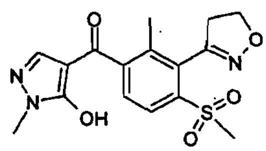
US EPA ARCHIVE DOCUMENT

ECOLOGICAL RISK ASSESSMENT

NEW CHEMICAL REGISTRATION

Topramezone (BAS 670H)

[3-(4,5-Dihydro-3-isoxazolyl)-2-methyl-4-(methylsulfonyl)phenyl]
(5-hydroxy-1-methyl-1H-pyrazol-4-yl) methanone
Chemical Family: Phenyl pyrazolyl ketone herbicide
CAS Registration Number: 210631-68-8
USEPA Chemical Code: 123009



Proposed End-Use Product: "BAS 670 336SC Post-emergent Corn Herbicide"
(29.7% topramezone)
Proposed Uses: Corn (grain, seed, popcorn, and sweet corn)

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I. Executive Summary

A. Nature of Chemical Stressor

Topramezone (BAS 670H; [3-(4,5-Dihydro-3-isoxazolyl)-2-methyl-4-(methylsulfonyl)phenyl](5-hydroxy-1-methyl-1H-pyrazol-4-yl) methanone) is a new post-emergence herbicide proposed for uses on corn (field corn, popcorn, seed corn, and sweet corn). Topramezone belongs to the phenyl pyrazolyl ketone family of herbicides. Its mode of herbicide action is inhibition of an enzyme (4-HPPD) that controls carotenoid biosynthesis. This is the same mode of action of isoxaflutole and mesotrione, although these two herbicides belong to different chemical families.

The proposed end-use product is "BAS 670 336SC Post-emergent Corn Herbicide" (29.7% topramezone). Aerial and ground applications are being proposed at a maximum application rate per season of 0.022 lb active ingredient per acre (25 g/ha) or two split applications seven days apart, but not to exceed 0.022 lb active ingredient per acre per season.

B. Potential Risks of Topramezone to Non-target Organisms: Animals and Plants

Topramezone is to be applied at a maximum application rate of 0.022 lbs ai/acre (25 g/ha) and is being proposed for ground and aerial applications. It was anticipated that non-target plants would be at risk. Minimal risk is expected for birds, mammals, fish and invertebrates including reptiles and amphibians

Direct Effects to Plants:

Vegetative vigor is a more sensitive endpoint than seedling emergence for topramezone. Therefore, even though exposure from drift alone is lower, in lb ai/acre, than drift plus runoff, the RQ for exposure from drift is higher, because the lowest EC_{25} (0.0001 lb ai/acre) and EC_{05} (0.000009 lb ai/acre) from vegetative vigor tests (soybeans) were much lower than the lowest seedling emergence EC_{25} (0.0039 lb ai/acre) and NOAEC (0.0017 lb ai/acre) (cabbage).

The vegetative vigor studies were not conducted with an adjuvant, as per label recommendation. Therefore, the effects on non-target plants may be more pronounced when an adjuvant is incorporated into the spray solution. This has been identified as a data gap.

A further evaluation of the Risk Quotients suggest that terrestrial dicots may be potentially at a higher risk than monocots. **Even though the LOCs were not exceeded for the terrestrial monocots, topramezone is recommended for the control of grasses. Therefore, risk to monocots to other non-tested species in terrestrial, dryland, and semi-aquatic habitats cannot be ruled out.**

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Tables I.1 and I.2 summarize the Levels of Concern for non-endangered and endangered terrestrial plants.

Table I.1. Summary of LOC exceedances for non-endangered terrestrial plants (dicots)			
Habitat and exposure route	Plant stage	Aerial	Ground
Terrestrial plants in dryland areas receiving drift and runoff	seed germination and seedling emergence	LOC not exceeded RQ<1	LOC not exceeded RQ<1
Terrestrial plants in semi-aquatic areas receiving drift and runoff	seed germination and seedling emergence	**LOC exceeded RQ=1.9**	**LOC exceeded RQ=2.8**
Areas adjacent to treated area receiving drift	vegetative vigor of emerged plants	**LOC exceeded RQ=11**	LOC not exceeded RQ<1

Table 2. Summary of LOC exceedances for endangered terrestrial plants (dicots)			
Habitat and exposure Route	Plant growth stage	Aerial	Ground
Terrestrial plants in dryland areas receiving drift and runoff	seed germination and seedling emergence	**LOC exceeded RQ=1**	LOC not exceeded RQ<1
Terrestrial plants in semi-aquatic areas receiving drift and runoff	seed germination and seedling emergence	**LOC exceeded RQ=4.5**	**LOC exceeded RQ=6.6**
Areas adjacent to treated area receiving drift	vegetative vigor of emerged plants	**LOC exceeded RQ=122**	**LOC exceeded RQ=24**

Aquatic

The primary route of exposure for aquatic plants is runoff. Drift was shown not to be a significant exposure route. Levels of Concern were exceeded for vascular endangered plants, with RQ ranging from 1.15 to 1.94, depending on the location of the corn scenario used in estimating environmental concentrations in surface water. Levels of Concern were not exceeded (RQ < 1) for non-endangered non-vascular plants and for endangered non-vascular plants

C. Conclusions to the Exposure Characterization

Environmental Fate

Biotransformation (soils; water-sediments) is the major route of dissipation of topramezone in the environment, although it is slow with a half-life from125 days to >1 year. However, there appears to be competition between biotransformation and sorption to soils/sediments in the overall dissipation of topramezone in terrestrial and water-sediment systems. Under environmental conditions, abiotic hydrolysis and direct photolysis in water are not important transformation pathways for topramezone. Topramezone exhibits high to moderate mobility in soils. Its major soil metabolite "M670H05" is highly mobile in soils. Topramezone is not expected to volatilize from soils or water nor to bioaccumulate in fish or other aquatic organisms.

Differences in persistence of topramezone, nature, and relative ratio of transformation products were found in six aerobic soils, but pseudo-first order, linear regression half-lives for topramezone were longer than 125 days. The major soil(> 10% of the applied radioactivity) metabolite is "M670H05" (3-(4,5-Dihydro-isoxazol-3-yl)-4-methanesulfonyl-2-methyl-benzoic acid), which could be persistent and accumulate in soils. In addition, if adsorption of topramezone on soils is considered as a dissipation route, topramezone residues on soils may have carryover potential from a growing season to the next. The metabolite 'MH670H01" ("cyano" metabolite) was found at > 10% only in one of six aerobic soils. Metabolites formed in aerobic soil were markedly different from those found in water-sediments (except "M670H01"). Metabolites were also distinctly different between anaerobic and aerobic water-sediments, but. deficiencies were identified in the water-sediment studies that must be addressed by the registrant to better understand the behavior of topramezone in water-sediment systems

Given the widespread cultivation of corn in the United States, there can be anticipated to be an extensive spatial and temporal variability in persistence, nature, and amount of biotransformation products of topramezone in soils.

Aquatic Ecosystems

Parent topramezone may enter a static water body by runoff and/or spray drift. Once in the water body, it may undergo biotransformation and/or adsorb to sediments, but how fast it adsorbs is not known, but is appears adsorption may control the dissipation of topramezone as opposed to biotransformation. The soil metabolite "M670H05" may reach surface water by runoff (or soil erosion), as this metabolite was not identified in water-sediment studies. The persistence of "M670H05" in water-sediment systems is not known. Exposure concentrations in surface water were estimated with the Tier II simulation models PRZM and EXAMS for ten different corn scenarios selected as surrogates to represent areas of potential use. Peak concentrations varied from 1.9 μgL^{-1} (Florida sweet corn) to 0.8 μgL^{-1} (East North Carolina). A major uncertainty affecting the confidence of the aquatic exposure concentration is the persistence of topramezone in water-sediment systems and how the physical and chemical characteristics of a water-sediment system may control the rate of dissipation.

The aquatic exposure assessment was performed only for parent topramezone. Ecological toxicity data with "M670H05" did not trigger a concern for aquatic organisms. No ecological toxicity data are available for "M670H01" and "M670H10". These metabolites were identified in water-sediment systems ("M670H01", aerobic; "M670H10", anaerobic) and have molecular structure features than suggest that they could exhibit the same mode of action as topramezone.

Terrestrial Ecosystems

Exposure in terrestrial ecosystems will occur through direct application to bird and mammal foraging food items in and immediately adjacent to the treated field. Based on the application rate, those residue levels will be relatively low compared to the acute and chronic toxicity to birds and mammals. Exposure to terrestrial and semi-aquatic ecosystems occupied by terrestrial plants will occur through drift and runoff. Exposure levels are likely to exceed levels of concern for terrestrial plants resulting in direct adverse effects to plants, and indirect effects are possible to animals depending on those plants for food, shelter and nesting structure.

D. Conclusions to the Effects Characterization

Topramezone is practically non-toxic to birds, mammals, fish, honeybees, earthworms, fish, but may be moderately toxic to marine/estuarine crustaceans. It is not expected to affect birds, mammals, fish or invertebrates chronically at levels that are expected in the field based on the relatively low application rate. Topramezone is toxic to aquatic and terrestrial plants. Nontarget terrestrial and aquatic plants would be at risk from off-site movement through drift and runoff.

There is some uncertainty in the chronic toxicity to birds. While the bobwhite study yielded a NOAEC of 294 ppm, the mallard study did not. There were small, but statistically significant reductions in body weight gain of offspring, and weight loss of adults, at the lowest level tested (100 ppm).

The EFED is recommending this chemical for future screening in the Endocrine Disruptor Screening Program (EDSP) in order to better characterize any topramezone effects related to endocrine disruption in wildlife and aquatic animals. Topramezone showed some effects in laboratory studies, such as reduction in number hatched to viable embryos, hatchling body weight and female weight gain in birds, thyroid effects for mammals, reductions in weight and length of fish, and reductions of live offspring produced per female daphnid. In addition, causes eye effects, pancreatic effects, and skeletal variations typically caused by inhibition of the enzyme 4-HPPD. Topramezone in an inhibitor of the 4-HPPD enzyme.

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E. Uncertainties and Data Gaps

1. Exposure

Aquatic Exposure

The following factors can introduce uncertainties in the aquatic assessment. Some are identified as data gaps:

a. Topramezone is a weak acid (pKa 4.06). Above pH 5, the concentration of the anionic form increases and, theoretically, mobility will also increase. For example, the persistence and mobility of most sulfonylurea herbicides (also weak acids) have been found to increase with pH. However, the range of soil pH used in the aerobic soil metabolism and sorption studies conducted with topramezone as the test substance was quite narrow (5.7 to 6.9) and does not allow an adequate correlation of pH with mobility.

b. Persistence in water-sediment systems is not well established because of inherent flaws in the studies and/or inadequate selection of water-sediment systems. The petitioner has been asked to address specific issues identified in their data.

c. The estimated environmental concentrations (EECs) for aquatic exposure assessment was performed only for parent topramezone, but a qualitative assessment of other chemical species that might be in surface water was also included in the overall assessment. The only metabolite for which there are ecological toxicity data is "M670H05". However, two other metabolites (M670H01 and M670H10) have molecular features that suggest a mode of action similar to topramezone and other known 4-HPPD inhibitors.

d. It appears that there is competition between biotransformation and binding to soils/sediments, but which process controls the dissipation of topramezone cannot be satisfactorily established from the provided guideline studies. The guideline studies are not designed to estimate time-dependent adsorption/desorption (i.e., the kinetics of sorption). The significance is that these bound residues may be released later and prolong undesirable exposure.

e. The sensitivity of available analytical chemistry method to identify and quantify residues of topramezone in water is not adequate. The Limit of Quantitation (LOQ) of this method is 60 μgL^{-1} (ppb) whereas Levels of Concern for aquatic vascular plants were triggered at concentrations of < 2 μgL^{-1}, which is well bellow this LOQ. Thus, this method cannot quantify residues of topramezone at concentrations triggering Levels of Concern for aquatic vascular plants. This analytical chemistry method cannot be used for monitoring or investigations at ecologically significant exposure levels.

Terrestrial Exposure

An uncertainty in the exposure assessment is that for Tier 1 risk assessments, oral ingestion is the only route of exposure considered. Exposure by dermal and inhalation is not assessed. However to balance that, some fairly conservative assumptions are made in the exposure assessment that is conducted. For example, high end exposure levels are assumed, maximum application rates are used, for the tier one assessment, it is assumed that birds and mammals feed 100% on the food item (short grass) containing the highest expected residues. This tends to maximize the exposure level against which toxicity is compared. Therefore, the assessment is considered to be certain enough to identify direct toxicity, if it was likely. Other uncertainties as follows:

a. There is a potential for long-term accumulation of the metabolite "M670H05", but the extent of accumulation is not known. Thus, long-term exposure of plants or animals cannot be assessed at this time. Likewise, if time-dependent binding to soils rather than biotransformation control the "disappearance" of topramezone in soils, there is a potential for carryover from season-to-season. Because the rate of adsorption/desorption of topramezone to soils is not known, the bioavailability of topramezone via desorption cannot be assessed.

c. There are no terrestrial plant data to evaluate the phytotoxicity of the metabolites of topramezone. Metabolite "M670H05" has the potential to accumulate in soils from carryover. The effect of this metabolite on plants is not known.

d. Even though the water-sediment studies have deficiencies that must be addressed by the registrant, two different metabolites may be present in water-sediment systems (M670H01 under aerobic conditions and M670H10 under anaerobic conditions). The metabolites M670H01 and M670H10 have molecular structure features required for herbicides that exhibit the same mode of action as topramezone, isoxaflutole, and mesotrione. Potentially these two metabolites may also have herbicidal effects, but there are no plant data to show if they are herbicide active or not.

e. Topramezone is a carotenoid biosynthesis inhibitor (via inhibition of an enzyme, 4-HPPD). The effect of topramezone on non-target plants at the carotenoid pigment development stage is not known. Current plant studies do not address effects at higher levels of development. Therefore, there is a potential for inhibition of carotenoid biosynthesis in non-target plants at higher developmental stages such as prior to flowering, fruit-development and maturing.

II. Problem Formulation

A. Stressor Source and Distribution

1. Source and Intensity

Topramezone (BAS 670H) is a new active ingredient proposed as a selective, systemic, post-emergence herbicide for weed control on grain corn, popcorn, seed corn, and sweet corn. It may be used on conventional and herbicide resistant/tolerant hybrids for field corn. The proposed end-use product is 'BAS 670 H 336 SC", a soluble concentrate formulation containing 29.7% topramezone. The proposed label allows ground and aerial applications, but application through irrigation systems are not allowed. The maximum application rate per growing season is 0.022 lbs ai/acre (25 g/ha).

Corn cultivation in the United States is extensive. Thus, a wide range of soils, climates, hydrological characteristics, and agricultural practices are expected throughout the corn growing areas. Therefore, the use of topramezone is likely to encompass a wide variety of ecosystems. As a herbicide, adverse effects to non-target plants can be anticipated. Topramezone may reach non target sites by spray drift and/or runoff from adjacent agricultural sites.

2 Chemical Identity of the Stressor

Topramezone (BAS 670H) is a new herbicide active ingredient belonging to the phenylpyrazolyl ketone chemical family of herbicides[1] Refer to Table II.1 for further chemical identity information.

Table II.1 Chemical Identity of the Stressor

Type of Information	Chemical Specific Information
Common Name Company Code	**Topramezone** BAS 670H
CAS Registry Number	210631-68-8
CAS Name	[3-(4,5-Dihydro-3-isoxazolyl)-2-methyl-4-(methylsulfonyl)phenyl](5-hydroxy-1-methyl-1H-pyrazol-4-yl) methanone
IUPAC NAme	[3-(4,5-dihydro-isoxazol-3-yl)-4-methylsulfonyl-2-methylphenyl]-(5-hydroxy-1-methyl-1*H*-pyrazol-4-yl)methanone
OPP Name and Code	[3-(4,5-Dihydro-3-isoxazol-3-yl)-4-methanesulfonyl-2-methyl-phenyl](5-hydroxy-1-methyl-1H-pyrazol-4-yl) methanone 123009
Empirical Formula	C16H17N3O5S

[1] Other members of this family include benzofenap, pyrazolynate, and pyrazoxyfen

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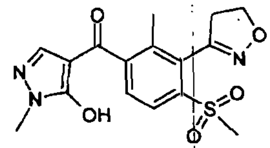
Type of Information	Chemical Specific Information
Molecular Weight	363.39 g/mol
Molecular Structure	
Proposed Name of End-use Product	"BAS 670 336SC Post-emergent Corn Herbicide" (29.7% topramezone)

a. Physical and Chemical Properties

Physical and chemical properties are intrinsic properties of a chemical. Some of these properties can be use to identify potential behavior of a chemical in the environment. For example, a low vapor pressure and Henry's Law Constant suggest low potential for volatilization from soil and water. The physical and chemical properties of topramezone are presented in Table II.2.

Table II.2 Physical and Chemical Properties of Topramezone

Parameter	Value	
Solubility in Water (20°)	pH	gL-1
	3	0.06
	5	0.98
	7	15
	9	23.4
Solubility in Non-aqueous Solvents, g/100 mL at 20°C	Solvent	Solubility
	Acetone	<1.0
	Acetonitrile	<1.0
	Dichloromethane	2.5 - 2.9
	Ethyl acetate	<1.0
	Methanol	<1.0
	N-heptane	<1.0
	N,N-dimethylformamide	11.4-13.3
	1-octanol	<1.0
	Olive oil	<1.0
	2-propanol	<1.0
	Toluene	<1.0
Dissociation constant (pKa)		4.06
Vapor Pressure, (25°)	1 x10 $^{-10}$ Pa (Measured) 1.3 x 10 $^{-10}$ Pa (Estimated by EPI)	
Henry's Law Constant (25°)	3 x 10 $^{-15}$ Pa −m3mole-1 (Estimated by EPIWIN 3.1)	

Parameter	Value	
Log *n*-octanol/water Partition Coefficient (Log Kow) at 20°C	Buffer pH 4 7 9	Log Kow −0.81 −1.52 −2.34
UV/visible absorption spectrum (pH not specified) (where ϵ is the molar absorption coefficient)	λ, nm 207 272 300 410	ϵ, $mol^{-1}cm^{-1}$ 27 077 8601 5800 410
Other	Topramezone is a white solid with a density of 1.425 gcm^{-3} and a Melting Point range of 220.9 to 222.2° C	

Topramezone is a weak acid (pKa 4.06; 1:1 ratio of anionic form to undissociated acid). Thus, in the environmentally significant pH range of 5 to 9, topramezone is not likely to predominate as the undissociated species. The concentration of dissociated topramezone will increase with increasing pH. However, at pHs near the pKa, some undissociated topramezone can still be present. In general, anions do not tend to bind to soils/sediments[2] and therefore, based on the value of the pKa alone, topramezone is expected to partition predominantly into the water column and to be mobile.

Based on the vapor pressure alone, topramezone has low potential to volatilize from soils. The low Henry's Law Constant (estimated) and the high, pH-dependent solubility of topramezone suggest that topramezone has a low potential to volatilize from water. The very low, pH dependent *n*-octanol/water partition coefficients indicate that topramezone has a very low potential to bioaccumulate in fish.

Topramezone absorbs energy (i.e., has electronic absorption bands) within the spectrum of sunlight. Thus, it meets the necessary condition to undergo direct photolysis in water. However, this necessary condition alone can not be used to conclude that it will actually photolyze, as the absorbed energy must be sufficient to cause bond breaking, rearrangements, or photoredox reactions. Therefore, the results of the photolysis in water study must be used to assess the effect of sunlight on topramezone.

b. <u>Environmental Fate Parameters</u>

Environmental fate parameters are taken from the environmental fate studies required to support registration of a pesticide. Unlike the intrinsic, physical and chemical properties, environmental fate parameters are extrinsic properties that are specific to the test media and conditions of the studies (e.g., type of soil, temperature, moisture content). Therefore, some information about

[2] Unless other biding mechanisms, such as chemisorption and hydrogen bonding are involved.

these conditions have been included in Table II.3.

Table II.3 Environmental Fate Parameters for Topramezone

Environmental Studies	Half-life (Linear)	Experimental Conditions	Comments
161-1 Abiotic Hydrolysis	Could not be established- Stable	pH 5, 7, and 9, 25° C	Topramezone is a weak acid (pKa 4.06). The solubility and concentration of the anionic form increases with increasing pH
161-2 [Direct] Photolysis	132 days based on a 12 hrs light/dark cycle	Artificial xenon-arc lamp, mimicking spring sunlight at 40° latitude North 22° C	Even though topramezone absorbs energy within the wavelength range of sunlight, the observed photoreaction quantum yield (ϕ) is very low. Thus, direct photolysis in water under environmental conditions is not a significant degradation route
161-3 Photolysis on Soil	> 33 days	Artificial xenon-arc lamp, mimicking spring sunlight at 40° latitude North Sandy loam soil 22° C	Photolysis on soil under environmental conditions is not a significant degradation route
162-1 Aerobic Soil Metabolism: Topramezone (6 soils) Metabolite M670H05 (NC sandy loam)	125 to > 1 year 55 to > 1 year	<u>Topramezone</u> Studies were conducted in the following soils: loam (Idaho), silt loam (Indiana), loam (Iowa), clay (Minnesota), silt loam (South Dakota) and sandy loam (North Carolina) Studies with topramezone an M670H05 were conducted at 27° C	Nature and relative ratio of biotransformation products, including CO_2, varied across the soils The most frequently identified metabolite was M670H05. Only in one soil "M670H01" was identified at >10% of the applied radioactivity
162-3 Anaerobic Aquatic	13 to 24 days (total system) Deficiencies need to be addressed by registrant	Lake reservoir in South Dakota; silt loam sediment 25° C	Only metabolite was M670H10, which is structurally very different from other metabolites. This metabolite is consistent with what is expected in a reducing (anoxic) environment.

Environmental Studies	Half-life (Linear)	Experimental Conditions	Comments
162-4 Aerobic Aquatic	System 1: > 120 days (water, sediment, and total system) System 2: Water: 11 days; Sediment: 49- 78 days Whole system: 19 to 24 days	System 1: River water; loamy sand sediment System 2: Pond water; loam sediment 20° C	Marked differences were observed in the properties of water of the two systems. Which property (or properties) of the pond water control the persistence of topramezone in not known.
163-1 Mobility in soil (Batch-equilibrium adsorption/desorption)	Kads (Freundlich): 1.4 to 4.9 Koc: 38 to 303	Same soils as those used in the aerobic soil metabolism study	Topramezone is a weak acid (pKa 4.06). Thus, the concentration of the anionic form increases with increasing pH. The higher the concentration of the anionic form, the weakest the binding to soils. However, the pH range of the soils was too narrow to adequately correlate mobility with pH

Note: The hydrolysis, direct aqueous photolysis, photolysis on soil, aerobic soil metabolism, and batch-equilibrium adsorption/desorption studies are acceptable. The biotransformation of topramezone in water-sediment systems (anaerobic and aerobic) may be acceptable if satisfactory additional information is received from the petitioner.

From the data summarized in Table II.3 biotransformation could be identified as a route of transformation of topramezone in the environment and considerable variability in persistence and metabolites might be expected across the use areas of this herbicide. However, time-dependent sorption, as evidenced from the increase of non-extractable residues in soils/sediment with time, might be an important dissipation route for topramezone.

3. Pesticide Type, Class, and Mode of Action

Topramezone belongs to the phenyl pyrazolyl ketone chemical family of herbicides. It is a selective, systemic herbicide proposed for post-emergence control of broadleaf and grass weeds on corn.

The mode of action of topramezone is inhibition of carotenoid biosynthesis by inhibiting the 4-hydroxyphenyl-pyruvate-dioxygenase enzyme (4-HPPD)[3] in the chlorophyll pathway and

[3] See http://www.plantprotection.org/HRAC/MOA.html

ultimate breakdown of chloroplast. Inhibition of carotenoid[4] biosynthesis causes "albino growth" in new plant tissues. Topramezone is absorbed by the leaves, roots and shoots, then translocated to the growing points of the sensitive weeds. This causes a strong bleaching activity on the growing zones of the shoots within 2-5 days of application. Plant growth does continue for a time, but without production of green photosynthetic tissue, growth of affected plants can not be maintained. Even though topramezone do not directly inhibit chlorophyll biosynthesis, direct exposure to light (photooxidation) causes plant death within 14 days after application. Carotenoids are also present in some bird feathers (e.g, flamingo; canary) and some crustaceans. The 4-HPPD enzyme also occurs in mammals and is involved in tyrosine catabolism.

Topramezone shares the same mode of action with isoxaflutole (cyclopropylisoxazole family of herbicides) and mesotrione (a triketone belonging to the benzoylcyclohexanedione family). The common structural features associated with 4-HPPD inhibition by these herbicides are: (1) at least one carbonyl (keto) group must be a substituted benzoyl group[5] and (2) at least a keto group is able to enolise (i.e., keto-enol tautomerism that favors the enolate tautomer). It is the enolate that is capable of inhibiting the enzyme by a competitive reaction of the enolate with dioxygen (molecular oxygen) at the Fe(II) site of the enzyme. This Fe (II) is the reaction site of the enzyme. The Fe(II) in 4-HPPD is a non-heme Fe(II)[6]. Inhibition of the enzyme by the enolate involves Fe-

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[4] Carotenoids are red, yellow and orange pigments that are widely distributed in nature. Although specific carotenoids have been identified in photosynthetic centers in plants, bird feathers, crustaceans and marigold petals, they are especially abundant in yellow-orange fruits and vegetables and dark green, leafy vegetables.

Carotenoids are a class of hydrocarbons (carotenes) and their oxygenated derivatives (xanthophylls) consisting of eight isoprenoid units joined in such a manner that the arrangement of isoprenoid units is reversed at the centre of the molecule so that the two central methyl groups are in a 1,6-positional relationship and the remaining nonterminal methyl groups are in a 1,5-positional relationship. All carotenoids may be formally derived from the acyclic structure of $C_{40}H_{56}$ having a long central chain of conjugated double bonds, by (i) hydrogenation. (ii) dehydrogenation, (iii) cyclization, or (iv) oxidation. or any c combination of these processes

http://www.chem.qmul.ac.uk/iupac/carot/car1t7.html

[5] [2-(methylsulfonyl)-4-trifluoromethylphenyl]- in isoxaflutole, [4-(methylsulfonyl)-2-nitrobenzoyl]- in mesotrione, and [3-(4,5-dihydro-3-isoxazolyl)-2-methyl-4-(methyl-sulfonyl)phenyl] in topramezone.

[6] Zhu, Y-Q, et al. 2005. *The Synthesis and Herbicidal Activity of 1-Alkyl-3-(α-hydroxy-substituted benzylidene)pyrrolidine-2,4-diones*. **Molecules**, 10: 427-434.

Wu, SC, et al. 2002. *Mode of action of 4-hydroxyphenylpyruvate dioxygenase inhibition by triketone-type inhibitors*. **J. Med. Chem.**, 23, 45(11), pp. 2222-8.

Continuation of Footnote 6

Matriange, M. et al. 2005. *p-Hydroxyphenylpyruvate dioxygenase inhibitor resistant plants*. **Pest Manag Sci.** 61(3): 269-76.

Yan, C, et al. 2004. *Structural basis for herbicidal inhibitor selectivity revealed by comparison of crystal structures of plant and mammalian hydroxyphenylpyruvate dioxygenases*. **Biochemistry**, 43(32): 10414-23.

Meazza, G., et al. 2002 *The inhibitory activity of natural products on plant p-hydroxyphenyl-pyruvate dioxygenase*. **Phytochemistry**, 60(3): 282-8.

enolate chelation[7], which causes a reduction of the activity of 4-HPPD as a dioxygenase. That is, it inhibits the incorporation of both oxygen atoms of dioxygen needed to form homogentisate[8], a precursor for pigment biosynthesis[9]. This mechanism of inhibition also applies to animal 4-HPPD by decreasing the formation of homogentisate, a degradation product of tyrosine.

4. Overview of Pesticide Usage

As a new herbicide, the extent at which topramezone will be actually used cannot be anticipated. However, it is reasonable to assume that it will be used in major corn growing areas of field, popcorn, and sweet corn (See Figure II.1). Therefore, use of topramezone may be widespread and will expand throughout different ecoregions of North America[10] and compare to corn acreage planted in the United States (Figure II.1)

Continuation Footnote 7,

Simkin, A.J., et al. 2003. *Comparison of carotenoid content, gene expression and enzyme levels in tomato (Lycopersicon esculentum) leaves.* **Z. Naturforsch. [C]**, 58 (5-6): 371-80.

Corona, V., et al. 1996. *Regulation of a carotenoid biosynthesis gene promoter during pigment development.* **Plant J.** 9(4): 505-12.

[7] From a close inspection of the molecular structure of topramezone, isoxaflutole, and mesotrione the keto-oxygen can be identified as the binding atom.

[8] Biosyntehesis of homogentisate includes a decarboxylation effect and rearrangement of the pyruvate side chain.

[9] Prescott, A.J. and Lloyd, M.D. 2000. *The Fe(II) and 2-oxoacid-dependent dioxygenases and their role in metabolism.* **Nat. Prod. Rep.**, 17, 367-383.

Bassam, A., Borowski, and Sieghbahn, P.E.M. 2004. *Quantum chemical studies of dioxygen activation by mononuclear non-heme iron enzymes with the 2-His-1-carboxylate facial triad.* **Dalton Trans.**, 3153- 3162.

Sailland, S.L., et al. 1999. *Crystal structure of Pseudonomas fluorescens 4-hydroxyphenyl-pyruvate dioxygenation in the tyrosine degradation pathway.* **Structure Fold Des**, 7(8), 977-88.

[10] http://www.fs.fed.us/land/ecosysmgmt/ecoreg1_home.html

The Bailey's classification system is comprised of broad "Domains"(not shown). Each "Domain" is then narrowed down into "Divisions" and each "Division" is further divided into "Provinces" The continental USA (conterminous states) is comprised of three Domains: a Dry Domain (center), a Humid Temperate Domain (East and West of the Dry Domain), and a Humid Tropical Domain (Southern Florida). There are 7 Divisions in the Dry Domain, 11 in the Humid Temperate Domain, and 1 in the Humid Tropical Domain.

A brief description of selected provinces where corn is grown is presented below in an attempt to show the variability in soils and climate among corn growing areas.

<u>Everglades Province (Southern Florida); Savanna Division</u>:
Almost flat marl and limestone shelf generally covered with a few feet of muck and a little sand. Elevation ranges from sea level to 25 ft (7.6 m). Average annual temperatures in this tropical climate range from 70 to 75F (21 to 24C), with minimums from October to February. Wet season between late spring and middle of fall and dry season between late fall and early spring. Histosols are the principal soils. In slightly less wet parts of the southern Everglades, Inceptisols occupy extensive areas Sweet corn is cultivated in this area.

<u>Outer Costal Plain Mixed Forest; Subtropical Division</u> (Brown: Eastern USA)

This province comprises the flat and irregular Atlantic and Gulf Coastal Plains down to the sea. The climate regime is equable, with a small to moderate annual temperature range. Average annual temperature is 60 to 70F (16 to 21C). Rainfall is abundant and well distributed throughout the year.

Soils are mainly Ultisols, Spodosols, and Entisols

<u>Prairie Parkland Temperate Province; Prairie Division</u> (Yellow)

It covers an extensive area from Canada to Oklahoma, with alternating prairie and deciduous forest. Summers are usually hot, and winters are cold, especially in the northern part of the province. Average annual temperatures may reach 40F (4C) in the north and 60F (16C) in the south. Winters are short and relatively mild in southerly areas. The frost-free season ranges from 120 days along the northern fringe to 235 days in the south. Average annual precipitation ranges from 20 to 40 in (510 to 1,020 mm), falling mainly during the growing season.

