIN(mm/mo)  37.2   CLOUD    3.24 LAT    38.5
 OZONE(cm) 0.314    ATURB(km) 2.00      RHUM(%)  58.6 LONG -121.5
 ELEV (m):    6.0    Air mass type(s): R
 WLAM, mE/cm2/day:  8.695E-22 4.905E-18 4.413E-15 2.833E-12
  4.802E-10 2.290E-08 4.269E-07 3.783E-06 2.133E-05 7.892E-05
  2.143E-04 4.840E-04 8.437E-04 1.407E-03 2.007E-03 2.550E-03
  3.147E-03 5.030E-03 2.357E-02 2.604E-02 3.050E-02 3.404E-02
  4.111E-02 4.315E-02 4.405E-02 6.562E-02 7.930E-02 8.516E-02
  8.255E-02 9.854E-02 0.113     0.120     0.121     0.127
  0.123     0.229     0.336     0.355     0.365     0.369
  0.381     0.384     0.387     0.584     0.764     0.734
 ------------------------------------------------------------------------------
 * Average of 12 monthly mean values.
1Exposure Analysis Modeling System -- EXAMS Version 2.98.04, Mode 3
 Ecosystem: Mississippi OPP Farm Pond (MLRA P134, WBAN 03940)
 Chemical:  imazapyr
 ------------------------------------------------------------------------------
 Table 12.01.13.  Mean kinetic profile of synthetic chemical,
 computed from chemical and environmental reactivity data. **
 ------------------------------------------------------------------------------
 Seg  T*    Local pseudo-first-order process half-lives (hours)
  #   y    Biolysis  Photol   Oxidat   Hydrol   Reduct   Volatil
 ------------------------------------------------------------------------------
   1  L             7.72E+04
   2  B
 ------------------------------------------------------------------------------
   * Segment types: Littoral, Epilimnetic, Hypolimnetic, Benthic
  ** Average of 12 monthly mean values.
1Exposure Analysis Modeling System -- EXAMS Version 2.98.04, Mode 3
 Ecosystem: Mississippi OPP Farm Pond (MLRA P134, WBAN 03940)
 ------------------------------------------------------------------------------
 Table 13.13. Mean chemical reactivity profile of ecosystem. ***
 ------------------------------------------------------------------------------
 Seg  T*   pH   pOH  Temp  Piston  Mean   Bact.   Oxidant  Singlet  Reduct.
  #   y              Deg.  Veloc.  Light  Popn.    Conc.   Oxygen   (REDAG)
      p               C.    m/hr     %    cfu/**   Molar    Molar    Molar
 ------------------------------------------------------------------------------
   1  L   7.0   7.0  15.3  2.6E-02    1   1.       0.      6.8E-16
   2  B   7.0   7.0  15.3                3.7E+01
 ------------------------------------------------------------------------------
   * Segment types: Littoral, Epilimnetic, Hypolimnetic, Benthic
  ** Active bacterial populations as cfu/mL in water column, and
     as cfu/100 g (dry weight) of sediments in benthic segments.
 *** Average of 12 monthly mean values.
1Exposure Analysis Modeling System -- EXAMS Version 2.98.04, Mode 3
 Ecosystem: Mississippi OPP Farm Pond (MLRA P134, WBAN 03940)
 ------------------------------------------------------------------------------
 Table 4.13.  Mean environmental input data: biologicals.**
 ------------------------------------------------------------------------------
 Seg  T*    BACPL    BNBAC    PLMAS    BNMAS
  #   y    cfu/ml   cfu/100g  mg/L    dry g/m2
 ------------------------------------------------------------------------------
   1  L    1.00              4.00E-01
   2  B             3.70E+01          6.00E-03
 ------------------------------------------------------------------------------
```

```
  * Segment types: Littoral, Epilimnetic, Hypolimnetic, Benthic.
 ** Average of 12 monthly mean values.
1Exposure Analysis Modeling System -- EXAMS Version 2.98.04, Mode 3
 Ecosystem: Mississippi OPP Farm Pond (MLRA P134, WBAN 03940)
 ------------------------------------------------------------------------------
 Table 5.13.  Mean environmental data: hydrologic parameters.**
 ------------------------------------------------------------------------------
 Seg  T*    STFLO    STSED    NPSFL    NPSED    SEEPS     EVAP
  #   y     m3/hr    kg/hr    m3/hr    kg/hr    m3/hr     mm/mon
 ------------------------------------------------------------------------------
   1  L    1.93     3.86E-02                            1.57E+02
   2  B
 ------------------------------------------------------------------------------
  * Segment types: Littoral, Epilimnetic, Hypolimnetic, Benthic.
 ** Average of 12 monthly mean values.
1Exposure Analysis Modeling System -- EXAMS Version 2.98.04, Mode 3
 Ecosystem: Mississippi OPP Farm Pond (MLRA P134, WBAN 03940)
 Chemical:  imazapyr
 ------------------------------------------------------------------------------
 Table 19.  Summary time-trace of spatially averaged, volume-
   weighted monthly mean chemical concentrations during 1961.
 ------------------------------------------------------------------------------
   Month   Average Chemical Concentrations     Total Chemical Mass
   -----   -------------------------------     -------------------
           Water Column      Benthic Sediments  Water Col  Benthic
      -------------------- ------------------- --------- ---------
      Free-mg/L Sorb-mg/kg Pore-mg/L Sed-mg/kg  Total kg  Total kg
 ------------------------------------------------------------------------------
   Jan  0.0       0.0       0.0       0.0        0.0       0.0
   Feb  0.0       0.0       0.0       0.0        0.0       0.0
   Mar  0.0       0.0       0.0       0.0        0.0       0.0
   Apr  0.0       0.0       0.0       0.0        0.0       0.0
   May 8.09E-02  0.32      1.56E-02  6.23E-02    1.6      4.60E-02
   Jun 7.61E-02  0.30      3.74E-02  0.15        1.5      0.11
   Jul 7.26E-02  0.29      5.02E-02  0.20        1.5      0.15
   Aug 7.00E-02  0.28      5.76E-02  0.23        1.4      0.17
   Sep 6.81E-02  0.27      6.15E-02  0.25        1.4      0.18
   Oct 6.68E-02  0.27      6.35E-02  0.25        1.3      0.19
   Nov 6.59E-02  0.26      6.45E-02  0.26        1.3      0.19
   Dec 6.49E-02  0.26      6.48E-02  0.26        1.3      0.19
1Exposure Analysis Modeling System -- EXAMS Version 2.98.04, Mode 3
 Ecosystem: Mississippi OPP Farm Pond (MLRA P134, WBAN 03940)
 Chemical: 1) imazapyr
 ------------------------------------------------------------------------------
 Table 14.01.13.  Total annual allochthonous chemical loads and
 pulses (kg) during year 1961.
 ------------------------------------------------------------------------------
 Seg  Streams  Rainfall    Seeps   NPS Loads   Drift    Pulse IC
 --- --------- --------- --------- --------- --------- ---------
   1                                                    1.68
 ------------------------------------------------------------------------------
1Exposure Analysis Modeling System -- EXAMS Version 2.98.04, Mode 3
 Ecosystem: Mississippi OPP Farm Pond (MLRA P134, WBAN 03940)
 Chemical:  imazapyr
 ------------------------------------------------------------------------------
 Table 15.01. Average distribution of chemical during 1961.
 ------------------------------------------------------------------------------
 Seg   Resident Mass   ******** Chemical Concentrations *********
  #                      Total    Dissolved  Sediments    Biota
       Kilos      %      mg/*     mg/L **     mg/kg       ug/g
 ---  -------- ------  ---------  ---------  ---------  ---------
      In the Water Column:
   1  0.95     100.00  4.745E-02  4.744E-02  0.189       3.49
      ======== ======
```

```
     0.95      90.25

     and in the Benthic Sediments:
   2  0.10     100.00  0.152      3.481E-02  0.139       2.56
     ======== ======
     0.10       9.75
 Total Mass (kilograms) =     1.052
 ---------------------------------------------------------------------------
  * Units: mg/L in Water Column; mg/kg in Benthic Zone.
 ** Excludes complexes with "dissolved" organics.
1Exposure Analysis Modeling System -- EXAMS Version 2.98.04, Mode 3
 Ecosystem: Mississippi OPP Farm Pond (MLRA P134, WBAN 03940)
 Chemical:  imazapyr
 ---------------------------------------------------------------------------
 Table 16.01.1.  Distribution of average concentrations among aqueous
 chemical species. All concentrations in ug/L (ppb).
 ---------------------------------------------------------------------------
 Seg  T*   Total**     DOC      - Dissolved Chemical Species (by valency) -
  #   y    Aqueous  Complexed       (0)
 ---------------------------------------------------------------------------
   1  L   4.74E+01   5.00E-03   4.74E+01
   2  B   3.48E+01   3.47E-02   3.48E+01
 ---------------------------------------------------------------------------
  * Segment types: Littoral, Epilimnetic, Hypolimnetic, Benthic.
 ** Includes complexes with Dissolved Organic Carbon.
1Exposure Analysis Modeling System -- EXAMS Version 2.98.04, Mode 3
 Ecosystem: Mississippi OPP Farm Pond (MLRA P134, WBAN 03940)
 Chemical:  imazapyr
 ---------------------------------------------------------------------------
 Table 17.01.  System-wide concentration means and extrema.
 "Seg)" indicates segment where value was found.
 ---------------------------------------------------------------------------
            Total            Dissolved         Sediments          Biota
         Seg   mg/*        Seg  mg/L **      Seg  mg/kg        Seg  ug/gram
         ------------     ------------     ------------     ------------
 Water Column:
 Mean         4.745E-02         4.744E-02         0.189              3.49
 Max     1)  8.400E-02     1)  8.398E-02     1)  0.335          1)   6.17
 Min     1)   0.00         1)   0.00         1)   0.00          1)   0.00

