

Appendix E. PRZM/EXAMS Model to Estimate Environmental Concentrations of S-Methoprene Direct Application to Water

Liquid Larvicide: This formulation may be applied via aerial and ground equipment to irrigated croplands after flooding to control mosquito emergence. Examples of such sites are: vineyards, rice fields (including wild rice), date palm orchards, fruit and nut orchards, and berry fields and bogs. Irrigated pastures may be treated after each flooding without the removal of grazing livestock. This formulation may also be applied to intermittently flooded non crop areas. Typical sites include freshwater swamps and marshes, salt marshes, woodland pools and meadows, dredging spoil sites, drainage areas, waste water treatment and settling ponds, ditches and other natural and manmade depressions.

Application rate of Liquid Larvicide 5%:

Given: This 5% formulation has 0.43 lbs ai/gal and is to be applied at the rate of 3 – 4 oz/A or **0.007 – 0.013 lbs ai/A**. Efficacy is about 7-10 days and can be reapplied as needed.

Application of Liquid Larvicide 20%:

Given: The 20% formulation consists of 1.72 lbs ai/gal with an application rate of ¾-1oz of formulation per acre or **0.007-0.013 lbs ai/A**. Efficacy is about 7-10 days with applications as needed.

S-Methoprene is efficacious to Dipteran larvae; therefore, the most effective mode of application to potential breeding areas is a direct application to water for liquid formulations. In order to derive estimated environmental concentrations (EECs) of S-Methoprene to aquatic ecosystems the Agency has relied on EXAMS (Exposure Analysis Modeling System) linked to PRZMS (Pesticide Root Zone Model) in order to evaluate the fate, transport, and exposure concentration of S-Methoprene. Simulation of direct application to water was accomplished by modifying PRZMS to reflect 100% drift to an aquatic area. The EEC values that were calculated from this modeling are noted in Table E-1.

Table E-1 Maximum Rate of S-Methoprene Formulations that are Applied Directly to Water (0.013 lbs ai/A; Applied 10 times at 10 Day Intervals)

Use	Formulation	App Interval (days)	Max. Rate (lbs ai/A)	Peak EEC (mg/L)	21-day EEC (mg/L)	60-day EEC (mg/L)
Bogs, swamps, marshes, ponds etc. (PRZMS EXAMS)	Liquid	10	0.013	0.002	0.001	0.001

PRZM/EXAMS Model to Estimate Environmental Concentrations of S-Methoprene Direct Application to Water (0.013 lbs ai/A, 10 applications, 10 day intervals)

stored as DirAppWaterLo.out

Chemical: Methoprene

PRZM environment: OHCornSTD.txt

modified Tuesday, 29 May 2007 at 13:59:54

EXAMS environment: pond298.exv modified Tuesday, 26 August 2008 at 06:14:07

Metfile: w93815.dvf modified Tuesday, 26 August 2008 at 06:16:19

Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	1.615	1.433	1.2	1.139	1.059	0.3586
1962	1.566	1.383	1.159	1.116	1.039	0.3923
1963	1.619	1.439	1.201	1.133	1.055	0.4018
1964	1.524	1.339	1.118	1.082	1.009	0.376
1965	1.501	1.315	1.095	1.06	0.9923	0.3622
1966	1.57	1.39	1.156	1.094	1.024	0.3806
1967	1.584	1.403	1.171	1.119	1.039	0.3824
1968	1.558	1.375	1.147	1.099	1.027	0.3831
1969	1.59	1.407	1.177	1.123	1.044	0.3942
1970	1.553	1.368	1.144	1.096	1.025	0.3793
1971	1.582	1.398	1.169	1.113	1.033	0.3724
1972	1.556	1.372	1.145	1.097	1.029	0.3746
1973	1.535	1.351	1.124	1.075	1.004	0.3676
1974	1.562	1.381	1.148	1.096	1.026	0.3782
1975	1.586	1.408	1.179	1.116	1.032	0.3854
1976	1.589	1.408	1.171	1.108	1.039	0.3915
1977	1.528	1.344	1.112	1.059	0.9989	0.3809
1978	1.559	1.375	1.147	1.097	1.025	0.3782
1979	1.577	1.395	1.167	1.12	1.042	0.3837
1980	1.468	1.282	1.063	1.031	0.9817	0.3599
1981	1.539	1.357	1.127	1.08	1.008	0.3762
1982	1.618	1.438	1.204	1.15	1.079	0.408
1983	1.524	1.339	1.116	1.074	1.018	0.3725
1984	1.604	1.422	1.194	1.141	1.052	0.3932
1985	1.647	1.464	1.234	1.177	1.094	0.4055
1986	1.595	1.412	1.173	1.105	1.029	0.3866
1987	1.565	1.382	1.155	1.107	1.023	0.3764
1988	1.521	1.339	1.115	1.077	1.012	0.3785
1989	1.618	1.437	1.206	1.157	1.086	0.4077
1990	1.655	1.476	1.236	1.167	1.076	0.4026