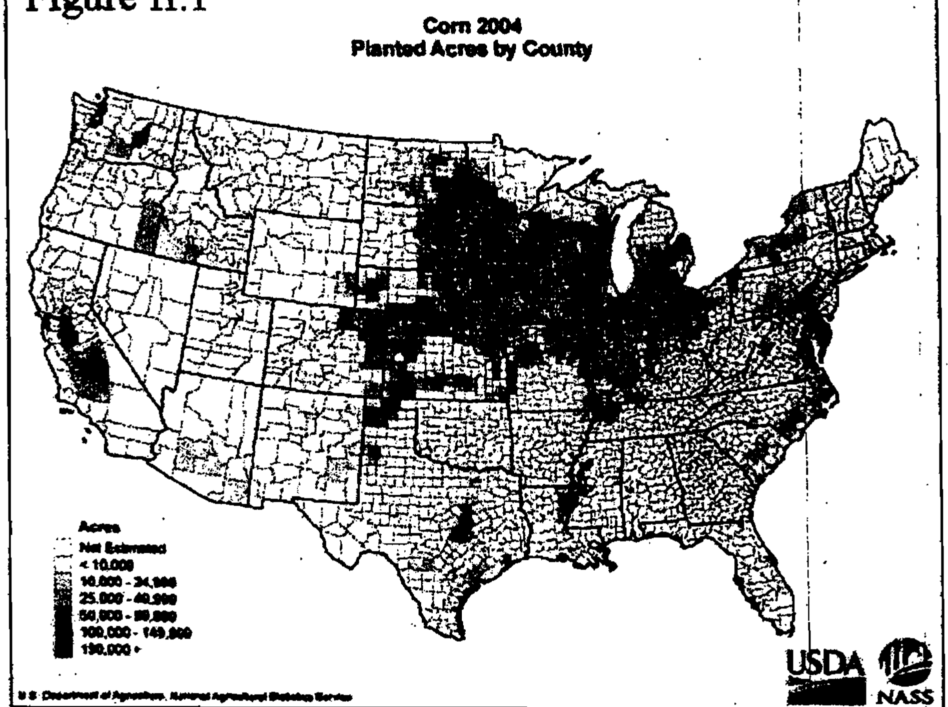
Mollisols dominate throughout the province. Alfisols are found in the Mississippi Valley

<u>Southeastern Mixed Forest; Subtropical Division</u> (Pink, Southeastern USA)

The climate is roughly uniform throughout the region. Mild winters and hot, humid summers are the rule; the average annual temperature is 60 to 70F (15 to 21C). The growing season is long (200 to 300 days), but frost occurs nearly every winter. Precipitation, which averages from 40 to 60 in (1,020 to 1,530 mm) annually, is rather evenly distributed throughout the year, but peaks slightly in midsummer or early spring, when it falls mostly during thunderstorms. Precipitation exceeds evaporation, but summer droughts occur. Snow falls rarely and melts almost immediately

Ultisols dominate throughout the region, with locally conspicuous Vertisols formed from marls or soft limestones. The Vertisols are clayey soils that form wide, deep cracks when dry. Inceptisols on floodplains of the major streams are among the better soils for crops.

Figure II.1



http://www.usda.gov/nass/graphics/county04/pages/CR-PL0TRGBChor_gif.htm

(18)

The maximum proposed application rate is 0.022 lb ai/acre (25 g/ha) per growing season. is. It may be applied in 2 split applications not to exceed the seasonal total maximum of 0.022 lb ai/acre, allowing 7 days between sequential application. Aerial and ground applications are proposed, but application through irrigation systems are not allowed. As a post-emergence herbicide, it will be applied when weeds are actively growing. The product may be used in conservation tillage as well as conventional tillage production systems.

Topramezone needs to be applied in conjunction with a nitrogen fertilizer and a petroleum -based or vegetable- seed based oil concentrate or a methylated seed oil as adjuvant. It may be mixed with other recommended herbicides, but should not be mixed with isoxaflutole or mesotrione. Topramezone can be applied up to 45 days prior to corn harvest Therefore, time of application is expected to vary depending on the typical harvest period for different use areas and type of corn crop.

5. Receptors

1. Aquatic Effects

For the aquatic ecosystem, ecological receptors include all aquatic life (fish, amphibians, invertebrates, plants) and those terrestrial animals (e.g., birds and mammals) that consume aquatic organisms. Based on the above sources/transport pathways, exposure media, and potential receptors of concern, specific questions or risk hypotheses formulated to characterize direct effects of topramezone application to selected assessment endpoints is provided below.

Risk to aquatic animals are based on registrant submitted acute and sublethal laboratory tests with aquatic vertebrates (Rainbow trout, Bluegill sunfish and Sheepshead minnow) and invertebrates (Water fleas, Mysid shrimps and Eastern oysters) Risk to aquatic vascular and nonvascular plants will be based on registrant submitted short-term tests to algae and diatoms, and duckweed.

2. Terrestrial Effects

Ecological receptors of concern identified for consideration in the terrestrial environment include primary producers, represented by both upland and wetland/riparian vegetation, and primary and secondary consumers, both vertebrates and invertebrates, representing common ecological functional feeding groups (*i.e.*, herbivores and insectivores). Herbivores as used here include animals that feed on foliage (stems and leaves), seeds, and/or fruit; the term granivore is sometimes used to identify animals that feed primarily on seeds. Omnivores (*i.e.*, consumers that feed on a mixed diet of animals and plants) are also potentially exposed but are not specifically included in the receptor list for a screening level risk assessment because exposure concentrations and risk levels will fall between the exclusive feeding groups.

Based on the sources/transport pathways, exposure media, and potential receptors of concern, specific questions or risk hypotheses formulated to characterize direct effects of topramezone following application on areas to selected assessment endpoints is provided below.

Risk to terrestrial animals will be based on registrant submitted acute and reproductive laboratory tests with birds (Northern bobwhite quail and mallard duck) and mammals (Norway rat or house mouse). to represent all terrestrial vertebrates. Risk to terrestrial plants will be assessed using registrant submitted vegetative vigor and seedling emergence laboratory tests with 10 species of crops (six dicots: soybean, cabbage, lettuce, radish, tomato and bean; four monocots: ryegrass, onion, wheat, and corn).

3. Ecosystems at Risk

The terrestrial ecosystems potentially at risk include the treated area and areas immediately adjacent to the treated area that might receive drift or runoff, and might include other cultivated fields, fence rows and hedgerows, meadows, fallow fields or grasslands, woodlands, riparian habitats and other uncultivated areas. For Tier 1 assessment purposes, risk will be assessed to terrestrial animals assumed to exclusively occur in the treated area. Risk will be assessed to terrestrial plants assumed to exclusively occur in areas immediately adjacent to, and in wetlands receiving runoff from treated areas.

Aquatic ecosystems potentially at risk include water bodies adjacent to, or down stream from the treated field and might include impounded bodies such as ponds, lakes and reservoirs, or flowing waterways such as streams or rivers. For uses in coastal areas, aquatic habitat also includes marine ecosystems including estuaries. For Tier 1 assessment purposes, risk will be assessed to aquatic animals and plants assumed to occur in small, static ponds receiving runoff and drift from treated areas.

As a new chemical, the use areas of topramezone are not known, but it is reasonable to assume that it may be used in major corn growing areas. However, corn cultivation in the United States is very widespread and includes a wide range of soils, climates, altitude, hydrology, and weather patterns that can support different and distinct ecosystems. For example, corn grown in the Mid-Atlantic states or Florida may be close to wetlands and marine ecosystems while corn grown and/or fields draining along the Mississippi basin would be predominantly freshwater ecosystems. It should be noted that Florida is a major grower of sweet corn and that the sweet corn growing areas are predominantly located in counties around the Everglades.

Because corn is grown practically within all latitudes of the country, planting times, times of weed emergence, growing season , and harvest times can vary considerably from region to region. Even for corn grown in the same area, differences in use scenarios can be expected when corn is grown as "sweet corn" (a warm weather crop) or as "field corn", given that the intervals between planting and harvesting are shorter for sweet corn than for field corn.

B. Assessment Endpoints

Environmental Fate Assessment

Laboratory scale and field studies serve to identify the most important routes of dissipation of a chemical stressor under environmental conditions. It is important to recognize that the studies are conducted on a limited number of test systems (soils; water-sediment systems), experimental conditions, and field sites. Therefore, environmental fate and exposure assessments are limited by guideline design and number of test systems, which may not be representative for all of the potential use areas of a pesticide.

Four major components enter in any environmental fate assessment of a chemical:

1. Kinetics- Identification of how fast and in which media the chemical dissipates (i.e., the persistence of the chemical)
2. Transformation- Identification of processes (abiotic and microorganism mediated) involved in the degradation of the chemical in different environmental media, the nature of the transformation products, and molecular features that may suggest potential herbicidal effects of these products.
3. Transport- Identification of the potential movement of the chemical (or transformation products) in the different environmental compartments
4. Accumulation- Identification of the potential of a chemical (or transformation products) to accumulate in soils and/or sediments or to bioaccumulate in organisms.

Ecological Toxicity Assessment Endpoints

The measurement endpoints addressed in this assessment include survival, growth, and reproduction of individual terrestrial and aquatic animals and by inference, health of populations and communities. Effects to terrestrial animals are assessed by considering the potential for survival and reproductive risk to birds and mammals. These effects seen in birds are intended to also represent potential risk to reptiles.

Effects to aquatic animal communities are assessed by considering potential for survival risk to individual freshwater and estuarine/marine fish and invertebrates, sub-lethal effects to fish and reproductive effect to freshwater invertebrates. The assessment cannot address potential for reproductive risk to a broad range of aquatic animals because reproductive toxicity tests are only available for invertebrates. Therefore, there is uncertainty in the potential for adverse effects to aquatic communities (except invertebrates) through potential reproductive effects. The fish early life stage study results compared to aquatic EECs suggests low sub-lethal risk, but that study does not address reproductive endpoints.

Effects to aquatic plant communities is assessed by analyzing the potential risk to growth of vascular and nonvascular populations. Effects to terrestrial plant communities is determined by assessing potential growth and survival of individual plants.

Generally, for either terrestrial or aquatic ecosystems, if a screening level assessment using upper bound exposure levels in conjunction with the most sensitive toxicity values result in a

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presumption of minimal risk at the individual level, that is, no LOCs are exceeded, there is a substantial degree of certainty of minimal impacts to populations or communities. A presumption of risk at the individual level *could* indicate a population or community effect. Refinement of the risk conclusions would be then needed to draw reasonable conclusions regarding the potential for population or community effects from the screening level assessment.

Specific toxicity endpoints required and used for ecological assessment of topramezone are listed below. A detailed characterization of the rationale for the use of these endpoints may be found in "Overview of the Ecological Risk Assessment Process in the Office of Pesticide Programs" (http://www.epa.gov/espp/consultation/ecorisk-overview.pdf)

C. Conceptual Model

1. Risk Hypotheses

Risk hypotheses are specific assumptions about potential adverse effects (i.e., changes in assessment endpoints) and may be based on theory and logic, empirical data, mathematical models, or probability models (EPA, 1998). For this assessment, the risk is stressor-linked, where the stressor is the release of topramezone to the environment via aerial or ground applications to corn The following risk hypothesis is presumed for this screening level assessment:

Topramezone has the potential to runoff from soils (high mobility and persistence) and/or enter surface water or non-target fields by spray drift. Thus, topramezone has the potential to affect the food-web of the non-target aquatic and terrestrial ecosystems and cause reduced survival, and reproductive and/or growth impairment for both aquatic and terrestrial animal and plant species. Furthermore, topramezone inhibits the biosynthesis of carotenoids, which could result in discoloration of plants that are attractive to animals as food source. This last point is mentioned as a possible effects, but is not specifically assessed in this document.

2. Conceptual Model Diagram

A generalized, conceptual model for topramezone is shown in Figure II.2

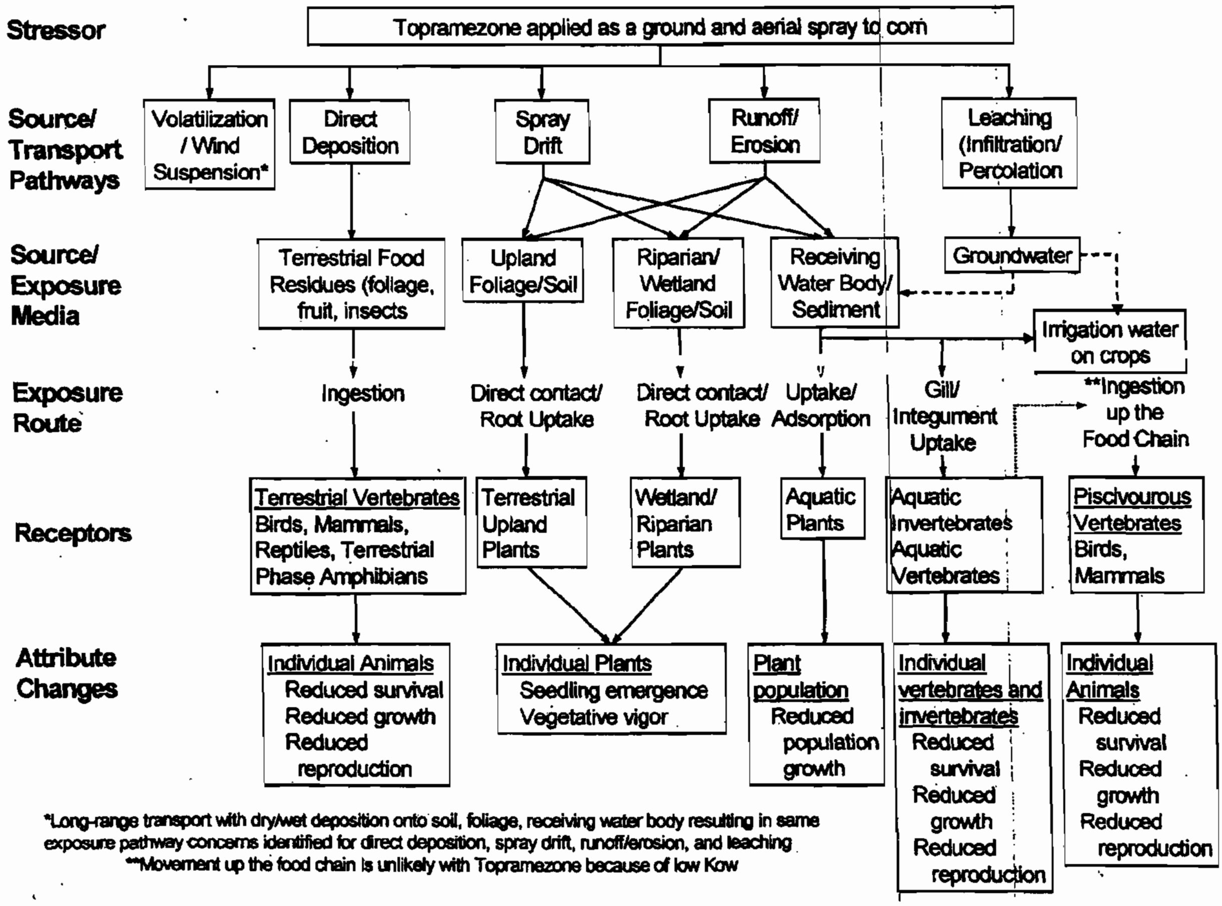

Figure II.2 Conceptual Model for Exposure Routes for Topramezone Herbicide

This generalized conceptual model diagram (Figure II.2) does not include exposure to transformation products or other dissipation processes that are specific to topramezone. A preliminary environmental fate assessment indicated that transformation of topramezone in the environment is controlled by microorganisms (i.e., biotransformation). However, this preliminary assessment also suggested that time-dependent sorption may be controlling the overall dissipation of topramezone in soils and/or sediments as a competitive process with biotransformation.

The chemical species to which animal and plants may be exposed, in which media, and the route of exposure are summarized below. All of these chemical species were considered in the exposure assessment, at least qualitatively.

Potential Exposure of Topramezone and Metabolites in Ecosystems.

Chemical Species	Observed	Route of Exposure	Exposure
Topramezone	All studies (Test substance)	Direct application to treated field Spray drift Runoff	Terrestrial Aquatic
"M670H05"	Aerobic Soils	Formation in the treated field Runoff	Terrestrial (as high as 16%) Aquatic
"M670H01"	Some aerobic soils Aerobic water-sediment system	Formation in the treated field Runoff Formation in aerobic water-sediments	Terrestrial (10%) Aquatic (10%)
"M670H10"	Anaerobic water-sediments	Formation in anaerobic water-sediments	Aquatic (16% water)

Of these metabolites, "M670H01" and "M670H10" have molecular features that suggest that they may potentially exhibit herbicidal activity, but no plant toxicity data or other ecological toxicity data are available for these metabolites.

E. Analysis Plan

1. Preliminary Identification of Data Gaps and Methods

As the first step in the analysis plan, environmental fate and toxicity studies were evaluated for completeness of data required under FIFRA and the scientific validity of the submitted studies. Data from these studies were taken to gather the necessary information to assess the exposure and effects of topramezone when used as a post-emergence herbicide on corn.

The assessment was performed at the screening level only, assuming that potential use of topramezone would be in any corn growing areas (field corn, seed corn, popcorn, and sweet corn).

Environmental Fate

All of the environmental fate studies required under FIFRA for registration of a terrestrial food-use herbicide were submitted by the petitioner. Although some of the studies have deficiencies that introduce a high level of uncertainty into certain aspects of the assessment, it was deemed in general that data from the studies was sufficient to generate a screening exposure assessment for topramezone. That is, to identify persistence, degradation pathways, transformation products, transport mechanisms (topramezone and products), and the potential to accumulate on soils, sediments, or fish. These data served as the basis for selecting the appropriate environmental fate input parameters for use in simulation to estimate exposure in ecosystems potentially at risk models.

Among the major uncertainties brought out from the laboratory studies are:

(a) The behavior of topramezone in water-sediment systems (anaerobic; aerobic) because of study deficiencies and/or inadequacy of some of the water-systems.

(b) The pH-dependence of adsorption of the weak acids topramezone and its soil metabolite M670H05 onto soils (and hence, mobility) could not be adequately established because of the narrow pH range of the studies.

(c) The potential for carryover from one treatment season to the next of the aerobic soil metabolite M670H05 was identified, but it could not be adequately assessed because no aerobic soil metabolism data were available beyond 1 year post-application that would indicate that the amount of this metabolite keeps increasing.

(d) The potential competition between rate of adsorption and biotransformation in the overall dissipation of topramezone in soils and sediments. It was observed that levels of non-extractable residues increased with time[11], but the role of the rate of adsorption (time-dependent sorption; kinetics of sorption) is not known because studies on the kinetics of sorption are not required under current guidelines.

[11] Recent research with chlorsulfuron and metsulfuron suggests that the herbicide stays associated with the fulvic fraction of the soil from which is then slowly released;

Gao. J. and Sun, J. 2002.*Studies on bound 14C-chlorsulfuron residues in soil.* **J. Agri. Food Chem.** 50 (8), pp 2278-82.

Ye, Q., Sun, J., and Wu, J. 2003. *Causes of phytotoxicity of metsulfuron-methyl bound residues in soil.* **Environ. Pollut.**, 126 (3), 417-23.

Non-extractable residues of topramezone were also predominantly associated with the fulvic acid fraction. Although topramezone is not a sulfonylurea herbicide, it is feasible that topramezone may exhibit a similar behavior. This topic is further discussed under the "Risk Description" section.

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Terrestrial field dissipation studies were conducted in Indiana, South Dakota, California, and Ontario (Canada). While the selected sites include areas where corn is grown, the Mid-Atlantic and Southeastern states were not represented despite the fact that sweet corn may be extensively grown in those regions. Thus, the behavior of topramezone in those areas is not known. However, a Florida (sweet corn) and East North Carolina corn scenarios were included among the standard scenarios selected for calculating EECs in aquatic systems.

Ecological Toxicity

All of the ecological studies required under FIFRA for registration of a terrestrial food-use herbicide were submitted by the petitioner. Although some of the studies have deficiencies that introduce a level of uncertainty into the assessment, it was satisfactory in general that data from the studies was sufficient to generate a screening ecological assessment for topramezone.

Among the uncertainties flagged in the assessment from the laboratory studies are:

(a) The NOAEC value in the mallard duck reproduction study is in question because statistically significant reductions in growth to chicks occurred and adult animals lost weight at all treatment levels.

(b) Data verifying the stability of the test substance in treated feed of the avian studies were not provided.

(c) The toxicity to aquatic vascular plant was based on only one species, *Lemna gibba*, which is a monocot tested as a surrogate representing vascular plants. It is not possible to distinguish the toxicity between aquatic dicots or monocots based on the only species tested.

(d) Toxicity effects to freshwater diatoms is unknown. In the study conducted with *N. pelliculosa*, the observed effects could not be distinguished between pH effects and topramezone effects. Thus, it cannot be ruled out that undissociated topramezone may be more toxic than the anionic form (i.e., that the phytotoxicity of topramezone increases with increasing pH). Because the study was not performed at the pH recommended levels in the guideline, it is classified as invalid.

(e) Dry weight was not measured in the aquatic invertebrate life cycle with daphnids. It is unknown if topramezone effects growth to invertebrates.

(f) Terrestrial plant toxicity tests were not tested with the metabolite M670H05 or other metabolites. In consideration of crop rotations, there is a potential for M670H05 to accumulate in soils from carryover. It is unknown if crops planted in previously corn fields treated with topramezone will be impacted from the metabolite.

(g) No estuarine/marine fish early life-stage toxicity test was conducted for topramezone. The NOAEC value for estuarine/marine fish was derived from the freshwater fish early life stage based on the assumption that both fish are of equal sensitivity.

2. Measures to Evaluate Risk Hypotheses and Conceptual Model

1. Measures of Exposure

Topramezone is a post-emergence herbicide that would be applied to corn at very low rates (maximum of 0.022 lbs a.i./acre; 25 g/ha, per growing season). Thus, effects to the growth of plants at low levels of exposure was identified as a potential, major concern.

Therefore, to estimate environmental concentrations in aquatic ecosystems, the Tier II simulation models PRZM (Version 3.12) and EXAMS were used on ten different standard corn scenarios. As a new chemical, monitoring data for topramezone is non-existent. Therefore, such data cannot be incorporated into the assessment.

Exposure to birds and mammals feeding on a treated field was estimated using the Terrestrial Residue EXposure (TREX) simulation model. Exposure to plants was estimated using the "TerrPlant" and AgDrift models

2. Measures of Effect

The toxicity data that will be used to address the assessment endpoints identified above are listed below.

<u>Avian and Mammalian, Survival of Individuals</u>

To determine potential for survival of birds from direct ingestion of sprayed vegetative matter, the avian LC50 value was used. For mammals, risk to individual survival was assessed using the mammalian LD50.

<u>Avian and Mammalian Reproduction:</u>

Potential risk to reproduction and growth of birds that forage on vegetation, seeds, and insects contaminated with topramezone residues during the breeding season are assessed by using the avian reproduction NOAEC. Potential risk to reproduction and growth of mammals that forage on vegetation, seeds, and insects with topramezone residues during the breeding season are assessed by using the mammalian reproduction NOAEC.

<u>Toxicity to Terrestrial Non-Target Plants:</u>

Potential risk to growth and survival of terrestrial plants is assessed by estimating exposure to dryland and semi-aquatic areas receiving drift and runoff from treated sites and comparing this exposure to the EC25 and NOAEC for the dicot and monocot. The EC25 is used to assess risk to non-endangered species; the NOAEC is used to assess risk to endangered species of terrestrial plants.

Freshwater and Estuarine/Marine Fish and Invertebrates

Potential risk to survival of freshwater fish and invertebrates in static water bodies exposed via runoff and drift is assessed using the fish 96-hour LC50 and the aquatic invertebrate 48-hour EC50.

Potential risk to growth and survival of fish from longer exposure is assessed using the early life-stage test NOAEC, which determines effects from egg hatch through early stages of development. For invertebrates, risk to reproduction, survival and growth is assessed using the life cycle NOAEC.

Toxicity to Aquatic Plants

Potential risk to growth and populations of aquatic plants is assessed using the EC50s and NOAECs for aquatic vascular and nonvascular plants. The EC50s are used to assess risk to non-endangered aquatic plants, the NOAEC or EC05[12] is used to assess risk to endangered aquatic plants.

3. Measures of Ecosystem and Receptor Characteristics

Topramezone is proposed as a herbicide to control emerged broadleaf and grassy weeds. The time of application depends on the developmental stage of the specific weed. Corn is cultivated extensively throughout the United States. Thus, planting, weed development, crop maturity, and harvesting times can vary widely across corn growing regions as well as between uses on field corn or on sweet corn. Because the timing of application needs to be considered together with the developmental stage of non-target organisms for representative, potential use sites, ten standard corn scenarios were considered to estimate environmental concentrations of topramezone in aquatic ecosystems. Each of the different scenarios used in PRZM and EXAMS consider soil characteristics selection of multiple , latitude, weather patterns, and agricultural practices (e.g., , planting times, times of weed emergence, growing season , and harvest times) to account for variability in exposure from region to region. Topramezone is a carotenoid biosynthesis inhibitor, non-target plants actively biosynthesizing carotenoids (green photosynthesizing tissues) at the time of application could be potentially at risk if exposed to topramezone.

For an ecological risk assessment at the screening level, the ecosystems that are modeled are intended to be generally representative of any aquatic or terrestrial ecosystem in or adjacent to where topramezone might be used. In the aquatic risk assessment, exposure concentrations were estimated with the Tier II simulation models PRZM and EXAMS, whereas the terrestrial risk assessment used the Tier I model estimates, T-REX for birds and mammals and TerrPlant for terrestrial plants. The specific receptors addressed in the ecological risk assessment are shown in the Conceptual Model (Figure II.2). In general, fish and aquatic invertebrates in both freshwater and estuarine/marine environments are represented in aquatic assessments. Three different size classes of small mammals are represented, along with four potential foraging categories are represented in terrestrial assessments.

[12] When a NOAEC value is determined to be statistically greater than the EC25 value, the EC05 is used instead.

III Analysis

A. Use Characterization

The proposed name for the end-use product containing topramezone as the single active ingredient is "BAS 670 H 336 SC Post-emergent Corn Herbicide"[13] It is a soluble concentrate that contains 29.7% topramezone as the only active ingredient. The product is to be used as a selective, systemic herbicide to control emergent weeds (grasses and broadleaf weeds) on corn.

This end-use product is being proposed for uses on field corn (i.e., corn grown primarily for animal feed or market grain), popcorn, seed corn, and sweet corn. "BAS 670 H 336 SC Post-emergent Corn Herbicide"can be used on conventional and herbicide resistant/tolerant hybrids,, such as Clearfield®, Roundup Ready®, and LibertyLink® corn. The proposed methods of
KO application are ground and aerial.

Table III-1 summarizes key information contained in the proposed label dated December 2004. This Table served as the basis for selecting the appropriate application rates and methods used as part of the input parameters needed to obtain EECs with simulation models and to identify label deficiencies.

Table III.1 Label Information for the Proposed End-use Product "BAS 670 H 336 SC Post-emergent Corn Herbicide", Dated December 2004.

Type of Information	Label Information	Comment
Time of Application	Apply when weeds are actively growing. Weed height specified in the label for optimal control Apply a minimum of 1 hour before rainfall or overhead irrigation Can be applied up to 45 days prior to corn harvest Conservation tillage as well as conventional tillage production systems Do not apply through irrigation systems	The following information is also contained in the proposed label: BASF has not tested all sweet corn or popcorn hybrids or seed corn inbred lines for tolerance (recommends contacting local seed supplier for tolerance information.) Avoid disturbing treated areas for at least 7 days after application The product should be applied during favorable growing conditions, for crops under environmental stress are most likely to experience injury. The sign of injury is transient (temporary) bleaching at leaves intercepting the spray application

[13] At the time of this assessment, no Trade Name has been assigned for the end-use product.

Type of Information	Label Information	Comment
Method of Application	Ground (ground equipment; flat nozzles). Avoid spraying when wind speeds are > 15 mph or during periods of temperature inversions Aerial	Aerial: Provides some , but not sufficient, guidance
Application Rate Frequency of Application	0.011 - 0.022 lbs ai/acre (12.35 - 25 g/ha) Split applications (2) are allowed, but not to exceed 25 g/ha per growing season and allowing 7 days between sequential application	No comment

Additives: a. Fertilizer b. Adjuvant	An adjuvant AND a nitrogen fertilizer source are required to achieve optimum weed control a. Fertilizer The label recommends that the nitrogen based fertilizer include urea ammonium nitrate (UAN; 28 to 34% and 10-34-0 at a minimum rate of 1.25 gallons/100 gallons of water (i.e., 1.25% v:v). Spray grade ammonium sulfate (AMS) may be used at a minimum rate of 8.5 lbs/100 gallons of water. Do not use a liquid fertilizer b. Adjuvant Petroleum -based or vegetable- seed based oil concentrate or methylated seed oil. Crop oil concentrates or methylated seed oils are to be used at a rate of 1.25 gallons/100 gallons water (i.e., 1.25%) "Agriculturally approved" drift reducing additives may be used Water is the only carrier that is recommended	**No comments**

Other Herbicides Recommended as Potential Tank Mixes Other Herbicides Recommended as Potential for Sequential Applications	Atrazine (0.25 to 1.0 lb (per acre) Is recommended for better weed control 2,4-D; Accent, Atrazine, Clarity, Bicep II Magnum; Bicep Lite II Magnum, Buctril; Distinct, Dual II Manum, -Max Lite; Guardsman Max; Harness; Harness Xtra; Hornet; Keystone; Keystone LA; Liberty; Lightning; Marksman; Option; Outlook; Prowl; Roundup UltraMax; Steadfast; Stiner; Surpass; TopNotch; Tough Use of BAS 670 336SC as a sequential post-emergence treatment following a pr-eemergence grass herbicide, such as Outlook, Prowl, Guardsman, Max, Dual II Magnum, Harness, or Surpass BAS 670 336SC may also be used in sequential programs with registered burn-down herbicides	**BAS 670 336SC should not be mixed with an herbicide with the same mode of action as topramezone (see "Mode of Action")** **The label says that use of a crop oil or methylated seed oils in tank mixtures of BAS 670 336SC plus 2,4-D, Clarity, Distinct, or Marksman may result in crop injury if applied during periods od cold, wet weather or hot and/or humid weather. In such cases, a nonionic surfactant is recommended**
Mixing Order	Fill spray tank (½ to 3/4 full with water Add other soluble packet products- mix thoroughly Add BAS 670 336SC Add WP, DG, DF, or LF formulations Add emulsifiable concentrate (EC) products (not specified which EC) Add adjuvant Add liquid fertilizer Agitate and fill the tank with water	No comment
Buffer Zone	Not specified in the label	
Replanting post-application	All field corn types, field corn grown for seed, sweet corn, popcorn...................... ANYTIME Cereal crops (wheat, barley, oats and rye, winter canola........ THREE MONTHS Alfalfa, cotton, canola, peanuts, sorghum, soybeans, sunflower, edible beans and peas, potato...... NINE MONTHS All crops not listed above........ EIGHTEEN MONTHS	

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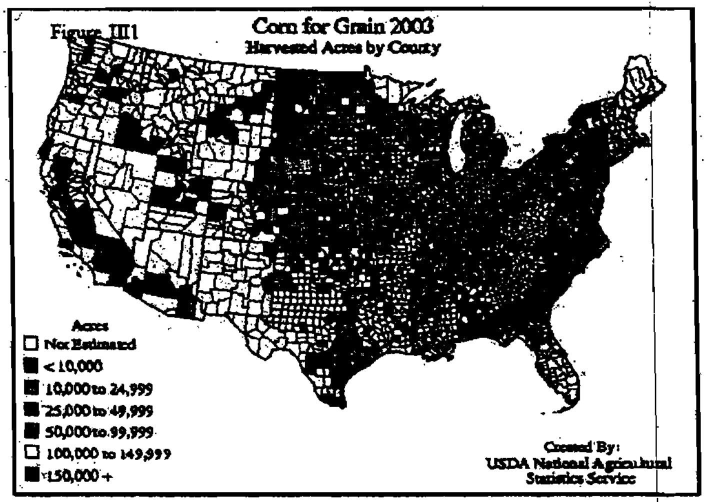
Environmental Hazard Statement in the proposed label	Do not apply directly to water or areas where surface water is present, or to inter-tidal areas below the mean water mark. Do not contaminate water when disposing of equipment wash water **Do not apply through any type of irrigation system** Product must be used in a manner which will prevent back siphoning in wells, spills or improper disposal of excess pesticide, spray mixtures or rinsate	
Other Warnings/Restrictions/	In addition to maximum application per season, no application within 45 days harvest, the following warnings/restrictions also appear in the proposed label: Label restrictions for other herbicides used in tank mixtures must be followed No grazing or feeding (treated corn forage, silage, fodder, rain) for at least 45 days after application	

Other Recommendations	Other Herbicides	Comments
Other Herbicides Recommended as Tank Mixes	Atrazine (0.25 to 1.0 lb per acre is recommended for better weed control 2,4-D; Accent, Atrazine, Clarity, Bicep II Magnum; Bicep Lite II Magnum, Buctril; Distinct, Dual II Manum, -Max Lite; Guardsman Max; Harness; Harness Xtra; Hornet; Keystone; Keystone LA; Liberty; Lightning; Marksman; Option; Outlook; Prowl; Roundup UltraMax; Steadfast; Stiner; Surpass; TopNotch; Tough	**BAS 670 336SC should not be mixed with an herbicide with the same mode of action as topramezone (see "Mode of Action"), such as isoxaflutole or mesotrione. They should only be used in rotation with topramezone.** The label says that use of a crop oil or methylated seed oils in tank mixtures of BAS 670 336SC plus 2,4-D, Clarity, Distinct, or Marksman may result in crop injury if applied during periods od cold, wet weather or hot and/or humid weather. In such cases, a nonionic surfactant is recommended
Potential Herbicides for Sequential Applications	Use of BAS 670 336SC as a sequential post-emergence treatment following a pre-emergence grass herbicide, such as Outlook, Prowl, Guardsman, Max, Dual II Magnum, Harness, or Surpass BAS 670 336SC may also be used in sequential programs with registered burn-down herbicides	BAS 670 336SC should not be mixed with an herbicide with the same mode of action as topramezone



Potential Use Areas

Corn is a major crop in the United States (Figure III 1). In 2004, corn planted area for all purposes was estimated at 81.0 million acres, up 3 percent from both 2002 and 2003. The percent of corn planted for grain/seed, "sweet corn" (market fresh; processing), and popcorn varied by state. Field corn is predominantly grown in the Midwestern United States. While sweet corn is also grown within the Corn Belt, the Eastern United States are major the growers of sweet corn.