 Benthic Sediments:
 Mean         0.152             3.481E-02         0.139              2.56
 Max     2)  0.283         2)  6.479E-02     2)  0.259          2)   4.76
 Min     2)   0.00         2)   0.00         2)   0.00          2)   0.00
 ---------------------------------------------------------------------------
  * Units: mg/L in Water Column; mg/kg in Benthic Zone.
 ** Excludes complexes with "dissolved" organics.
1Exposure Analysis Modeling System -- EXAMS Version 2.98.04, Mode 3
 Ecosystem: Mississippi OPP Farm Pond (MLRA P134, WBAN 03940)
 Chemical:  imazapyr
 ---------------------------------------------------------------------------
 Table 18.01.  Sensitivity analysis of chemical fate: 1961.
 ---------------------------------------------------------------------------
    Mean Values by           Mass Flux    % of Total  Half-Life*
        Process              Kg/month        Flux      months
   ---------------          ----------   ----------  ----------
 Hydrolysis
 Reduction
 Radical oxidation
 Direct photolysis           6.5158E-03     38.83      111.9
 Singlet oxygen oxidation
   All Chemical Processes    6.5158E-03     38.83      111.9
 Bacterioplankton
 Benthic Bacteria
```

```
  Total Biolysis
 Surface Water-borne Export  1.0265E-02     61.17      71.01
 Seepage export
 Volatilization
                            ==========
 Total mass flux:           1.6781E-02
 --------------------------------------------------------------------------------
 * Pseudo-first-order estimates based on flux/resident mass;
   assumes transport delays will not throttle fluxes.
        Average Resident Mass -- kg              1.05
           Water Column . . . . . . . . . . .     90.25 %
           Benthic Sediments  . . . . . . . .      9.75 %
1Exposure Analysis Modeling System -- EXAMS Version 2.98.04, Mode 3
 Ecosystem: Mississippi OPP Farm Pond (MLRA P134, WBAN 03940)
 Chemical:  imazapyr
 Table 20.01.  Exposure analysis summary: Maximum Events of 1961.
 --------------------------------------------------------------------------------
 Event Duration           96-hour    21-day     60-day     90-day      1961
 ==============----====  ---------  ---------  ---------  ---------  ---------
          ***** Ecotoxicological Direct Exposure Concentrations ******
 Water Column      Min.  8.318E-02  7.994E-02  7.442E-02  7.136E-02   0.00
  dissolved mg/L   Mean  8.351E-02  8.180E-02  7.864E-02  7.668E-02  4.744E-02
                   Peak  8.385E-02  8.385E-02  8.385E-02  8.385E-02  8.398E-02
 Benthic Sediment  Min.  6.479E-02  6.476E-02  6.417E-02  6.288E-02   0.00
  mg/L dissolved   Mean  6.479E-02  6.478E-02  6.463E-02  6.428E-02  3.481E-02
    in pore water  Peak  6.479E-02  6.479E-02  6.479E-02  6.479E-02  6.479E-02
          ***** Ecotoxicological Trophic Exposure Concentrations *****
 Water Column      Min.   6.11       5.87       5.47       5.24       0.00
  ug/g dry weight  Mean   6.14       6.01       5.78       5.64       3.49
    of plankton    Peak   6.16       6.16       6.16       6.16       6.17
 Benthic Sediment  Min.   4.76       4.76       4.72       4.62       0.00
  ug/g dry weight  Mean   4.76       4.76       4.75       4.72       2.56
    of benthos     Peak   4.76       4.76       4.76       4.76       4.76
          ***** Total Media Concentrations **************************
 Water Column      Min.  8.320E-02  7.996E-02  7.444E-02  7.138E-02   0.00
  total mg/L       Mean  8.353E-02  8.182E-02  7.866E-02  7.670E-02  4.745E-02
                   Peak  8.387E-02  8.387E-02  8.387E-02  8.387E-02  8.400E-02
 Benthic Sediment  Min.  0.283      0.283      0.280      0.274       0.00
  total mg/kg      Mean  0.283      0.283      0.282      0.280      0.152
    dry weight     Peak  0.283      0.283      0.283      0.283      0.283
1Exposure Analysis Modeling System -- EXAMS Version 2.98.04, Mode 3
 Chemical: 1) imazapyr
 --------------------------------------------------------------------------------
 Table 1.1.1  Chemical input data for neutral molecule (Sp.#1).
 *** Chemical-specific data: SET via "entry(1)"
 MWT:   2.61E+02 VAPR:           HENRY:           KOW:
 MP:   -9.90E+01 EVPR:           EHEN:            KOC:   9.98E+01
 AerMet (half-life, days):            AnaerM (half-life, days):
 *** Ion-specific data: "entry(1,1)"
 SOL:   1.11E+04 KPB:             KPS:
 ESOL:           KPDOC:
 *** Reactivity of dissolved species: SET via "entry(1,1,1)
 KAH:            EAH:             KNH:             ENH:
 KBH:            EBH:             KRED:            ERED:
 KBACW:          QTBAW: 2.00      KBACS:           QTBAS: 2.00
 *** Reactivity of solids-sorbed species:     "entry(2,1,1)
 KAH:            EAH:             KNH:             ENH:
 KBH:            EBH:             KRED:            ERED:
 KBACW:          QTBAW: 2.00      KBACS:           QTBAS: 2.00
 *** Reactivity of "DOC"-complexed species:   "entry(3,1,1)
 KAH:            EAH:             KNH:             ENH:
 KBH:            EBH:             KRED:            ERED:
 KBACW:          QTBAW: 2.00      KBACS:           QTBAS: 2.00
 *** Reactivity of biosorbed species:         "entry(4,1,1)
```

```
 KBACW:          QTBAW: 2.00     KBACS:          QTBAS: 2.00

 Photochemical process data;  Ion-specific data: "entry(1,1)"
 KDP(1,1): 1.45E-03 RFLAT(1,1):   0.0    LAMAX(1,1):   0.0
 *** Reactivity of dissolved species: SET via "entry(1,1,1)
 K1O2:           EK1O2:          KOX:            EOX:
 *** Reactivity of solids-sorbed species:     "entry(2,1,1)
 K1O2:           EK1O2:          KOX:            EOX:
 *** Reactivity of "DOC"-complexed species:   "entry(3,1,1)
 K1O2:           EK1O2:          KOX:            EOX:
 QYield(1,1,1) 1.00     QYield(2,1,1)          QYield(3,1,1)
 Light ABSORption (n,1,1):        (1)             (2)
  (3)             (4)             (5)             (6)
  (7)             (8)             (9)            (10)
 (11)            (12)            (13)            (14)
 (15)            (16)            (17)            (18)
 (19)            (20)            (21)            (22)
 (23)            (24)            (25)            (26)
 (27)            (28)            (29)            (30)
 (31)            (32)            (33)            (34)
 (35)            (36)            (37)            (38)
 (39)            (40)            (41)            (42)
 (43)            (44)            (45)            (46)
1Exposure Analysis Modeling System -- EXAMS Version 2.98.04, Mode 3
 Chemical: 1) imazapyr
 ------------------------------------------------------------------------------
 Table 2.  Chemical input data: product chemistry.
 ------------------------------------------------------------------------------
 No product chemistry specified.
 ------------------------------------------------------------------------------
1Exposure Analysis Modeling System -- EXAMS Version 2.98.04, Mode 3
 Ecosystem: Mississippi OPP Farm Pond (MLRA P134, WBAN 03940)
 Chemical: 1) imazapyr
 ------------------------------------------------------------------------------
 Table 3.  Chemical input data: pulse loadings.*
 ------------------------------------------------------------------------------

