APPENDIX J: Example KABAM Inputs and Outputs for the Cyfluthrins.

INPUTS:

Chemical characteristics of Cyfluthrin.

Characteristic	Value	Comments/Guidance
Pesticide Name	Cyfluthrin	None
Log K_{OW}	5.97	Enter value from acceptable or supplemental study submitted by registrant or available in scientific literature.
K_{OW}	933254	No input necessary. This value is calculated automatically from the Log K_{OW} value entered above.
K_{OC} (L/kg OC)	107412	Input value used in PRZM/EXAMS to derive EECs. Follow input parameter guidance for deriving this parameter value (USEPA 2002).
Time to steady state (T_S; days)	257	No input necessary. This value is calculated automatically from the Log K_{OW} value entered above.
Pore water EEC (µg/L)	0.179	Enter value generated by PRZM/EXAMS benthic file. PRZM/EXAMS EEC represents the freely dissolved concentration of the pesticide in the pore water of the sediment. The appropriate averaging period of the EEC is dependent on the specific pesticide being modeled and is based on the time it takes for the chemical to reach steady state. Select the EEC generated by PRZM/EXAMS which has an averaging period closest to the time to steady state calculated above. In cases where the time to steady state exceeds 365 days, the user should select the EEC representing the average of yearly averages. The peak EEC should not be used.
Water Column EEC (µg/L)	0.333	Enter value generated by PRZM/EXAMS water column file. PRZM/EXAMS EEC represents the freely dissolved concentration of the pesticide in the water column. The appropriate averaging period of the EEC is dependent on the specific pesticide being modeled and is based on the time it takes for the chemical to reach steady state. The averaging period used for the water column EEC should be the same as the one selected for the pore water EEC (discussed above).

Mammalian and avian toxicity data for Cyfluthrin.

Animal	Measure of effect (units)	Value	Species
Avian	LD_{50} (mg/kg-bw)	2000	Northern bobwhite quail
	LC_{50} (mg/kg-diet)	5000	Northern bobwhite quail
	NOAEC (mg/kg-diet)	250	Northern bobwhite quail
	Mineau Scaling Factor	1.15	Default value for all species is 1.15 (for chemical specific values, see Mineau et al. 1996).
Mammalian	LD_{50} (mg/kg-bw)	16	laboratory rat
	LC_{50} (mg/kg-diet)	N/A	other
	Chronic Endpoint	5.4	laboratory rat
	units of chronic endpoint*	mg/kg-bw	

Identification of mammals and birds feeding on aquatic biota of the model ecosystem.

Mammal/Bird #	Name	Body weight (kg)
Mammal 1	fog/water shrew	0.018
Mammal 2	rice rat/star-nosed mole	0.085
Mammal 3	small mink	0.45
Mammal 4	large mink	1.8
Mammal 5	small river otter	5

Mammal/Bird #	Name	Body weight (kg)
Mammal 6	large river otter	15
Bird 1	sandpipers	0.02
Bird 2	cranes	6.7
Bird 3	rails	0.07
Bird 4	herons	2.9
Bird 5	small osprey	1.25
Bird 6	white pelican	7.5

Diets of mammals feeding on aquatic biota of the model ecosystem.

	Diet for:					
Trophic level in diet	fog/water shrew	rice rat/star-nosed mole	small mink	large mink	small river otter	large river otter
phytoplankton	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
zooplankton	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
benthic invertebrates	100.0%	34.0%	0.0%	0.0%	0.0%	0.0%
filter feeders	0.0%	33.0%	0.0%	0.0%	0.0%	0.0%
small fish	0.0%	33.0%	0.0%	0.0%	0.0%	0.0%
medium fish	0.0%	0.0%	100.0%	100.0%	100.0%	0.0%
large fish	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Diets of birds feeding on aquatic biota of the model ecosystem.

	Diet for:					
Trophic level in diet	sandpipers	cranes	rails	herons	small osprey	white pelican
phytoplankton	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
zooplankton	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
benthic invertebrates	33.0%	33.0%	50.0%	50.0%	0.0%	0.0%
filter feeders	33.0%	33.0%	0.0%	0.0%	0.0%	0.0%
small fish	34.0%	0.0%	50.0%	0.0%	0.0%	0.0%
medium fish	0.0%	34.0%	0.0%	50.0%	100.0%	0.0%
large fish	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

OUTPUTS:

Estimated concentrations of Cyfluthrin in ecosystem components.