Besides the difference in soils and climates, there is also a major difference between field and sweet corn, as harvesting time depends on the degree of moisture of the grain. Therefore, the time intervals between planting, post-planting weed emergence, and harvest can exhibit a wide range of spatial and temporal variability in post-emergence applications.

http://www.usda.gov/nass/graphics/county03/crhar.htm

Planting and Harvesting

http://www.usda.gov/nass/pubs/uph97.htm)

The extensive spatial and temporal variability in corn cultivation can be inferred from the summaries presented below for popcorn, sweet corn, and "grain" corn. Thus, time of weed emergence (when a post-emergence herbicide, such as topramezone, will be used), is expected to be dependent on the time of planting.

a. Popcorn:

Popcorn cultivation is predominantly centered in the upper Midwestern States, of which Indiana and Nebraska are major producing states. Other states include Illinois, Iowa, Kansas, Kentucky, Michigan, Missouri, and Ohio. Popcorn is also grown in Alabama, Oklahoma, New Jersey, Maryland, Oregon, Pennsylvania, South Dakota, Tennessee, Virginia, and Wisconsin.

Popcorn grows best in deep fertile soils, moderate rainfall, and temperate weather. Fields are planted from April 15 (southern regions) to May 25 (northern regions). Most of the popcorn is irrigated. Popcorn (*Zea mays everta*) has a very hard endosperm. The criteria for harvesting popcorn is crop maturity and optimal moisture content Harvest may occur during an extended period, typically from mid-September to early-December, depending on the region..

http://www.ipmcenters.org/cropprofiles/docs/us-ncr-popcorn.html

b. Sweet Corn:

Sweet corn is planted as a fresh market vegetable or for processing. Unlike popcorn or grain corn, sweet corn must be harvested within a very short time for optimal maturity and moisture (average 70 to 85 days after planting, that is in less than 3 months). Thus, planting dates are staggered over periods of weeks to extend the harvesting period.

The Eastern states are the major growers of fresh-market sweet corn, with California as the major producer in the West. In the North Central region, most of the sweet corn grown for processing falls within twelve states, mainly from western Indiana through northern Illinois and southern Wisconsin and Minnesota. The optimal cultivation conditions are deep fertile soils, moderate rainfall, and temperate weather. Early planting dates is 1 to 2 weeks before the frost-free date for a particular area, but may extend to early July.

http://www.ipmcenters.org/cropprofiles/docs/us-ncr-sweetcorn.html

Florida is a major producer of fresh-market sweet corn. Most of the Florida sweet corn is grown in farms that also produce other vegetables, row crops, pasture, and forage crops. Palm Beach county is the major producing region, but Miami-Dade, Collier, and Hendry Counties are also significant growing areas. In Florida, sweet corn seeds may be planted at any time from August through April, depending on the production region. In South Florida, it is typically planted from October to March. Sweet corn harvest can occur from mid-November through mid-July, with an active harvest period from April to May.

http://www.ipmcenters.org/cropprofiles/docs/FLSweetcorn.html

c. Grain corn

The U.S. Corn Belt[14] comprises Illinois, Indiana, Iowa, Kansas, Kentucky, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin.

Planting in Texas can begin as early as the end of February and extends until the middle of June. In most of the southern states in general, the planting window is from early March to no later than the middle of May. In the Corn Belt states, most of the corn is planted after the middle of April and may extend until no later than the middle of June. In the Northern states, most of the corn is planted from May to June. The end of the harvest period may extend up to the middle of December. The span between planting and harvesting are longer than for sweet corn because grain corn must have a lower moisture content than sweet corn.

B. Exposure Characterization

1. Environmental Fate and Transport Characterization

Summary

Biotransformation (soils; water-sediments) is the major route of dissipation of topramezone in the environment, although it appears that adsorption competes with biotransformation.. Differences in persistence, nature, and relative ratio of transformation products were found in aerobic soils. The metabolite "M670H05"was identified as the major metabolite in some, but not all, of the aerobic soils. Both topramezone and "M670H05" can be persistent in aerobic soils (pseudo-first order, linear half-lives > 125 days in most soils). Under environmental conditions, abiotic hydrolysis and direct photolysis in water are not important transformation pathways for topramezone.

Metabolites formed in aerobic soil were markedly different from those found in water-sediments. Moreover, metabolites were also different in anaerobic and aerobic water-sediments. Major differences in persistence of topramezone were found between two aerobically incubated water-sediments test systems (half-lives < 20 days in a pond water, but > 120 days in river water), but the reasons for these differences are not clear.

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[14] The U.S. Corn Belt is the largest, contiguous agro-ecosystem in the world capable of supporting corn production.

Topramezone exhibits high to moderate mobility in soils. Its major soil metabolite "M670H05" is highly mobile in soils. Topramezone does not have the potential to volatilize from soils or water nor to bioaccumulate in fish or other aquatic organisms.

General Note: Soil, sediments, and water characterization appear in Appendix B.2

a. Persistence

Topramezone is stable towards abiotic hydrolysis (pH 5, 7, and 9; 25° C; 45902416). Direct photolysis in water is not an important degradation pathway for topramezone (half-life 132 days based on a 12 hrs light/dark cycle, Spring sunlight at 40° latitude North; 45902417). Photolysis on soil is not a significant degradation pathway for topramezone (45902418).

The overall dissipation of topramezone in soil and water-sediment systems is likely to involve two different processes, namely biotransformation and time-dependent sorption and it appears that time-dependent sorption may play a significant role. However, biotransformation is involved in the formation of metabolites. Even though microorganisms control metabolite formation, topramezone has the potential to be persistent in aerobic soils, as can be seen from the half-lives in Table III-2. For all studies involving soils and water-systems, half-life calculations were based on extractable radioactivity.

Aerobic soil metabolism studies with topramezone as the test substance were conducted in six USA soils of various textures and different collection sites representative of potential corn growing areas. Table III-2 summarizes persistence data (as linear half-lives and DT50[15]) of topramezone in the six study soils. The variability in persistence among the soils is likely a reflection of differences of microbial activity. In addition, a separate aerobic soil metabolism study (one soil) was conducted with the major aerobic soil metabolite M670H05 (i.e., a metabolite found at > 10% of the applied radioactivity) as the test substance (45902420). Although this metabolite was not form in large amounts in all soils and it did not exceed 16% of the applied radioactivity after 1 year incubation in any of the soils, the observed half-life was as high as 1 year. When topramezone was used as the test substance, the amount of M670H05 increased with time throughout the 1-year study, but it is not known if it continues to increase after 1 year.

[15] The aquatic exposure models (GENEEC; PRZM and EXAMS, and SCI-GROW) use pseudo-first order, linear half-lives as input paramaters and not DT50. Half-lives are equal to the DT50 if and only if a reaction follows first order kinetics. In addition, only kinetics data derived from laboratory studies are used in selecting input parameters for simulation modeling. Field data are not used as input parameters

Table II.2 Persistence of Topramezone in Soils Incubated under Aerobic Conditions at 27° C (45902419; 45902421)

Data	Loam from Idaho	Silt loam from Indiana.	Loam from Iowa.	Clay loam from Minnesota.	Silt loam from South Dakota	Sandy loam from North Carolina
Linear half-life (0-383 days)	181.3 days (r2 = 0.886).	182.0 days (r2 = 0.958).	301.5 days (r2 = 0.848	124.5 days (r2 = 0.924).	195.9 days (r2 = 0.942)	Observed: > 364 days
DT50 (empirical data)	100- 160 days	125 days	290 days	90-150 days	110 days	> 364 days

Although there are some deficiencies in the studies conducted with water-sediment systems, the persistence of topramezone in water-sediment systems appears to be shorter than in aerobic soils (half-life of 13 to 24 days in total system, anaerobic conditions; and 19 to 24 days in one aerobically incubated system). Marked differences in persistence were observed between the two aerobically incubated water-sediment systems (Table III.3). Under aerobic conditions, topramezone was more persistent in the river water system (half-life > 120 days) than in the pond water system (half-life of total system, 19 to 24 days). Considerable differences were observed in some of the physical and chemical properties of the river and pond water. For example, the pond water was considerably higher in hardness, electrical conductivity (an indication of a high content of ionic species), and total dissolved solids when compared with the river water. How these differences in between pond and river water systems affect the persistence of topramezone in aerobic water-sediment systems is not known. However, it is reasonable to assume that considerable variability in persistence and nature/ relative amounts of metabolites is expected throughout the widespread potential use areas. The petitioner has been requested to address and clarify the deficiencies identified in all of the water-sediment studies.

Table III.3 Persistence of Topramezone in Water-Sediment Systems Incubated Under Anaerobic (45902422) and Aerobic (45902423) Conditions

Water-Sediment Conditions	Water-Sediment System	Half-lives (Linear); (R2)
Anaerobic	Lake reservoir in South Dakota; silt loam sediment	Linear/Natural log Water: 11 to 18 days (0.880 to 0.932) Sediment (Not calculated) Total system: 13-24 days (0.849 to 0.917) DT50 (empirical): 7-15 days, total system
Aerobic	Non-agricultural river, Ohio; loamy sand sediment	Water, sediment, and total system, > 120 days DT50 (empirical): > 120 days

37

Water-Sediment Conditions	Water-Sediment System	Half-lives (Linear); (R2)
Aerobic	Non-agricultural pond, Ohio Loam sediment	Water: 10.7 to 10.9 days (0.926- 0.976) Sediment: 49- 78 days (0.808- 0.8390 Total system: 19 to 24 days (0.968) DT50 (empirical), total system: 14 to 28 days

Although terrestrial field dissipation data are not currently used in models, the results of these studies are summarized in Table III..4. Additional data has been requested from the petitioner to help clarify procedures and data in the storage stability study (45902428)

Table III.4 Persistence of Topramezone End-use Product Under Field Conditions (45902426 and 45902427)

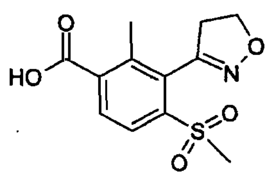
Site and Formulation	Linear Half-life, Days	DT50, Days
Indiana, Bare ground Plot, SC Sandy loam over loamy sand *Ecoregion 8.1*	67	4.2 to 5
South Dakota, Bare ground Plot, SC Clay loam *Ecoregion 9.2*	182	3 to 13
South Dakota, Bare ground Plot, DF Clay loam *Ecoregion 9.2*	158	13 to 17
California, Bare ground Plot, SC Sandy loam *Ecoregion 11.1*	98	5 to 18
California, Cropped Plot, SC Sandy loam *Ecoregion 11.1*	29	19 to 22
Ontario, Canada/Loam cm) over silt loam-silty clay loam *Ecoregion 8.3*	158	29

(38)

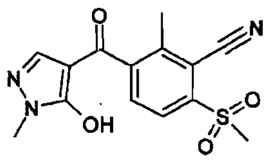
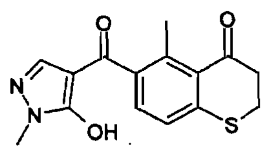
b. Transformation products

The identified metabolites of topramezone are presented in Table III.5. The Table indicates the media and incubation conditions in which they were found, at what percent of the applied radioactivity, how they form, and when they reach a maximum amount Note that metabolite M670H05 is formed only in soils and that the metabolites formed in aerobic water-sediment systems are very different from those encountered under anaerobic conditions. In all the studies involving soils and sediments, "non-extractable" residues increased with time and were predominantly associated with the fulvic acid fraction. A plausible explanation could be that the rate of adsorption to soils/sediment may be faster than the rate of biotransformation. That is, that the rate of adsorption (time-dependent sorption) controls the dissipation of topramezone in soils/sediments.

Table III.5 Metabolites of Topramezone

Metabolite and Company Code	Chemical Name	Formation	Detection (As Percent of the Applied Radioactivity)
 M670H05 (BAS 670 H acid Like topramezone, this metabolite is also a weak acid	3-(4,5-Dihydro-isoxazol-3-yl)-4-methanesulfonyl-2-methyl-benzoic acid CAS Reg. No: 223646-24-0	Cleavage of the -C (pyrazol)-C(keto)- bridge This is the only cleavage metabolite identified for topramezone. This metabolite retains the isoxazol ring	Major soil metabolite, but the amount varied among the 6 soils (aerobic). It was found at a maximum of 16% only in a clay loam soil from Minnesota after 279, but at < 10% in some of the other soils. The amount of this metabolite increased with time and was not detected before 97 days in any of the soils It was not found in any of the water-sediment systems (anaerobic; aerobic). The transformation products identified in water-sediment systems cannot form M670H05 nor can this metabolite form the water-sediment metabolites

(39)

Metabolite and Company Code	Chemical Name	Formation	Detection (As Percent of the Applied Radioactivity)
 M670H01 (BAS 670 H cyano) Note: The cyano group can potentially hydrolyze to an amide and/or to carboxylic acid group. Neither the amide nor a carboxylic acid form for "M670H01" were detected	[3-Cyano-4-methane-sulfonyl-2-methyl-phenyl](5-hydroxy-1-methyl-1H-pyrazol-4-yl)methanone.	Isoxazol ring opening	Found only in one of the aerobically incubated soils (Idaho loam), at 10.3% Found at a maximum of 10.2% in pond water-loam sediment (OH) under aerobic conditions. This metabolite was predominantly associated with the sediment
 M670H10	6-[(5-Hydroxy-1-methyl-1H-pyrazol-4-yl)carbonyl]-5-methyl-2,3-dihydro-4H-1-benzothiopyran-4-one.	Elimination of the isoxazol ring and formation of a 4-one- thiopyran (heterocyclic) ring Reduction of S(VI) of the sulfonyl group to S(-II) in the thiopyran ring. This is consistent with what would be expected in anoxic water-sediment systems	This metabolite was only found water-sediment under anaerobic conditions, at 16% in water, 26 -34% in sediment.
$^{14}CO_2$	Carbon dioxide	Mineralization	Maximum of 14% only in the Idaho loam soil (aerobic) after 388 day

Although no physical and chemical properties were submitted for the metabolites, these were estimated using the structure-activity relationship EPIWIN 3.1 program (Estimation Programs Interface) Suite™, Version 3.10)[16] Appendix B.3 summarizes the EPI estimates for these metabolites and a description of the program.

The EPIWIN-estimated physical and chemical properties for topramezone are in agreement with the experimental data. The Log Kow of MH670H05 is 2.75 (just below the trigger for bioaccumulation potential), that is, it is the most hydrophobic of the metabolites and the one

[16]The EPI (Estimation Programs Interface) Suite™ is a Windows® based suite of physical/chemical property and environmental fate estimation models developed by the EPA''s Office of Pollution Prevention Toxics and Syracuse Research Corporation (SRC). EPI Suite™ uses a single input to run the following estimation models: KOWWIN™, AOPWIN™, HENRYWIN™, MPBPWIN™, BIOWIN™, PCKOCWIN™, WSKOWWIN™, BCFWIN™, HYDROWIN™, and STPWIN™, WVOLWIN™, and LEV3EPI™. EPI Suite™ was previously called EPIWIN

having the highest binding coefficients, which is consistent with the results of the batch-equilibrium adsorption/desorption studies.

As discussed under the "Mode of Action" section, the two major molecular structure features of 4-HPPD inhibitors (e.g., topramezone, isoxaflutole, and mesotrione) are centered on the carbonyl (keto) groups. At least one of the carbonyl groups must be attached to a substituted benzoyl group and at least one of the carbonyl groups can form a stable enolate (i.e., a stable enol tautomer; keto-enol tautomerism). This class of compounds ("ketonates") chelate with Fe(II), the active site of the 4-HPPD dioxygenase enzyme. Chelation via ketonato ligands to Fe(II) is well known.[17]

The metabolites "M670M01" (cyano metabolite) and "M670H10" preserve the carbonyl group and the enolate in the pyrazole ring. Based on these structural features, these two metabolites are potential 4-HPPD inhibitors. Furthermore, "M670H10" also has an additional carbonyl group at C-4 of the thiopyran ring, which can potentially form the enolate.

The metabolite "M670H01" (the cyano (nitrile) metabolite) also have the potential to bind to Fe(II) via the cyano (nitrile) group. "M670H01" is structurally very similar to an active degradation product of isoxaflutole (RPA-202248; also a "ketonitrile").

c. <u>Transport</u>

Batch-equilibrium adsorption/desorption studies were conducted with topramezone, the major soil metabolite "M670H05", and the anaerobic aquatic metabolite "M670H10" as the test substances. The same six soils used in the aerobic soil metabolism study were used for the adsorption/desorption studies. The results for the adsorption phase (Freundlich adsorption coefficients, organic -carbon normalized coefficients, and 1/N) are summarized in Table III.6.

Of The most mobile of these chemical species are topramezone and M670H05, both of which can be carried to surface water by runoff and/or ground water by leaching. The two weak acids, topramezone and "M670H05", did not bind strongly to most soils, but both adsorbed stronger in the Minnesota clay loam and North Carolina sandy loam than in any of the other soils. The weakest adsorption for parent and the two metabolites was observed with the Idaho loam soil. The anaerobic water-sediment metabolite "M670H10" adsorbed stronger than the weak acids and was predominantly associated with the sediment phase (anaerobic conditions). This is a metabolite formed *in-situ* (i.e., in the water-sediment system) and therefore, will not be carried to surface water by runoff or leach in the field. Based on EPIWIN estimates, M670H01 (the cyano metabolite) could be as mobile as parent or M670H05.

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[17] Cotton, F.A. and Wilkinson, G. Advanced Inorganic Chemistry, Fifth Edition, 1988, Wiley Interscience, New York

Table III.6 Adsorption Behavior of Topramezone, the Aerobic Soil Metabolite M670H05 (45902425) and the Anaerobic Aquatic Metabolite M670H10 (46242703) on Six Soils No appreciable adsorption (n/a)

Sorption Coefficients	Idaho	Indiana	Iowa	Minnesota	South Dakota	North Carolina
Soil Texture	Loam	Silt loam	Loam	Clay loam	Silt loam	Sandy loam
Kads, Freundlich: a. Parent b. M670H05 c. M670H10	a. 1.40 b. n/a 1 c. 10.6	a. 2.30 b. n/a c. 4.3	a. 1.97 b. n/a c. 19.5	a. 4.87 b. 9.4 c. 52	a. 2.59 b. n/a c. 23.9	a. 3.69 b. 5.71 c. 61
Koc a. Parent b. M670H05 c. M670H10	a. 38 b. n/a c. 377	a. 284 b. n/a c. 857	a. 53 b. n/a c. 807	a. 120 b. 134 c. 1,292	a. 91 b. n/a c. 1,219	a. 303 b. 235 c. 5,675
1/N a. Parent b. M670H05 c. M670H10	a. 0.875 b. n/a c. 0.9	a. 0.823 b. n/a 0.8	a. 0.863 b. n/a c. 0.9	a. 0.859 b. n/a c. 0.9	a. 0.850 b. 0.920 c. 0.9	a. 0.802 b. 0.885 0.9

In theory, the mobility of the two weak acids (topramezone and "M670H05") should increase with increasing pH. However, the pH of all of the soils ranged from 5.7 to 6.8. Therefore, the pH-dependence of adsorption could not be established from such a narrow range. Adsorption did not appear to correlate with cation exchange capacity or type of clay, although it appears to be some correlation with the percent of organic matter content. Although topramezone is likely to be highly dissociated within that pH range, the sorptive behavior of the undissociated form is not well established. An invalid test on the toxicity of topramezone to a non-vascular plant was higher at pH range of 4.1- 5 than that observed for other species at neutral pH. It is unclear if the increased toxicity is related to undissociated topramezone or simply to a pH effect. The test is considered invalid because the pH was out of the acceptable range.

In all of the metabolism studies, the amount of "non-extractable" radioactivity associated with soil or sediment increased with time. The "non-extractable"radioactivity was found to be predominantly associated with the fulvic acid fraction. Thus, it is possible that the overall dissipation of topramezone in soils and water-sediments may depend on competitive biotransformation and time-dependent adsorption processes. The batch-equilibrium adsorption/ desorption studies are short duration studies and are not currently designed to determine the kinetics of sorption (i.e., how fast a chemical adsorbs to or desorbs from soils). Therefore, the contribution of time-dependent adsorption to the overall dissipation of topramezone cannot be established. In sediments, the majority of "lost radioactivity" appears in the non-extractable sediments, suggesting that it may bind quickly with sediments, where it may remain relatively unchanged for at least one year. A qualitative discussion on binding of topramezone to soil and sediment is contained in the "Risk Description" section.

Topramezone has a low potential to volatilize from soils or water, as suggested by its low vapor pressure and the calculated Henry's Law Constant.

d. Accumulation

Based on the pH-dependent *n*-octanol/water partition coefficients (< −0.8), topramezone has a low potential to bioaccumulate in fish within the environmentally significant range of 5 to 9. In a fish bioaccumulation in fish study (45902322) conducted at a exposure level of 0.030 mgL-1, the Bioconcentration Factors (BCF) were 0.30, 0.69, and <0.048 for the whole fish, non-edible tissues, and edible tissues, respectively. Of all the metabolites that may form in water-sediments, "M670H10" (anaerobic conditions) is the most hydrophobic. Parent topramezone, "M670H05", and "M670H01" have very low *n*-octanol/water partition coefficients (Log Kow < 1). The EPIWIN-estimated Log Kow for "M670H10" is 2.75.

In aerobic soil metabolism studies (1-year duration), the amount of the metabolite M670H05 increased with time, but it is not known if it keeps increasing beyond 1 year after application. Considering that M670H05 is a persistent metabolite (half-life 56 days to > 1 year), its potential to accumulate in the field cannot be ruled out. In addition, if one considers soils as a reservoir for topramezone based on the observed time-dependent increase in non-extractable residues there is a potential for carryover of topramezone from season to season as noted by long rorational crop intervals recommended in the label. Although it may be argued that these residues are not bioavailable, they may become bioavailable if they desorb slowly as parent topramezone and/or potentially active metabolites. Long-term behavior of non-extractable residues of pesticides is not well understood, but recent data for two sulfonylurea herbicides (chlorsulfuron and metsulfuron) suggest that these two herbicides remain "intact" in the fulvic acid fraction of the soil. The long-term phytotoxicty of soils associated with some sulfonylurea herbicides has been attributed to the slow release (desorption) of the intact herbicide associated with the fulvic acid fraction[18]. A similar behavior cannot be ruled out for topramezone.

18 Gao. J. and Sun, J. 2002. *Studies on bound ^{14}C-chlorsulfuron residues in soil.* **J. Agri. Food Chem.** 50(8), pp 2278-82.

Ye, Q., Sun, J., and Wu, J. 2003. *Causes of phytotoxicity of metsulfuron-methyl bound residues in soil.* **Environ. Pollut.**, 126(3), 417-23.

2. Measures of Aquatic Exposure

Figure III3 summarizes the chemical species that may be found in anaerobic and aerobic water-sediment systems. The figure indicates the routes by which each could enter to or form in aquatic media. Note that the soil metabolite M670H005 can only enter an aquatic system by runoff/soil erosion. This metabolite was not found in water-sediment studies.

Anaerobic Water-Sediment Systems

Parent (Run-off; Spray Drift)

Metabolite **M670H10** (formed in the water-sediment system)

Soil Metabolite M670H05 (Run-off)

Aerobic Water-Sediment Systems

Parent (Run-off; Spray Drift)

Metabolite **M670H01 (BAS 670 H cyano)**- (Formed in the water-sediment system; Run-off from soils)

Soil Metabolite M670H05 (Run-off)

Figure III.3

This figure represent the potential chemical species to which aquatic organisms may be exposed and by which route they may enter surface water. Note that the cleavage metabolite "M670H05" appears to form only in aerobic soils and can enter surface water only by run-off and/or wind-blown soil. Metabolite "M670H10" was found only in anaerobic water-sediment systems (i.e., *in situ* formation), while "M670H01" could form in soil and enter the water body by runoff and/or form *in situ* in aerobic water-sediment systems. Therefore, the only chemical species that may enter surface water by spray drift is topramezone. Once all these chemical species are present in surface water, they may further transform and/or partition into the water column or the sediment according to their binding behavior. However, the data from the submitted studies indicate that non-extractable residues in soil and water-sediments increase with time, with the concomitant decrease of parent topramezone. Thus, "disappearance" (i.e., overall dissipation) of topramezone may be a result of time-dependent adsorption competing with biotransformation. The metabolites "M670H01" and "M670H10" have the potential to be 4-HPPD inhibitors.

1. Aquatic Exposure Modeling

Since toxicity to plants was anticipated for topramezone, exposure concentrations of topramezone surface water were estimated using Tier II simulation models, PRZM Version 3.12 (beta compiled(05/24/01, Carsel, 1997) and EXAMS (Vers. 2.98.04 compiled 07/18/04, Burns, 2002) [19] for surface water. PRZM simulates pesticide fate and transport as a result of leaching, direct spray drift, runoff and erosion from an agricultural field and EXAMS estimates environmental fate and transport of pesticides in to a surface water body for a 30-year period (1961 to 1990). PRZM and EXAMS were linked by the program (PE4-PL, vers. 01)

The EECs for surface water generated by PRZM-EXAMS typically represent a range of exposure scenarios from pesticide use on a particular crop or noncrop use site. Estimates were made for aerial and ground applications and at the maximum proposed applications rates and for single and split applications. Ten different, standard corn cropping scenarios were selected for these estimates.

Application rates were taken from the proposed label. Appropriate input parameters were selected from the physical and chemical properties (intrinsic properties) and from environmental fate studies[20] submitted in support of registration for this chemical. Selection of physical chemical properties and environmental fate input parameters were in accordance with the recommendations given in *Guidance for Selecting Input Parameters in Modeling the Environmental Fate and Transport of Pesticides*, Version II, February 28, 2002. Estimates were made for aerial and ground applications and at the proposed applications rates.

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19 See http://www.epa.gov/oppefed1/models/water/index.htm for detail description of the simulation models and guidelines for selecting input parameters

20 Unlike the intrinsic, physical and chemical properties, environmental fate parameters are extrinsic properties that are specific to the test media and conditions of the studies (e.g., type of soil, temperature, moisture)

Scenarios

The standard scenario for ecological exposure simulates the fate of a pesticide transported as a result of runoff and erosion, and or spray drift from an 10-ha agricultural field directly into a surface water body (PRZM). The small field is assumed to be 100% cropped. The surface water body in which the EECs are simulated (EXAMS) is the standard pond (10,000-m2 pond, 2-m deep). Topramezone is a new chemical and therefore, there are no specific aquatic monitoring data that can be used in the aquatic exposure. The ten scenarios (Table III.7) were chosen as representative corn-growing sites where topramezone may be used (Leovey, 2002)[21]. The "Florida sweet corn scenario" was of particular interest because Florida sweet corn is grown primarily in counties around the Everglades (e.g., Palm Beach County).

Table III.7 Ten standard corn scenarios used in the aquatic exposure assessment.

Corn Scenario	Location	Met File
California Corn	Stanislaus/San Joaquin Counties in the Central Valley	w23232.dvf
Florida Sweet Corn	Palm Beach County	w12844.dvf
Illinois Corn	McLean County	w14923.dvf
Mississippi Corn	Southern Mississippi Valley Uplands	w13893.dvf
North Carolina Corn East	Pitt County	w13722.dvf
North Carolina Corn West	Henderson County.	w03812.dvf
North Dakota Corn	Pembina County in the Red River Valley	w14914.dvf
Ohio Corn	Darke and/or Pickaway Counties	w93815.dvf
Pennsylvania Corn	Lancaster County	14737.dvf
Texas Corn	Claypan area, Milam County	w13958.dvf

Input Parameters

Environmental fate data and physical and chemical properties (Table III.8) were selected from the submitted studies in accordance with *Guidance for Selecting Input Parameters in Modeling the Environmental Fate and Transport of Pesticides*, Version II, February 28, 2002. Detailed description, documentation, and direct links for running these models can be found in: http://www.epa.gov/oppefed1/models/water/index.htm

[21] Leovey, Elizabeth. 2002. PRZM Standard Crop/Location Scenarios, Procedure to Develop and Approve New Scenarios, and PRZM Turf Modeling Scenarios to Date. February 27, 2002. USEPA. OPP. Environmental Fate and Effects Division, Arlington, VA

Table III.8 Input Parameters Selected to Run the PRZM and EXAMS Models[22].

Parameter	Value/Selection criteria	Source
Maximum Application Rate per Season, lb ai/acre (g/ha)	0.022 lb topramezone/acre (25 g topramezone/ha) Can also be applied in 2 sequential 0.011 lb ai/acre per applications, 7 days apart, but not to exceed 0.022 lbs ai/acre per season	Proposed label of end-use product BAS 670 336SC
Application Method and Depth of Incorporation (cm)	Ground Aerial No incorporation (model default 4-cm)	Proposed label of end-use product BAS 670 336SC
Soil Partition Coefficient (Kads; mL/g)	mean Kads = 2.8 (n = 6; 1.40, 2.30, 1.97, 4.87, 2.59, 3.69)	45902425
Aerobic Soil Metabolism Half-life (days) [Linear T½]	241.28days (90th percent upper bound of mean) (n=5; 181.3, 182.0, 301.5, 124.5, 195.9)	45902419; 45902421
Spray Drift Fraction (ground spray / aerial)	ECO: 0.01/ 0.05	Model
Application Efficiency (ground spray / aerial)	0.99 / 0.95	Model
Molecular Weight, Daltons	363.39	Physical and Chemical Property
Vapor Pressure	7.5 * 10-13 torrs	Physical and Chemical Property
Henry's Law Constant	2.39 * 10-17 atm-m-3mol^{-1} @ 20 °C	Estimated
Solubility in Water at 20oC Topramezone is a weak acid (pKa 4.6) The solubility of topramezone is pH dependent	15,000 mgL^{-1}	Physical and Chemical Property

22 Based upon the aerobic aquatic degradation from the Grand River. Aerobic aquatic metabolism was available for two water bodies (Grand River and Homestead Pond - both in Ohio). The half-life was > 120 days in a 120 day study (both rings and all systems: water, sediment, total) in Grand River Water and less than for 25 days (19.0 and 24.2 days for the two different labeled rings) for the total systems (sediment half-life was 49.2 to 77.7 days) in the Homestead Pond. The reason(s) for apparent differences in aerobic aquatic metabolism between water sources could not be determined. But the chemistry of the Homestead Pond water (high salinity - 10.65 mmhos/cm, high dissolved solids - 6,044 mg/L) and sediment acidity (pH < 5) does not appear to be representative of naturally occurring water body. More information concerning the water/sediment source is needed before this information would be considered in the assessment.

(47)

Parameter	Value/Selection criteria	Source
Aerobic Aquatic Metabolism Half-life (days)	01 - stable The default value was used because uncertainty in the results for aerobic water-sediment systems 482.56 days [3]	45902422 Data uncertain
Anaerobic Aquatic Metabolism Half-life (days)	30.52 days 90th percent upper bound of mean total system (13.4 and 18.6 days)	45902423
Hydrolysis Half-life @ pH 7 (days)	Stable	45902416
Aquatic, Direct Photolysis Half-life @ pH 7	Stable	45902417

[1] Henry's Law Constant is calculated by EXAMS if Vapor Pressure is entered. Henry's Law Constant is only given to aid in an appreciation of the limited potential for losses through volatilization.

[2] Based upon the aerobic aquatic degradation from the Grand River. Aerobic aquatic metabolism was available for two water bodies (Grand River and Homestead Pond - both in Ohio). The half-life was > 120 days in a 120 day study (both rings and all systems: water, sediment, total) in Grand River Water and less than for 25 days (19.0 and 24.2 days for the two different labeled rings) for the total systems (sediment half-life was 49.2 to 77.7 days) in the Homestead Pond. The reason(s) for apparent differences in aerobic aquatic metabolism between water sources could not be determined. But the chemistry of the Homestead Pond water (high salinity - 10.65 mmhos/cm, high dissolved solids - 6,044 mg/L) and sediment acidity (pH < 5) does not appear to be representative of naturally occurring water body. This issue is discussed in the Risk Characterization chapter. More information concerning the water/sediment source is needed before this information would be considered in the assessment

[3] Aerobic soil metabolism times two.