 IMONth         5
 IDAY           1
 ICHEM-ADB#     1
 ISEGment       1
 IMASS (kg)  1.68
 ------------------------------------------------------------------------------
 * N.B.: Input data only; may be revised during simulation.
1Exposure Analysis Modeling System -- EXAMS Version 2.98.04, Mode 3
 Ecosystem: Mississippi OPP Farm Pond (MLRA P134, WBAN 03940)
 ------------------------------------------------------------------------------
 Table 6.13.  Mean environmental inputs: sediment properties.**
 ------------------------------------------------------------------------------
 Seg  T*    SUSED    BULKD    PCTWA    FROC      CEC       AEC
  #   y     mg/L     g/cm3      %               meq/100g (dry)
 ------------------------------------------------------------------------------
   1  L    3.00E+01                  4.00E-02 1.00E-02 1.00E-02
   2  B            1.85     1.37E+02 4.00E-02 1.00E-02 1.00E-02
 ------------------------------------------------------------------------------
  * Segment types: Littoral, Epilimnetic, Hypolimnetic, Benthic.
 ** Average of 12 monthly mean values.
1Exposure Analysis Modeling System -- EXAMS Version 2.98.04, Mode 3
 Ecosystem: Mississippi OPP Farm Pond (MLRA P134, WBAN 03940)
 ------------------------------------------------------------------------------
 Table 7.  Environmental input data: physical geometry.
 ------------------------------------------------------------------------------
 Seg  T*   VOLume    AREA     DEPTH    XSA      LENGth   WIDTH
  #   y      m3       m2        m       m2        m        m
```

```
 ------------------------------------------------------------------------------
   1  L    2.00E+04 1.00E+04 2.00              1.00E+02 1.00E+02
   2  B    5.00E+02 1.00E+04 5.00E-02          1.00E+02 1.00E+02
 ------------------------------------------------------------------------------
  * Segment types: Littoral, Epilimnetic, Hypolimnetic, Benthic.
1Exposure Analysis Modeling System -- EXAMS Version 2.98.04, Mode 3
 Ecosystem: Mississippi OPP Farm Pond (MLRA P134, WBAN 03940)
 ------------------------------------------------------------------------------
 Table 8.13.  Mean miscellaneous environmental input data.**
 ------------------------------------------------------------------------------
 Seg  T*    DFAC     DISO2     KO2     WIND     DOC     CHL pgmt
  #   y     m/m      mg/L    cm/hr@20 m/s@10cm  mg/L      mg/L
 ------------------------------------------------------------------------------
   1  L    1.19     5.00              1.80     5.00     5.00E-03
   2  B                                        1.00E+01
 ------------------------------------------------------------------------------
  * Segment types: Littoral, Epilimnetic, Hypolimnetic, Benthic.
 ** Average of 12 monthly mean values.
1Exposure Analysis Modeling System -- EXAMS Version 2.98.04, Mode 3
 Ecosystem: Mississippi OPP Farm Pond (MLRA P134, WBAN 03940)
 ------------------------------------------------------------------------------
 Table 9.  Input specifications -- advective transport field.
 ------------------------------------------------------------------------------

 J FR AD        1         2
 I TO AD        0         1
 ADV PR      1.00      1.00
 ------------------------------------------------------------------------------
1Exposure Analysis Modeling System -- EXAMS Version 2.98.04, Mode 3
 Ecosystem: Mississippi OPP Farm Pond (MLRA P134, WBAN 03940)
 ------------------------------------------------------------------------------
 Table 10.13.  Mean dispersive transport field.
 ------------------------------------------------------------------------------

 J TURB           1
 I TURB           2
 XS TUR m2    1.000E+04
 CHARL m       1.02
 DSP m2/hr*   3.000E-05
 ------------------------------------------------------------------------------
 * Average of 12 monthly mean values.
1Exposure Analysis Modeling System -- EXAMS Version 2.98.04, Mode 3
 Ecosystem: Mississippi OPP Farm Pond (MLRA P134, WBAN 03940)
 ------------------------------------------------------------------------------
 Table 11.13.  Mean environmental data:  global parameters.*
 ------------------------------------------------------------------------------
 OXRAD (M)  0.0     RAIN(mm/mo)  37.2   CLOUD    3.24 LAT    38.5
 OZONE(cm) 0.314    ATURB(km) 2.00      RHUM(%)  58.6 LONG -121.5
 ELEV (m):    6.0    Air mass type(s): R
 WLAM, mE/cm2/day:  8.695E-22 4.905E-18 4.413E-15 2.833E-12
  4.802E-10 2.290E-08 4.269E-07 3.783E-06 2.133E-05 7.892E-05
  2.143E-04 4.840E-04 8.437E-04 1.407E-03 2.007E-03 2.550E-03
  3.147E-03 5.030E-03 2.357E-02 2.604E-02 3.050E-02 3.404E-02
  4.111E-02 4.315E-02 4.405E-02 6.562E-02 7.930E-02 8.516E-02
  8.255E-02 9.854E-02 0.113     0.120     0.121     0.127
  0.123     0.229     0.336     0.355     0.365     0.369
  0.381     0.384     0.387     0.584     0.764     0.734
 ------------------------------------------------------------------------------
 * Average of 12 monthly mean values.
1Exposure Analysis Modeling System -- EXAMS Version 2.98.04, Mode 3
 Ecosystem: Mississippi OPP Farm Pond (MLRA P134, WBAN 03940)
 Chemical:  imazapyr
 ------------------------------------------------------------------------------
 Table 12.01.13.  Mean kinetic profile of synthetic chemical,
```

computed from chemical and environmental reactivity data. **

Seg #	T* y	Local pseudo-first-order process half-lives (hours) Biolysis	Photol	Oxidat	Hydrol	Reduct	Volatil
1	L		7.72E+04				
2	B						

* Segment types: Littoral, Epilimnetic, Hypolimnetic, Benthic
** Average of 12 monthly mean values.

Table 13.13. Mean chemical reactivity profile of ecosystem. ***

Seg #	T* y p	pH	pOH	Temp Deg. C.	Piston Veloc. m/hr	Mean Light %	Bact. Popn. cfu/**	Oxidant Conc. Molar	Singlet Oxygen Molar	Reduct. (REDAG) Molar
1	L	7.0	7.0	15.3	2.6E-02	1	1.	0.	6.8E-16	
2	B	7.0	7.0	15.3			3.7E+01			

* Segment types: Littoral, Epilimnetic, Hypolimnetic, Benthic
** Active bacterial populations as cfu/mL in water column, and as cfu/100 g (dry weight) of sediments in benthic segments.
*** Average of 12 monthly mean values.

Table 4.13. Mean environmental input data: biologicals.**

Seg #	T* y	BACPL cfu/ml	BNBAC cfu/100g	PLMAS mg/L	BNMAS dry g/m2
1	L	1.00	4.00E-01		
2	B		3.70E+01	6.00E-03	

* Segment types: Littoral, Epilimnetic, Hypolimnetic, Benthic.
** Average of 12 monthly mean values.

Table 5.13. Mean environmental data: hydrologic parameters.**

Seg #	T* y	STFLO m3/hr	STSED kg/hr	NPSFL m3/hr	NPSED kg/hr	SEEPS m3/hr	EVAP mm/mon
1	L	1.93	3.86E-02				1.57E+02
2	B						

* Segment types: Littoral, Epilimnetic, Hypolimnetic, Benthic.
** Average of 12 monthly mean values.

Table 19. Summary time-trace of spatially averaged, volume-weighted monthly mean chemical concentrations during 1962.

Month	Average Chemical Concentrations				Total Chemical Mass	
	Water Column		Benthic Sediments		Water Col	Benthic
	Free-mg/L	Sorb-mg/kg	Pore-mg/L	Sed-mg/kg	Total kg	Total kg

```
 ---------------------------------------------------------------------------
   Jan 6.32E-02  0.25      6.45E-02  0.26        1.3      0.19
   Feb 6.19E-02  0.25      6.38E-02  0.25        1.2      0.19
   Mar 6.14E-02  0.25      6.30E-02  0.25        1.2      0.19
   Apr 6.09E-02  0.24      6.24E-02  0.25        1.2      0.18
   May 0.14      0.56      7.72E-02  0.31        2.8      0.23
   Jun 0.14      0.54      9.82E-02  0.39        2.7      0.29
   Jul 0.13      0.52      0.11      0.44        2.6      0.32
   Aug 0.13      0.51      0.12      0.47        2.5      0.34
   Sep 0.12      0.49      0.12      0.48        2.5      0.35
   Oct 0.12      0.49      0.12      0.48        2.4      0.36
   Nov 0.12      0.48      0.12      0.48        2.4      0.36
   Dec 0.12      0.47      0.12      0.48        2.4      0.35
1Exposure Analysis Modeling System -- EXAMS Version 2.98.04, Mode 3
 Ecosystem: Mississippi OPP Farm Pond (MLRA P134, WBAN 03940)
 Chemical: 1) imazapyr
 ---------------------------------------------------------------------------
 Table 14.01.13.  Total annual allochthonous chemical loads and
 pulses (kg) during year 1962.
 ---------------------------------------------------------------------------
 Seg  Streams  Rainfall    Seeps   NPS Loads   Drift    Pulse IC
 --- --------- --------- --------- --------- --------- ---------
   1                                                    1.68
 ---------------------------------------------------------------------------
1Exposure Analysis Modeling System -- EXAMS Version 2.98.04, Mode 3
 Ecosystem: Mississippi OPP Farm Pond (MLRA P134, WBAN 03940)
 Chemical:  imazapyr
 ---------------------------------------------------------------------------
 Table 15.01. Average distribution of chemical during 1962.
 ---------------------------------------------------------------------------
 Seg   Resident Mass   ******** Chemical Concentrations *********
  #                      Total    Dissolved  Sediments    Biota
       Kilos      %       mg/*     mg/L **     mg/kg       ug/g
 ---  -------- ------  ---------  ---------  ---------  ---------
      In the Water Column:
   1   2.1     100.00  0.106      0.106      0.422       7.77
      ======== ======
       2.1      88.33