Ecosystem Component	Total concentration (µg/kg-ww)	Lipid normalized concentration (µg/kg-lipid)	Contribution due to diet (µg/kg-ww)	Contribution due to respiration (µg/kg-ww)
Water (total)*	0	N/A	N/A	N/A
Water (freely dissolved)*	0	N/A	N/A	N/A
Sediment (pore water)*	0	N/A	N/A	N/A
Sediment (in solid)**	769	N/A	N/A	N/A
Phytoplankton	11,518	575881	N/A	11,517.63
Zooplankton	12,348	411615	2,192.96	10,155.50
Benthic Invertebrates	16,120	537328	6,179.97	9,939.87
Filter Feeders	10,553	527633	3,994.03	6,558.63
Small Fish	40,363	1009083	29,547.43	10,815.89
Medium Fish	84,896	2122388	76,043.41	8,852.10
Large Fish	293,106	7327662	285,954.19	7,152.30
* Units: µg/L; **Units: µg/kg-dw				

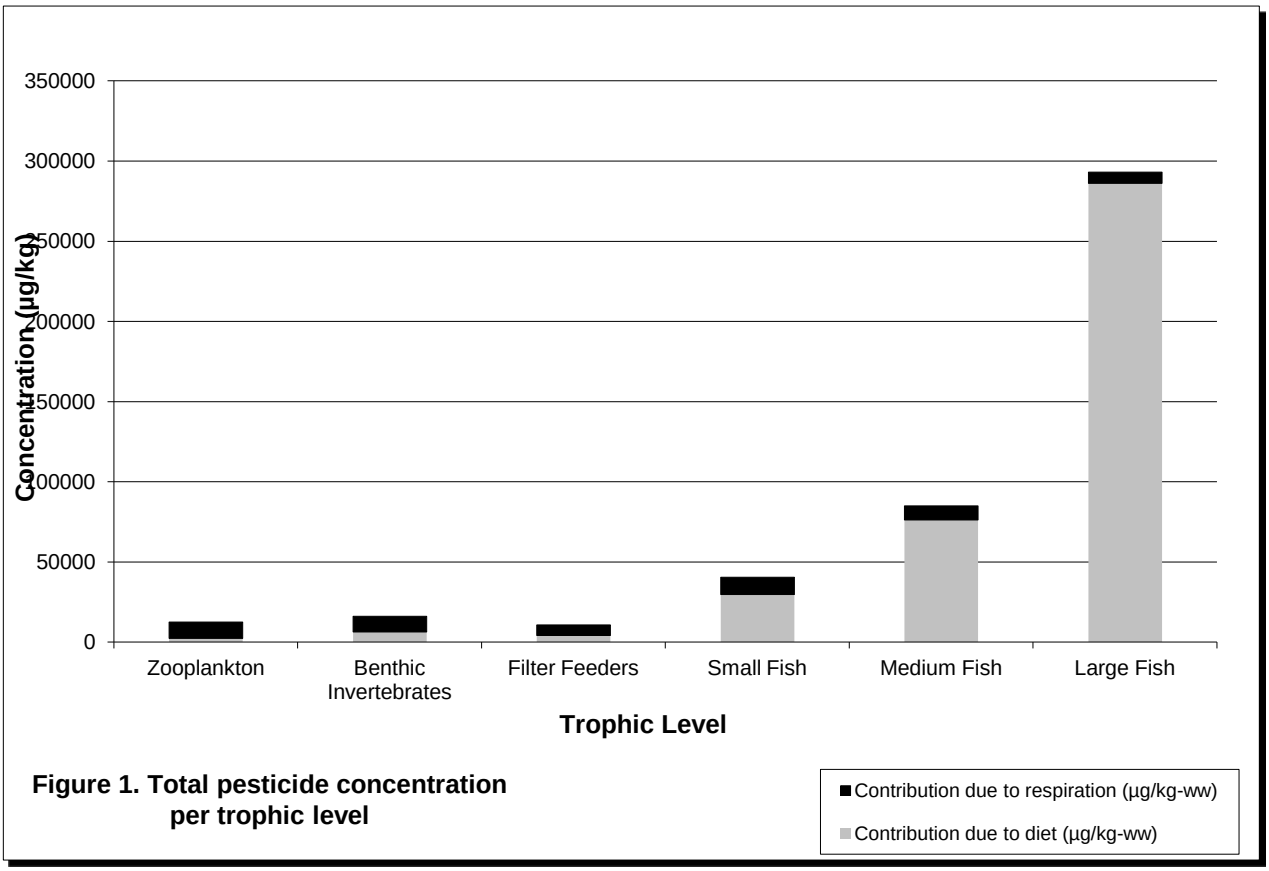

Figure 1. Total pesticide concentration per trophic level

Total BCFand BAF values of Cyfluthrin in aquatic trophic levels.