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Because of the uncertainty of the metabolism of topramezone in the aquatic environment resulting from the two water sources (river and pond) used in the aerobic aquatic metabolism studies and the apparent persistent nature of topramezone in the soils (181 to 301 day half-lives), two approaches were used to obtain an estimate of the metabolism in an aerobic aquatic environment. The first assumed that topramezone was stable (half-life = 0) in an aerobic aquatic environment and second, followed EFED's Model Input Parameter Guidance and assumed that aerobic aquatic metabolism rate was twice as slow as aerobic soil metabolism. Thus, the aerobic aquatic metabolism half-life is obtained by multiplying the aerobic soil metabolism half-life [241.28 days = 90 percent upper bound of mean] times a factor two [the aerobic aquatic metabolism half-life is estimated to be 482.56 days]. An additional aerobic aquatic metabolism study and additional information concerning the Homestead Pond water **would help reduce the uncertainty in the aerobic aquatic metabolism of topramezone**. Additional information concerning the metabolism of topramezone in an aerobic aquatic may result in lower EECs.

Estimated Environmental Concentrations (EECs) for the ten corn scenarios

Table III.9 through Table III.12 provide Tier II surface water EECs. The topramezone concentrations represent, the 1-in-10-year annual exceedence probability for peak, 96-hr, 21-day, 60-day, and 90-day for each scenarios. For each scenario two rows are given; the first assumes no aerobic aquatic metabolism. The second represents concentrations estimated assuming a 482.56 day aerobic aquatic metabolism half-life.

Aerial Applications

Table III.9 EECs for Aerial Applications (Single)

1 - Aerial application at 0.022 lb ai/acre per season. Concentrations are in $\mu g L^{-1}$(ppb)					
Scenario	*Peak*	*96-hr*	*21-day*	*60-day*	*90-day*
Florida (Sweet)	1.79	1.79	1.77	1.72	1.62
Florida (Sweet)1	1.15	1.14	1.12	1.09	0.89
California	0.54	0.54	0.53	0.52	0.51
California1	0.35	0.35	0.35	0.34	0.33
Illinois	1.16	1.16	1.15	1.15	1.14
Illinois	0.75	0.75	0.74	0.72	0.7
Mississippi	1.49	1.49	1.48	1.45	1.44
Mississippi1	0.86	0.86	0.85	0.81	0.8
N.Carolina E.	0.78	0.77	0. 77	0.76	0.75
N. Carolina E.1	0.45	0.45	0.44	0.43	0.42
N. Carolina W.	1.13	1.13	1.12	1.11	1.1
North Carolina W.1	0.72	0.72	0.71	0.69	0.67
North Dakota	1.02	1.01	1.01	1	0.99
North Dakota1	0.6	0.6	0.59	0.57	0.56
Ohio	0.88	0.88	0.88	0.87	0.86
Ohio1	0.6	0.6	0.59	0.57	0.56
Pennsylvania	0.81	0.81	0.8	0.79	0.79
Pennsylvania1	0.46	0.45	0.45	0.44	0.43

Texas	1.34	1.34	1.33	1.31	1.3
Texas1	0.74	0.73	0.72	0.7	0.68

[1] Aerobic aquatic metabolism assumed to be equal to 482.56 days (2 x the aerobic soil metabolism half-life).

Table III.10 EECs for Aerial Applications (Split)

2 - Aerial applications at 0.011 lb ai/acre per application, 7 days apart. Concentrations are in μgL^{-1}(ppb)					
Scenario	*Peak*	*96-hr*	*21-day*	*60-day*	*90-day*
Florida (Sweet)	1.94	1.93	1.92	1.9	1.72
Florida (Sweet)1	1.22	1.22	1.2	1.16	0.99
California	0.55	0.55	0.54	0.53	0.52
California1	0.36	0.36	0.35	0.34	0.34
Illinois	1.32	1.31	1.31	1.3	1.29
Illinois1	0.87	0.86	0.85	0.82	0.8
Mississippi	1.46	1.46	1.45	1.43	1.41
Mississippi1	0.85	0.85	0.83	0.8	0.78
N. Carolina E.	0.82	0.82	0.81	0.8	0.79
N. Carolina E.1	0.47	0.46	0.46	0.45	0.44
N. Carolina W.	1.11	1.11	1.1	1.09	1.08
N. Carolina W.1	0.69	0.69	0.68	0.66	0.64
North Dakota	0.98	0.97	0.97	0.96	0.96
North Dakota1	0.59	0.59	0.58	0.56	0.54
Ohio	0.99	0.99	0.98	0.97	0.96
Ohio1	0.66	0.66	0.65	0.64	0.62
Pennsylvania	0.8	0.79	0.79	0.78	0.77
Pennsylvania1	0.45	0.45	0.44	0.43	0.42
Texas	1.37	1.37	1.36	1.35	1.33
Texas1	0.75	0.74	0.73	0.71	0.69

[1] Aerobic aquatic metabolism assumed to be equal to 482.56 days (2 x the aerobic soil metabolism half-life).

Ground Applications

Table III.11 EECs for Ground Applications (Single)

1-Ground Application at 0.022 lb ai/acre per. Concentrations are in µgL⁻¹(ppb)					
Scenario	*Peak*	*96-hr*	*21-day*	*60-day*	*90-day*
Florida (Sweet)	1.69	1.68	1.67	1.61	1.52
Florida (Sweet)1	1.1	1.1	1.09	1.04	0.85
California	0.38	0.38	0.38	0.37	0.37
California1	0.27	0.27	0.27	0.26	0.26
Illinois	0.99	0.98	0.98	0.97	0.96
Illinois1	0.65	0.65	0.64	0.62	0.6
Mississippi	1.34	1.34	1.33	1.31	1.28
Mississippi1	0.8	0.8	0.58	0.57	0.57
N. Carolina E.	0.58	0.58	0.58	0.57	0.57
N. Carolina E.1	0.35	0.35	0.34	0.34	0.33
N. Carolina W.	0.95	0.95	0.94	0.93	0.92
N. Carolina W.1	0.63	0.62	0.62	0.6	0.59
North Dakota	0.79	0.79	0.78	0.77	0.77
North Dakota1	0.47	0.47	0.46	0.45	0.44
Ohio	0.7	0.7	0.7	0.69	0.68
Ohio1	0.49	0.49	0.49	0.47	0.46
Pennsylvania	0.83	0.83	0.82	0.81	0.81
Pennsylvania1	0.47	0.47	0.46	0.45	0.44
Texas	1.2	1.2	1.19	1.18	1.17
Texas1	0.67	0.67	0.66	0.64	0.61

[1] Aerobic aquatic metabolism assumed to be equal to 482.56 days (2 x the aerobic soil metabolism half-life).

Table III.12 EECs for Ground Applications (Split)

2- Ground applications .at 0.011 lb ai/acre per application, 7 days apart. Concentrations are in µgL^{-1}(ppb)					
Scenario	*Peak*	*96-hr*	*21-day*	*60-day*	*90-day*
Florida (Sweet)	1.85	1.85	1.83	1.8	1.62
Florida (Sweet)1	1.19	1.19	1.17	1.12	0.96
California	0.56	0.56	0.56	0.55	0.53
California1	0.37	0.37	0.36	0.35	0.34
Illinois	1.15	1.15	1.48	1.14	1.13
Illinois1	0.78	0.77	0.76	0.74	0.72
Mississippi	1.31	1.31	1.3	1.28	1.26
Mississippi1	0.78	0.78	0.77	0.73	0.72
N. Carolina E.	0.64	0.63	0.63	0.62	0.61
N. Carolina E.1	0.37	0.37	0.37	0.36	0.35
N. Carolina W.	1.15	1.15	1.14	1.13	1.12
N. Carolina W.1	0.71	0.71	0.7	0.68	0.67
North Dakota	0.75	0.75	0.74	0.73	0.73
North Dakota1	0.47	0.47	0.46	0.44	0.43
Ohio	0.79	0.79	0.78	0.78	0.77
Ohio1	0.55	0.55	0.55	0.54	0.52
Pennsylvania	0.59	0.59	0.59	0.58	0.58
Pennsylvania1	0.35	0.35	0.35	0.34	0.34
Texas	1.24	1.23	1.23	1.21	1.2
Texas1	0.68	0.68	0.67	0.64	0.63

[1] Aerobic aquatic metabolism assumed to be equal to 482.56 days (2 x the aerobic soil metabolism half-life).

The results for aerial and ground applications suggest that it is runoff and not spray drift during application what may be controlling the degree of exposure in an aquatic system. The peak EECs for the Florida corn scenario was 1.73 µgL^{-1} (6.5% less) when the spray drift contribution from two applications was not added to the pond (peak EEC from a single application 1.58 µgL^{-1} with no drift contribution). Drift contributed to as much as 50 percent of the topramezone to the EECs in the California corn scenario, because runoff is quite low since irrigation (corn is apparently not normally irrigated) is not added. However, it should be recognized that the estimates are as good as the quality of environmental fate data used as input parameters. Considering that there are uncertainties about the kinetics and transformation products in water-sediment systems, these estimates carry these uncertainties. The decrease from peak concentration to 90-days is very slight because of the 482.56 day half-life used for aerobic aquatic degradation.

Uncertainties

Several uncertainties (beyond the normal ones, e.g., first order kinetics, validity of Koc model) should be noted for the estimated EECs for topramezone. The first is that the range of soil pH used in the aerobic soil metabolism studies and sorption studies was quite narrow (5.7 to 6.9), the persistence, mobility, and toxicity have been found for other similar chemicals to correlated with pH. A second uncertainty concerns the persistence in the aerobic aquatic environment, as previously discussed under the "Environmental Fate" section. The third uncertainty is the assessment only considers the parent compound[23]. Additional data or information would be needed to improve on these limitations. The petitioner has been requested to address the deficiencies identified in the water-sediment studies.

Model Outputs are contained in Appendix D.

2. Aquatic Exposure Monitoring and Field Data

Topramezone is a new, non-registered chemical. Therefore, no monitoring and field data exist at the time of this assessment. And it is noted that the analytical chemistry method apparently does not have a low enough detection level to measure topramezone at levels potentially hazardous to plants.

[23] The maximum exposure concentration of metabolites formed in the water column have been estimated as 1.0 μgL^{-1}(ppb) for "M670H10" (anaerobic conditions) and 1.1 μgL^{-1}(ppb) for "M670H01" (aerobic conditions). These estimates were made by multiplying the molecular ratio of each metabolite by the maximum of all of the peak concentrations of parent topramezone (1.2 μgL^{-1}), assuming that all of the topramezone converts completely to "M670H10" or to "M670H01". However, these estimates must be looked at with caution given the uncertainties identified in the biotransformation of topramezone in water-sediment systems. There are no ecotoxicity data for these metabolites.

3. Measures of Terrestrial Exposure

a. Terrestrial Exposure Modeling

Birds and Mammals

Birds and mammals in the field may be exposed to residues of topramezone by incidental ingestion of contaminated soils or drinking water in the treated areas (i.e., oral exposure). Because topramezone is a nonvolatile chemical, inhalation or absorption through the skin are not expected to be significant routes of exposure for birds and mammals.

The estimated environmental concentration (EEC) values used for terrestrial exposure of birds are derived from the Kenega nomograph, as modified by Fletcher *et al.* (1994), based on a large set of actual field residue data. The upper limit values from the nomograph represent the 95th percentile of residue values from actual field measurements (Hoerger and Kenega, 1972). The Fletcher *et al.* (1994) modifications to the Kenaga nomograph are based on measured field residues from 249 published research papers, including information on 118 species of plants, 121 pesticides, and 17 chemical classes. These modifications represent the 95th percentile of the expanded data set. Risk quotients are based on the most sensitive LC50 and NOAEC for birds and LD50 for mammals (based on lab rat studies). These environmental concentration estimates were made with the Terrestrial Exposure Model (TREX), Version 1.1 (October 5, 2004).

The TREX used in estimating environmental concentrations is a spreadsheet based model that calculates the decay of a chemical applied to foliar surfaces for single or multiple applications, assuming first-order decay. In the absence of foliar dissipation data for topramezone, the recommended default value of 35 days was used. For further description of TREX, and outputs refer to Appendix E..

Estimated Environmental Concentrations (EECs) for Birds and Mammals

Table III.13 Estimated Environmental Concentrations on Avian Food Items (ppm) Following Broadcast Application of Topramezone Products.

Site	App. Rate (lb a.i./acre) / No. of Apps / Intervals	Food Items	EEC Maximum Residue (ppm)	EEC equivalent dose (mg/kg-bw)		
				20 g	100 g	1000 g
Corn	0.022 / 1 application	Short grass	5.28	6	3	2
		Tall grass	2.42	3	2	1
		Broadleaf plants and small insects	2.97	3	2	1
		Fruits, pods, seeds, and large insects	0.33	0	0	0

Table III.14 Estimated Environmental Concentrations on Mammalian Food Items (ppm) Following Broadcast Application of Topramezone Products

Site	App. Rate (lb a.i./acre) / No. of Apps / Intervals	Food Items	EEC Maximum Residue (ppm)	EEC equivalent dose (mg/kg-bw)		
				15 g	35 g	1000 g
CORN	0.022 / 1 application	Short grass	5.28	5	3	1
		Tall grass	2.42	2	2	0
		Broadleaf plants and small insects	2.97	3	2	0
		Fruits, pods, seeds, and large insects	0.33	0	0	0

Non-Target Plant Exposure Modeling

Terrestrial plant exposure characterization employs runoff and spray drift scenarios contained in OPP's TerrPlant model. Exposure calculations are based on the water solubility of a pesticide and the amount of pesticide present on the surface soil within the first inch of depth. For dry areas, the loading of pesticide active ingredient from runoff to an adjacent non-target area is assumed to occur from one acre of treatment to one acre of non-target area. For terrestrial plants inhabiting semi-aquatic (wetland) areas, runoff is considered to occur from a larger source area with active ingredient loading originating from 10 acres of treated area to a single acre of non-target wetland. Default spray drift assumptions are 1% for ground applications and 5% for aerial, airblast, forced air, and chemigation applications.

Estimated Environmental Concentrations for Terrestrial Plants

Table III. 14 Estimated Environmental Concentrations For Dry and Semi- Aquatic Areas (lb ai/A) Following Ground or Aerial Applications (based on 1 application of 0.022 lbs a.i./acre).

Application	**Total Loading to Adjacent Areas (EEC = Sheet Runoff + Drift)**	**Total Loading to Semi-aquatic Area (EEC = Channelized Runoff + Drift)**	**Drift EEC (for ground: application rate x 0.01); (for aerial: application rate x 0.05)**
Ground Unincorporated	0.0013	0.0122	0.0002
Aerial, Airblast, Forced-Air and Chemigation	0.0018	0.0077	0.0011

b Residue Studies

No foliar dissipation studies are available. Therefore, the recommended default value of 35 days was used in the T-REX Model. This default halflife did not influence the RQs since peak EECs were used.

C. Ecological Effects Characterization

In screening-level ecological risk assessments, "effects characterization" describes the types of effects a pesticide may produce in an organism or plant. This characterization is based on registrant-submitted studies that describe acute and chronic effects toxicity information for various aquatic and terrestrial animals and plants. In addition, other sources of information, including reviews of the open literature, ECOTOX (ECOTOXicity database maintained by EPA's National Health and Environmental Effects Research Laboratory, Mid-Continent Ecology Division) and the Ecological Incident Information System (EIIS), are conducted to further refine the characterization of potential ecological effects. Topramezone is a new active ingredient not registered in the USA. Therefore, a search of the database engines revealed that there are no monitoring, incident data, other sources of information or open literature recorded in the EPA or in other Federal Agency databases that relates to topramezone, except for patent literature and a "Notice of Filing a Pesticide Petition to Establish a Tolerance for a Certain Pesticide Chemical in or on Food" (http://www.epa.gov/fedrgstr/EPA-PEST/2003/June/Day-11/p14328.htm)

This section presents the results of the registrant-submitted toxicity studies used to characterize ecotoxicity effects for this risk assessment. Toxicity testing reported in this section does not represent all species of birds, mammals, aquatic organisms or plants. Only a few surrogate species for both freshwater fish and birds are used to represent all freshwater fish (2000+) and bird (680+) species in the United States. For mammals, acute studies are limited to Norway rat or the house mouse. Estuarine/Marine toxicity testing is limited to a crustacean, a mollusk, and a fish. Also, neither reptiles nor amphibians are tested. The risk assessment assumes that reptiles are not more sensitive than birds and that amphibians are not more sensitive than fish. Only a few dicot and monocot surrogates are used to represent all terrestrial plants. A hazard assessment of the submitted studies can be found in Appendix F.

Summary

As expected for a herbicide, the major effects were on plants. For aquatic plants, toxic effects were higher on vascular than on non-vascular plants. Vascular plants are more sensitive to topramezone (TGAI) than to M670H05 (metabolite) or to BAS 670 00H (formulated topramezone). The most pronounced effects on frond counts were observed for topramezone TGAI. No tests were conducted with "M670H01" or "M670H10", which may exhibit herbicidal activity.

All terrestrial plants showed toxic effects in seedling emergence and vegetative vigor studies, but at varying degree depending on the species and exposure concentrations. In seedling emergence and vegetative vigor studies, monocots were observed to be less sensitive than dicots. The most sensitive plants to seedling emergence were ryegrass (monocot) and cabbage (dicot). The most sensitive plants to vegetative vigor were onion (monocots) and soybeans (dicots). Dry weight was selected as the most sensitive endpoint. However, phytotoxic effects and other growth effects such as shoot height were also observed.

Overall, topramezone is practically nontoxic to avian, mammalians, honeybees, earthworms, freshwater fish and invertebrates and estuarine/marine fish and moderately toxic to estuarine/marine invertebrates. Chronic effects for bobwhite quail reproduction include reduction in the ratio of number hatched to live embryos (a measure of hatchability) at the highest treatment level, 1012 mg ai/kg dw and the mallard duck reproduction had significant reductions in hatchling body weight and female weight gain at all three treatment levels, resulting in the inability to define a NOAEC. No chronic effects were observed in mammals as high as 4000 ppm, based on a two-generation toxicity study on laboratory rats. Chronic effects were apparent for freshwater fish with reduced growth (length and weight) at 9.01 mg aiL^{-1}. Estimated chronic effects for estuarine/marine fish are uncertain because no chronic data were submitted by the registrant; therefore, the NOAEC value was derived based on the assumption that the freshwater and estuarine/marine fish are of equal sensitivity.

M670H05 is practically nontoxic to freshwater fish and invertebrates. The formulated product BAS 670 00H is practically nontoxic to honeybee, terrestrial invertebrates, and freshwater fish and invertebrates.

The reproductive problems seen in chronic toxicity studies do show some effects such as reduction in number hatched to viable embryos, hatchling body weight and female weight gain in birds, thyroid effects for mammals[24], reductions in weight and length of fish and reductions of live offspring produced per female daphnid. This finding would recommend future screening for any endocrine disruption in terrestrial and aquatic animals to better characterize the effects when exposed to topramezone. Disrupting the endocrine system may pose significant risks to animals because proper functioning of the endocrine system is important in regulating growth, development, and reproduction.

> EFED is required under the Federal Food, Drug, and Cosmetic Act (FFDCA), as amended by Food Quality Protection Act (FQPA), to develop a screening program to determine whether certain substances (including all pesticide active and other ingredients) "may have an effect in humans that is similar to an effect produced by a naturally-occurring estrogen, or other such endocrine effects as the Administrator may designate." Following the recommendations of its Endocrine Disruptor Screening and Testing Advisory Committee (EDSTAC), EFED determined that there was scientific basis for including, as part of the program, the androgen- and thyroid hormone systems, in addition to the estrogen hormone system. EFED also adopted EDSTAC's recommendation that the Program include evaluations of potential effects in wildlife. For pesticide chemicals, EPA will use Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) and, to the extent that effects in wildlife may help determine whether a substance may have an effect in humans, FFDCA authority to require the wildlife evaluations. As the science develops and resources allow, screening of additional hormone systems may be added to the Endocrine Disruptor Screening Program (EDSP).

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[24]The effects of topramezone on thyroid is related to the metabolism of the chemical in the liver. This chemical induces the liver metabolic enzymes, which in turn causes increased excretion of the thyroid hormone. The decrease of T4 in the blood causes an increase in THS and increase in the size of the thyroid and liver. For topramezone, this leads to thyroid tumors.

In addition, topramezone was found to cause eye effects, pancreatic effects, and skeletal variations typically caused by inhibition of the 4-HPPD enzyme.

1. Aquatic Effects Characterization

a. Aquatic Animals

i. Acute Effects

Freshwater Fish and Aquatic-phase Amphibians

Acute toxicity data are available for parent topramezone, the aerobic soil metabolite "M670H05"[25], and a topramezone formulation (BAS 670 00H; 31% topramezone).

The 96-hour LC_{50} values for the rainbow trout (MRID 45902315) and bluegill sunfish (MRID 45902314) tested with topramezone are in the >97.4 to >100 mg aiL^{-1} (ppm ai) range, topramezone is classified as practically non-toxic to freshwater fish on an acute exposure basis.

No mortality or sublethal effects were observed for the rainbow trout or bluegill. The freshwater fish acute studies are consistent with Guideline §72-1A(a) and §72-1(c) testing requirements and are classified as acceptable. (Table F-10 of Appendix F).

Estuarine/marine Fish

One estuarine/marine fish acute toxicity test using the topramezone (TGAI) was submitted for the preferred test species sheepshead minnow, (*Cyprinodon variegatus*) (MRID 45902319). No mortality or sub-lethal effects were observed in any test or control group following 96 hours of exposure. The resulting LC_{50} of >100 mg aiL^{-1} (ppm ai) categorizes topramezone as practically non-toxic to estuarine/marine fish on an acute exposure basis. The NOAEC was 100 mg aiL^{-1} (ppm ai), the highest concentration tested. This study is classified as acceptable and fulfills guideline requirements for an acute toxicity test with sheepshead minnow (§72-3(a)). The results of this test are provided in **Table F-17** of the Appendix.

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[25] As discussed under "Measures of Aquatic Exposure", "M670H05" was identified only in aerobic soils. It is persistent and very mobile metabolite and it may have potential to accumulate in soils as a result of carryover from season to season. The metabolite "M670H05" can only enter surface water via runoff. "M670H05" was not identified in the biotransformation studies in water-sediment systems. The metabolites that were identified in water-sediment systems are "M670H01 (aerobic conditions) and "M670H10" (anaerobic conditions). Both are potential 4-HPPD inhibitors.

Freshwater Invertebrates

Acute freshwater invertebrate data are available for topramezone, the metabolite M670H05 and the formulated product with the preferred test species, *Daphnia magna*. Results of acute toxicity tests with the daphnid are summarized in **Table F-14 through F-16** of Appendix F.

The 48-hr EC50 value for *D. magna* is >100 mg aiL^{-1} with a NOAEC value of 100 mg aiL^{-1}. (ppm ai) (MRID 45902316). No significant treatment-related effects were seen at the 100 mg aiL^{-1} treatment level, since 5% of daphnids were each immobilized in the controls and the 12.5 mg aiL^{-1} level. Based on the results of this study, topramezone is categorized as practically non-toxic to freshwater invertebrates on an acute exposure basis. The study is scientifically sound, acceptable, and fulfills the §72-2 guideline requirements.

Two studies were submitted on the acute toxicity of the metabolite M670H05 and the formulated product BAS 670 00H to *D. magna* (MRIDs 462427-05 and 459018-20, respectively). No mortality or sublethal effects were seen at the highest concentration group in the studies and are classified as acceptable. The 48-hour EC_{50} values are >100 mg aiL^{-1} (ppm ai) indicates that "M670H05" and the formulated product are practically non-toxic to freshwater invertebrates on an acute exposure basis. Both studies are scientifically sound, acceptable, and satisfy the §72-2 guideline requirements.

Estuarine/marine Invertebrates

Acute topramezone toxicity data are available for mysid shrimp (*Americamysis bahia*) and the Eastern oyster (*Crassostrea virginica*), and the results are summarized in Table F-18 of Appendix F. Results indicate that shrimp was more sensitive to topramezone than the oyster.

The 96-hour mysid shrimp EC_{50} is 2.7 mg aiL^{-1} (MRID 4590238); therefore, topramezone is classified as moderately toxic to saltwater crustaceans on an acute exposure basis. After 96 hours, mortality in the 1.3, 2.6, and 5.1 mg aiL^{-1} (ppm ai) treatment groups was 5, 55, and 85%, respectively. One mortality (5%) had occurred in the control group. No sublethal effects were seen in all treatment groups and controls, the NOAEC was 1.3 mg aiL^{-1} (ppm ai). A dose-response relationship was evident. The slope of the dose response curve with 95% confidence intervals was 4.5 (95% C.I.: 2.76 - 6.14). The study is scientifically sound, acceptable, and fulfills §72-3(c) guideline requirements for an acute toxicity test with mysid shrimp.

b. Chronic Effects

The only data available to evaluate chronic effects on aquatic animals is an early life-stage toxicity test conducted with the freshwater fish, rainbow trout. No data are available to evaluate chronic effects on estuarine/marine fish or freshwater and estuarine/marine invertebrates, although there is an assumption that freshwater and estuarine/marine fish are of equal sensitivity.

Freshwater Fish

A freshwater fish early life-stage test using technical grade topramezone (TGAI) was submitted (MRID 45902321) using the preferred test species, rainbow trout. No treatment-related effects on hatchability and survival parameters were observed. The survival rate in the viability control (mean of 100 embryos) after 14 days was 83%. Survival at the termination of the hatching period (Day 35) was 91% (criteria: >66%) relative to total numbers of fertilized eggs, or 110% relative to the percentage of fertilized eggs seen in the viability controls. Mean survival at test termination (Day 96) was 99% relative to Day 55 survivors, and 70% relative to Day 35 survivors (criteria ≥70%).

Treatment-related effects on growth (length and weight) were observed to be significant. Sublethal effects caused by BAS 670 H were observed in the 9.01 mg aiL^{-1} treatment. Fish in the juvenile stage (day 55-96) in the highest concentration group, 9.01 mg aiL^{-1}, treatment showed a reduction in body length. These observations were confirmed by the significant differences observed in total length and wet weight between the fish in this treatment and the control fish. The total mean wet weight of the surviving fish at study termination was significantly lower in the 9.01 mg aiL^{-1} treatment compared to the control. Similarly, the total mean body length of the surviving fish on day 96 was significantly lower in the 9.01 mg aiL^{-1} treatment compared to the control. A significant difference in mean length was observed between the fish in the 0.90 mg aiL^{-1} and the control fish; however, the effect was opposite to the one expected: fish in the 0.90 mg aiL^{-1} treatment were significantly longer than the control fish. This may have been caused by the fewer number of survivors in this group, leading to a lower loading of the test vessel. This is not considered to be a substance-related effect. No significant difference in the mean body length was observed between the control fish and those in the 2.93 mg aiL^{-1} treatment. As a result, the NOAEC values, based on mortality of juveniles (day 55 to day 96) and reproductive effects, are both 2.93 mg aiL^{-1} treatment, in which reduced activity was seen occasionally in a higher proportion of the trout

Shortly after the end of hatch and until study day 58, sporadic abnormalities in single trouts were observed in all the 4 replicates of the control group, such as reduced activity, apathy and decreased respiration rate. Abnormalities in the concentration groups were comparable to the control group and were observed only in a few individuals with the exception of the 9.01 mg aiL^{-1}

during the last two weeks of study, and in which fish growth was clearly reduced, showing a clear reduction in body length while body width appeared normal. The abundance of deformations was not increased markedly in the concentration groups. At study termination, deformations were observed in one individual from the 0.10 mg aiL^{-1} treatment. No deformations were observed in the control fish. Two trouts with deformations were observed in the 9.01 mg aiL^{-1} treatment, but likely did not survive until the end of the study.

The study is classified as acceptable and fulfills the §72-4 guideline requirements. The results are summarized in **Table F-13** of Appendix F.

Estuarine/Marine Fish

No data were available to assess the chronic toxicity of topramezone to estuarine/marine fish. An estimated NOAEC value of 2.93 mg aiL^{-1} (ppm ai) was derived for estuarine/marine fish based on the assumption that the freshwater and estuarine/marine fish are of equal sensitivity. This assumption was based on the sensitivity of both fish seen in the acute toxicity tests though the LC_{50} values of $\geq$100 mg aiL^{-1} were not discrete. Extrapolation from freshwater to estuarine/marine chronic NOAEC values is possible; however, there is uncertainty associated with this assumption because quantifiable taxonomic sensitivity factors between the two broad categories of fish do not exist.

There is additional uncertainty associated with the estimated chronic NOAEC for estuarine/marine fish because the acute toxicity data do not allow for a determination of the relative sensitivity of freshwater and estuarine/marine fish.

Freshwater Invertebrates

The 21-day-chronic toxicity of BAS 670 H to *Daphnia magna* (MRID 45902320) was studied under semi-static conditions. Ten replicates of 1 adult female were exposed to control, and topramezone at mean measured test concentrations were <0.06 (<LOQ, control), 6.1, 12.3, 25.1, 48.6, and 97.5 mg aiL^{-1}. Parameters measured included survival of first generation daphnids, mean number of live offspring produced per female daphnid, and number of aborted subitane eggs per surviving female. Dry weight of surviving daphnids were not measured.

The 21-day EC_{50} based on mortality/sublethal effect was >97.5 mg aiL^{-1}. The 21-day NOAEC and LOAEC based on reduced mean number of live offspring produced per female daphnid, was 48.6 and 97.5 mg aiL^{-1}, respectively. Production of offsprings in the treated groups indicated that BAS 670 H had an effect on the reproduction at concentrations greater than 48.6 mg aiL^{-1}. The most sensitive end point was reproduction.

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This study is classified as scientifically sound but does not fulfills the data requirement for an *Daphnia magna* reproduction test guidelines. The Agency has classified this study as supplemental.

b. Aquatic Plants

Toxicity data for topramezone is available for both vascular and non-vascular plants. Data on the metabolite M670H05 and the formulated product is available only for vascular plants. A summary of Tier II toxicity of topramezone, M670H05, and product to vascular aquatic plants is provided in **Table F-21 through F-23** of Appendix F. A summary of Tier II toxicity of topramezone to non-vascular aquatic plants is also provided in **Table F-21** of Appendix F.

Vascular Plants

Three Tier II toxicity studies for vascular plants, using duckweed (*Lemna gibba*) as the surrogate species, were conducted with topramezone TGAI, the metabolite M670H05[26] and formulated topramezone as test substances. Results indicate that vascular plants are more sensitive to topramezone TGAI than to M670H05 or formulated topramezone. Note that the most pronounced effects on frond counts were observed for topramezone TGAI.

Tier II study of the freshwater aquatic vascular plant, duckweed (*Lemna gibba*), was completed using the TGAI of topramezone. In this study (MRID 459023-29), frond number was the most sensitive endpoint with the EC_{50} value at 8 µg aiL^{-1} (ppb ai); the NOAEC and EC_{10} values were 1 and 1.8 µg aiL^{-1} (ppb ai), respectively. The % inhibition of frond numbers in the treated cultures compared to the control ranged from -2.5 to 66.9%, respectively. Abnormalities of small frond size and discoloration (chlorotic, brown or white) of new fronds were noted. This study is scientifically sound and satisfies the U.S. EPA Guideline Subdivision J, §123-2 for aquatic vascular plant studies with *L. gibba*. This study is classified as acceptable.

A Tier II test of the vascular plant, duckweed (*Lemna gibba*) was also completed for the metabolite M670H05 (MRID 462427-04). The results of this study show frond number and average 0-7 day growth rate were significantly reduced by exposure to M670H05. The % inhibition in frond numbers and in specific growth rate in the treated cultures as compared to the control ranged from 4.5 to 62% and from 1.5 to 30.4%, respectively. No effects on frond appearance were observed throughout the study. The most sensitive endpoint was frond number, with a 7 day NOAEC, EC_{10} and EC_{50} value of 6.7 µg M670H05 L^{-1}, 10 µg M670H05 L^{-1} and 360 µg M670H05 L^{-1} (ppb ai), respectively. The Tier II study on the metabolite M670H05 is

[26] As indicated earlier, "M670H05" was only found in the aerobic soil metabolism study. This metabolite could enter surface water by runoff, but not by drift.

scientifically sound, satisfy the U.S. EPA Guideline Subdivision J, §123-2 for an aquatic vascular plant study with *L. gibba* and is classified as acceptable.

A Tier II test of the vascular plant, duckweed (*Lemna gibba*) was also completed for the formulated product BAS670 00H (MRID 45901821). The results of this study show frond number and average 0-7 day growth rate were significantly reduced by exposure to BAS 670 00 H. The % inhibition in frond numbers and in specific growth rate in the treated cultures as compared to the control ranged from -3.2 to 67% and from -1.3 to 38.6%, respectively. Abnormalities of single fronds, small frond size and discoloration (chlorosis) of new fronds were noted. The most sensitive endpoint was frond number, with a 7 day NOAEC, EC_{10} and EC_{50} value of 2.3 µg EP L^{-1}, 3.1 µg EP L^{-1} and 28.6 µg EP L^{-1}, respectively. The Tier II study on the metabolite M670H05 is scientifically sound, satisfy the U.S. EPA Guideline Subdivision J, §123-2 for an aquatic vascular plant study with *L. gibba* and is classified as acceptable.