      and in the Benthic Sediments:
   2  0.28     100.00  0.414      9.493E-02  0.379       6.98
      ======== ======
      0.28      11.67
 Total Mass (kilograms) =     2.396
 ---------------------------------------------------------------------------
  * Units: mg/L in Water Column; mg/kg in Benthic Zone.
 ** Excludes complexes with "dissolved" organics.
1Exposure Analysis Modeling System -- EXAMS Version 2.98.04, Mode 3
 Ecosystem: Mississippi OPP Farm Pond (MLRA P134, WBAN 03940)
 Chemical:  imazapyr
 ---------------------------------------------------------------------------
 Table 16.01.1.  Distribution of average concentrations among aqueous
 chemical species. All concentrations in ug/L (ppb).
 ---------------------------------------------------------------------------
 Seg  T*   Total**     DOC      - Dissolved Chemical Species (by valency) -
  #   y    Aqueous  Complexed       (0)
 ---------------------------------------------------------------------------
   1  L   1.06E+02   1.12E-02   1.06E+02
   2  B   9.50E+01   9.47E-02   9.49E+01
 ---------------------------------------------------------------------------
  * Segment types: Littoral, Epilimnetic, Hypolimnetic, Benthic.
 ** Includes complexes with Dissolved Organic Carbon.
1Exposure Analysis Modeling System -- EXAMS Version 2.98.04, Mode 3
 Ecosystem: Mississippi OPP Farm Pond (MLRA P134, WBAN 03940)
```

Chemical: imazapyr

Table 17.01. System-wide concentration means and extrema.
"Seg)" indicates segment where value was found.

	Total		Dissolved		Sediments		Biota	
	Seg	mg/*	Seg	mg/L **	Seg	mg/kg	Seg	ug/gram
Water Column:								
Mean		0.106		0.106		0.422		7.77
Max	1)	0.145	1)	0.145	1)	0.577	1)	10.6
Min	1)	6.055E-02	1)	6.054E-02	1)	0.242	1)	4.45
Benthic Sediments:								
Mean		0.414		9.493E-02		0.379		6.98
Max	2)	0.527	2)	0.121	2)	0.482	2)	8.88
Min	2)	0.271	2)	6.204E-02	2)	0.248	2)	4.56

* Units: mg/L in Water Column; mg/kg in Benthic Zone.
** Excludes complexes with "dissolved" organics.

1Exposure Analysis Modeling System -- EXAMS Version 2.98.04, Mode 3
Ecosystem: Mississippi OPP Farm Pond (MLRA P134, WBAN 03940)
Chemical: imazapyr

Table 18.01. Sensitivity analysis of chemical fate: 1962.

Mean Values by Process	Mass Flux Kg/month	% of Total Flux	Half-Life* months
Hydrolysis			
Reduction			
Radical oxidation			
Direct photolysis	1.4165E-02	38.13	117.2
Singlet oxygen oxidation			
All Chemical Processes	1.4165E-02	38.13	117.2
Bacterioplankton			
Benthic Bacteria			
Total Biolysis			
Surface Water-borne Export	2.2988E-02	61.87	72.24
Seepage export			
Volatilization			
	==========		
Total mass flux:	3.7153E-02		

* Pseudo-first-order estimates based on flux/resident mass;
assumes transport delays will not throttle fluxes.

Average Resident Mass -- kg 2.40
Water Column . . . . . 88.33 %
Benthic Sediments . . . . . 11.67 %

1Exposure Analysis Modeling System -- EXAMS Version 2.98.04, Mode 3
Ecosystem: Mississippi OPP Farm Pond (MLRA P134, WBAN 03940)
Chemical: imazapyr

Table 20.01. Exposure analysis summary: Maximum Events of 1962.

Event Duration		96-hour	21-day	60-day	90-day	1962
***** Ecotoxicological Direct Exposure Concentrations ******						
Water Column dissolved mg/L	Min.	0.144	0.140	0.133	0.129	6.054E-02
	Mean	0.144	0.142	0.138	0.136	0.106
	Peak	0.144	0.144	0.144	0.144	0.145
Benthic Sediment mg/L dissolved in pore water	Min.	0.121	0.121	0.120	0.120	6.204E-02
	Mean	0.121	0.121	0.121	0.121	9.493E-02
	Peak	0.121	0.121	0.121	0.121	0.121
***** Ecotoxicological Trophic Exposure Concentrations *****						

Water Column	Min.	10.6	10.3	9.77	9.46	4.45
ug/g dry weight	Mean	10.6	10.4	10.2	9.97	7.77
of plankton	Peak	10.6	10.6	10.6	10.6	10.6
Benthic Sediment	Min.	8.88	8.87	8.86	8.83	4.56
ug/g dry weight	Mean	8.88	8.88	8.87	8.86	6.98
of benthos	Peak	8.88	8.88	8.88	8.88	8.88
***** Total Media Concentrations **********						
Water Column	Min.	0.144	0.140	0.133	0.129	6.055E-02
total mg/L	Mean	0.144	0.142	0.138	0.136	0.106
	Peak	0.144	0.144	0.144	0.144	0.145
Benthic Sediment	Min.	0.527	0.527	0.526	0.524	0.271
total mg/kg	Mean	0.527	0.527	0.526	0.526	0.414
dry weight	Peak	0.527	0.527	0.527	0.527	0.527

```
set mode = 3
set outfil(4) to Y
set outfil(2) to N
READ ENV C:\models\INPUTS\EXAMSenv\pond298.exv
READ MET C:\models\INPUTS\Metfiles\w23232.dvf
SET YEAR1 = 1961
recall chem 1
chemical name is Imazapyr
set MWT(1) = 261
set SOL(1,1) = 11100
set KDP(1,1) = 0.0014513
set KBACW(*,1,1) = 0.00
set KBACS(*,1,1) = 0.00
set KOC(1) = 99.8
set QTBAS(*,1,1) = 2
set QTBAW(*,1,1) = 2
RUN
CONTIUNE
READ PRZM P2E-C1.D62
set STFLO(1,*) = 0.0
set EVAP(*,*) = 0.0
set NPSFL(*,*)=0.0
set NPSED(*,*)=0.0
set RAIN(*) = 0.0
set IMASS(1)= 1.68
set ICHEM(1)=1
set ISEG(1)=1
set IDAY(1)=1
set IMON(1)=5
CONTINUE
READ PRZM P2E-C1.D63
set STFLO(1,*) = 0.0
set EVAP(*,*) = 0.0
set NPSFL(*,*)=0.0
set NPSED(*,*)=0.0
set RAIN(*) = 0.0
set IMASS(1)= 1.68
set ICHEM(1)=1
set ISEG(1)=1
set IDAY(1)=1
set IMON(1)=5
CONTINUE
READ PRZM P2E-C1.D64
set STFLO(1,*) = 0.0
set EVAP(*,*) = 0.0
set NPSFL(*,*)=0.0
set NPSED(*,*)=0.0
set RAIN(*) = 0.0
set IMASS(1)= 1.68
set ICHEM(1)=1
set ISEG(1)=1
set IDAY(1)=1
set IMON(1)=5
CONTINUE
READ PRZM P2E-C1.D65
set STFLO(1,*) = 0.0
set EVAP(*,*) = 0.0
set NPSFL(*,*)=0.0
set NPSED(*,*)=0.0
set RAIN(*) = 0.0
set IMASS(1)= 1.68
set ICHEM(1)=1
set ISEG(1)=1
set IDAY(1)=1
```