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	1.655	1.476	1.236	1.177	1.094	0.408
0.0645161290322581	1.647	1.464	1.234	1.167	1.086	0.4077
0.0967741935483871	1.619	1.439	1.206	1.157	1.079	0.4055
0.129032258064516	1.618	1.438	1.204	1.15	1.076	0.4026
0.161290322580645	1.618	1.437	1.201	1.141	1.059	0.4018
0.193548387096774	1.615	1.433	1.2	1.139	1.055	0.3942

0.225806451612903	1.604	1.422	1.194	1.133	1.052	0.3932
0.258064516129032	1.595	1.412	1.179	1.123	1.044	0.3923
0.290322580645161	1.59	1.408	1.177	1.12	1.042	0.3915
0.32258064516129	1.589	1.408	1.173	1.119	1.039	0.3866
0.354838709677419	1.586	1.407	1.171	1.116	1.039	0.3854
0.387096774193548	1.584	1.403	1.171	1.116	1.039	0.3837
0.419354838709677	1.582	1.398	1.169	1.113	1.033	0.3831
0.451612903225806	1.577	1.395	1.167	1.108	1.032	0.3824
0.483870967741936	1.57	1.39	1.159	1.107	1.029	0.3809
0.516129032258065	1.566	1.383	1.156	1.105	1.029	0.3806
0.548387096774194	1.565	1.382	1.155	1.099	1.027	0.3793
0.580645161290323	1.562	1.381	1.148	1.097	1.026	0.3785
0.612903225806452	1.559	1.375	1.147	1.097	1.025	0.3782
0.645161290322581	1.558	1.375	1.147	1.096	1.025	0.3782
0.67741935483871	1.556	1.372	1.145	1.096	1.024	0.3764
0.709677419354839	1.553	1.368	1.144	1.094	1.023	0.3762
0.741935483870968	1.539	1.357	1.127	1.082	1.018	0.376
0.774193548387097	1.535	1.351	1.124	1.08	1.012	0.3746
0.806451612903226	1.528	1.344	1.118	1.077	1.009	0.3725
0.838709677419355	1.524	1.339	1.116	1.075	1.008	0.3724
0.870967741935484	1.524	1.339	1.115	1.074	1.004	0.3676
0.903225806451613	1.521	1.339	1.112	1.06	0.9989	0.3622
0.935483870967742	1.501	1.315	1.095	1.059	0.9923	0.3599
0.967741935483871	1.468	1.282	1.063	1.031	0.9817	0.3586

0.1 1.6189 1.4389 1.2058 1.1563 1.0787 0.40521

Average of yearly averages: 0.38300

Inputs generated by pe5.pl - Novemeber 2006

Koc Koc 2300 mg/L

Photolysis half-life kdp 2.3 days Half-life

Aerobic Aquatic Metabolism kbacw 94.5 days Halfife

Anaerobic Aquatic Metabolism kbacs 94.5 days Halfife

Aerobic Soil Metabolism asm 36.0 days Halfife

Hydrolysis: pH 5 0 days Half-life

Hydrolysis: pH 7 0 days Half-life

Hydrolysis: pH 9 0 days Half-life

Method: CAM 1 integer See PRZM manual

Incorporation Depth: DEPI cm

Application Rate: TAPP 0.0146 kg/ha

Application Efficiency: APPEFF 0.0 fraction

Spray Drift DRFT 1.0 fraction of application rate applied to pond

Application Date Date 01-06 dd/mm or dd/mm or dd-mm or dd-mmm

Interval 1 interval 10 days Set to 0 or delete line for single app.

app. rate 1 apprate0.0146 kg/ha

Interval 2 interval 10 days Set to 0 or delete line for single app.

app. rate 2	apprate0.0146 kg/ha		
Interval 3	interval 10	days	Set to 0 or delete line for single app.
app. rate 3	apprate0.0146 kg/ha		
Interval 4	interval 10	days	Set to 0 or delete line for single app.
app. rate 4	apprate0.0146 kg/ha		
Interval 5	interval 10	days	Set to 0 or delete line for single app.
app. rate 5	apprate0.0146 kg/ha		
Interval 6	interval 10	days	Set to 0 or delete line for single app.
app. rate 6	apprate0.0146 kg/ha		
Interval 7	interval 10	days	Set to 0 or delete line for single app.
app. rate 7	apprate0.0146 kg/ha		
Interval 8	interval 10	days	Set to 0 or delete line for single app.
app. rate 8	apprate0.0146 kg/ha		
Interval 9	interval 10	days	Set to 0 or delete line for single app.
app. rate 9	apprate0.0146 kg/ha		
Record 17:	FILTRA		
	IPSCND 1		
	UPTKF		
Record 18:	PLVKRT		
	PLDKRT		
	FEXTRC 0.5		
Flag for Index Res. Run	IR	EPA Pond	
Flag for runoff calc.	RUNOFF	none	none, monthly or total(average of entire run)