Non-vascular Plants

Four Tier II, 96-hour exposures, studies were completed using four non-vascular plant surrogates and parent topramezone (topramezone TGAI). The non-vascular plant surrogates included *Navicula pelliculosa* (freshwater diatom), *Skeletonema costatum* (marine diatom), and the green algae *Anabaena flos-aquae* and *Pseudokirchneriella subcapitata.*

Cell density (biomass) was identified as the most sensitive endpoint. Of all the non-vascular surrogates tested, the green algae *Pseudokirchneriella subcapitata* was the most sensitive species.

In the test with *A. flos-aquae* (MRID 45902330), after 96 hours of exposure to BAS670H, the growth rate of *A. flos-aquae* was reduced by 0.2 - 6.9%, and biomass was reduced by -4.1(i.e., stimulated) to 15.6% relative to controls. A clear dose-response relationship was not evident for either endpoints examined, with maximum inhibition occurring at 56 mg a.i. L^{-1}. No morphological effects on the algae were observed. The most sensitive endpoint was biomass, with NOAEC, EC_{10} and EC_{50} value of 32 mg ai L^{-1}, >100 mg ai L^{-1} and >100 mg ai L^{-1}, respectively. The Tier II study is scientifically sound, satisfy the US EPA Guideline Subdivision J, §123-2 for a freshwater blue-green algae study with *A. flos-aquae* is classified as acceptable.

In the test with *S. costatum* (MRID 459023-31), results show after 96 hours of exposure to BAS 670 H, cell densities were reduced by 8.9 - 56% relative to controls. A clear dose-response relationship was evident, with statistical significance at the ≥6.0 mg a.i. L^{-1} concentrations. No morphological effects on the algae were observed. The most sensitive endpoint was cell densities, with a NOAEC and EC_{50} value of 3 mg ai L^{-1} and 49 mg ai L^{-1}, respectively. The Tier II study is scientifically sound, satisfy the U.S. EPA Guideline Subdivision J, §123-2 for a marine algal (nonvascular) study with *S. costatum* is classified as acceptable.

In the test with *P. subcapitata* (MRID 459023-33), results show after 96 hours of exposure to BAS 670 H, the growth rate was reduced by 2.0 - 61.3%, and biomass was reduced by 8.2 - 93.8% relative to controls. A clear dose-response relationship was evident for both endpoints examined. No morphological effects on the algae were observed. The most sensitive endpoint was biomass, with NOAEC, EC_{10} and EC_{50} value of 3 mg ai L·1, 17 mg ai L^{-1} and 17.2 mg a.i L^{-1}, respectively. The Tier II study is scientifically sound, satisfy the US EPA Guideline Subdivision J, ∲ 123-2 for a freshwater green algae study with *P. subcapitata* is classified as acceptable.

2. Terrestrial Effects Characterization

a. Terrestrial Animals

i. Acute and Subacute Effects

Birds

Topramezone is classified as practically non toxic to birds on an acute exposure basis. Topramezone is practically non-toxic to the bobwhite quail *(Colinus virginianus)* and the mallard duck *(Anas platyrhnchos)* on a subacute dietary basis. A summary of acute and subacute toxicity of topramezone to birds is provided in **Tables F-1 and F-2** of Appendix F.

The acute oral toxicity of topramezone to 13-month old bobwhite quail (*Colinus virginianus*) was assessed over 14 days (MRID 45902309). The 14-day acute oral LD_{50} exceeded the highest dose tested (>2000 mg a.i./kg bw), **Table F-1** of Appendix F. There was no mortality during the study. No phyisological or behavioral abnormalities were observed and body weights and food consumption remained unaltered. According to the U.S. EPA classification, topramezone is classified as practically non-toxic to birds on an acute exposure basis. The study is scientifically sound, satisfy the §71-1 US EPA guideline requirement for an avian oral study with bobwhite quail is classified as acceptable.

Two subacute dietary studies using the active ingredient are required to establish the toxicity of topramezone to birds. The results of the dietary studies for the preferred test species, 11-day old bobwhite quail (*C. virginianus*) and 8-day old mallard duck (*Anas platyrhynchos*), are summarized in **Table F-2** of the Appendix In the 8-day quail study (MRID 45902310), no mortality occurred in any control or test group, and no clinical signs of toxicity or abnormalities upon necropsy were observed. The LC_{50} exceeded the highest test concentration, >5000 mg a.i/kg dw (ppm a.i.), which categorizes topramezone as practically non-toxic to the bobwhite quail on an acute dietary basis. The NOAEC was determined to be 5000 mg ai/kg dw (ppm ai). This quail study is scientifically sound, but does not fulfill the guideline requirements for an avian subacute dietary study using the Northern Bobwhite quail (§71-2a) because data verifying the stability of the test substance in treated feed were not provided. This study is classified as supplemental.

In the 8-day mallard study (MRID 45902311), no mortality was observed in any control or test group, and no clinical signs of toxicity were observed. The LC_{50} exceeded the highest test concentration, >5000 mg ai/kg dw (ppm a.i.), which categorizes topramezone as practically non-toxic to the mallard duck on an acute dietary basis. The NOAEC was determined to be 5000 mg ai/kg dw (ppm ai). This duck study is scientifically sound and satisfies the guideline requirement for subacute dietary study for mallard duck, and is classified as acceptable.

Mammals

Three acute mammalian studies (summarized in **Table F-4** of Appendix F) were submitted and considered in this assessment. Rats exposed to technical grade topramezone showed no mortality, clinical signs, or gross lesions at the highest doses tested. All rats gained weight during the study. Corresponding LD_{50} values for the 3 studies are >2000; classifying topramezone as practically non-toxic to mammals on an acute basis (MRID 45902118, 45902119, and 45902120).

Terrestrial-phase Amphibians, Reptiles, and Beneficial Insects (Honey Bee)

The acute contact toxicity to honeybees (*Apis mellifera*) was tested for topramezone active ingredient and the acute contact and oral toxicity was tested with the formulated product (48 hours). Topramezone and the tested formulated product are categorized as practically non-toxic to honeybees on an acute contact and oral basis. The LD_{50} for both topramezone and the formulated product were > 100 µg a.i./bee for the contact and oral tests (MRID 45901819 and 45902325). For further information refer to **Tables F-6 and F-7** of Appendix.F.

Earthworms and other Terrestrial Invertebrates

Acute toxicity studies to earthworms (*Eisenia foetida*) and other terrestrial invertebrates (parasitic wasp, *Aphidius rhopalosiphi*; predator lacewing, *Chrysoperla carnea*; carabid beetle, *Poecilus cupreus*; predatory mite, *typhlodromus pyri*) in accordance with OECD guidelines, were performed for the active ingredient topramezone and its formulated product. As shown in **Tables F-8 and F-9** of the Appendix, acute LC_{50} values for both topramezone and BAS670 00H formulation are greater than the highest treatment level tested. No significant mortality and/or sublethal effects were observed in any of the treatment groups. All of the terrestrial invertebrate toxicity studies are classified as supplemental, because these types of tests are not required by the Agency for pesticide registration.

ii. Chronic Effects to Terrestrial Animals

Birds

Two studies were submitted. One of the studies was conducted with the bobwhite quail (*Colinus virginianus*; MRID 45902312; Data Requirement Guideline §71-4a) and the other with the mallard duck (*Anas platyrhynchos*; MRID 45902313; Data Requirement Guideline §71-4b), but in both of the studies the stability of the test substance (topramezone) in the treated feed was not reported. Results are summarized in **Table F-3** of the Appendix.

Bobwhite Quail

The one generation reproductive toxicity to groups of 16 pairs of 6-month-old bobwhite quail (*Colinus virginianus*) was assessed over 22 weeks. No significant treatment-related effects were seen on mortality, egg production, egg weight, eggshell thickness, fertility rates of eggs, or sublethal effects. There was a reduction (p-value = 0.017) in the ratio of number hatched to live embryos (a measure of hatchability) at the highest treatment level, 1012 mg ai/kg dw. Chick survival 14-days after hatch was not significantly affected by exposure to topramezone at doses up to 1012 mg a.i./kg dw (ppm a.i.) diet. There was no evidence of test substance-effects on body weights of hatchlings or 14-days old survivors. The adult birds may have exhibited a minor avoidance of treated diet, as there was a slight increasing trend in feed consumption with treatment level which may have been due to spillage. Food consumption throughout weeks 1 - 22 showed a slight dose-related trend, with rates being 4.0, 5.3 and 8.0% higher than controls at 100, 300 and 1000 mg a.i./kg (ppm) diet, respectively. There were significant increases in food consumption relative to controls at all treatment levels for some individual weeks over the study, however, the 8.0% increase at 1000 mg a.i./kg (ppm) diet was not considered to be biologically relevant. Although the authors report no marked rejection of feed containing topramezone, the slight increase in food consumption with dose may be a result of increased spillage due to changing taste of the diet containing topramezone.

The NOAEC and LOAEC of topramezone to the bobwhite quail based on the reproductive parameters was 294 and 1012 mg ai/kg dw (ppm a.i.) diet, respectively, when compared to the control. The stability of the topramezone in the treated feed was not assessed at concentration levels relevant to the definitive test.

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Mallard Duck

In the mallard duck one-generation reproduction study to groups of 16 pairs of mallard ducks (approximately 5-months-old) per treatment group was assessed over 22 weeks. The analysis revealed statistically significant reductions in hatchling body weight (p-value = 0.006) and female weight gain (p-value = 0.021) at all three treatment levels, resulting in the inability to define a NOAEC in this study (<100 mg a.i./kg dw (ppm a.i.) diet). The LOAEC based on reductions in body weight was determined to be 100 mg a.i./kg diet, the lowest concentration tested. No topramezone-related effects were observed on any other adult or offspring parameter. The stability of the topramezone in the treated feed was not assessed and a NOAEC could not be determined. If multiple applications or a higher application rate of topramezone is requested in the future, this study will be required to be repeated using lower test concentrations and with data verifying the stability of topramezone under actual use conditions.

Mammals

In a two-generation reproduction toxicity study (MRID 45902214), laboratory rats exposed to technical grade topramezone showed no treatment-related effects on: mortality, estrous cycle, sperm enumeration, morphology, or motility; pre-coital or gestation intervals; number of implantations; post-implantation loss; or mating, fertility, gestation, or live birth indices. With no treatment-related effects, the NOAEC and LOAEC were 4000 and >4000 ppm ai (equivalent to 426.8/471.9 mg ai/kg/day for males and females), respectively (see **Table F-5** of the Appendix).

b. Terrestrial Plants

Like data for vascular and non-vascular plants, data from Tier II terrestrial plant testing are critical in evaluating the risk of herbicides to non-target plants.

Toxicity data for BAS670 00H formulation (31% active ingredient; proposed product is 29.7%) is available for both seedlings and grown plants exposed at a single application up to 50 g/ha (0.045 lb ai/A). This rate is more than 2x higher than the maximum application rate of 0.022 lbs ai/acre proposed for topramezone. In addition, data for BAS670 00H formulation plus an adjuvant is available for peas exposed at an application up to 0.1005 lb BAS 670 00H/A + 0.4465 lb DASH HC/A under field conditions.

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Seedling Emergence

An acceptable 21-day Tier II study of the seedling emergence (MRID 459023-27) with 10 terrestrial plant species (bean (*Phaseolus vulgaris*), cabbage (*Brassica oleracea*), lettuce (*Lactuca sativa*), radish, (*Raphanus sativus*), soybean (*Glycine max*), tomato (*Lycopersicon escuylentum*), onion (*Allium cepa*), corn (*Zea mays*), ryegrass (*Lolium perenne*) and wheat (*Triticum aestivum*)) were studied at the seed stage. After 21-days, emerged seedlings were evaluated for phytotoxicity, percent emergence, and percent reduction in shoot length or shoot weight.

Plant emergence rates by Day 21 were >85% for all species. The observed NOAEC for % emergence was 0.045 lb/A for all species. The most sensitive dicot was cabbage, with a NOAEC of 0.0017 lb/A and EC_{25} of 0.0039 lb/A for dry weight. The most sensitive monocot was ryegrass, with a NOAEC of 0.015 lb/A and EC_{25} of 0.042 lb/A for dry weight.

The condition of surviving seedlings (**Table III.13**) appeared normal in the control and the 0.00019, 0.0006, and 0.0017 lb/A groups, but several seedlings in the 0.005, 0.015 and 0.045 lb/A groups showed increased evidence of phytotoxicity including necrosis, chlorosis and leaf curl. Monocots were observed to be less sensitive to topramezone than dicots. Further details are included in **Tables F-19 and F-19a** of Appendix F.

Table.III.15 Condition (Phytotoxicity) of Surviving Seedlings

Plant Injury Index at 17 g ai/ha or 0.015 lb ai/A *									
Soybean	Lettuce	Radish	Tomato	Bean	Cabbage	Wheat	Ryegrass	Corn	Onion
4-12% LC, CL	13-49% CL, N	33-63% LC, CL, N	22-65% N	n/a	20-65% LC, CL, N	n/a	2-13% CL, N	n/a	0-6% N

* 0% = No effect; 10% = Effect barely noticeable; 20% = Some effect, not apparently detrimental; 30% = Effect more pronounced, not obviously detrimental; 40% = Effect moderate, plants appear able to recover; 50% = More lasting effect, recovery doubtful; 60% = Lasting effect, recovery doubtful; 70% = Heavy injury, loss of individual leaves; 80% = Plant nearly destroyed, a few surviving leaves; 90% = Occasional surviving leaves; 100% = plant death. CL = Chlorosis; LC = Leaf Curl; N = Necrosis; S = Stunting; D = mildew

The conditions of surviving seedlings at the observed application of 0.015 lb/A show bean, corn, and wheat were generally normal and not effected. Soybean, ryegrass, onion, and lettuce were moderately affected with an increase in phytotoxicity of chlorosis, leaf curl and necrosis observed but appears to recover back to normal levels. Radish, tomato and cabbage were detrimentally effected with a pronounce increase in phytotoxicity of chlorosis, leaf curl and necrosis.

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Vegetative Vigor

An acceptable 21-day Tier II study of the vegetative vigor (MRID 45902328) with 10 terrestrial plant species (bean (*Phaseolus vulgaris*), cabbage (*Brassica oleracea*), lettuce (*Lactuca sativa*), radish, (*Raphanus sativus*), soybean (*Glycine max*), tomato (*Lycopersicon escuylentum*), onion (*Allium cepa*), corn (*Zea mays*), ryegrass (*Lolium perenne*) and wheat (*Triticum aestivum*) were studied at the 1-2 true leaf stage.

After 21-days, growing plants were evaluated for phytotoxicity and percent reduction in shoot length or shoot weight. Based on results, the most sensitive monocot was onion with a NOAEC of 0.005 lb/A and an EC_{25} of 0.0098 lb/A, based on dry weight. The most sensitive dicot was the soybean with an EC_{05} of 0.000009 lb/A, an EC_{25} of 0.0001 lb/A, based on dry weight.

The condition of growing plants appeared normal in both the negative and adjuvant control groups. There was increased evidence of phytotoxicity (**Table III.14**) including necrosis, chlorosis, leaf curl and wilting with increasing test concentrations for all dicots tested. Visible effects were less severe for the monocots. See also **Tables F-20 and F-20a** of Appendix F.

Table III.16. Condition (Phytotoxicity) of Growing Plants

Plant Injury Index at 17 g ai/ha or 0.015 lb ai/A *									
Soybean	Lettuce	Radish	Tomato	Bean	Cabbage	Wheat	Ryegrass	Corn	Onion
82-90% LC, N	100% S, N	90-100% CL, LC, N	90-94% CL, LC, N, S	28-64% N	96-100% LC, N	4-14% CL, LC, N, D	0-3% N	0%	0-6% N

* 0% = No effect; 10% = Effect barely noticeable; 20% = Some effect, not apparently detrimental; 30% = Effect more pronounced, not obviously detrimental; 40% = Effect moderate, plants appear able to recover; 50% = More lasting effect, recovery doubtful; 60% = Lasting effect, recovery doubtful; 70% = Heavy injury, loss of individual leaves; 80% = Plant nearly destroyed, a few surviving leaves; 90% = Occasional surviving leaves; 100% = plant death. CL = Chlorosis; LC = Leaf Curl; N = Necrosis; S = Stunting; D = mildew

The conditions of growing plants at the observed application of 0.015 lb/A show corn, onion and ryegrass were generally normal and not effected. Wheat appears to be normal with a slight increase of chlorosis, leaf curl, necrosis and mildew. Bean was detrimentally effected with a pronounce increase in phytotoxicity of necrosis. Soybean, lettuce, radish, tomato and cabbage were nearly destroyed with some approaching death and a pronounce increase in phytotoxicity of leaf curl, chlorosis, necrosis and stunting.

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Field Study

A vegetative vigor field study was submitted (MRID 46460702) to observe the effect of topramezone's formulated product BAS670 00H including an adjuvant (DASH HC) to pea under field conditions. Results indicate that the response of pea plants from treatment conditions did not differ from control plants with the exception of the two highest treatment levels (0.5 + 0.2233 and 0.1005 lb BAS 670 00H/A + 0.4465 lb DASH HC/A). The phytotoxic effects in the 0.5 + 0.2233 and 0.1005 lb BAS 670 00H/A + 0.4465 lb DASH HC/A were 33 and 85%, respectively. The EC25 was determined to be 0.048 lb BAS 670 00H/A + 0.22 lb DASH HC/A. The NOAEC was 0.025 lb BAS 670 00H./A + 0.1116 lb DASH HC/A. The study is classified as supplemental because it is unknown whether the effects were caused by the adjuvant or the end use product. A solvent control for the adjuvant DASH HC was not tested. In addition, there was no indication whether the control plots were separated from treated plot to prevent cross-contamination between plots.

Summary of Toxicity Data for Plant Studies (Aquatic and Terrestrial)

The toxicity data for all of the plant studies (**Tables III.17 through III.19**) are summarized below. These data were the basis for selecting the endpoints and other necessary information for the plant risk assessment.

Table III.17. Summary of Aquatic Plant Toxicity Data for Topramezone

Nontarget Aquatic Plant Toxicity (Tier II)					
Species	% ai	EC_{50}, mg aiL^{-1}	NOAEC, mg aiL^{-1}	MRID no.	Study classification
Vascular species:					
Duckweed (*Lemna gibba*)	95.8	0.008	0.001	45902329	Acceptable
Nonvascular species:					
Anabaena flos-aquae	95.8	>100	100	45902330	Acceptable
Skeletonema costatum	95.8	49	3	45902331	Acceptable
Pseudokirchneriella subcapitata.	95.8	17	3	45902333	Acceptable

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Table III.18. Summary of Seedling Emergence Toxicity Data Based on Dry Weight for Topramezone (As a formulated product)

Nontarget Terrestrial Plant Seedling Emergence Toxicity (Tier II) [1]

Species	% ai	EC_{25} (lb/A)	NOAEC (lb/A)	Endpoint Affected[2]	Slope
	31				
Dicot-Cabbage		0.0039	0.002	dry weight	1.44
Dicot- Lettuce		0.007	0.005	dry weight	1.72
Dicot-Radish		0.009	0.005	dry weight	2.82
Dicot-Tomato		0.044	0.015	dry weight	1.21
Dicot-Soybean		>0.045	0.045	none	n/a
Dicot- Bean		>0.045	0.045	none	n/a
Monocot- Ryegrass		0.042	0.015	dry weight	2.68
Monocot- Onion		>0.045	0.045	none	n/a
Monocot- Corn		>0.045	0.045	none	n/a
Monocot- Wheat		>0.045	0.045	none	n/a

1 MRID no. 459023-27; proposed label application rate is 0.022 lb ai/A, however, test was conducted at 0.045 lb ai/A (2x max. appl. rate).

2 only the most sensitive endpoint is tabulated, if no effects are observed a "none" is denoted.

Table III.19 Summary of Vegetative Vigor Toxicity Data Based on Dry Weight for Topramezone (As a formulated product)

Nontarget Terrestrial Plant Vegetative Vigor Toxicity (Tier II)1

Species	% ai	EC_{25} (lb/A)	NOAEC (lb/A)	Endpoint Affected2	Slope
	31				
Dicot-Soybean		0.0001	[0.000009]A	dry weight	0.893
Dicot- Cabbage		0.0005	[0.00015]	dry weight	1.92
Dicot- Tomato		0.0005	0.0002	dry weight	1.73
Dicot-Radish		0.0008	0.0006	dry weight	1.17
Dicot- Lettuce		0.001	0.0002	dry weight	3.64
Dicot- Bean		0.002	[0.0004]	dry weight	1.5
Monocot- Onion		0.01	0.005	dry weight	1.02
Monocot- Wheat		0.029	0.015	dry weight	2.56
Monocot- Ryegrass		>0.034	0.034	none	n/a
Monocot- Corn		>0.045	0.045	none	n/a

A [EC05]

1 MRID no. 459023-28; proposed label application rate is 25 g ai/A, however, test was conducted at 50 g ai/A (2x max. appl. rate).

2 only the most sensitive endpoint is tabulated

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Table III.20 Summary of Toxicity Data for Wildlife Studies (Aquatic and Terrestrial)

Species	Acute Toxicity			Chronic Toxicity	
	96-hr LC_{50}, mg L^{-1}	48-hr EC_{50}, mg L^{-1}	Acute Toxicity	NOAEC / LOAEC mg L^{-1}	Affected Endpoints
Rainbow Trout *Oncorhynchus mykiss* (TGAI)	>97.4	–	practically nontoxic	2.93 / 9.01	wet weight, length, juvenile survival; abnormalities included decreased growth (reduction of body length) in juveniles.
Bluegill sunfish *Lepomis macrochirus* (TGAI)	>100	--	practically nontoxic	--	--
Rainbow Trout *Oncorhynchus mykiss* (metabolite)	>100	–	practically non-toxic	--	--
Rainbow Trout *Oncorhynchus mykiss* (formulation)	>100	--	practically nontoxic	--	--
Water flea *Daphnia magna* (TGAI)	–	>100	practically nontoxic	50 / 100	mean number of live offspring produced per female daphnid
Water flea *Daphnia magna* (metabolite)	–	>100	practically nontoxic	–	–
Water flea *Daphnia magna* (formulation)	--	>100	practically nontoxic	--	--
Sheepshead minnow *Cyprinodon variegatus* (TGAI)	>119	–	practically nontoxic	–	--
Eastern oyster *Crassostrea virginica* (TGAI)	>123	–	practically nontoxic	–	--
Mysid shrimp *Americamysis bahia* (TGAI)	2.7	–	moderately toxic	--	–

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Species	Acute Toxicity				Chronic Toxicity	
	LD_{50} (ppm)	Acute Oral Toxicity	5-day LC_{50} (ppm)	Subacute Dietary Toxicity	NOAEC / LOAEC (ppm)	Affected Endpoints
bobwhite quail *Colinus virginianus*	>2000	practically non-toxic (458654-22)	>5000	practically nontoxic	294 / 1012	reproduction
Mallard duck *Anas platyrhynchos*	--	--	>5000	practically non-toxic	<100 / 100	growth
Honey bee *Apis meliferus*	>100 (µg/bee contact)	practically non-toxic	–	–	–	–
Laboratory rat *Rattus norvegicus* (TGAI)	>2000	practically non-toxic	–	–	4000 / >4000	no effects

Selection of Endpoints for Risk Quotient Calculations for Plants

Tables III.21 through III.24 summarize the selections to estimate Risk Quotients for the non-target plant risk assessment.

Table III.21. Aquatic Plants (Topramezone)

Surrogate Species	EC_{50}, mg aiL^{-1}	NOAEC mg aiL^{-1}	Endpoint
Vascular Plants, Duckweed *Lemna gibba*	0.008	0.001	Biomass Reduction
Non-vascular Plants, Green Algae *Pseudokirchneriella subcapitata.*	17	3	Biomass Reduction

Table III.22 Terrestrial Plants , Seedling Emergence (at 21 days); Topramezone as a Formulated product

Surrogate Species	NOAEC, lbs/A	EC_{25} lbs/A	End-point
Monocot (Ryegrass)	0.015	0.042	Dry weight
Dicot (Cabbage)	0.0017	0.0039	Dry weight

Table III.23 Terrestrial Plants , Vegetative Vigor (at 21 days); Topramezone as a Formulated product

Surrogate Species	NOAEC, (lbs/A)	EC_{25} (lbs/A)	End-point
Monocot (Onion)	0.005	0.0098	Dry weight
Dicot (Soybean)	[0.000009][1]	0.0001	Dry weight

[1]Use as EC05 because the NOEC value is above the EC25

Table III. 24 **Wildlife Animals (Topramezone)**

Surrogate Species	NOAEC	LC_{50} or LOAEC	End-point
Freshwater Fish Acute (Trout) LC50, mgL^{-1}	97.4	>97.4	No effect
Freshwater Invertebrate Acute (daphnid) EC50, mgL^{-1}	100	>100	No effect
Freshwater Fish Chronic (Trout) NOAEC, mgL^{-1}	2.93	9.01	wet weight, length, juvenile survival; abnormalities included decreased growth (reduction of body length) in juveniles.
Freshwater Invertebrates Chronic (daphnid) NOAEC, mgL^{-1}	48.6	97.5	mean number of live offspring produced per female daphnid
Estuarine/marine Fish Acute (sheepshead minnow) LC50, mgL^{-1}	119	>119	No effect
Estuarine/marine Invertebrate Acute (mysid shrimp) EC50, mgL^{-1}	--	2.7	Survival
Avian Oral Acute (Northern bobwhite quail) LD50, ppm	2000	>2000	No effects
Avian Dietary Subacute (Northern bobwhite quail) LC50, ppm	5000	>5000	No effects
Avian Reproduction (Mallard duck) NOAEC, ppm	<100	100	Hatchling body weight and adult female weight gain
Mammalian Oral Acute (laboratory rat) LD50, ppm	2000	>2000	No effects
Mammalian Reproduction NOAEC, ppm	4000	>4000	No effects

IV. Risk Characterization

Risk characterization integrates exposure and effects characterizations to provide an estimate of risk (RQ, Risk Quotient = Exposure/Toxicity) relative to Levels of Concerns (LOCs.) established by the Agency. It also includes a risk description which is an interpretation of the risk estimates.

A. Risk Estimation - Integration of Exposure and Effects Data

In this deterministic approach, a single point estimate of toxicity is divided by an exposure estimate to calculate a risk quotient (RQ). The RQ is then compared to Agency LOC's that serve as criteria for categorizing potential risk to non-target organisms. A description of the Risk Presumptions for terrestrial, aquatic animals and plants can be found in appendix G.

1. Non-target Terrestrial Animals

Birds

Exposure to birds and mammals for Tier 1 assessments is based on the upper 95th percentile residues on food items from collections of field residues on various plant types as reported by (Hoerger, F. and E.E. Kenaga, 1972) and further supported by additional analysis reported in Fletcher et al. (1994). The upper 95th percentile EECs on short grass is ~5-6 mg ai/kg food at 0.022 lb ai/acre. These are substantially lower than the results of the dietary LC_{50} studies for both mallard and bobwhite which are both >5000 mg ai/kg food. The RQs for acute toxicity to birds are not being calculated because the LC_{50}s are > 5000 mg ai/kg food. It is unlikely that such concentration of topramezone would be found in the environment.

Chronic RQ for the Mallard duck are in Table IV.1. Normally, the NOAEC is used if the measurement endpoint is a production of offsprings; however, without a valid NOAEC for the most sensitive bird selected, the LOAEC at the lowest test level is used instead to calculate a quotient.

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Table IV.1 Chronic Risk Quotients for One Application of Topramezone compared to a Mallard Duck LOAEC of 100.

Site	App. Rate (lbs a.i./acre)	Food Items	Maximum EEC mg/kg diet (ppm)	LOAEC (ppm)	Chronic RQ (EEC/LOAEC)
Corn (grain, seed, popcorn, sweet corn)	0.022	Short grass[27]	5-6	100	0.06

Since the estimated residues are so much lower than the dietary concentration at which no mortality occurred and at which some reproductive effects occurred, risk from direct effects is unlikely to birds, including endangered bird species.

The LOAEC for mallards is in question because there were some small, but statistically significant (p-value of 0.006) growth effects to offspring at 100 ppm, the lowest test level which a NOAEC could not be established. There was also weight loss for female adults (p-value of 0.021) at this level. While the effects were statistically significant, they were relative minor (<10%), and since the peak exposure levels are so much lower than this level, environmental effects are expected to be minimal.

Mammals

To assess risk to mammals, the acute oral LD_{50} of >2000 mg/kg was used to estimate LD_{50} s for mammals of various sizes assumed to occur in treated areas and exposed to treated food items. The rat LD_{50} and rat reproductive NOAEL was converted to representative exposed mammals using the following formula:

$$\text{Adj LD50} = (\text{TW/AW})0.25$$

Where,

TW=Tested animal Weight, 350 g for laboratory rat
AW=Assessed animal Weight

Table IV-2 shows the adjusted mammal LD_{50} and NOAEL..

[27] Other food items are not included here because residues on short grass are higher than any other food item and if residues on short grass are unlikely to be a risk, lower residues on other items would be unlikely to be a risk.

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Table IV.2 Adjusted LD_{50} and NOAEL for various mammal weights

Mammalian Class	Assessed Animal Weight	% body wgt consumed	Adjusted LD_{50} mg/kg bw	Adjusted NOAEL
Herbivores/ insectivores	15	95	> 4396	440
	35	66	> 3557	356
	1000	15	> 1538	154
Grainvores	15	21	> 4396	440
	35	15	> 3557	356
	1000	3	> 1538	154

The residue on food items were converted to daily doses based on mammal body weight and ingestion rates, see Table IV-6.

Table IV.3 Daily equivalent doses based on mammal weight and application rate

Mammalian Class	Assessed Animal Weight	% body wgt consumed	Adjusted LD50 mg/kg bw	Adjusted NOAEL
Herbivores/ insectivores	15	95	> 4396	440
	35	66	> 3557	356
	1000	15	> 1538	154
Grainvores	15	21	> 4396	440
	35	15	> 3557	356
	1000	3	> 1538	154

The equivalent dose for all mammal classes is significantly lower than the adjusted LD_{50} s and NOAEL indicating low potential for acute and chronic risk. However, thyroid tumors were observed in the rat studies. Other effects were on the eye, pancreas, and skeletal variations. These effects are associated with inhibition of 4-HPPD.

2. Non-target Aquatic Animals and Plants

In this assessment, for acute toxicity to fish, invertebrates and aquatic plants, Tier II simulation Models PRZM and EXAMS were used to estimate peak surface water concentrations. The peak concentrations are then divided by the 96-hr LC_{50} for fish, 48-hr EC_{50} for invertebrates and EC50 for aquatic plants. The estimated peak concentrations of topramezone in the five different corn scenarios were < 2 μgL^{-1} (ppb).

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Aquatic Animals

Freshwater and Estuarine/Marine Animals

Peak EECs were estimated for five different corn scenarios (See the "Aquatic Exposure Modeling" section). The highest estimated peak concentrations of topramezone were for 2 applications [28] (each at 0.011 lb ai per acre), with the second application 7 days apart as per label recommendation. These higher concentrations correspond to the Florida sweet corn scenario (Palm Beach County) The highest peak EECs for topramezone are 1.94 μgL^{-1} for aerial and 1.85 μgL^{-1} for ground applications. These peak concentrations are much lower than the acute LC_{50} s or EC_{50} s for freshwater and estuarine/marine animals greater than ~94 - 124 mg ai L^{-1} for most species, and mysid shrimp which had an LC_{50} 2.7 mg ai L^{-1}. This indicates that risk of direct acute effects is unlikely to all freshwater and estuarine/marine animals, including endangered species (Table IV.7).

Reproductive risk to fish cannot be assessed, however, sublethal (survival of juveniles and growth) risk to fish can be assessed using the fish early life stage NOAEC of 2.93 mgL^{-1}. For invertebrates, reproductive risk can be assessed using the life cycle NOAEC of 48.6 mgL^{-1}. The highest EECs are significantly lower than this value suggesting low potential for sublethal chronic risk for fish and reproductive risk for invertebrates (Table IV.7).

Table IV.7 Acute and Reproductive Risks to Fish and Aquatic Invertebrates

Aquatic RQs based on Florida sweet corn scenario		
Assessed Organism	Acute RQ (peak EEC=1.94 $\mu g\ L^{-1}$)	Chronic (21-day EEC 1.91; 60-day EEC 1.9 $\mu g\ L^{-1}$)
Fish LC50 >94.6 mgL^{-1} NOAEC = 2.93 mgL^{-1}	<0.05	<1
Invertebrate (shrimp) EC50=2.7 mgL^{-1} Daphnid NOAEC = 48.6 mgL^{-1}	<0.05	<1

[28] Estimates of environmental concentrations in surface water were made for aerial and ground applications. Two applications regimes were modeled for each method of application. The application regimes are a single application at the maximum application rate of 0.022 lb ai/acre and for 2 applications each at 0.011 lb ai/acre and 7 days apart. Source: Proposed label for the end-use product.