```
set IMON(1)=5
CONTINUE
READ PRZM P2E-C1.D65
set STFLO(1,*) = 0.0
set EVAP(*,*) = 0.0
set NPSFL(*,*)=0.0
set NPSED(*,*)=0.0
set RAIN(*) = 0.0
set IMASS(1)= 1.68
set ICHEM(1)=1
set ISEG(1)=1
set IDAY(1)=1
set IMON(1)=5
CONTINUE
READ PRZM P2E-C1.D66
set STFLO(1,*) = 0.0
set EVAP(*,*) = 0.0
set NPSFL(*,*)=0.0
set NPSED(*,*)=0.0
set RAIN(*) = 0.0
set IMASS(1)= 1.68
set ICHEM(1)=1
set ISEG(1)=1
set IDAY(1)=1
set IMON(1)=5
CONTINUE
READ PRZM P2E-C1.D67
set STFLO(1,*) = 0.0
set EVAP(*,*) = 0.0
set NPSFL(*,*)=0.0
set NPSED(*,*)=0.0
set RAIN(*) = 0.0
set IMASS(1)= 1.68
set ICHEM(1)=1
set ISEG(1)=1
set IDAY(1)=1
set IMON(1)=5
CONTINUE
READ PRZM P2E-C1.D68
set STFLO(1,*) = 0.0
set EVAP(*,*) = 0.0
set NPSFL(*,*)=0.0
set NPSED(*,*)=0.0
set RAIN(*) = 0.0
set IMASS(1)= 1.68
set ICHEM(1)=1
set ISEG(1)=1
set IDAY(1)=1
set IMON(1)=5
CONTINUE
READ PRZM P2E-C1.D69
set STFLO(1,*) = 0.0
set EVAP(*,*) = 0.0
set NPSFL(*,*)=0.0
set NPSED(*,*)=0.0
set RAIN(*) = 0.0
set IMASS(1)= 1.68
set ICHEM(1)=1
set ISEG(1)=1
set IDAY(1)=1
set IMON(1)=5
CONTINUE
READ PRZM P2E-C1.D70
set STFLO(1,*) = 0.0
```

```
set EVAP(*,*) = 0.0
set NPSFL(*,*)=0.0
set NPSED(*,*)=0.0
set RAIN(*) = 0.0
set IMASS(1)= 1.68
set ICHEM(1)=1
set ISEG(1)=1
set IDAY(1)=1
set IMON(1)=5
CONTINUE
READ PRZM P2E-C1.D71
set STFLO(1,*) = 0.0
set EVAP(*,*) = 0.0
set NPSFL(*,*)=0.0
set NPSED(*,*)=0.0
set RAIN(*) = 0.0
set IMASS(1)= 1.68
set ICHEM(1)=1
set ISEG(1)=1
set IDAY(1)=1
set IMON(1)=5
CONTINUE
READ PRZM P2E-C1.D72
set STFLO(1,*) = 0.0
set EVAP(*,*) = 0.0
set NPSFL(*,*)=0.0
set NPSED(*,*)=0.0
set RAIN(*) = 0.0
set IMASS(1)= 1.68
set ICHEM(1)=1
set ISEG(1)=1
set IDAY(1)=1
set IMON(1)=5
CONTINUE
READ PRZM P2E-C1.D73
set STFLO(1,*) = 0.0
set EVAP(*,*) = 0.0
set NPSFL(*,*)=0.0
set NPSED(*,*)=0.0
set RAIN(*) = 0.0
set IMASS(1)= 1.68
set ICHEM(1)=1
set ISEG(1)=1
set IDAY(1)=1
set IMON(1)=5
CONTINUE
READ PRZM P2E-C1.D74
set STFLO(1,*) = 0.0
set EVAP(*,*) = 0.0
set NPSFL(*,*)=0.0
set NPSED(*,*)=0.0
set RAIN(*) = 0.0
set IMASS(1)= 1.68
set ICHEM(1)=1
set ISEG(1)=1
set IDAY(1)=1
set IMON(1)=5
CONTINUE
READ PRZM P2E-C1.D75
set STFLO(1,*) = 0.0
set EVAP(*,*) = 0.0
set NPSFL(*,*)=0.0
set NPSED(*,*)=0.0
set RAIN(*) = 0.0
```

```
set IMASS(1)= 1.68
set ICHEM(1)=1
set ISEG(1)=1
set IDAY(1)=1
set IMON(1)=5
CONTINUE
READ PRZM P2E-C1.D76
set STFLO(1,*) = 0.0
set EVAP(*,*) = 0.0
set NPSFL(*,*)=0.0
set NPSED(*,*)=0.0
set RAIN(*) = 0.0
set IMASS(1)= 1.68
set ICHEM(1)=1
set ISEG(1)=1
set IDAY(1)=1
set IMON(1)=5
CONTINUE
READ PRZM P2E-C1.D77
set STFLO(1,*) = 0.0
set EVAP(*,*) = 0.0
set NPSFL(*,*)=0.0
set NPSED(*,*)=0.0
set RAIN(*) = 0.0
set IMASS(1)= 1.68
set ICHEM(1)=1
set ISEG(1)=1
set IDAY(1)=1
set IMON(1)=5
CONTINUE
READ PRZM P2E-C1.D78
set STFLO(1,*) = 0.0
set EVAP(*,*) = 0.0
set NPSFL(*,*)=0.0
set NPSED(*,*)=0.0
set RAIN(*) = 0.0
set IMASS(1)= 1.68
set ICHEM(1)=1
set ISEG(1)=1
set IDAY(1)=1
set IMON(1)=5
CONTINUE
READ PRZM P2E-C1.D79
set STFLO(1,*) = 0.0
set EVAP(*,*) = 0.0
set NPSFL(*,*)=0.0
set NPSED(*,*)=0.0
set RAIN(*) = 0.0
set IMASS(1)= 1.68
set ICHEM(1)=1
set ISEG(1)=1
set IDAY(1)=1
set IMON(1)=5
CONTINUE
READ PRZM P2E-C1.D80
set STFLO(1,*) = 0.0
set EVAP(*,*) = 0.0
set NPSFL(*,*)=0.0
set NPSED(*,*)=0.0
set RAIN(*) = 0.0
set IMASS(1)= 1.68
set ICHEM(1)=1
set ISEG(1)=1
set IDAY(1)=1
```

```
set IMON(1)=5
CONTINUE
READ PRZM P2E-C1.D81
set STFLO(1,*) = 0.0
set EVAP(*,*) = 0.0
set NPSFL(*,*)=0.0
set NPSED(*,*)=0.0
set RAIN(*) = 0.0
set IMASS(1)= 1.68
set ICHEM(1)=1
set ISEG(1)=1
set IDAY(1)=1
set IMON(1)=5
CONTINUE
READ PRZM P2E-C1.D82
set STFLO(1,*) = 0.0
set EVAP(*,*) = 0.0
set NPSFL(*,*)=0.0
set NPSED(*,*)=0.0
set RAIN(*) = 0.0
set IMASS(1)= 1.68
set ICHEM(1)=1
set ISEG(1)=1
set IDAY(1)=1
set IMON(1)=5
CONTINUE
READ PRZM P2E-C1.D83
set STFLO(1,*) = 0.0
set EVAP(*,*) = 0.0
set NPSFL(*,*)=0.0
set NPSED(*,*)=0.0
set RAIN(*) = 0.0
set IMASS(1)= 1.68
set ICHEM(1)=1
set ISEG(1)=1
set IDAY(1)=1
set IMON(1)=5
CONTINUE
READ PRZM P2E-C1.D84
set STFLO(1,*) = 0.0
set EVAP(*,*) = 0.0
set NPSFL(*,*)=0.0
set NPSED(*,*)=0.0
set RAIN(*) = 0.0
set IMASS(1)= 1.68
set ICHEM(1)=1
set ISEG(1)=1
set IDAY(1)=1
set IMON(1)=5
CONTINUE
READ PRZM P2E-C1.D85
set STFLO(1,*) = 0.0
set EVAP(*,*) = 0.0
set NPSFL(*,*)=0.0
set NPSED(*,*)=0.0
set RAIN(*) = 0.0
set IMASS(1)= 1.68
set ICHEM(1)=1
set ISEG(1)=1
set IDAY(1)=1
set IMON(1)=5
CONTINUE
READ PRZM P2E-C1.D86
set STFLO(1,*) = 0.0
```