Trophic Level	Total BCF (µg/kg-ww)/(µg/L)	Total BAF (µg/kg-ww)/(µg/L)
Phytoplankton	44797	34587
Zooplankton	31918	37082
Benthic Invertebrates	34052	48408
Filter Feeders	22382	31690
Small Fish	43807	121211
Medium Fish	43807	254941
Large Fish	44844	880200

Lipid-normalized BCF, BAF, BMF and BSAF values of Cyfluthrin in aquatic trophic levels.

Trophic Level	BCF (µg/kg-lipid)/(µg/L)	BAF (µg/kg-lipid)/(µg/L)	BMF (µg/kg-lipid)/(µg/kg-lipid)	BSAF (µg/kg-lipid)/(µg/kg-OC)
Phytoplankton	2239855	1729373	N/A	30
Zooplankton	1063938	1236082	0.71	21
Benthic Invertebrates	1135060	1613598	1.65	28
Filter Feeders	1119122	1584484	1.62	27
Small Fish	1095167	3030279	2.13	52
Medium Fish	1095167	6373537	2.74	110
Large Fish	1121090	22004992	3.45	381

Calculation of EECs for mammals and birds consuming fish contaminated by Cyfluthrin.

Wildlife Species	Biological Parameters				EECs (pesticide intake)	
	Body Weight (kg)	Dry Food Ingestion Rate (kg-dry food/kg-bw/day)	Wet Food Ingestion Rate (kg-wet food/kg-bw/day)	Drinking Water Intake (L/d)	Dose Based (mg/kg-bw/d)	Dietary Based (ppm)
Mammalian						
fog/water shrew	0.02	0.140	0.585	0.003	9.433	16.12
rice rat/star-nosed mole	0.1	0.107	0.484	0.011	10.781	22.28
small mink	0.5	0.079	0.293	0.048	24.900	84.90
large mink	1.8	0.062	0.229	0.168	19.455	84.90
small river otter	5.0	0.052	0.191	0.421	16.220	84.90
large river otter	15.0	0.042	0.157	1.133	46.055	293.11
Avian						
sandpipers	0.0	0.228	1.034	0.004	23.2879	22.53
cranes	6.7	0.030	0.136	0.211	5.1188	37.67
rails	0.1	0.147	0.577	0.010	16.3055	28.24
herons	2.9	0.040	0.157	0.120	7.9499	50.51
small osprey	1.3	0.054	0.199	0.069	16.9287	84.90
white pelican	7.5	0.029	0.107	0.228	31.2744	293.11

Calculation of toxicity values for mammals and birds consuming fish contaminated by Cyfluthrin.

Wildlife Species	Toxicity Values			
	Acute		Chronic	
	Dose Based (mg/kg-bw)	Dietary Based (mg/kg-diet)	Dose Based (mg/kg-bw)	Dietary Based (mg/kg-diet)
Mammalian				
fog/water shrew	33.60	N/A	11.34	108
rice rat/star-nosed mole	22.79	N/A	7.69	108
small mink	15.03	N/A	5.07	108
large mink	10.62	N/A	3.59	108
small river otter	8.23	N/A	2.78	108
large river otter	6.25	N/A	2.11	108
Avian				
sandpipers	1440.86	5000.00	N/A	250
cranes	3446.50	5000.00	N/A	250
rails	1738.73	5000.00	N/A	250
herons	3039.67	5000.00	N/A	250
small osprey	2679.19	5000.00	N/A	250
white pelican	3505.31	5000.00	N/A	250

Calculation of RQ values for mammals and birds consuming fish contaminated by Cyfluthrin.

Wildlife Species	Acute		Chronic	
	Dose Based	Dietary Based	Dose Based	Dietary Based
Mammalian				
fog/water shrew	**0.281**	N/A	0.832	0.149
rice rat/star-nosed mole	**0.473**	N/A	**1.402**	0.206
small mink	**1.657**	N/A	**4.910**	0.786
large mink	**1.831**	N/A	**5.426**	0.786
small river otter	**1.971**	N/A	**5.840**	0.786
large river otter	**7.365**	N/A	**21.822**	**2.714**
Avian				
sandpipers	0.016	0.005	N/A	0.090
cranes	0.001	0.008	N/A	0.151
rails	0.009	0.006	N/A	0.113
herons	0.003	0.010	N/A	0.202
small osprey	0.006	0.017	N/A	0.340
white pelican	0.009	0.059	N/A	**1.172**