The risk quotients for acute and sublethal risk to fish are lower than the LOCs indicating low potential for risk to aquatic vertebrates. The risk quotients for aquatic invertebrates, represented in this case by the most sensitive invertebrate, shrimp are lower than the LOC, indicating low potential for acute risk. The risk quotient for reproductive risk to invertebrate are lower than the LOC indicating minimal reproductive risk to invertebrates.

Further evaluation of the acute toxicity data for *Americamysis bahia* show that the data sets for the shrimp result in a dose response slope of 4.51 (95% C.I.: 2.59 - 6.42). Based on an assumption of a probit dose response relationship with a mean estimated slope of 4.51, the corresponding estimated chance of individual mortality/immobilization associated with the listed species LOC (0.05) of the acute toxic endpoint for estuarine/marine invertebrates is 1 in 4.51E+08. It is recognized that extrapolation of very low probability events is associated with considerable uncertainty in the resulting estimates. In order to explore the possible bounds to such estimates, the upper and lower values for the mean slope estimate (95% C.I.: 2.59 - 6.42) were used to calculate upper and lower estimates of the effects probability associated with the listed species LOC. The respective lower and upper effects probability estimates are 1 in 2660 and 1 in 1.00E+16. Although the acute toxicity data for freshwater invertebrates statistically supports the assumption of a probit dose response relationship, the confidence in estimated event probabilities for this taxonomic group is reduced by the large confidence intervals associated with the slope.

Aquatic Plants

Table IV.8 presents the RQs estimated from PRZM and EXAMS concentrations and vascular and nonvascular plant toxicity endpoints.

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Table IV.8 Risk Quotients for Vascular and Non-vascular Plants for the use of Topramezone used on corn at a total maximum application rate of 0.022 lb ai/acre and applied in 2 single applications at 0.011 lb ai/acre and a re-application interval of 7 days and for a single application at 0.022 lb ai/acre.The maximum application rate per season is 0.022 lb ai/acre (25 g/ha). The EECs are the peak concentration for the five corn scenarios used in PRZM-EXAMS simulations

Scenarios	Taxa	No of Appls.	EEC ($\mu g\ L^{-1}$)	Toxicity ($\mu g\ L^{-1}$)		RQ	
			Peak	EC_{50}	NOAEC	Acute[2]	Endangered Species[3]
Corn, aerial Florida	Vascular (*Lemna gibba*)	2	1.94	8	1	0.24	**1.94***
		1	1.79	8	1	0.22	**1.79***
	Non-Vascular (*Pseudokirchneriella subcapitata*)	2	1.94	17000	3000	<0.01	<0.01
		1	1.79	17000	3000	<0.01	<0.01
Corn, ground Florida	Vascular (*Lemna gibba*)	2	1.85	8	1	0.23	**1.85***
		1	1.69	8	1	0.21	**1.69***
	Non-Vascular (*Pseudokirchneriella subcapitata*)	2	1.85	17000	3000	<0.01	<0.01
		1	1.69	17000	3000	<0.01	<0.01
Corn, aerial Illinois	Vascular (*Lemna gibba*)	2	1.32	8	1	0.17	**1.32***
		1	1.17	8	1	0.15	**1.17***
	Non-Vascular (*Pseudokirchneriella subcapitata*)	2	1.32	17000	3000.	<0.01	<0.01
		1	1.17	17000	3000	<0.01	<0.01
Corn, ground Illinois	Vascular (*Lemna gibba*)	2	1.15	8	1	0.14	**1.15***
		1	0.99	8	1	0.12	0.99
	Non-Vascular (*Pseudokirchneriella subcapitata*)	2	1.15	17000	3000	<0.01	<0.01
		1	0.99	17000	3000	<0.01	<0.01
Corn, aerial Mississippi	Vascular (*Lemna gibba*)	2	1.46	8	1	0.18	**1.46***
		1	1.49	8	1	0.19	**1.49***
	Non-Vascular (*Pseudokirchneriella subcapitata*)	2	1.46	17000	3000	<0.01	<0.01
		1	1.49	17000	3000	<0.01	<0.01
Corn, ground Mississippi	Vascular (*Lemna gibba*)	2	1.31	8	1	0.16	**1.31***
		1	1.34	8	1	0.17	**1.34***

Scenarios	Taxa	No of Appls.	EEC (μg L^{-1})	Toxicity (μg L^{-1})		RQ	
	Non-Vascular (*Pseudokirchneriella subcapitata*)	2	1.31	17000	3000	<0.01	<0.01
		1	1.34	17000	3000	<0.01	<0.01
Corn, aerial N. Carolina, East	Vascular (*Lemna gibba*)	2	0.82	8	1	0.1	0.82
		1	0.78	8	1	0.1	0.78
	Non-Vascular (*Pseudokirchneriella subcapitata*)	2	0.82	17000	3000	<0.01	<0.01
		1	0.78	17000	3000	<0.01	<0.01
Corn, ground N. Carolina, East	Vascular (*Lemna gibba*)	2	0.64	8	1	0.08	0.64
		1	0.58	8	1	0.07	0.58
	Non-Vascular (*Pseudokirchneriella subcapitata*)	2	0.64	17000	3000	<0.01	<0.01
		1	0.58	17000	3000	<0.01	<0.01
Corn, aerial Texas	Vascular (*Lemna gibba*)	2	1.37	8	1	0.17	**1.37***
		1	1.34	8	1	0.17	**1.34***
	Non-Vascular (*Pseudokirchneriella subcapitata*)	2	1.37	17000	3000	<0.01	<0.01
		1	1.34	17000	3000	<0.01	<0.01
Corn, ground Texas	Vascular (*Lemna gibba*)	2	1.24	8	1	0.16	**1.24***
		1	1.2	8	1	0.15	**1.2***
	Non-Vascular (*Pseudokirchneriella subcapitata*)	2	1.24	17000	3000	<0.01	<0.01
		1	1.2	17000	3000	<0.01	<0.01

1 The EC50 is used for the RQ for nonendangered species, the NOAEC is used for the endangered species

2 LOC >1 for risk to non-endangered species

* LOC >1 for risk to endangered species.

The most sensitive acute toxicity endpoint for vascular plants was frond number reduction. For non-vascular plants it was reduction in biomass.

Based on toxicity tests with vascular plants, parent topramezone (EC_{50} = 8.0 μgL^{-1}) was more toxic than the metabolite "M670H05" (EC_{50} = 360 μgL^{-1}) or the formulated topramezone (EC_{50} = 29.6 μgL^{-1}) used in the study.

According to the RQs, endangered vascular aquatic plants are at risk at levels of concern to the

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Agency (i.e., RQs > 1.0) with the exception of a single ground application in Illinois and application(s) of ground or aerial in North Carolina (East). Although these estimates are only for a limited number of scenarios in potential use areas, there are exceedances resulting from multiple scenarios across the country, which suggests that risk is not limited to a small geographic location and that risk may be underestimated for some locations, but overestimated for others.

The Table also shows drift not to be a significant contributor to risk. Note that the RQs for aerial application are only slightly higher than those for ground application, indicating the primary route of exposure is runoff.

3. Non-target Terrestrial Plants in Dry-land and Semi-aquatic Habitats

Risks to terrestrial plants are based on RQs derived from the TERRPLANT model which estimates exposure from drift and runoff, both to dryland areas immediately adjacent to treated sites and to semi-aquatic areas receiving channelized runoff from treated areas. Non-endangered species risk quotients are presented in Tables IV.9 (aerial applications) and IV.10 (ground applications), and endangered species risk quotients are presented in Tables IV.11 (aerial applications) and IV.12 (ground applications).

Table IV.9. Topramezine EECs and **Nonendangered** Species Risk Quotients for Terrestrial Plants (0.022 bs ai./A; **Aerial** Application)
The EC25 is used to derive RQs for nonendangered plants.

Crop Most Sensitive	Spray Drift (5%)		Spray Drift(5%) + Runoff to Dry and Wet Areas		
	Vegetative Vigor EC_{25}[1] (lbs ai/A)	EEC Risk Quotients Nonendangered Species	Seedling Emergence EC_{25}[2] (lbs ai/A)	EEC lb ai/acre Risk Quotients Nonendangered Species in Dry Areas	EEC lb ai/acre Risk Quotients Nonendangered Species in Wet Areas
Monocot	0.0098 dry weight onion	0.0011 lb ai/acre <1 RQ	0.042 dry weight ryegrass	0.0018 lb ai/acre <1 RQ	0.0077 lb ai/acre <1 RQ
Dicot	0.0001 dry weight soybean	0.0011 lb ai/acre **11 RQ**	0.0039 dry weight cabbage	0.0018 lb ai/acre <1 RQ	0.0077 lb ai/acre **1.9 RQ**

1. Vegetative vigor results are compared to spray drift because drift is simulated by the route of exposure in the vegetative vigor test.
2. Seedling emergent results are compared to exposure from runoff because exposure in the seedling emergent test simulates exposure in soil as occurs from runoff.

Table IV.10. Topramezone EECs and **Non-endangered** Species Risk Quotients for Terrestrial Plants (0.022 bs ai./A; **Ground** Application) The EC25 is used to derive RQs for nonendangered plants.					
Crop Most Sensitive	Spray Drift (1%)		Spray Drift(1%) + Runoff to Dry and Wet Areas		
	Vegetative Vigor EC_{25}[1] (lbs ai/A)	EEC lb ai/acre Risk Quotients Non-Endangered Species	Seedling Emergence EC_{25}/NOAEC[2] (lbs ai/A)	EEC Risk Quotients Non-Endangered Species in Dry Areas	EEC Risk Quotients Non-Endangered Species in Wet Areas
Monocot	0.0098 dry weight onion	0.0002 lb ai/acre <1 RQ	0.043 dry weight ryegrass	0.0013 lb ai/acre <1 RQ	0.0112 lb ai/acre <1 RQ
Dicot	0.0001 dry weight soybean	0.0002 lb ai/acre <1 RQ	0.0039 dry weight cabbage	0.0013 lb ai/acre <1 RQ	0.01122 lb ai/acre **2.8 RQ**

1. Vegetative vigor results are compared to spray drift because drift is simulated by the route of exposure in the vegetative vigor test.

2. Seedling emergent results are compared to exposure from runoff because exposure in the seedling emergent test simulates exposure in soil
as occurs from runoff.

Table IV.11. Topramezone EECs and **Endangered** Species Risk Quotients for Terrestrial Plants (0.022 bs ai./A; **Aerial** Application) The NOAEC is used to derive RQs for endangered plant species					
Crop Most Sensitive	Spray Drift (5%)		Spray Drift(5%) + Runoff to Dry and Wet Areas		
	Vegetative Vigor NOAEC[1] (lbs ai/A)	EEC lb ai/acre Risk Quotients Endangered Species	Seedling Emergence NOAEC[2] (lbs ai/A)	EEC lb ai/acre Risk Quotients Endangered Species in Dry Areas	EEC lb ai/acre Risk Quotients Endangered Species in Wet Areas
Monocot	0.005 dry weight onion	0.0011 lb ai/acre <1 RQ	0.015 dry weight ryegrass	0.0018 lb ai/acre <1 RQ	0.0077 lb ai/acre <1 RQ
Dicot	0.000009 dry weight soybean	0.0011 lb ai/acre **122 RQ**	0.0017 dry weight cabbage	0.0018 lb ai/acre **1 RQ**	0.0077 lb ai/acre **4.5 RQ**

1. Vegetative vigor results are compared to spray drift because drift is simulated by the route of exposure in the vegetative vigor test.

2. Seedling emergent results are compared to exposure from runoff because exposure in the seedling emergent test simulates exposure in soil as occurs from runoff.

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Table IV.12. Topramezone EECs and Endangered Species Risk Quotients for Terrestrial Plants (0.022 bs ai./A; Ground Application) The NOAEC is used to derive RQs for endangered plant species					
Crop Most Sensitive	Spray Drift (1%)		Spray Drift(1%) + Runoff to Dry and Wet Areas		
	Vegetative Vigor NOAEC[1] (lbs ai/A)	EEC lb ai/acre Risk Quotients Typical2/Endangere d Species	Seedling Emergence /NOAEC[2] (lbs ai/A)	EEC lb ai/acre Risk Quotients Endangered Species in Dry Areas	EEC lb ai/acre Risk Quotients Endangered Species in Wet Areas
Monocot	0.005 dry weight onion	0.0002 lb ai/acre <1 RQ	0.015 dry weight ryegrass	0.0013 lb ai/acre <1 RQ	0.0112 lb ai/acre <1 RQ
Dicot	0.000009 dry weight soybean	0.0002 lb ai/acre **24 RQ**	0.0017 dry weight cabbage	0.0013 lb ai/acre <1 RQ	0.0112 lb ai/acre **6.6 RQ**

1. Vegetative vigor results are compared to spray drift because drift is simulated by the route of exposure in the vegetative vigor test.
2. Seedling emergent results are compared to exposure from runoff because exposure in the seedling emergent test simulates exposure in soil as occurs from runoff.

Spray Drift Risk to Terrestrial Plants

The AgDRIFT Tier I model for ground and aerial application was used to estimate how far from the treated field non-target plants would be affected in an effort to provide information on the feasibility of using spray drift buffers to protect plants. Appendix E contains a bar graph that shows the percent effects for tested species at a range of distances down wind up to 1000 feet. It shows that for corn, rye grass and wheat there would not even be a 10% effect, immediately adjacent to the treated field. Conversely, beans and lettuce would be affected at the 25% level up to about 100 feet. Buffers of 100 feet would protect plants from effects of 25% that have sensitivities similar to beans and lettuce. However, radish, tomato and cabbage are more sensitive, and would experience 25% effects at 200 to 300 feet. Species that have sensitivity similar to soybean, the most sensitive species tested, are expected to experience up to 25% effects up to, and over 1000 ft.

B. Risk Description - Interpretation of Direct Effects

1. Risks to Terrestrial and Aquatic Plants

The results of this risk assessment suggest the potential for direct effects to both non-endangered and endangered terrestrial plants, and endangered aquatic vascular plants.

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Specifically, RQs for the following receptors exceed risk levels of concern established for the Agency for the screening-level risk assessment:

Terrestrial plants: RQs exceed non-endangered and endangered dicot LOCs. (RQ ranges from 1.04 to 122; Agency's Level of Concern is 1); RQs do not exceed non-endangered and endangered monocots LOCs

Aquatic plants: RQs exceed endangered vascular species LOCs (RQ = 1.9; Agency's Level of Concern is 1. RQs do not exceed non-endangered vascular, non-endangered and endangered nonvascular species LOCs.

Terrestrial Plants

Terrestrial plants actively growing in dry or wet areas adjacent to agricultural fields may be at risk as a result of runoff and/or drift. In addition to considering where plants grow, exposure must be estimated to compare with results from two kinds of plant tests - a seedling emergence study and a vegetative vigor study. The seedling emergence study involves treating the soil in which seedlings grow, thus, exposing the growing plant to the pesticide. The vegetative vigor study involves exposing only the foliage of actively growing plants off-site to spray drift Both spray drift and runoff are assumed to reach off-site soil. The risks to emerging seedlings and 2-4 true leaf stage plants are discussed in greater detail below.

Emerging seedlings in dry areas receiving sheet runoff (1:1 ratio) from adjacent treated areas:

- Potential risk from a combination of runoff and drift to non-endangered emerging seedlings (based on seedling emergence EC_{25}) is not expected when applying by air or ground (RQ ranges from 0.03 to 0.45; Agency's Level of Concern is 1).

- Potential risk from a combination of runoff and drift to endangered emerging seedlings (based on seedling emergence NOAEC) may be expected when applying by air (RQ = 1.0; Agency's Level of Concern is 1), but not expected for ground application.

Emerging seedling in wetlands or areas receiving channelized runoff (10:1 ratio) from adjacent treated areas:

- Potential risk from a combination of runoff and drift to non-endangered and endangered emerging seedlings (based on both seedling emergence EC25 and NOAEC) may be expected when applying by air (RQ ranges from 1.9 to 4.5) or ground (RQ ranges from 2.9 to 6.6; Agency's Level of Concern is 1).

Plants approaching the 2-4 true leaf stage in adjacent areas receiving 5% and 1% drift alone from aerial and ground application, respectively, in treated areas:

- Potential risk from drift to non-endangered plants (based on vegetative Vigor EC25) may be expected for aerial application (RQ = 1.1; Agency's Level of Concern is 1), but not expected for ground application.
- Potential risk from drift to endangered plants (based on vegetative vigor NOAEC) may be expected when applying by (RQ = 122) air or ground (RQ = 24; Agency's Level of Concern is 1).

The tested terrestrial plants exhibited a wide range of sensitivity to topramezone (see Appendix E, Figure 1). Seedling emergence EC_{25} values ranged from >0.045 (soybean and monocots, dry weight) to 0.0039 lbs ai/A (cabbage, dry weight), while seedling emergence NOAEC/EC_{05} values.

ranged from 0.045 (soybean and monocots, dry weight) to 0.002 lbs ai/A (cabbage, dry weight). If applied at the proposed labeled rate of 0.022 lb ai/A, 5 out of 10 tested species in the emergence study may be affected when exposed to topramezone.

The seedling emergence and vegetative vigor studies suggest this chemical exhibits considerable toxic selectivity. It can be assumed that there may also be similar variation in the general non-target plant population. However, there are uncertainties in having ten tested species represent the universe of non-target plant species. In addition, measurable endpoints were based on growth effects (shoot weight, shoot height) and observed physical injury. Currently, EPA does not measure reproduction effects in plants and therefore is not able to adeptly characterize herbicidal effects such as chlorosis (discoloration) and necrosis.

Further evaluation of the observed injuries to plants from topramezone reveals at an observed application rate of 0.015 lb ai/A, chlorosis and necrosis is most pronounced for those crops: soybean, lettuce, radish, tomato and cabbage. This should be taken in consideration in terms of crop rotation or one of the above crop is found on adjacent agricultural sites. For example, if soybeans follow corn on a field where topramezone is applied to corn, then effects to soybeans, which are sensitive to topramezone, could be observed.

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Aquatic Plants

Aquatic plants actively growing in static water bodies adjacent to agricultural fields may be at risk as a result of a combination of runoff and/or drift. In addition to considering where plants grow, exposure must be estimated to compare with results from two kinds of plant tests - an aquatic vascular study and an aquatic nonvascular study. The risks to vascular and nonvascular plants are discussed in details below.

Vascular plants in water bodies receiving runoff and drift from adjacent treated areas:

- Potential risk from a combination of runoff and drift to non-endangered vascular plants (based on duckweed EC_{50}) is not expected for aerial or ground application.

- Potential risk from a combination of runoff and drift to endangered vascular plants (based on duckweed NOAEC) may be expected for aerial (RQ = 1.9) and ground application (RQ = 1.6; Agency's Level of Concern is 1) with the exception of ground application in Illinois and application(s) of ground or aerial in North Carolina (East)

Nonvascular plants in water bodies receiving runoff and drift from adjacent treated areas:

- Potential risk from a combination of runoff and drift to non-endangered and endangered nonvascular plants (based on *Pseudokirchneriella subcapitata* EC_{50} and NOAEC) are not expected for aerial or ground application.

Direct Effects to Plants Related to the Mode of Action of Topramezone

This analysis of direct effects on plants is based on the mode of action of topramezone. Topramezone, like isoxaflutole[29] and mesotrione, inhibits the HPPD enzyme (4-hydroxyphenyl-pyruvate-dioxygenase,4-HPPD)[30], which is involved in regulating the biosynthesis of carotenoids. Inhibition of carotenoid biosynthesis causes "bleaching" in plants. Topramezone is absorbed by

[29] There are incidents reported for isoxaflutole related to discoloration of corn, even though corn is the target crop.

[30] See http://www.plantprotection.org/HRAC/MOA.html
The HPPD enzyme is also present in animals and it is a tyrosine regulator

the leaves, roots and shoots, then translocated to the growing points of the sensitive weeds. This causes a strong bleaching activity on the growing zones of the shoots within 2-5 days ofapplication. Exposure to light causes necrosis of chlorotic tissues and eventual plant death within 14 days after application . More detailed information on the mode of action of topramezone and other 4-HPPD inhibitors was presented under the "Mode of Action" section.

a. *Direct effects from off-target exposure (runoff and spray drift)*

Both terrestrial plant studies are limited to 21-day data and at the time when plants are at an early developmental stage (seedlings; and growing plants). None of the current guideline studies address the effects of a herbicide at higher stages of development, such as flowering, fruiting, and ripening (i.e., when pigmentation is likely to be more active) .

The terrestrial plant assessment was based on the most sensitive endpoint, in this case dry weight. However, other effects were observed that were significant and even detrimental. In vegetative vigor studies, tomato and radish, two species that are well known to be rich in carotenoids showed chlorosis and necrosis at a significant percent (> 90%). Dicots were identified as the most sensitive terrestrial plants and are more likely to be affected by topramezone than monocots.

Although the available plant data is very limited to go beyond an assessment at the screening level, the mode of action of topramezone (or other 4-HPPD inhibitors, such as isoxaflutole and mesotrione) raise the following issues:

1. The variability in time of enzyme development for different plants and if inhibition of 4-HPPD is such that the plant cannot recover and advance to higher developmental stage. That is, if different plants can or cannot recover from the chemical stress at early stages of development.

2. The variability in flowering, fruiting, and fruit pigmentation stages among plants, to what extent pigmentation is inhibited, and for how long. Therefore, there is a potential for direct effects to non-target plants at more advanced developmental stages. This is an issue that cannot be resolved from the current Tier II Plant Testing studies, which do not test plants at the pre-flowering, fruiting and other active pigmentation stages.

Examples of plants rich in carotenoids are tomato, radish (both used in the Tier II plant studies), most fruits such as pineapples, oranges, strawberries and others, and flowers like narcissus.

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b. *Direct effects from inadvertent exposure to residues of topramezone*

Ground and/or surface water is used to not only irrigate crops (or commercial ornamental plants), but also plants in residential sites or public spaces. Residues of topramezone in irrigation water are a source of inadvertent exposure.

Risk Quotients for non-endangered and endangered plants were calculated from the estimated concentrations of irrigation water drawn from ground water and surface water and the most sensitive endpoints identified in the vegetative vigor studies. The estimated concentration in irrigation water from surface water is based on a maximum peak concentration of 1.94 μgL^{-1} (PRZM-EXAMS; Florida sweet corn scenario). The estimated concentration in irrigation water from ground water was based on 0.067 μgL^{-1}, as estimated by SCI-GROW. Assumptions and calculations to estimate inadvertent concentrations of topramezone in irrigation water are included in Appendix E.

Table IV.13 Risk Quotients for Non-endangered and Endangered Plants Irrigated with Ground and Surface Water Containing Residues of Topramezone [1]

Plant	Ground water	Surface water
Non-endangered Monocots,	1.52 x 10-4	0.044
Non-endangered Dicots	1.52 x 10-3	0.44
Endangered Monocots	0.003	0.09
Endangered Dicots	**1.69**	**49**

1 Estimated concentrations of topramezone in irrigation water:
1.52 x 10-6 μgL^{-1} (ground water) and 4.4 x 10-4 μgL^{-1} (surface water).
Vegetative vigor endpoints (dry weight),
Non-endangered: 1 x 10^{-2} (monocots;onions) and 1 x 10^{-3} (dicots; soybeans)
Endangered: 5 x 10^{-3} (monocots;onions) and 9 x 10^{-6} (dicots;soybeans)

Levels of Concern are exceeded for endangered plants irrigated with ground or surface water containing residues of topramezone..

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b. *Direct effects from inadvertent exposure from soil dust containing residues of topramezone and/or potentially active metabolites*

Topramezone and its soil metabolite "M670H01" may bind to soils via hydrogen bonding to humic components of soil and/or via chelation to Fe(II) species on soil, even though topramezone is an anion and not expected to bind.. Soil and water-sediment studies have shown that non-extractable residues in soils/sediments increase with time and that time-dependent sorption appears to control the overall dissipation of topramezone. These residues (parent; metabolites) may remain intact and desorb slowly. That is, topramezone and/or metabolites may then become bioavailable. Therefore, topramezone and/or metabolites have the potential to be transported by soil dust deposited on off-target sites long after treatment. Desorption in the non-target fields may cause direct effects on emerging seedlings.

2. Risks to Terrestrial and Aquatic Animals

The results of the risk characterization with terrestrial and aquatic animals suggest that there are no acute and chronic risks associated with avian, mammal, fish, and invertebrate exposures to topramezone and its formulated product, as appropriate. The risks associated with all of the terrestrial and aquatic animals are discussed in greater detail below.

Birds and Mammals

As shown in Table IV.4, all avian acute and chronic Risk Quotients (RQs) are less than the Level of Concerns (LOCs). Therefore, the acute and chronic risks to birds and mammals are presumed to be negligible.

Further evaluation of the avian reproduction studies with the Northern bobwhite quail and Mallard duck shows an uncertainty in the toxicity results. The mallard duck appears to be more sensitive to topramezone than the bobwhite quail, however, a LOAEC value of 100 ppm ai for the mallard duck was obtained to characterize the reproductive risks to birds. Treatment-related effects seen in the bobwhite quail and mallard duck were reduction in the ratio of number hatched to live embryos at 1012 ppm ai and reduction in hatchling body weight and female weight gain at all three treatment levels, respectively. Although, the estimated environmental concentration (EEC) was estimated to be ~5 ppm which is approximately 20 times below the lowest concentration tested in the duck study. EFED is requesting the mallard duck study to be repeated to establish a NOAEC. If multiple applications or an increase in the application rate of topramezone is requested in the future, the avian reproductive test with the mallard duck will be of a greater value.

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Precautionary Labeling for Terrestrial Invertebrates

Although EFED does not estimate risk quotients for terrestrial invertebrates, acute and subchronic toxicity studies to terrestrial invertebrates were completed for active ingredient topramezone (BAS 670H) and the formulated product (BAS 670 00H). No significant mortality and/or sublethal effects were observed in any of the treatment groups; therefore, terrestrial invertebrates exposures to topramezone and its formulated product in soil are not likely to be at risk. Precautionary labeling is not required for those terrestrial invertebrates as follows:

- honeybees
- earthworms
- carabid beetle
- lacewings
- predatory mites
- parasitoids

3. Incidents Involving Terrestrial and Aquatic Animals and Plants

No incident information is found in the Ecological Incident Information System (EIIS) database, since topramezone is petitioned for registration as a new chemical. In addition, there are no open literature data on topramezone that may indicate use related incident. However, there are incident involving plants for isoxaflutole and mesotrione, both of which share the same mode of action with topramezone.

4. Federally Threatened and Endangered (Listed) Species Concern

For listed species assessment purposes, the action area is considered to be the area affected directly or indirectly by the Federal action and not merely the immediate area involved in the action. At the initial screening-level assessment, broadly described taxonomic groups are considered and thus conservatively assumes that listed species within those broad groups are co-located with the pesticide treatment area. This means that terrestrial plants and wildlife are assumed to be located on or adjacent to the treated site, and aquatic plants and organisms are assumed to be located in a surface water body adjacent to the treated site. The assessment alsoassumes that the listed species are located within an assumed area which has the relatively

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highest potential exposure to the pesticide, and that exposures are likely to decrease with distance from the treatment area.

In Section II.A.4 of this screening-level assessment for topramezone presents the pesticide use sites that are used to establish initial collocation of species with treatment areas. If the assumption associated with the screening-level action area result in RQs that are below the listed species LOCs, a "no effect" determination conclusion is made with respect to listed species in that taxa, and no further description of an action area is necessary. Furthermore, RQs below the listed species LOCs for a given taxonomic group indicate no concern for indirect effects upon listed species that depend upon the taxonomic group covered by the RQ as a resource.

However, in situations where the screening assumptions lead to RQs in excess of the listed species LOCs for a given taxonomic group, a potential for a "may effect" conclusion exists and may be associated with direct effects on listed species belonging to that taxonomic group or may extend to indirect effects upon listed species that depend upon that taxonomic group as a resource. In such cases, additional information on the biology of listed species, the locations of these species, fate and transport properties of the chemical, and the locations of use sites could be considered to determine the extent to which screening assumptions regarding an action area apply to a particular listed organism. These subsequent refinement steps could consider how this information would impact the action area for a particular listed organisms and may potentially include areas of exposure that are downwind and downstream of the pesticide use site.

5. Data Related to Under-represented Taxa

Ecotoxicity studies are conducted with a very limited number of species as surrogates for members of the same species. Moreover, neither reptiles or amphibians are test organisms. Risk characterization for reptiles relies on data from birds, which is also based of a very limited number of bird species. Likewise, risk characterization for amphibians uses fish data conducted in a very limited number of fish species. Acute toxicity studies conducted with rats or mice are extrapolated to represent acute toxicity to all mammals (including aquatic mammals), whereas 2-generation studies with rats are used to assess reproductive effects on mammals.

Based on these extrapolations, topramezone does not pose risk to animals if used on corn and accordingly to the proposed label.

Plant studies (seedling emergence and vegetative vigor) for topramezone were limited to 10 plants to represent all monocots and all dicots. Moreover, all of the plants used in these studies are commercial crops. For the aquatic risk assessment, one surrogate species was used to represent all aquatic vascular plant and four surrogate species were used to represent all non-

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vascular plants. In addition, plant studies are not designed to provide data at developmental stages beyond those required by the guideline.

6. Implications of Sub-lethal Effects

a. Indirect Effects Analysis

Potential direct effects of topramezone based on its mode of action were previously discussed Pigmentation inhibition to non-target plants was identified as a potential direct effect. Potential indirect effects that may be associated with the mode of action of topramezone are:

1. Plants "depleted" of carotenoids not only loose in esthetic appearance, but also in nutritional value. Consider, for example, β-carotene as a precursorto Vitamin A.

2. Many insects (or other animals) are attracted to flowers or fruits by their color. Discoloration of petals by inhibition of carotenoid biosynthesis may result in food source loss for the animals.

Other potential indirect effects could be:

1. Aquatic organisms may be indirectly affected due to loss of cover or food sources.

2. Structural changes in the aquatic plant communities due to variable species sensitivity and resistance. This could result in changes further up the aquatic food chain.

b. Critical habitat

In the evaluation of pesticide effects on designated critical habitat, consideration is given to the physical and biological features (constituent elements) of a critical habitat identified by the U.S Fish and Wildlife and National Marine Fisheries Services as essential to the conservation of a listed species and which may require special management considerations or protection. The evaluation of impacts for a screening level pesticide risk assessment focuses on the biological

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features that are constituent elements and is accomplished using the screening-level taxonomic analysis (risk quotients, RQs) and listed species levels of concern (LOCs) that are used to evaluate direct and indirect effects to listed organisms.

The screening-level risk assessment has identified potential concerns for indirect effects on listed species for those organisms dependent upon terrestrial and aquatic plants. In light of the potential for indirect effects, the next step for EPA and the Service(s) is to identify which listed species and critical habitat are potentially implicated. Analytically, the identification of such species and critical habitat can occur in either of two ways. First, the agencies could determine whether the action area overlaps critical habitat or the occupied range of any listed species. If so, EPA would examine whether the pesticide's potential impacts on non-endangered species would affect the listed species indirectly or directly affect a constituent element of the critical habitat. Alternatively, the agencies could determine which listed species depend on biological resources, or have constituent elements that fall into, the taxa that may be directly or indirectly impacted by the pesticide. Then EPA would determine whether use of the pesticide overlaps the critical habitat or the occupied range of those listed species. At present, the information reviewed by EPA does not permit use of either analytical approach to make a definitive identification of species that are potentially impacted indirectly or critical habitats that is potentially impacted directly by the use of the pesticide. EPA and the Service(s) are working together to conduct the necessary analysis.

This screening-level risk assessment for critical habitat provides a listing of potential biological features that, if they are constituent elements of one or more critical habitats, would be of potential concern. These correspond to the taxa identified above as being of potential concern for indirect effects and include the following terrestrial and aquatic plants. This list should serve as an initial step in problem formulation for further assessment of critical habitat impacts outlined above, should additional work be necessary.

c. <u>Co-occurrence Analysis</u>

EFED used the LOCATES[31] database to identify listed species located in counties known to produce corn, the crop upon which the pesticide will be used. This screening level assessment considers both direct and indirect effects across generic taxonomic groupings; therefore, plants and species that may depend on plants for the assessment endpoints considered in this assessment were identified. Plant species were further divided into monocots and dicots. **Although LOCs were not exceeded for any monocot plant tested, topramezone is a herbicide for post-**

[31] LOCATES is a Lotus Approach database used in EFED to identify threatened and endangered (T&E) species that may be adversely affected by use of toxic pesticides on a specified crop or crops. The database identifies counties where T&E species may occur and where the acreage grown of a crop or crops exceeds a specified threshold level (e.g., >10 acres).

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emergence control of grasses. Therefore, there are potential adverse effects to some monocots because topramezone is proposed as a herbicide to control emerged grasses in corn fields. Further habitat analysis is needed to allow for a determination of potential risk to listed dicot plants. Monocot and dicot species located in corn-growing counties of the United States are in Appendix H and are summarized in Table IV.14.