```
  set EVAP(*,*) = 0.0
  set NPSFL(*,*)=0.0
  set NPSED(*,*)=0.0
  set RAIN(*) = 0.0
  set IMASS(1)= 1.68
  set ICHEM(1)=1
  set ISEG(1)=1
  set IDAY(1)=1
  set IMON(1)=5
  CONTINUE
  READ PRZM P2E-C1.D87
  set STFLO(1,*) = 0.0
  set EVAP(*,*) = 0.0
  set NPSFL(*,*)=0.0
  set NPSED(*,*)=0.0
  set RAIN(*) = 0.0
  set IMASS(1)= 1.68
  set ICHEM(1)=1
  set ISEG(1)=1
  set IDAY(1)=1
  set IMON(1)=5
  CONTINUE
  READ PRZM P2E-C1.D88
  set STFLO(1,*) = 0.0
  set EVAP(*,*) = 0.0
  set NPSFL(*,*)=0.0
  set NPSED(*,*)=0.0
  set RAIN(*) = 0.0
  set IMASS(1)= 1.68
  set ICHEM(1)=1
  set ISEG(1)=1
  set IDAY(1)=1
  set IMON(1)=5
  CONTINUE
  READ PRZM P2E-C1.D89
  set STFLO(1,*) = 0.0
  set EVAP(*,*) = 0.0
  set NPSFL(*,*)=0.0
  set NPSED(*,*)=0.0
  set RAIN(*) = 0.0
  set IMASS(1)= 1.68
  set ICHEM(1)=1
  set ISEG(1)=1
  set IDAY(1)=1
  set IMON(1)=5
  CONTINUE
  READ PRZM P2E-C1.D90
  set STFLO(1,*) = 0.0
  set EVAP(*,*) = 0.0
  set NPSFL(*,*)=0.0
  set NPSED(*,*)=0.0
  set RAIN(*) = 0.0
  set IMASS(1)= 1.68
  set ICHEM(1)=1
  set ISEG(1)=1
  set IDAY(1)=1
  set IMON(1)=5
CONTINUE
  QUIT
```

EXAMS Output Data

WATER COLUMN DISSOLVED CONCENTRATION (PPB)

YEAR	PEAK	96 HOUR	21 DAY	60 DAY	90 DAY	YEARLY
1961	.000	.000	.000	.000	.000	.000
1962	83.980	83.570	82.120	79.550	78.070	49.570
1963	152.000	152.000	150.000	147.000	146.000	117.000
1964	216.000	215.000	214.000	210.000	209.000	179.000
1965	275.000	275.000	273.000	270.000	267.000	238.000
1966	331.000	330.000	328.000	325.000	322.000	293.000
1967	382.000	382.000	380.000	376.000	374.000	344.000
1968	431.000	430.000	428.000	424.000	422.000	392.000
1969	476.000	475.000	473.000	469.000	466.000	436.000
1970	518.000	517.000	515.000	511.000	508.000	478.000
1971	557.000	557.000	555.000	550.000	547.000	517.000
1972	594.000	594.000	591.000	587.000	583.000	553.000
1973	628.000	628.000	625.000	621.000	617.000	587.000
1974	661.000	660.000	657.000	653.000	649.000	618.000
1975	690.000	690.000	687.000	682.000	679.000	648.000
1976	718.000	718.000	715.000	710.000	707.000	675.000
1977	744.000	744.000	741.000	736.000	732.000	701.000
1978	769.000	768.000	766.000	760.000	757.000	725.000
1979	792.000	791.000	788.000	783.000	779.000	748.000
1980	813.000	812.000	809.000	804.000	800.000	769.000
1981	833.000	832.000	829.000	824.000	820.000	788.000
1982	851.000	851.000	848.000	842.000	838.000	807.000
1983	869.000	868.000	865.000	859.000	855.000	824.000
1984	885.000	884.000	881.000	875.000	871.000	839.000
1985	900.000	899.000	896.000	890.000	886.000	854.000
1986	914.000	913.000	910.000	904.000	900.000	868.000
1987	927.000	926.000	923.000	917.000	913.000	881.000
1988	939.000	938.000	935.000	929.000	925.000	893.000
1989	951.000	950.000	947.000	941.000	937.000	905.000
1990	961.000	961.000	958.000	952.000	947.000	915.000
1991	971.000	971.000	968.000	962.000	957.000	925.000

SORTED FOR PLOTTING

PROB	PEAK	96 HOUR	21 DAY	60 DAY	90 DAY	YEARLY
.031	971.000	971.000	968.000	962.000	957.000	925.000
.063	961.000	961.000	958.000	952.000	947.000	915.000
.094	951.000	950.000	947.000	941.000	937.000	905.000
.125	939.000	938.000	935.000	929.000	925.000	893.000
.156	927.000	926.000	923.000	917.000	913.000	881.000
.188	914.000	913.000	910.000	904.000	900.000	868.000
.219	900.000	899.000	896.000	890.000	886.000	854.000
.250	885.000	884.000	881.000	875.000	871.000	839.000
.281	869.000	868.000	865.000	859.000	855.000	824.000
.313	851.000	851.000	848.000	842.000	838.000	807.000
.344	833.000	832.000	829.000	824.000	820.000	788.000
.375	813.000	812.000	809.000	804.000	800.000	769.000

.406	792.000	791.000	788.000	783.000	779.000	748.000
.438	769.000	768.000	766.000	760.000	757.000	725.000
.469	744.000	744.000	741.000	736.000	732.000	701.000
.500	718.000	718.000	715.000	710.000	707.000	675.000
.531	690.000	690.000	687.000	682.000	679.000	648.000
.563	661.000	660.000	657.000	653.000	649.000	618.000
.594	628.000	628.000	625.000	621.000	617.000	587.000
.625	594.000	594.000	591.000	587.000	583.000	553.000
.656	557.000	557.000	555.000	550.000	547.000	517.000
.688	518.000	517.000	515.000	511.000	508.000	478.000
.719	476.000	475.000	473.000	469.000	466.000	436.000
.750	431.000	430.000	428.000	424.000	422.000	392.000
.781	382.000	382.000	380.000	376.000	374.000	344.000
.813	331.000	330.000	328.000	325.000	322.000	293.000
.844	275.000	275.000	273.000	270.000	267.000	238.000
.875	216.000	215.000	214.000	210.000	209.000	179.000
.906	152.000	152.000	150.000	147.000	146.000	117.000
.938	83.980	83.570	82.120	79.550	78.070	49.570
.969	.000	.000	.000	.000	.000	.000
1/10	948.600	947.600	944.600	938.600	934.600	902.600

MEAN OF ANNUAL VALUES = 598.922

STANDARD DEVIATION OF ANNUAL VALUES = 278.548

UPPER 90% CONFIDENCE LIMIT ON MEAN = 673.171

SigmaPlot Data

Nonlinear Regression for Peak Values

Data Source: Data 1 in Notebook1
Equation: Exponential Rise to Maximum, Single, 2 Parameter
f=a*(1-exp(-b*x))

R	Rsqr	Adj Rsqr	Standard Error of Estimate
0.9999	0.9999	0.9999	2.7640

	Coefficient	Std. Error	t	P	VIF
a	1101.2004	2.6722	412.0889	<0.0001	11.6551<
b	0.0707	0.0004	196.7819	<0.0001	11.6551<

Analysis of Variance:

Uncorrected for the mean of the observations:

	DF	SS	MS
Regression	2	15121198.7233	7560599.3617
Residual	28	213.9171	7.6399
Total	30	15121412.6404	504047.0880

Corrected for the mean of the observations:

	DF	SS	MS	F	P
Regression	1	2010951.0326	2010951.0326	263217.0793	<0.0001
Residual	28	213.9171	7.6399		
Total	29	2011164.9497	69350.5155		

Statistical Tests:

PRESS 227.8010

Durbin-Watson Statistic 0.0925 Failed

Normality Test Passed (P = 0.1472)

K-S Statistic = 0.2033 Significance Level = 0.1472

Constant Variance Test Failed (P = 0.0067)

Power of performed test with alpha = 0.0500: 1.0000

Regression Diagnostics:

Row	Std. Res.	Stud. Res.	Stud. Del. Res.
1	3.1723<	3.1808<	3.9085<
2	2.4290	2.4505<	2.7150<
3	1.9628	1.9951	2.1152<
4	1.3010	1.3323	1.3518
5	1.0568	1.0894	1.0931
6	0.4042	0.4188	0.4125
7	0.3328	0.3460	0.3405
8	0.0299	0.0311	0.0306

9	-0.2258	-0.2352	-0.2312
10	-0.5115	-0.5323	-0.5254
11	-0.5376	-0.5585	-0.5515
12	-0.7330	-0.7596	-0.7537
13	-0.4367	-0.4513	-0.4448
14	-0.7923	-0.8166	-0.8116
15	-0.7689	-0.7904	-0.7849
16	-0.7788	-0.7988	-0.7935
17	-0.5073	-0.5195	-0.5126
18	-0.3602	-0.3685	-0.3628
19	-0.3784	-0.3871	-0.3811
20	-0.2382	-0.2439	-0.2397
21	-0.3370	-0.3456	-0.3401
22	0.0158	0.0162	0.0159
23	0.0656	0.0677	0.0665
24	0.1457	0.1510	0.1483
25	0.2291	0.2388	0.2347
26	0.2910	0.3052	0.3002
27	0.3081	0.3255	0.3203
28	0.6205	0.6611	0.6543
29	0.4846	0.5209	0.5140
30	0.6050	0.6569	0.6500

Influence Diagnostics:

Row	**Cook's Dist**	**Leverage**	**DFFITS**
1	0.0270	0.0053	0.2858
2	0.0533	0.0174	0.3618
3	0.0660	0.0321	0.3851
4	0.0432	0.0464	0.2983
5	0.0371	0.0588	0.2733
6	0.0064	0.0684	0.1117
7	0.0048	0.0747	0.0968
8	4.0987E-005	0.0780	0.0089