TableIV.14. Number of Monocots and Dicots Located in Corn-Growing Counties

Crop	Number of Monocots[a]	Number of Dicots and Other Plants[a]
Field Corn	32	262
Sweet Corn	52	385
Pop corn	6	20
Grain and Seed	22	185

a Although adverse effects may not be expected for the tested monocots, topramezone can be used to control post-emergent grasses. Therefore, there is potential risk for some monocots. Further analysis is needed to determine potential risk to dicots and other plants.

d. Indirect Effects Co-Occurrence Analysis.

LOCATES was also used to identify listed species that depend on plants for survival, fecundity, or reproduction that reside in corn-growing counties in the United States. Because plants are primary producers, all taxonomic groups included in LOCATES were included in this analysis (mammals, birds, insects, fish, aquatic invertebrates, arachnids, snails, reptiles, and amphibians). For these taxonomic groups, EFED performed a preliminary analysis to identify species that are unlikely to be indirectly affected by potential effects on dicots from topramezone uses. These species, and basis for the designation, are in Appendix H and are summarized in Table IV.15, below.

Table IV.14. Number of Species Identified that are Unlikely to be Indirectly Affected by Potential Direct Effects to Dicots and Number of Species Identified Where Further Evaluation is Needed (All Proposed Uses)

Animal	No. of Species Identified as Unlikely Affected	No. of Species Where Further Analysis is Needed	Comment
Mammals	27	32	Habitat, home-range, and diet were used for preliminary analysis. Carnivores with large home ranges or species whose habitats and diets were inconsistent with agriculture were identified as unlikely adversely affected
Birds	20	35	Habitat, home-range, and diet were used for preliminary analysis. Carnivores with large home ranges or species whose habitats and diets were inconsistent with agriculture were identified as unlikely adversely affected
Fish	77	29	Fish species were subdivided by diet. Species that do not consume plants were identified as unlikely indirectly affected by topramezone.
Arachnids	20	0	All arachnids were either obligate subterraneous species or are located in high-elevation forests.
Amphibians	0	18	Preliminary analysis has not been conducted.
Aquatic Invertebrates	0	89	Preliminary analysis has not been conducted.
Insects	0	39	Preliminary analysis has not been conducted.
Reptiles	0	28	Preliminary analysis has not been conducted.

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C. Description of Assumptions, Limitations, Uncertainties, Strength, and Data Gaps

a. Assumptions, Limitations, Uncertainties, Strength, and Data Gaps Environmental Fate Data and Exposure Assessment.

In the "Problem Formulation" chapter, several sources of uncertainty in the environmental fate data were identified. Considering that the data is used to select input parameters for aquatic exposure assessment, these uncertainties are carried into the exposure assessment. These environmental fate uncertainties are discussed in more detail in this chapter.

As a new chemical for which the use areas are not known, generic, rather than region specific assessments can only be performed at the screening level. In addition, corn is widely cultivated in the USA and corn is grown in a wide variety of soils, climates, ecosystems, and agricultural practices. Therefore, risk may be underestimated for some geographical regions and underestimated for others.

Most of the environmental fate studies were well conducted and provided reliable data for characterizing the environmental fate of topramezone and estimating environmental concentrations. However, deficiencies were identified in some of the studies that can introduce uncertainty in the assessment and EECs. Topramezone is stable in abiotic media (hydrolysis; direct photolysis) and even towards indirect photolysis. Although biotransformation was identified as a route of dissipation, further assessment and integration of data indicate that kinetically controlled adsorption to soil/sediments (i.e, time-dependent sorption) may be competing with biotransformation as a dissipation route. Specific identified issues are presented below.

1. Effect of pH in exposure and toxicity of topramezone

Topramezone is a weak acid, with a pK_a of 4.06 and, therefore the concentration of the dissociated form increases with pH and, in principle, its mobility in soils is expected to increase, provided that other binding mechanisms (e.g., chemisorption or hydrogen bonding) do not control sorption behavior of topramezone. Given the very narrow pH range of the soils used in the batch-equilibrium adsorption/desorption studies could not be established. Assuming that sorption behavior correlates with pH and given the extensive variability in soils across the potential use area of topramezone, exposure concentrations of topramezone in aquatic environments may be underestimated or overestimated for specific sites.

2. Time-dependent sorption behavior

Batch-equilibrium adsorption/desorption are short term studies (24 hr or, at the most 48) and are not designed to study the kinetics of sorption. That is, how fast the chemical absorbs and how fast it desorbs (time-dependent adsorption and desorption). In all of the soil and water-sediment systems, non-extractable radioactivity increased with time and was predominantly associated with the fulvic acid fraction. It is conceivable that biotransformation and adsorption are competitive processes and that the observed dissipation of topramezone may be controlled by adsorption rather than by biotransformation.

Topramezone can be envisioned as a chelating ligand and it is chelation to the Fe(II) site of the 4-HPPD enzyme what makes topramezone a 4-HPPD inhibitor. The structural requirements for herbicides that inhibit the functions of 4-HPPD were discussed under the mode of action of topramezone. In the same manner that the keto (carbonyl) and the enolate can bind to the Fe (II) site of the enzyme, it can be speculated that there are two possible ways by which topramezone could bind to soil. One way is via hydrogen bonding to terminal hydroxyl (-OH) and/or carbonyl (keto) groups in organic matter (e.g., humic and fulvic acids in soil and/or present on the surfaces of clays). Another way is by chelation to Fe surface sites of iron mineral phases (crystalline and/or amorphous) that may be present in soils and sediments. Chelation to other metal sites such as Mn and Cu cannot be ruled out. Time-dependent sorption of topramezone may be related to changes it the conformation of the molecule over time that can optimize hydrogen bonding and/or chelation. Factors that may contribute to desorption are those that could weaken hydrogen bonding and/or chelation to metal sites, for example, changes in ionic strength of the media.[32]

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3. Behavior of topramezone in water-sediment systems

Although the study has deficiencies that must be addressed by the registrant, a marked difference was found between the types of metabolites formed in water-sediment systems under aerobic and anaerobic incubation.

Metabolite formation

The soil metabolite "M670H05" was not found in the water-sediment studies., although this metabolite could only enter surface water by runoff or via eroded soil. Although there are animal toxicity data for this metabolite, no plant data are available). Therefore, the toxicity of this metabolite to aquatic plants is not known. However, the limited number of water- sediment systems used in the studies does not preclude that M670H05 could also form in some water - sediment systems.

The metabolite "M670H01" (the "cyano" metabolite, this metabolite is a "ketonitrile) was found in one aerobic soil and in the aerobic water-sediment system. No transformation of the cyano group to an amide and to a carboxylic acid group was found in the study, but such pathway is feasible (it is well documented for cyanazine). There are no toxicity data for "M670H01", even though this metabolites have the molecular structure features required for a 4-HPPD inhibitor and it is very similar to an active metabolite of isoxaflutole (RPA-202248, also a "ketonitrile")..

The metabolite "M670H10" was the only one identified under anaerobic conditions. It is clear that reduction was involved in the formation of this metabolite, as the sulfonyl group, S(VI), of topramezone is reduced to a sulfide, (S-II), which is consistent with redox chemistry in anoxic environments.. There are no toxicity data for this metabolite. An EPIWIN estimate of physical and chemical properties of the metabolite indicate that this metabolite was the most hydrophobic of all of the metabolites (Log Kow = 2.75). The metabolite "M670H10" have higher adsorption coefficients than parent topramezone or "M670H05). In the batch-equilibrium adsorption/ desorption study conducted with this metabolite (46242703), the authors argue that the exposure to aquatic organisms would decrease by partitioning into the sediment. However, long term persistence in sediments (and potential accumulation) nor its time-dependent sorption is not well understood. There are no toxicity data for "M670H10", even though this metabolite also has the molecular structure features required for a 4-HPPD inhibitor.

Persistence

Marked differences in kinetics and transformation products were found between the two studied aerobic - water sediment system. In a river water -sediment system, topramezone was persistent throughout the 120 days duration of the study and no metabolites were identified. In a pond water-sediment, the total system half-life of topramezone was 19 days and the metabolite "M670H01" was identified. But major differences were found between the physical and chemical characteristics of the pond water-sediment and the river water-sediment systems:

i. The sediment in the pond water was acidic.

ii. The pond water had a high electrical conductivity and high "dissolved solids"

Thus, the following explanations are plausible: (a) Dissipation is related to microorganisms typical of an acid environment; (b) Ionic species may be involved; (c) Colloidal material may contribute to surface-catalyzed reactions; (d) "Disappearance" of topramezone is dominated by adsorption rather than by biotransformation, particularly if the colloidal material is significant, as colloids provide a much higher surface area (adsorption sites) than larger particulates.

Although the design of the guideline study is not geared to identify such contributions, the pond water-sediment system is nevertheless atypical of ponds that may be found in sites where topramezone might be used. Therefore, how persistent topramezone is in aerobic water-sediment systems is not well understood. Because aerobic soil half-life is an important input parameter in aquatic exposure models, this uncertainty is carried over to the estimated exposure concentrations, as assumptions had to be made (in this case the 2 x aerobic soil metabolism recommended default value). Therefore, exposure concentrations may have been underestimated or overestimated as a result of this uncertainty.

The Agency has requested that the petitioner addresses the identified deficiencies. This information is important to better define the behavior of topramezone in aquatic environments.

Soils

The potential for carryover of the aerobic soil metabolite M670H05 (which appears to form only in aerobic soils) was identified, but it could not be adequately assessed because no aerobic soil metabolism data were available beyond 1 year post-application that would indicate that the amount of this metabolite keeps increasing. There are no seedling emergence data for this metabolite that could be used to evaluate its phytotoxicity to emerging, non-target plants.

Considerable variability in persistence of topramezone and nature and relative ratio of metabolites was observed in the six aerobic soils. Therefore, based on soil differences (including microbial activity) it is expected that the persistence of topramezone, nature and relative amount of metabolites will be highly variable across the potential use area.

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Temperature at the time of application and throughout the growing season can control the persistence of a pesticide in the environment. The aerobic soil metabolism studies were conducted only at one temperature (27° C), and therefore, persistence at lower temperatures. Given the regional variability of corn agricultural practices, topramezone may persist longer when it is applied at temperatures lower than the study temperature. Topramezone may persist longer in colder, northen climates that in the south. As a result, exposure concentrations in surface water (or amount of residues in soil) may be overestimated or underestimated for specific areas.

In addition, carryover of topramezone from season-to-season can not be ruled out if adsorption to soils as "non-extractable" residues is taken into account. The extent of bioavailability via desorption is not known, as the batch-equilibrium adsorption/desorption studies are not designed to study the kinetics component of sorption. Thus, soils or sediments may act as reservoirs to store topramezone.

b. Assumptions, Limitations, Uncertainties, Strength, and Data Gaps in Characterization of the Effects Characterization and their Implications to the Ecological Risk Assessment.

Terrestrial

1.. The terrestrial assessment accounts only for exposure of terrestrial organisms to topramezone, but not to its metabolites. The potential toxicity of soil metabolites (M670H05 and M670H01) is unknown. The only toxicity data submitted is with M670H05, but was conducted only with aquatic organisms. The effect of these two metabolites on seedling emergence is not known. However, "M670H01" exhibit those molecular features associated with 4-HPPD inhibitors.

2. The risk assessment only considers the most sensitive species tested. Terrestrial acute and chronic risks are based on toxicity data for the most sensitive bird, mammal, and plant species tested. Responses to a toxicant can be expected to be variable across species. The position of the tested species relative to the distribution of all species' sensitivities to topramezone is unknown. This is of particular concern for topramezone effects on plant because this herbicide is selective and some plant species are likely to be more sensitive than others. In addition, plant studies are not conducted at the flowering, fruiting and fruit maturity stages. At these stages, plants may be more sensitive to topramezone because topramezone may affect pigment biosynthesis. There are no protocols for plant testing at higher developmental stages.

3.. The risk assessment only considered a subset of possible use scenarios. For this risk assessment, the scenarios represented only a limited number of potential use sites. As a new chemical, only potential use areas can be identified. A greater risk to the environment than those included in this risk assessment may be for those occurring in or near sensitive environments

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(e.g., close proximity to habitat that supports or has the potential to support endangered or threatened terrestrial species).

4.. Only dietary exposure is included in the exposure assessment. Other exposure routes are possible for animals in treated areas. These routes include ingestion of contaminated drinking water, ingestion of contaminated soils, preening/grooming, dermal contact, and inhalation. Consumption of drinking water would appear to be inconsequential if water concentrations were equivalent to the concentrations from PRZM/EXAMS; however, puddled water sources on treated fields may have much higher concentrations than those modeled ponds. Preening exposures, involving the oral ingestion of material from the feathers remains an non-quantified, but potentially important, exposure route considering that the mode of herbicide action of topramezone is inhibition of the HPPD enzyme. This enzyme is also present in mammals and controls tyrosine catabolism. Thyroid effects on wild mammals is not known, but were observed in tests conducted with rats.

5.. The risk assessment assumes 100% of the diet is relegated to single food types foraged only from treated fields. These assumptions are likely to be conservative for many species and will tend to overestimate potential risks. The assumption of 100% diet from a treated area may be realistic for acute exposures, but long-term exposures modeled as single food types composed entirely of material from a treated field is uncertain.

Aquatic

1. The risk assessment only considers the most sensitive species tested. Aquatic acute and chronic risks are based on toxicity data for the most sensitive fish, invertebrate, and plant species tested. Responses to a toxicant can be expected to be variable across species. Sensitivity differences between species can be considerable (several orders of magnitude) for some chemicals (Mayer and Ellersieck 1986). It is uncertain if the tested laboratory species is representative of most species' sensitivities to topramezone toxicity.

2. There are no toxicity data for the metabolites "M670H01" (which is also a soil metabolite) and "M670H10", which have been identified as forming in water-sediment systems and have molecular features that suggest potential behavior as 4-HPPD inhibitors.

3. Topramezone has a proposed label only for corn, which is grown over a large geographic area. For this risk assessment, the scenarios selected for PRZM-EXAMS simulations represented only a finite number of areas where this chemical might be used.EECs in aquatic environmental l use geographic areas. Uses in areas occurring in sensitive

locations (close proximity to aquatic environments and high runoff potentials) could result in increased risk to these organisms.

4. Surrogates were used to predict potential risks for species with no data (i.e., reptiles and amphibians). It was assumed that use of surrogate effects data are sufficiently conservative to apply the broad range of species within taxonomic groups. If other species are more or less sensitive to topramezone and/or its metabolites than the surrogates, risks may be under- or over-estimated, respectively.

5. The long term effects to wild mammals is not known. Topramezone caused thyroid tumors in rats. In addition, eye effects, pancreatic effects, and skeletal variations were identified. These effects are typically caused by inhibition of the 4-HPPD enzyme. Topramezone inhibits the 4-HPPD enzyme.

V. Literature Cited

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U.S. Environmental Protection Agency. 2004c. Overview of the Ecological Risk Assessment Process in the Office of Pesticide Programs, U.S. Environmental Protection Agency. Endangered and Threatened Species Effects Determinations. Office of Prevention, Pesticides and Toxic Substances, Office of Pesticide Programs, Washington, D.C. January 23, 2004.

U.S. Environmental Protection Agency. 2004d. Probit Slope/LOC Information Guidance and Spreadsheet. Sent through Email to OPP EFED on September 16, 2004 from Ed Odenkirchen.

Willis, G. H. and L..L. McDowell, 1987. Pesticide Persistence on Foliage. in *Reviews of Environmental Contamination and Toxicology*. 100:23-73.

Open Literature (Peer Reviewed Journals)

The following open literature papers were used to expand the information on the mode of action of the 4-HPPD enzyme, which is the mode of action of topramezone, isoxaflutole, and mesotrione.

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Wu, SC, et al. 2002. *Mode of action of 4-hydroxyphenylpyruvate dioxygenase inhibition by triketone-type inhibitors*. **J. Med. Chem.**, 23, 45(11), pp. 2222-8.

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Yan, C, et al. 2004. *Structural basis for herbicidal inhibitor selectivity revealed by comparison of crystal structures of plant and mammalian hydroxyphenylpyruvate dioxygenases*. **Biochemistry**, 43(32): 10414-23.

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Simkin, A.J., et al. 2003. *Comparison of carotenoid content, gene expression and enzyme levels in tomato (Lycopersicon esculentum) leaves*. **Z. Naturforsch. [C]**, 58 (5-6): 371-80.

Corona, V., et al. 1996. *Regulation of a carotenoid biosynthesis gene promoter during pigment development*. **Plant J.**. 9(4): 505-12.

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The following open literature papers were used to explain the long-term phytotoxicity of soils:

Gao. J. and Sun, J. 2002..*Studies on bound 14C-chlorsulfuron residues in soil*. **J. Agri. Food Chem**. 50 (8), pp 2278-82.

Ye, Q., Sun, J., and Wu, J. 2003. *Causes of phytotoxicity of metsulfuron-methyl bound residues in soil*. **Environ. Pollut.,** 126 (3), 417-23.

<u>Other Sources</u>

Cotton, F.A. and Wilkinson, G. **Advanced Inorganic Chemistry**, Fifth Edition, 1988, Wiley Interscience, New York

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N.N. Greenwood and A. Earnshaw. **Chemistry of the Elements**. Published by Pergamon Press, New York, 1984.

J. Buffle. **Complexation Reactions in Aquatic Systems: an analytical approach**. Published by Ellis Horwood, New York., 1990.

W. Stumm. **Chemistry of the Solid-Water Interface: Processes at the Mineral-Water and Particle-Water Interface in Natural Systems**. Published by Wiley Interscience, New York., 1992

M.B. McBride. **Environmental Chemistry of Soils**. Published by Oxford University Press, New York, 1994.

K.J. Irgolic and A.E. Martell. **Environmental Inorganic Chemistry**. Published by VCH, Deerfield Beach, Florida.

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Appendix A- Identification of Data Gaps

1. Environmental Fate

Topramezone is a NAFTA Joint Review with Canada. Both PMRA and the USEPA identified deficiencies in the studies that must be addressed by the petitioner. The importance of needed data is discussed in this section. In addition, the registrant should formally petition waivers for the 163-2, Volatilization from Soil and 165-4, Bioaccumulation in Fish, Subdivision N Data Requirements. Neither the vapor pressure nor the Log *n*-octanol-water partition coefficient trigger the requirements for this studies.

a. Aerobic Soil Metabolism (162-4)

David, M.D.2002. *BASF 670 H: Aerobic Aquatic Metabolism*. Performed by BASF Corp., Ewing, NJ. BASF Report ENV 01-055. BASF Study 56940. BASF Re. Document # 2002/5003947. Completed on 6/28/2002
45902423

Deficiency	Required	Importance
Topramezone was much less persistent in the pond water-sediment (19 to 24 days in the whole system) than in the river-water sediment (> 120 days). The chemical and physical characteristics of the two sediments were markedly different. The pond water-sediment appears to be atypical: the sediment had a very low pH, the water had a high electrical conductivity and high amount of "dissolved" solids. These characteristics are reminiscent of ponds receiving acid mine drainage	It is requested that an attempt be made to satisfactorily address these differences. Otherwise, a new study may be required	The importance of this request is **HIGH.** Aerobic soil metabolism half-life is an important input parameter to estimate exposure concentrations in aquatic ecosystems and in drinking water drawn from surface water. In the selection of input parameters for PRZM-EXAMS, assumptions had to be made for the most conservative case by using twice the already prolonged aerobic soil metabolism half-life of241 days. The exposure concentrations in aquatic ecosystems may represent an overestimate. This, in turn, may overestimate the risk to aquatic plants and to irrigated crops. In addition, the metabolite "M670H01" identified in the pond water-sediment system has molecular structure feature that suggest that it potentially manifest the same mode of action as topramezone. The amount of this metabolite in this system may not reflect its concentration in less atypical systems.

-1-

b. Anaerobic Aquatic Metabolism (162-3)

Guirgius, A. 2002.*Anaerobic Aquatic Metabolism of ^{14}C-BAS 670 H.*Conducted by BASF, Research Triangle Park, NC.and BASF Aktiengesellshaft, Limburgenhof, Germany.BASF Study No.58523. BASF Reg. Doc. 2002/5003696. Completed on 12/16/2002
USEPA 45902422

At this time, this study is not acceptable. However, it may be upgrade if the following deficiencies are adequately addressed by the petitioner.

Deficiency	Required	Importance
Individual replicate results for parent (BAS 670H) and its degradates (HPLC analyses) were only provided for five of the ten sampling intervals, and there were sufficient levels of variability between replicates at the same sampling interval and between means for consecutive sampling intervals. The validity of the reported results could not be confidently assessed due to these sufficient variability between replicates	1. Submit additional replicate data. 2. Provide a rationale explaining these variability	**HIGH** A degradate (M670H10) identified in this study has been identified as potentially exhibiting the same herbicidal mode of action as topramezone. The additional data may clarify the concentrations of this metabolite at each sampling time.
Storage conditions and intervals of sediment samples prior to and after extraction and of sediment extracts and water layers prior to analysis were not reported and it was not established that the variable results were not the consequence of instability during storage prior to analysis.	1. Submit information on storage procedures and intervals of sediment sampling 2. Provide a rationale explaining these variability	Same as above
It was not established that the methodology employed did not artificially degrade parent BAS 670H and it transformation products.	Method validation data is required to ensure that the extraction and concentration techniques employed did not effect on the integrity (transformation) of BAS 670H prior to analysis	Same as above
All degradates detected at ≥10% of the applied radioactivity have not been identified. An unidentified compound, Unk1 (Rt 6:27), was detected in phenyl-U-^{14}C -lable treated sediment at a mean of 8.55% of the applied. Because the concentration of this compound is very close to ≥10% of the applied the applicant must submit the replicate results. This compound must be identified.	1. Submit the replicate results 2. Unk1 compound must be identified	**HIGH** Unknown 1 may have molecular structure features that could suggest potential herbicidal activity

c. Mobility in Soils (163-1)

In all of the studies involving soils and sediments, the increase in "non-extractable" radioactive residues increased with time and were mostly associated with the fulvic acid fraction. Thus, the overall dissipation of topramezone appears to be controlled by the kinetics of sorption rather than by biotransformation (i.e., time-dependent adsorption and desorption). That is, a competition between sorption and transformation. Unfortunately, studies designed to address the kinetics of adsorption and desorption of pesticides on soils/sediment are not commonly conducted. Data on kinetics of adsorption/desorption of topramezone should be submitted, if available. These data may help assessing the contribution of time-dependent sorption over biotransformation.

d. Frozen Storage Stability

White , M. And K. Smith. 2003. *Freezer storage stability of BAS 670H and its degradates in soil.* Document No. 2002/5004331. BASF study No. 59941. Completed on 12/31/2003. **45902428**

The quality of a terrestrial field dissipation study depends on the stability of residues in the samples taken from the field and analysis. The following deficiencies were identified in this study.

Deficiency	Required	Importance
The method by which the soil was treated was not described, so the potential for treatment variability could not be assessed.	Provide information on the soil treatment method.	**HIGH** for further evaluating the terrestrial field dissipation studies
The mean incubation temperatures was reported, however, no data supporting these values was provided	Submit supporting data for temperature (min. and max. temperatures).	Same as above
The detailed description of the HPLC/MS method was not provided.	Submit detailed description of the HPLC/MS method	Same as above

Deficiency	Required	Importance
The soil samples for different intervals were not treated on the same date. The 0-day samples were treated on 2/4/02, the 4-month samples on 10/9/01, and the longer stored samples (range of 18 to 29.5- month) on 8/4/00. Therefore, the samples identified as "time zero" can not serve as a baseline for the stored samples and they can not be used to validate the application rate. Please note that this is not the preferred method for determining storage stability. A set of samples is treated, a subset is analyzed as time 0, and the remainder are stored frozen and sampled at various intervals. *All data appear to be reported in terms of percent of the nominal application rate*	1. Provide rationale as why the soil samples for different intervals were not treated on the same date and the treatment times are reverse than a typical storage stability study. 2. Provide measured data if available 3. Provide rationale for using nominal data instead of measured data	Same as above
HPLC chromatograms were provided only for one 18-month sample	Provide chromatograms for later sampling intervals to demonstrate that no transformation products of BAS 670H were recovered from the soil	Same as above

2. Ecological Effects

a. <u>Avian Subacute Dietary 71-2(a)</u>

Zok, S. 2001. BAS 670 H - Avian dietary LC50 test in chicks of the Bobwhite quail (*Colinus virginianus*). Environmental Toxicology and Ecology, BASF Akiengesellschaft, 67056 Ludwigshafen/Rhein, Germany. Project No. 31W0124/98135. BASF Corporation. July 12, 2001. **45902310**

Deficiency	Required	Importance
Data verifying the stability of topramezone in treated feed were not provided. Topramezone was reported to be stable over 30 days in the diet, however, the analytical report (08B0124/986033) was not submitted for verification.	Provide the analytical report for verification	**LOW** for verifying the stability of test concentrations in treated feed.

b. Avian Reproduction 71-4(a)

Zok, D. 2002. BAS 670 H - 1-Generation reproduction study on the bobwhite quail (*Colinus virginianus*) by administration in the diet. Experimental Toxicology and Ecology, BASF AG, Germany. Unpublished. Project No. 71W0124/98086. BASF Registration No. 2002/1005238.
45902312

Deficiency	Required	Importance
Stability of BAS 670 H at room temperature was verified for 30 days in treated quail feed prepared at 60 ppm only; this level is below the range of concentrations tested in the definitive study.	Provide data verifying the stability of BAS 670 H under actual use conditions.	**LOW** for verifying the stability of actual test concentrations in treated feed.

c. Avian Reproduction 71-4(b)

S. Zok. 2002. BAS 670 H - 1-Generation reproduction study on the mallard duck (*Anas platyrhynchus*) by administration in the diet. Environmental Toxicology and Ecology, BASF Akiengesellschaft, 67056 Ludwigshafen/Rhein, Germany. Project No. 72W0124/98126. BASF Corporation. February 18, 2002
45902313

Deficiency	Required	Importance
1. Stability of BAS 670 H at room temperature was verified for 30 days in treated quail feed prepared at 60 ppm only; this level is below the range of concentrations tested in the definitive study. 2. All three concentrations tested elicited adverse effects on hatchling body weight and adult female weight gain; therefore, a NOEC could not be determined.	1. Provide data verifying the stability of BAS 670 H under actual use conditions. 2. A new study with concentrations lower than the tested concentrations to establish a NOAEC.	**MODERATE** for establishing a NOAEC and verifying the stability of actual test concentrations in treated feed.

d. Aquatic Invertebrate Life-Cycle 72-4(b)

Jatzek, H.-J. 2002. BAS 670 H - Determination of the chronic effect on the reproduction of the water flea *Daphnia magna* STRAUS. BASF AG, Germany. Study No. 01/0082/51/3. BASF Registration No. 2002/1008626.
45902320

Deficiency	Required	Importance
Dry weight of surviving daphnids was not measured.	Provide data on dry weight if available	**MODERATE** to determine the growth deficiencies of daphnids, if any

e. Aquatic Plant Growth (Tier 2) 123-2

Palmer, S.J., T.Z. Kendall, H.O. Krueger, and C.M. Holmes. 2001. BAS 670 H: A 96-hour toxicity test with the freshwater diatom (*Navicula pelliculosa*). Wildlife International, Ltd., Maryland, USA. Unpublished. Laboratory Study No. 147A-186. BASF Registration No. 2001/5002327.
45902332

Deficiency	Required	Importance
It was not possible to differentiate whether the reduction in diatom growth was due to topramezone, or from a reduction in pH.	Provide data with pH levels at 7.5 ± 0.1 at all treatment levels throughout the test, if available.	**LOW** to determine the toxicity of topramezone to freshwater diatoms

f. Seedling Emergence (Tier 2) 123-1(a)

In the seedling emergence study tested with BAS 670 00H, an end use product, exhibits toxicity effects to terrestrial plants. Thus, the toxic effects to terrestrial plants is known with the end use product only. In consideration of crop rotations, there are no terrestrial plant data to evaluate the phytotoxicity any of the metabolites of topramezone. The effect of metabolites on plants is not known. Data on toxicity of metabolites to seedling emergence (Tier II toxicity test) should be submitted, if available. The importance of the request is **moderate** to protect crop damage through crop rotation.

g. Vegetative Vigor (Tier 2) 123-1(b)

In the vegetative vigor study tested with BAS 670 00H, an end use product, exhibits toxicity effects to terrestrial plants. The proposed label requires that the product add an adjuvant and a nitrogen fertilizer to achieve optimum weed control. Thus, phytotoxic effects to terrestrial plants is known with the end use product without the adjuvant and fertilizer. Unfortunately, vigor studies designed to address the adjuvant or fertilizer of the herbicide on non-target plants are uncommon. Data on BAS 670 00H with both the adjuvant and fertilizer on non-target plants should be submitted, if available. The importance of the request is **moderate** to protect endangered plants from BAS 670 336SC.

Appendix B.1 Topramezone Environmental Fate

Appendix B consists of three parts. Appendix B.1 contains the Executive Summaries of the reviewed studies. Appendix B.2 summarizes specific information on the soils and water-sediments studies (i.e., their characterization). Appendix B.3 contains the results of EPI estimates for the metabolites of topramezone

The environmental fate data summarized in this Appendix come from the Data Evaluation Records of the studies submitted by BASF to satisfy USEPA Environmental Fate Data Requirements in support of registration of a new active ingredient (topramezone) intended for terrestrial use (40CFR). Topramezone underwent a Joint Review with Canada's PMRA. Primary review of the environmental fate data was the responsibility of the USEPA.

<u>Abiotic Hydrolysis</u> **(USEPA 161-1; PMRA Data Code: 8.2.3.2)**

161-1 <u>Hydrolysis (Abiotic)</u>
Venkatesh, K. 1999. *Hydrolysis of BAS 670H [Pyrazol-4- ^{14}C] in Aqueous Media.* Performed by BASF, Research Triangle Park, NC. Lab. Project ID # 56797.BASF Reg. Document # 99/50/70; Completed on 9/27/99
USEPA MRID 45902416; PMRA Submission 2003-0839
The study was classified as **acceptable**

BAS 670 H is stable towards abiotic hydrolysis (pH 5, 7, 9; 25° C). At 50° C, the shortest half-life was 103 days at pH 4. Therefore, under environmental conditions, BAS 670 H is expected to be stable to abiotic hydrolysis. No abiotic hydrolysis half-lives could be estimated.

EXECUTIVE SUMMARY

The hydrolysis of [pyrazol-4-^{14}C]-labeled [3-(4,5-dihydro-3-isoxazolyl)-2-methyl-4-(methylsulfonyl)phenyl](5-hydroxy-1-methyl-1H-pyrazol-4-yl)methanone (BAS 670H), at 5.19 to 5.30 µg a.i./mL, was studied in the dark at 25 or 50 ± 0.5°C in sterile aqueous buffered solutions. Experiments conducted at 25°C were performed at pH 5 (0.01M acetate), pH 7 (0.01M Trizma), and pH 9 (0.01M tris) for up to 30 days; experiments at 50°C were performed at pH 4 (0.01M hydrogen phthalate), pH 7 (0.01M tris), and pH 9 (0.01M tris) for up to 5 days. This study was conducted in accordance with USEPA Pesticide Assessment Guidelines, Subdivision N §161-1, and in compliance with USEPA FIFRA GLP standards. The test system consisted of amber glass vials (not further characterized) filled with 1.5-mL of the respective treated test solution and sealed with Teflon-lined screw caps. Volatiles were not trapped. Duplicate samples were collected at 0, 15, and 30 days posttreatment in the 25°C experiments and at 0, 1, 2, 3, 4, and 5 days in the 50°C experiments. Aliquots of the samples were analyzed using LSC and HPLC. [^{14}C]BAS 670H was identified by cochromatography with an unlabeled reference standard. The identification of the parent was confirmed using LC/ESI/MS.

Transformation products were not addressed.

At **25°C**, total [^{14}C]residue recoveries ranged from 95.23 to 98.52% of the applied (mean 97.26 ± 1.28%) in the pH 5 solution, from 99.11 to 101.88% (mean 100.29 ± 1.16%) in the pH 7 solution, and from 97.61 to 101.44% (mean 99.21 ± 1.69%) in the pH 9 solution. In all three buffer solutions, the concentrations of [^{14}C]BAS 670H showed no evidence of decline over the 30-day study. At pH 5, [^{14}C]BAS 670H averaged 91.03% of the applied at 0 days posttreatment and 91.62% at 30 days. At pH 7, [^{14}C]BAS 670H averaged 94.97% at 0 days posttreatment and 96.01% at 30 days. At pH 9, [^{14}C]BAS 670H averaged 92.93% at 0 days posttreatment and 95.43% at 30 days. No transformation products were identified at any pH; minor peaks were each <2% of the applied. Volatiles were not measured.