9	0.0024	0.0786	-0.0675
10	0.0118	0.0769	-0.1516
11	0.0124	0.0735	-0.1553
12	0.0214	0.0689	-0.2050
13	0.0069	0.0637	-0.1161
14	0.0207	0.0585	-0.2023
15	0.0177	0.0536	-0.1868
16	0.0166	0.0495	-0.1810
17	0.0066	0.0464	-0.1131
18	0.0032	0.0447	-0.0785
19	0.0035	0.0445	-0.0823
20	0.0014	0.0460	-0.0526
21	0.0031	0.0492	-0.0773
22	7.5402E-006	0.0541	0.0038
23	0.0001	0.0609	0.0169
24	0.0008	0.0694	0.0405
25	0.0025	0.0795	0.0690
26	0.0047	0.0912	0.0951
27	0.0062	0.1044	0.1093
28	0.0295	0.1189	0.2404
29	0.0211	0.1347	0.2028
30	0.0386	0.1516	0.2748

95% Confidence:

Row	Predicted	95% Conf-L	95% Conf-U	95% Pred-L	95% Pred-U
1	75.2115	74.7987	75.6244	69.5346	80.8885
2	145.2862	144.5383	146.0341	139.5751	150.9972
3	210.5747	209.5605	211.5890	204.8227	216.3267
4	271.4041	270.1840	272.6242	265.6123	277.1960
5	328.0789	326.7057	329.4520	322.2529	333.9049
6	380.8828	379.4025	382.3630	375.0306	386.7349
7	430.0802	428.5324	431.6280	424.2105	435.9498
8	475.9174	474.3357	477.4991	470.0388	481.7961
9	518.6240	517.0366	520.2113	512.7438	524.5042
10	558.4137	556.8437	559.9838	552.5382	564.2893
11	595.4858	593.9511	597.0206	589.6196	601.3520
12	630.0259	628.5397	631.5122	624.1722	635.8796
13	662.2070	660.7775	663.6364	656.3674	668.0465
14	692.1900	690.8207	693.5594	686.3649	698.0151
15	720.1253	718.8144	721.4362	714.3136	725.9369
16	746.1526	744.8931	747.4120	740.3523	751.9528
17	770.4022	769.1822	771.6222	764.6104	776.1940
18	792.9956	791.7984	794.1928	787.2085	798.7826
19	814.0458	812.8513	815.2404	808.2593	819.8324
20	833.6584	832.4444	834.8724	827.8678	839.4489
21	851.9314	850.6759	853.1869	846.1320	857.7308
22	868.9564	867.6389	870.2738	863.1432	874.7695
23	884.8185	883.4215	886.2156	878.9869	890.6502
24	899.5973	898.1063	901.0884	893.7424	905.4523
25	913.3667	911.7704	914.9630	907.4841	919.2493
26	926.1957	924.4858	927.9056	920.2813	932.1101
27	938.1485	936.3191	939.9778	932.1984	944.0985
28	949.2848	947.3322	951.2375	943.2957	955.2740
29	959.6606	957.5824	961.7388	953.6294	965.6918
30	969.3277	967.1231	971.5323	963.2518	975.4037

Fit Equation Description:

[Variables]
x = col(1)
y = col(2)
reciprocal_y = 1/abs(y)
reciprocal_ysquare = 1/y^2
'Automatic Initial Parameter Estimate Functions
first(q)=if(size(q)<10,size(q)-1,int(0.9*size(q)))
ylast(q)=mean(q[data(first(q),size(q))])
[Parameters]
a = ylast(y) "Auto {{previous: 1101.2}}
b = -ln(.5)/(x50(x,y,.5)-min(x)) "Auto {{previous: 0.070744}}
[Equation]
f=a*(1-exp(-b*x))
fit f to y
"fit f to y with weight reciprocal_y
"fit f to y with weight reciprocal_ysquare
[Constraints]
b>0
[Options]
tolerance=1e-10
stepsize=1
iterations=200

Number of Iterations Performed = 9

Nonlinear Regression for 21-Day Values

Data Source: Copy of Data 1 in Notebook1
Equation: Exponential Rise to Maximum, Single, 2 Parameter
f=a*(1-exp(-b*x))

R	Rsqr	Adj Rsqr	Standard Error of Estimate
1.0000	0.9999	0.9999	2.3873

	Coefficient	Std. Error	t	P	VIF
a	1098.8281	2.3269	472.2373	<0.0001	11.7915<
b	0.0704	0.0003	226.2112	<0.0001	11.7915<

Analysis of Variance:

Uncorrected for the mean of the observations:

	DF	SS	MS
Regression	2	14986965.1125	7493482.5563
Residual	28	159.5819	5.6994
Total	30	14987124.6944	499570.8231

Corrected for the mean of the observations:

	DF	SS	MS	F	P
Regression	1	2001834.9160	2001834.9160	351239.0028	<0.0001
Residual	28	159.5819	5.6994		
Total	29	2001994.4979	69034.2930		

Statistical Tests:

PRESS 171.0628

Durbin-Watson Statistic 0.0863 Failed

Normality Test Passed (P = 0.0921)

K-S Statistic = 0.2208 Significance Level = 0.0921

Constant Variance Test Failed (P = 0.0183)

Power of performed test with alpha = 0.0500: 1.0000

Regression Diagnostics:

Row	Std. Res.	Stud. Res.	Stud. Del. Res.
1	3.1140<	3.1222<	3.7975<
2	2.3895	2.4105<	2.6590<
3	2.0216	2.0547<	2.1894<
4	1.4064	1.4401	1.4696
5	0.8373	0.8629	0.8589
6	0.6161	0.6382	0.6313
7	0.2149	0.2234	0.2196
8	-0.0491	-0.0511	-0.0502
9	-0.2706	-0.2819	-0.2772
10	-0.1190	-0.1238	-0.1216

11	-0.5144	-0.5344	-0.5275
12	-0.6957	-0.7210	-0.7147
13	-0.7345	-0.7591	-0.7533
14	-0.6974	-0.7187	-0.7124
15	-0.6464	-0.6645	-0.6577
16	-0.6394	-0.6559	-0.6491
17	-0.3116	-0.3191	-0.3139
18	-0.5509	-0.5637	-0.5567
19	-0.5665	-0.5795	-0.5725
20	-0.4020	-0.4116	-0.4054
21	-0.0982	-0.1007	-0.0989
22	-0.1118	-0.1149	-0.1129
23	-0.0594	-0.0613	-0.0602
24	0.0261	0.0271	0.0266
25	0.1140	0.1188	0.1167
26	0.1756	0.1843	0.1810
27	0.1843	0.1948	0.1914
28	0.5340	0.5690	0.5620
29	0.7828	0.8416	0.8371
30	0.9089	0.9870	0.9865

Influence Diagnostics:

Row	Cook's Dist	Leverage	DFFITS
1	0.0259	0.0053	0.2769
2	0.0513	0.0174	0.3534
3	0.0697	0.0319	0.3977
4	0.0503	0.0463	0.3237
5	0.0232	0.0586	0.2143
6	0.0149	0.0682	0.1708
7	0.0020	0.0746	0.0623
8	0.0001	0.0779	-0.0146
9	0.0034	0.0785	-0.0809
10	0.0006	0.0769	-0.0351
11	0.0113	0.0735	-0.1485
12	0.0193	0.0689	-0.1945
13	0.0196	0.0638	-0.1966
14	0.0161	0.0586	-0.1777
15	0.0125	0.0537	-0.1566
16	0.0112	0.0495	-0.1482
17	0.0025	0.0465	-0.0693
18	0.0074	0.0447	-0.1205
19	0.0078	0.0445	-0.1236
20	0.0041	0.0460	-0.0890
21	0.0003	0.0492	-0.0225
22	0.0004	0.0541	-0.0270
23	0.0001	0.0609	-0.0153
24	2.7366E-005	0.0693	0.0073
25	0.0006	0.0795	0.0343
26	0.0017	0.0912	0.0574
27	0.0022	0.1045	0.0654
28	0.0219	0.1191	0.2066
29	0.0553	0.1350	0.3307
30	0.0873	0.1520	0.4176

95% Confidence:

Row	Predicted	95% Conf-L	95% Conf-U	95% Pred-L	95% Pred-U
1	74.6859	74.3303	75.0415	69.7828	79.5891

2	144.2955	143.6512	144.9399	139.3630	149.2280
3	209.1739	208.2998	210.0479	204.2061	214.1416
4	269.6425	268.5907	270.6943	264.6404	274.6446
5	326.0012	324.8171	327.1852	320.9696	331.0327
6	378.5292	377.2524	379.8060	373.4750	383.5834
7	427.4870	426.1515	428.8224	422.4177	432.5563
8	473.1172	471.7521	474.4822	468.0400	478.1943
9	515.6459	514.2755	517.0163	510.5673	520.7245
10	555.2840	553.9282	556.6399	550.2093	560.3587
11	592.2280	590.9024	593.5537	587.1613	597.2947
12	626.6610	625.3769	627.9450	621.6050	631.7170
13	658.7536	657.5183	659.9888	653.7097	663.7974
14	688.6648	687.4814	689.8483	683.6335	693.6962
15	716.5431	715.4101	717.6762	711.5233	721.5629
16	742.5265	741.4380	743.6151	737.5166	747.5364
17	766.7439	765.6895	767.7982	761.7413	771.7465
18	789.3152	788.2807	790.3497	784.3168	794.3136
19	810.3524	809.3204	811.3844	805.3545	815.3503
20	829.9597	828.9112	831.0082	824.9583	834.9611
21	848.2343	847.1501	849.3186	843.2254	853.2433
22	865.2669	864.1293	866.4045	860.2461	870.2877
23	881.1417	879.9354	882.3481	876.1049	886.1785
24	895.9376	894.6499	897.2252	890.8807	900.9945
25	909.7278	908.3490	911.1065	904.6469	914.8086
26	922.5807	921.1036	924.0578	917.4722	927.6891
27	934.5600	932.9793	936.1407	929.4206	939.6993
28	945.7251	944.0375	947.4127	940.5518	950.8983
29	956.1313	954.3347	957.9278	950.9215	961.3411
30	965.8302	963.9239	967.7365	960.5816	971.0788

Fit Equation Description:

```
[Variables]
x = col(1)
y = col(3)
reciprocal_y = 1/abs(y)
reciprocal_ysquare = 1/y^2
'Automatic Initial Parameter Estimate Functions
first(q)=if(size(q)<10,size(q)-1,int(0.9*size(q)))
ylast(q)=mean(q[data(first(q),size(q))])
[Parameters]
a = ylast(y) "Auto {{previous: 1098.83}}
b = -ln(.5)/(x50(x,y,.5)-min(x)) "Auto {{previous: 0.0703889}}
[Equation]
f=a*(1-exp(-b*x))
fit f to y
"fit f to y with weight reciprocal_y
"fit f to y with weight reciprocal_ysquare
[Constraints]
b>0
[Options]
tolerance=1e-10
stepsize=1
iterations=200
```

Number of Iterations Performed = 10

Nonlinear Regression for 60-Day Values

Data Source: Copy of Copy of Data 1 in Notebook1
Equation: Exponential Rise to Maximum, Single, 2 Parameter
f=a*(1-exp(-b*x))

R	Rsqr	Adj Rsqr	Standard Error of Estimate
1.0000	1.0000	1.0000	1.7440

	Coefficient	Std. Error	t	P	VIF
a	1094.0957	1.7153	637.8573	<0.0001	11.9455<
b	0.0700	0.0002	306.6120	<0.0001	11.9455<

Analysis of Variance:

Uncorrected for the mean of the observations:

	DF	SS	MS
Regression	2	14781776.0431	7390888.0216
Residual	28	85.1594	3.0414
Total	30	14781861.2025	492728.7068

Corrected for the mean of the observations:

	DF	SS	MS	F	P
Regression	1	1986175.5264	1986175.5264	653045.1208	<0.0001
Residual	28	85.1594	3.0414		
Total	29	1986260.6858	68491.7478		

Statistical Tests:

PRESS 91.7953

Durbin-Watson Statistic 0.1089 Failed

Normality Test Passed (P = 0.1659)

K-S Statistic = 0.1986 Significance Level = 0.1659

Constant Variance Test Failed (P = 0.0336)

Power of performed test with alpha = 0.0500: 1.0000

Regression Diagnostics:

Row	Std. Res.	Stud. Res.	Stud. Del. Res.
1	3.2039<	3.2123<	3.9697<
2	2.3366	2.3570<	2.5852<
3	1.5908	1.6167	1.6673
4	1.6174	1.6559	1.7121
5	1.1008	1.1345	1.1406
6	0.4576	0.4740	0.4673
7	0.1145	0.1190	0.1169
8	-0.0649	-0.0676	-0.0664
9	-0.2082	-0.2168	-0.2131
10	-0.4339	-0.4515	-0.4450

11	-0.2793	-0.2902	-0.2854
12	-0.4213	-0.4366	-0.4302
13	-0.3825	-0.3953	-0.3893
14	-0.8261	-0.8514	-0.8471
15	-0.6890	-0.7083	-0.7018
16	-0.6226	-0.6386	-0.6317
17	-0.6997	-0.7165	-0.7102
18	-0.4146	-0.4242	-0.4179
19	-0.4041	-0.4134	-0.4072
20	-0.1537	-0.1573	-0.1546
21	-0.2917	-0.2992	-0.2942
22	-0.2961	-0.3045	-0.2995
23	-0.2146	-0.2215	-0.2177
24	-0.0919	-0.0952	-0.0935
25	0.0306	0.0319	0.0314
26	0.1142	0.1198	0.1176
27	0.1225	0.1295	0.1272
28	0.5955	0.6345	0.6276
29	0.9282	0.9982	0.9981
30	1.0915	1.1855	1.1945

Influence Diagnostics:

Row	Cook's Dist	Leverage	DFFITS
1	0.0273	0.0053	0.2885
2	0.0488	0.0173	0.3427
3	0.0429	0.0318	0.3021
4	0.0662	0.0461	0.3762
5	0.0399	0.0584	0.2841
6	0.0082	0.0680	0.1262
7	0.0006	0.0744	0.0331
8	0.0002	0.0778	-0.0193
9	0.0020	0.0784	-0.0622
10	0.0085	0.0768	-0.1284
11	0.0033	0.0735	-0.0804
12	0.0071	0.0690	-0.1171
13	0.0053	0.0639	-0.1017
14	0.0226	0.0586	-0.2114
15	0.0143	0.0538	-0.1673
16	0.0106	0.0496	-0.1444
17	0.0125	0.0465	-0.1569
18	0.0042	0.0448	-0.0905
19	0.0040	0.0446	-0.0879
20	0.0006	0.0460	-0.0339
21	0.0023	0.0491	-0.0669
22	0.0026	0.0541	-0.0716
23	0.0016	0.0608	-0.0554
24	0.0003	0.0693	-0.0255
25	4.4060E-005	0.0795	0.0092
26	0.0007	0.0913	0.0373
27	0.0010	0.1046	0.0435
28	0.0273	0.1193	0.2310
29	0.0779	0.1352	0.3947
30	0.1263	0.1523	0.5064

95% Confidence:

Row	Predicted	95% Conf-L	95% Conf-U	95% Pred-L	95% Pred-U
1	73.9625	73.7036	74.2215	70.3808	77.5442

2	142.9251	142.4557	143.3945	139.3220	146.5281
3	207.2256	206.5887	207.8626	203.5969	210.8543
4	267.1794	266.4127	267.9461	263.5257	270.8331
5	323.0802	322.2168	323.9436	319.4050	326.7554
6	375.2020	374.2706	376.1333	371.5102	378.8937
7	423.8003	422.8258	424.7747	420.0974	427.5031
8	469.1133	468.1169	470.1096	465.4046	472.8220
9	511.3630	510.3625	512.3636	507.6532	515.0728
10	550.7566	549.7664	551.7468	547.0496	554.4637
11	587.4872	586.5187	588.4556	583.7859	591.1885
12	621.7347	620.7964	622.6730	618.0411	625.4282
13	653.6670	652.7641	654.5698	649.9823	657.3517
14	683.4406	682.5755	684.3057	679.7650	687.1162
15	711.2015	710.3732	712.0299	707.5344	714.8687
16	737.0858	736.2899	737.8816	733.4258	740.7457
17	761.2202	760.4494	761.9909	757.5656	764.8747
18	783.7231	782.9670	784.4791	780.0716	787.3745
19	804.7047	803.9507	805.4587	801.0537	808.3558
20	824.2680	823.5020	825.0339	820.6144	827.9215
21	842.5087	841.7169	843.3006	838.8497	846.1678
22	859.5164	858.6856	860.3472	855.8487	863.1841
23	875.3743	874.4933	876.2553	871.6949	879.0537
24	890.1602	889.2197	891.1007	886.4661	893.8543
25	903.9465	902.9394	904.9537	900.2349	907.6582
26	916.8009	915.7216	917.8802	913.0691	920.5327
27	928.7863	927.6311	929.9415	925.0318	932.5408
28	939.9615	938.7278	941.1952	936.1821	943.7408
29	950.3812	949.0675	951.6948	946.5750	954.1874
30	960.0965	958.7022	961.4908	956.2617	963.9313

Fit Equation Description:

```
[Variables]
x = col(1)
y = col(4)
reciprocal_y = 1/abs(y)
reciprocal_ysquare = 1/y^2
'Automatic Initial Parameter Estimate Functions
first(q)=if(size(q)<10,size(q)-1,int(0.9*size(q)))
ylast(q)=mean(q[data(first(q),size(q))])
[Parameters]
a = ylast(y) "Auto {{previous: 1094.1}}
b = -ln(.5)/(x50(x,y,.5)-min(x)) "Auto {{previous: 0.069995}}
[Equation]
f=a*(1-exp(-b*x))
fit f to y
"fit f to y with weight reciprocal_y
"fit f to y with weight reciprocal_ysquare
[Constraints]
b>0
[Options]
tolerance=1e-10
stepsize=1
iterations=200
```

Number of Iterations Performed = 10