At **50°C**, total [^{14}C]residue recoveries ranged from 97.45 to 100.13% of the applied (mean 98.30 ± 0.86%) in the pH 4 solution, from 98.27 to 102.36% (mean 99.87 ± 1.22%) in the pH 7 solution, and from 97.48 to 100.36% (mean 98.86 ± 0.89%) in the pH 9 solution. At pH 4, [^{14}C]BAS 670H decreased slightly from an average 95.07% of the applied at 0 days posttreatment to 91.65% at 5 days (study termination). At pH 7, [^{14}C]BAS 670H decreased slightly from an average 94.97% of the applied at 0 days posttreatment to 93.89% at 5 days. At pH 9, [^{14}C]BAS 670H averaged 92.93% of the applied at 0 days posttreatment and 93.27% at 5 days. No transformation products were identified at any pH; minor peaks were each <2% of the applied. Volatiles were not measured.

Because of the stability of BAS 670H, half-lives could not be calculated for the pH 5, 7, and 9/25°C experiments or the pH 9/50°C experiment. Based on first order linear regression analysis (Excel 2000), BAS 670H degraded with a half-life of 103 days in the pH 4 buffer and 217 days in the pH 7 buffer at 50°C; however, the accuracy of these values is highly uncertain because they are extrapolated far beyond the duration of the study.

A transformation pathway was not proposed by the study author. Based on the study results, BAS 670H would be stable to hydrolysis under normal environmental conditions.

Synopsis

25°C	Half-life	Transformation products
pH 5	Stable	None
pH 7	Stable	None
pH 9	Stable	None
50°C	**Half life**	**Transformation products**
pH 4	103.45 days	None
pH 7	216.61 days	None

pH 9	Stable	None

Direct Photolysis in Water (USEPA 161-1; PMRA Data Code: 8.2.3.3)

161-2 [Direct] Photolysis in Water.
Guirguis, A.2000. *Water Photolysis of ^{14}C-BAS 607 H.* Performed by BASF, Research Triangle Park, NC.Lab. Project ID # 56799.BASF Reg. Document # 99/5100.Completed on 4/14:2000 ,
MRID 45902417; PMRA Submission 2003-0839
The study was classified as **acceptable.**

This study had two components. The studies conducted in buffered solutions were aimed to address the role of direct photolysis. The studies conducted with a "natural water" were aimed to address the contribution of indirect photolysis.The data show that direct photolysis is not a transformation route for BAS 670 H (predicted environmental phototransformation is 6 months), even though this chemical absorbs energy within the wavelength of sunlight. In studies conducted in natural water, it appears that indirect photolysis may constitute a minor degradation pathway, but it is still a very slow process.

EXECUTIVE SUMMARY

The aqueous, direct phototransformation of [pyrazol-4-^{14}C]-labeled [3-(4,5-dihydro-3-isoxazolyl)-2-methyl-4-(methylsulfonyl)phenyl](5-hydroxy-1-methyl-1H-pyrazol-4-yl)methanone (BAS 670H), was studied at a nominal concentration of 5 µg a.i./mL under continuous irradiation in sterile aqueous buffers at pH 5 (0.01 M acetate) and pH 9 (0.01 M tris) for 17 days at 22 ± 1°C. Samples were irradiated using a UV-filtered xenon arc lamp (average intensity 300-1100 nm, 501 W/m^2), which was reported to be equivalent to solar noon in Spring at 40°N (average intensity, 583-584 W/m^2). This study was conducted in accordance with USEPA Pesticide Assessment Guidelines, Subdivision N §161-2, and in compliance with USEPA FIFRA GLP standards. The test system for the irradiated buffer solutions consisted of cylindrical glass photolysis vessels (18-mL capacity) with sidearms, which contained 18 mL of treated solution and were sealed with a glass cap fitted with a quartz glass disc. Like vessels were connected in series to a flow-through volatile trapping apparatus (one apparatus for 4 vessels). The test system for the dark control buffer solutions consisted of a single foil-wrapped LSC vial (1/pH) containing 15 mL of treated solution that was tightly capped; volatiles were not trapped. The time 0 sample was an aliquot of the treated bulk buffer solutions. For each pH solution, one irradiated photolysis vessel and an aliquot (2 mL) of the dark control solution were collected at 3, 7, 12, and 17 days posttreatment. The volatile trapping solutions were analyzed using LSC. The test solutions were analyzed as collected using LSC and HPLC. [^{14}C]BAS 670H was identified by cochromatography with an unlabeled reference standard. The identification of the parent was confirmed by one-dimensional TLC. Transformation products were not addressed.

Additional samples were prepared using nonsterile pond water (pH 7.0) from North Carolina that was treated at a nominal concentration of 5 µg a.i./mL and incubated for 30 days at 22 ± 1°C. The irradiated test system consisted of a single photolysis vessel (as described for the buffer samples) that was attached to a flow-through volatile trapping system. The dark control consisted of a foil-wrapped LSC vial. The time 0 sample was an aliquot of the treated bulk natural water. Aliquots (2 mL) of the irradiated and dark control solutions were collected at 3, 10, 17, 23, and 30 days posttreatment. Samples were analyzed as described for the buffer solutions.

Buffer solutions: In the pH 5 buffer solution, total [^{14}C]residue recoveries averaged 102.13 ± 1.47% of the applied (range 100.00-103.55%) in the dark controls and 102.91 ± 2.07% (range 100.00-105.64%) in the irradiated solutions. In the pH 9 buffer, total [^{14}C]residue recoveries averaged 98.36 ± 1.05% of the applied (range 97.38-100.00%) in the dark controls and 104.10 ± 3.73% (range 100.00-108.27%) in the irradiated solutions. There was no loss of material with time.

[^{14}C]BAS 670H was stable in the dark control and irradiated pH 5 and 9 buffer solutions. In the **pH 5 buffer solution,** [^{14}C]BAS 670H concentration was 95.93% and 100.18% of the applied at 0 and 17 days posttreatment, respectively, in the dark control, and 95.93% to 99.38%, respectively, in the irradiated samples. No major transformation products were isolated, and unidentified minor compounds were each <4% of the applied. Volatilization from the dark controls was not measured; volatilization from the irradiated solutions was 1.71% of the applied at 17 days. In the **pH 9 buffer solution,** [^{14}C]BAS 670H was 95.70% of the applied at 0-3 days posttreatment and 94.31-94.66% at 7-17 days in the dark control, and was 95.70 at 0 days posttreatment and 104.19-104.62% at 12-17 days in the irradiated samples. No major transformation products were isolated, and unidentified minor compounds were each <4% of the applied. Volatilization from the dark controls was not measured;. Volatilization from the irradiated solutions was 0.28% of the applied at 17 days.

Because of the stability of BAS 670H, half-lives could not be calculated for the irradiated and dark control pH 5 and 9 buffer solutions and the dark control natural water. Since BAS 670H was stable, phototransformation and environmental half-lives are not relevant.

Natural water: Total [^{14}C]residue recoveries averaged 100.87 ± 1.81% of the applied (range 98.57-103.18%) in the dark controls and 98.04 ± 1.23% (range 96.26-100.00%) in the irradiated solutions. In **dark controls,** [^{14}C]BAS 670H was 98.1% of the applied at 0 days posttreatment and 100.32-101.07% at 23-30 days (study termination). No major transformation products were isolated. Unidentified HPLC Region 3 ranged in concentration from 1.9-2.67% of the applied during the study. Volatilization from the dark controls was not measured. In the **irradiated water,** [^{14}C]BAS 670H decreased from 98.1% of the applied at 0 days posttreatment to 76.43% at 30 days. No major transformation products were isolated. Unidentified HPLC Regions 1, 2, and 3 increased steadily during the study. Regions 1 and 2 were maximums of 6.24 and 9.13% of the applied at 30 days posttreatment, respectively, and Region 3 was a maximum of 6.98% at

23 days. Volatilization from the irradiated water was reported to be 3.93% at 23 days and 1.10% at 30 days.

Because of the stability of BAS 670H, half-lives could not be calculated for the dark control natural water. Based on first order linear regression analysis (Excel 2000), BAS 670H degraded with a half-life of 69 days in the irradiated natural water, based on the continuous irradiation used in the study, or 138 days based on a 12 hour light/12 hour dark cycle. The value of this half-life is uncertain because it is extrapolated well beyond the duration of the study.

Since BAS 670H did not degrade in the natural water dark controls, the **phototransformation half-life** for BAS 670H is equivalent to the calculated half-life of 69 days based on the continuous irradiation used in the study or 138 days based on 12-hour light/12-hour dark cycles. The intensity of the artificial light was approximately 80% of natural sunlight in spring at 40°N, based on lamp intensities of 501 W/m^2 (study initiation) and 441 W/m^2 (study termination) and a sunlight intensity of 584 W/m^2. Therefore, the predicted **environmental phototransformation half-life** is approximately 6 months (172 days).

A transformation pathway was not proposed by the study author. In the presence of organic substances, BAS 670H degrades to multiple minor unidentified components and CO_2.

EXECUTIVE SUMMARY

The aqueous, direct phototransformation of [pyrazol-4-^{14}C]-labeled [3-(4,5-dihydro-3-isoxazolyl)-2-methyl-4-(methylsulfonyl)phenyl](5-hydroxy-1-methyl-1H-pyrazol-4-yl)methanone (BAS 670H), was studied at a nominal concentration of 5 µg a.i./mL under continuous irradiation in sterile aqueous buffers at pH 5 (0.01 M acetate) and pH 9 (0.01 M tris) for 17 days at 22 ± 1°C. Samples were irradiated using a UV-filtered xenon arc lamp (average intensity 300-1100 nm, 501 W/m^2), which was reported to be equivalent to solar noon in Spring at 40°N (average intensity, 583-584 W/m^2). This study was conducted in accordance with USEPA Pesticide Assessment Guidelines, Subdivision N §161-2, and in compliance with USEPA FIFRA GLP standards. The test system for the irradiated buffer solutions consisted of cylindrical glass photolysis vessels (18-mL capacity) with sidearms, which contained 18 mL of treated solution and were sealed with a glass cap fitted with a quartz glass disc. Like vessels were connected in series to a flow-through volatile trapping apparatus (one apparatus for 4 vessels). The test system for the dark control buffer solutions consisted of a single foil-wrapped LSC vial (1/pH) containing 15 mL of treated solution that was tightly capped; volatiles were not trapped. The time 0 sample was an aliquot of the treated bulk buffer solutions. For each pH solution, one irradiated photolysis vessel and an aliquot (2 mL) of the dark control solution were collected at 3, 7, 12, and 17 days posttreatment. The volatile trapping solutions were analyzed using LSC. The test solutions were analyzed as collected using LSC and HPLC. [^{14}C]BAS 670H was identified by cochromatography with an unlabeled reference standard. The identification of the parent was confirmed by one-dimensional TLC. Transformation products were not addressed.

Additional samples were prepared using nonsterile pond water (pH 7.0) from North Carolina that was treated at a nominal concentration of 5 µg a.i./mL and incubated for 30 days at 22 ± 1°C. The irradiated test system consisted of a single photolysis vessel (as described for the buffer samples) that was attached to a flow-through volatile trapping system. The dark control consisted of a foil-wrapped LSC vial. The time 0 sample was an aliquot of the treated bulk natural water. Aliquots (2 mL) of the irradiated and dark control solutions were collected at 3, 10, 17, 23, and 30 days posttreatment. Samples were analyzed as described for the buffer solutions.

Buffer solutions: In the pH 5 buffer solution, total [^{14}C]residue recoveries averaged 102.13 ± 1.47% of the applied (range 100.00-103.55%) in the dark controls and 102.91 ± 2.07% (range 100.00-105.64%) in the irradiated solutions. In the pH 9 buffer, total [^{14}C]residue recoveries averaged 98.36 ± 1.05% of the applied (range 97.38-100.00%) in the dark controls and 104.10 ± 3.73% (range 100.00-108.27%) in the irradiated solutions. There was no loss of material with time.

[^{14}C]BAS 670H was stable in the dark control and irradiated pH 5 and 9 buffer solutions. In the **pH 5 buffer solution,** [^{14}C]BAS 670H concentration was 95.93% and 100.18% of the applied at 0 and 17 days posttreatment, respectively, in the dark control, and 95.93% to 99.38%, respectively, in the irradiated samples. No major transformation products were isolated, and unidentified minor compounds were each <4% of the applied. Volatilization from the dark controls was not measured; volatilization from the irradiated solutions was 1.71% of the applied at 17 days. In the **pH 9 buffer solution,** [^{14}C]BAS 670H was 95.70% of the applied at 0-3 days posttreatment and 94.31-94.66% at 7-17 days in the dark control, and was 95.70 at 0 days posttreatment and 104.19-104.62% at 12-17 days in the irradiated samples. No major transformation products were isolated, and unidentified minor compounds were each <4% of the applied. Volatilization from the dark controls was not measured;. Volatilization from the irradiated solutions was 0.28% of the applied at 17 days.

Because of the stability of BAS 670H, half-lives could not be calculated for the irradiated and dark control pH 5 and 9 buffer solutions and the dark control natural water. Since BAS 670H was stable, phototransformation and environmental half-lives are not relevant.

Natural water: Total [^{14}C]residue recoveries averaged 100.87 ± 1.81% of the applied (range 98.57-103.18%) in the dark controls and 98.04 ± 1.23% (range 96.26-100.00%) in the irradiated solutions. In **dark controls,** [^{14}C]BAS 670H was 98.1% of the applied at 0 days posttreatment and 100.32-101.07% at 23-30 days (study termination). No major transformation products were isolated. Unidentified HPLC Region 3 ranged in concentration from 1.9-2.67% of the applied during the study. Volatilization from the dark controls was not measured. In the **irradiated water,** [^{14}C]BAS 670H decreased from 98.1% of the applied at 0 days posttreatment to 76.43% at 30 days. No major transformation products were isolated. Unidentified HPLC Regions 1, 2, and 3 increased steadily during the study. Regions 1 and 2 were maximums of 6.24 and 9.13% of the applied at 30 days posttreatment, respectively, and Region 3 was a maximum of 6.98% at

23 days. Volatilization from the irradiated water was reported to be 3.93% at 23 days and 1.10% at 30 days.

Because of the stability of BAS 670H, half-lives could not be calculated for the dark control natural water. Based on first order linear regression analysis (Excel 2000), BAS 670H degraded with a half-life of 69 days in the irradiated natural water, based on the continuous irradiation used in the study, or 138 days based on a 12 hour light/12 hour dark cycle. The value of this half-life is uncertain because it is extrapolated well beyond the duration of the study.

Since BAS 670H did not degrade in the natural water dark controls, the **phototransformation half-life** for BAS 670H is equivalent to the calculated half-life of 69 days based on the continuous irradiation used in the study or 138 days based on 12-hour light/12-hour dark cycles. The intensity of the artificial light was approximately 80% of natural sunlight in spring at 40°N, based on lamp intensities of 501 W/m^2 (study initiation) and 441 W/m^2 (study termination) and a sunlight intensity of 584 W/m^2. Therefore, the predicted **environmental phototransformation half-life** is approximately 6 months (172 days).

A transformation pathway was not proposed by the study author. In the presence of organic substances, BAS 670H degrades to multiple minor unidentified components and CO_2.

Results Synopsis:

Test medium: 0.01M acetate buffer (pH 5) or 0.01M tris buffer (pH 9).
Source of irradiation: Xenon lamp, continuous irradiation.
Half-life/dark: Stable.
Half-life/irradiated: Stable.
Major transformation products/dark and irradiated:
None.
Minor transformation products/dark and irradiated:
None.

Test medium: Natural pond water (pH 7.0).
Source of irradiation: Xenon arc lamp, continuous irradiation.
Half-life/dark: Stable.
Half-life/irradiated: 69 days ($r^2 = 0.947$) based on continuous irradiation, or 172 days based on a 12 hour photoperiod; extrapolated beyond the duration of the study.
Major transformation products/dark and irradiated:
None.
Minor transformation products/dark and irradiated:
None.

<u>Photolysis on Soils</u> (USEPA 161-3; PMRA Data Code: 8.2.3.3.1)

161-3 **Photolysis on Soil**

Singh, M. 2002. *Photolysis of [14]C-BAS 670 H on soil.* Performed by BASF, Research Triangle Park, NC. Lab. Project ID # 66424. BASF Reg. Document # 2002/5004142.Completed on 12/16.2002

MRID 45902418; PMRA Submission 2003-0839

The study was classified as **acceptable**

Photolysis on Soil does not contribute significantly to the degradation of BAS 670H. Degradation is driven by microorganisms.

EXECUTIVE SUMMARY

The phototransformation of [phenyl-U-^{14}C]- labeled [3-(4,5-dihydro-isoxazol-3-yl)-4-methanesulfonyl-2-methyl-phenyl](5-hydroxy-1-methyl-1H-pyrazol-4-yl)methanone (BAS 670H) was studied on sandy loam soil (75% of 1/3 bar, pH 6.3, organic matter 2.6%) from Lucama, North Carolina for 15 days under continuous irradiation at 22 ± 1°C. [^{14}C]BAS 670H was applied at a nominal concentration of 0.335 mg a.i./kg for each soil (measured concentration, 0.9 mg a.i./kg; equivalent to 2.7 times the maximum field application rate of 50 g a.i./ha). The test systems were irradiated by a UV-filtered xenon arc lamp (300-800 nm; 595 W/m^2). Using a spectroradiometer, it was estimated that the intensity and wavelength distribution of the xenon lamp was equivalent to the average spring sunlight at 40° N. The study was conducted in accordance with the USEPA Pesticide Assessment Guidelines, Subdivision N §161-3, and in compliance with the USEPA FIFRA GLP Standards. For the irradiated samples, the test system consisted of treated soil held in stainless steel dishes and kept within a jacketed stainless steel tray covered with quartz glass. For the dark controls, glass petri dishes containing treated soil were kept in a glass, shelved tower within an incubator. To trap volatiles, air was drawn though the irradiated sample chamber continually or the dark control tower for 1 hour prior to each sampling, than through ethylene glycol, sulphuric acid, and NaOH trapping solutions. Samples were collected at 0, 3, 7, 10, and 15 days posttreatment; duplicate samples were collected at 0, 7, and 15 days and single samples at 3 and 10 days. The soils were extracted four times with pH 8 phosphate buffer:methanol (1:1, v/v) by shaking. Nonextractable residues were partitioned into fulvic acid, humic acid, and humin. The soil extracts, extracted soils, volatile traps, and nonextractable residues were analyzed for total radioactivity using LSC. The soil extracts and fulvic acid fraction of the organic fraction were also analyzed for BAS 670H and its transformation products using HPLC; compounds were identified by cochromatographic comparison to unlabeled reference standards of BAS 670H, M670H05 {3-(4,5-dihydro-isoxazol-3-yl)-4-methanesulfonyl-2-methyl-benzoic acid}, and M670H01 {[3-cyano-4-methanesulfonyl-2-methyl-phenyl](5-hydroxy-1-methyl-1H-pyrazol-4-yl)methanone}. Identifications were confirmed using HPLC/MS with electrospray ionization.

Total [^{14}C]residue recoveries averaged 97.02 ± 4.41% of the applied (range 88.68-101.7%) in the irradiated samples and 97.05 ± 3.22% (range 92.37-101.7%) in the dark controls. Recoveries decreased slightly over with time in the dark controls, but showed no pattern of decline in the irradiated samples.

BAS 670 was identified in both the soil extracts (shaking with phosphate buffer:methanol) and in the fulvic acid fraction of the soil organic matter. In the extractable fraction, [^{14}C]BAS 670H decreased from an average of 98.10% of the applied at 0 days posttreatment to 69.20-69.68% of the applied in the irradiated and dark control samples at 3 days posttreatment, and to 67.97% in the irradiated samples and 62.12% in the dark controls at 15 days. If the BAS 670H identified in the fulvic acid fraction is included, the concentration of [^{14}C]BAS 670H in the irradiated and dark control samples at 15 days posttreatment averages 73.77 and 73.32% of the applied, respectively.

No major transformation products were identified in either the irradiated or dark control soils. The two identified minor transformation products (M670H05 and M670H01) and one minor unidentified transformation product (Unk 2) isolated from the soils at 3.15-3.44%, 5.04-5.61%, and 1.03-1.10%, respectively, were common to both the irradiated soil and dark controls. These three compounds were isolated in the fulvic acid fraction at ≤0.65% of the applied, except for M670H05 at 1.18-1.40% at 15 days in the dark control

[^{14}C]Extractable residues decreased from an average 98.11% of applied at 0 days posttreatment to 81.74% at 15 days in the irradiated soil and 72.54% in the dark controls. [^{14}C]Nonextractable residues increased to 15.42% of the applied in the irradiated samples and 20.89% in the dark controls. At 15 days posttreatment, [^{14}C]volatiles, almost exclusively as $^{14}CO_2$, totaled 1.4% and 0.14% of the applied from the irradiated samples and dark controls, respectively.

Based on first order linear regression analysis (Excel 2000) and using the concentration of BAS 670H in the extractable fraction only, BAS 670H degraded with half-lives of 32.85 days in the irradiated samples and 24.67 days in the dark controls. This half-life is of uncertain value because data are extrapolated beyond the duration of the study and the regression line is a poor fit to the data. In fact, BAS 670H decreased by 30% through 3 days posttreatment and then plateaued between 3 and 15 days. Half-life calculations using total BAS 670H are highly suspect because the unextractable residues were fractionated only in the 7 and 15 days posttreatment samples. If it is assumed that the nonextractable fraction at 0 days contains no BAS 670H, BAS 670H degraded with half-lives of 36.3 and 37.5 days in the dark control and irradiated soils, respectively.

Because BAS 670 degraded at the same rate in the irradiated and dark control soils, **phototransformation and environmental phototransformation half-lives** are not relevant.

A degradation pathway was illustrated by the study author. BAS 670H degraded into M670H05 {3-(4,5-dihydro-isoxazol-3-yl)-4-methanesulfonyl-2-methyl-benzoic acid} and M670H01 {[3-cyano-4-methanesulfonyl-2-methyl-phenyl](5-hydroxy-1-methyl-1H-pyrazol-4-yl)methanone}. M670H01 and M670H05 degraded into CO_2 and bound residues.

Results Synopsis

Soil type: Lucama sandy loam soil.
Source of irradiation: Xenon arc lamp (continuous).
Half-life for irradiated samples: 32.85 days (r^2 = 0.5434).
Half-life for dark controls: 24.67 days (r^2 = 0.5894).
Major transformation products/irradiated samples and dark controls:
None.
Minor transformation products/irradiated samples and dark controls:
M670H05 {3-(4,5-dihydro-isoxazol-3-yl)-4-methanesulfonyl-2-methyl-benzoic acid}.
M670H01 {[3-cyano-4-methanesulfonyl-2-methyl-phenyl](5-hydroxy-1-methyl-1H-pyrazol-4-yl)methanone}.

Biotransformation Studies

Aerobic Soil (USEPA 162-1 PMRA DACO 8.2.3.4.2

1. Study 1 - Parent (One Soil)

Venkatesh, K. 2002. *Aerobic Soil Metabolism of ^{14}C-BAS 607 H in a US Soil.* Performed by BASF, Research Triangle Park, NC. Lab. Project ID # 64444
BASF Reg. Document #2001/5003312. Completed on 4/18/2002
MRID 45902419

This study, conducted with [phenyl-U-^{14}C]- and [pyrazol-4-^{14}C]-labeled BAS 670H, is classified **acceptable** and can be used towards the fulfillment of the aerobic soil and can be used towards the fulfillment of the aerobic soil metabolism guideline, USEPA Subdivision N Guideline §162-1, for BAS 670H. However, an additional study investigating the aerobic soil metabolism of BAS 670H labeled in the oxazole ring moiety may be required.

Under the experimental conditions of the study, BAS 670H was found to be persistent in a North Carolina sandy soil. Identified degradates did not exceed 2% of the applied at any of the sampling times. It is likely that adsorption rather than biotransformation controlled the dissipation of BAS 670H in the study system

EXECUTIVE SUMMARY:

The biotransformation of [phenyl-U-^{14}C]- and [pyrazol-4-^{14}C]-labeled [3-(4,5-dihydro-isoxazol-3-yl)-4-methanesulfonyl-2-methyl-phenyl]-(5-hydroxy-1-methyl-1H-pyrazol-4-yl)methanone (BAS 670H) was studied in sandy loam soil (pH 6.3, organic matter 2.6%) from North Carolina for 364 days under aerobic conditions in darkness at 27 ± 1°C and soil moisture of 75% of 1/3 bar. [^{14}C]BAS 670H was applied at a nominal rate of 0.15 mg a.i./kg dry wt. soil (equivalent to 0.17 kg a.i./ha). This experiment was conducted in accordance with USEPA Subdivision N Guideline §162-1 and in compliance with GLP Standards 40 CFR, Part 160. The test system consisted of glass dishes containing treated soil that were housed within a sealed glass column.

Periodically throughout the incubation, the incubation column was connected to a flow-through trapping system and flushed with air for the collection of CO_2; no attempt was made to trap volatile organic compounds. For each label, duplicate samples were collected after 0, 3, 7, 14, 36, 62, 90, 120, 188, 272 and 364 days of incubation. One replicate was placed in frozen storage. The second soil sample was extracted four times with 0.1M pH 8 phosphate buffer:methanol (1:1, v:v). Soil extracts were combined, concentrated, acidified and partitioned three times with ethyl acetate. Ethyl acetate phases were combined and concentrated for HPLC analysis. Soil extracts, extracted soil and trapping solutions were analyzed for total radioactivity using LSC. Extracts were analyzed for [^{14}C]BAS 670H and its transformation products by reverse-phase HPLC; [^{14}C]compounds were identified by comparison to the retention times of reference standards. Identification of parent BAS 670H was confirmed using multiple reaction monitoring LC/MS/MS.

No supporting records were provided to establish that aerobicity, soil moisture and incubation temperature were maintained throughout the 1-year study.

Overall recovery (both labels) of radiolabeled material averaged 99.15 ± 3.52% (range 90.45-105.20%) of the applied, with no consistent patterns of decline throughout the incubations for either label. Recoveries of radiolabeled material averaged 99.90 ± 2.38% (range 95.79-103.05%) and 98.40 ± 4.23% (range 90.45-105.20%) for the [phenyl-U-^{14}C]- and [pyrazol-4-^{14}C]-label treated soils, respectively. BAS 670H (both labels, total parent recovered in initial extracts and fulvic acid extracts; see below) slowly dissipated to an observed DT_{50} at approximately 3 months posttreatment, then remained relatively stable thereafter decreasing from 94.03-94.63% of the applied at day 0 to 50.70-52.86% at 3 months and was 49.15-49.42% at study termination (1 year). Calculated half-lives, determined using linear/natural log and nonlinear/normal (single, 2 parameter) regression, are of limited value because they were extrapolated beyond the final sampling interval (364 days).

No major nonvolatile transformation products were detected. One minor nonvolatile transformation product, tentatively identified as BAS 670H acid (M670H05), was detected at a maximum 1.34% of the applied in [phenyl-U-^{14}C]-label treated soil. A second minor product, tentatively identified as BAS 670H cyano (M670H01, UK1), was detected at ≤1.75% and ≤0.69% in [phenyl-U-^{14}C]- and [pyrazol-4-^{14}C]-label treated soils, respectively. For both labels, extractable [^{14}C]residues decreased from 97.76-101.15% of the applied at day 0 to 32.26-34.01% at 6 months and were 31.61-35.81% at 9-12 months, while nonextractable [^{14}C]residues increased from 1.90-2.05% at day 0 to 49.62-58.77% at 1-3 months and were 57.26-64.75% thereafter. Organic matter fractionation of 3- to 364-day extracted soil found 5.49-15.68%, 6.04-23.76% and 12.09-26.99% of the applied associated with the humin, fulvic acids and humic acids, respectively. [^{14}C]Residues associated with the fulvic acids were almost completely organo-soluble; <1% of the applied remained associated with the aqueous phase following ethyl acetate partitioning. HPLC analysis of fulvic acid extracts detected parent [^{14}C]BAS 670H (both labels) at maximums of 19.44-21.15% at 6 months decreasing to 18.35% at study termination, with BAS 670H acid (phenyl label) detected at a maximum 1.56%. At study termination, volatilized $^{14}CO_2$ totaled only 0.75% and 1.61% of the applied for the [phenyl-U-^{14}C]- and [pyrazol-^{14}C]-label treated soils, respectively.

A transformation pathway proposed by the study author involved removal of the pyrazole ring moiety via hydrolysis/oxidation to yield BAS 670H acid (M670H05, maximum 1.34% of applied), with formation of soil bound residues (maximums of 64.04-64.75% of applied) and minor levels of mineralization to CO_2 (maximums 0.75-1.61% of applied).

In a supplemental experiment, the presence of BAS 670H, at 0.15 mg/kg dry wt. soil, had no significant impact on the microbial viability of the test soil.

Results Synopsis:

Soil type: Sandy loam from North Carolina.
[Phenyl-U-^{14}C]-label:
Half-life (observed, including non-extractable fulvic acid residues): >364 days.
Half-life (observed, extractable residues only): 35 days
Major transformation products: None.
Minor transformation products: BAS 670H acid (M670H05, maximum 1.34% of applied). BAS 670H cyano (M670H01, UK1, maximum 1.75%). One unidentified compound (UK2, maximum 0.18%). CO_2 (maximum 0.75%).

[Pyrazol-4-^{14}C]-label:
Half-life (observed, including non-extractable fulvic acid residues): >364 days.
Half-life (observed, including extractable residues only): 30 days
Major transformation products: None.
Minor transformation products: BAS 670H cyano (M670H01, UK1, maximum 0.69% of applied). Two unidentified compounds (UK2, UK3, each ≤0.85%). CO_2 (maximum 1.61%)

2. Study 2 (Metabolite M670H05)

Metabolite (Cleavage Product):BAS 670 H Acid (M670H05)
Venkatesh, K. 2002. *Aerobic Soil Metabolism of ^{14}C-BAS 607 H Acid in a US Soil.* Performed by BASF, Research Triangle Park, NC Lab. Project ID # 66422
BASF Reg. Document #2002/5003792. Completed on 8/7/2002
MRID 45902420

This study was conducted with BAS 670H Acid (M670H05), a major metabolite of BAS 670H. This study is classified **as acceptable**. This study conducted with the soil metabolite M670H05 and in conjunction with the studies conducted with BAS670H may be used towards satisfying the aerobic soil metabolism data requirement (USEPA Subdivision N Guideline §162-1).

The metabolite BAS 670H Acid (M670H05) was persistent in a sandy loam soil from North Carolina and under the experimental conditions of the study (half-lives > 364 days, based on non-extractable radioactivity). No metabolites or CO_2 were found at > 10% of the applied radioactivity.

EXECUTIVE SUMMARY:

The biotransformation of [phenyl-U-^{14}C]-labeled [3-(4,5-dihydro-isoxazol-3-yl)-4-methanesulfonyl-2-methyl-benzoic acid (BAS 670H acid) was studied in sandy loam soil (pH 5.9, organic matter 2.8%) from North Carolina for 350 days under aerobic conditions in darkness at 27°C and soil moisture of 75% of 1/3 bar. [^{14}C]BAS 670H acid was applied at a nominal rate of 0.15 mg a.i./kg dry wt. soil (equivalent to 0.17 kg a.i./ha). This experiment was conducted in accordance with USEPA Subdivision N Guideline §162-1 and in compliance with GLP Standards 40 CFR, Part 160. The test system consisted of glass dishes containing treated soil that were housed within a glass column connected to a flow-through trapping system for the continuous collection of CO_2 and volatile organic compounds. Duplicate samples were collected after 0, 3, 7, 14, 28, 56, 91, 119, 175, 266 and 350 days of incubation. One replicate was placed in frozen storage. The second soil sample was extracted four times with 0.1M pH 8 phosphate buffer:methanol (1:1, v:v). Soil extracts were combined, concentrated, acidified and partitioned three times with ethyl acetate. Ethyl acetate phases were combined and concentrated for HPLC analysis. Soil extracts, extracted soil and trapping solutions were analyzed for total radioactivity using LSC. Extracts were analyzed for [^{14}C]BAS 670H and its transformation products by reverse-phase HPLC; parent [^{14}C]BAS 670H acid was identified by comparison to the HPLC retention time of reference standard, with identification confirmed via LC/MS and LC/MS/MS.

No supporting records were provided to establish that aerobicity, soil moisture and incubation temperature were maintained throughout the 350-day study.

Overall recovery of radiolabeled material averaged 104.46 ± 3.09% (range 99.32-108.18%) of the applied, with no consistent pattern of decline throughout the incubation. BAS 670H acid (total parent recovered in initial extracts and fulvic acid extracts; see below) slowly dissipated to an observed DT_{50} at approximately 2 months posttreatment, then remained relatively stable thereafter decreasing from 97.64% of the applied at day 0 to 47.65% at 56 days and was 41.96-54.83% thereafter. Calculated half-lives, determined using linear/natural log and nonlinear/normal (single, 2 parameter) regression, were >350 days and 284 days, respectively, but are of limited value due to extremely low correlation coefficients (r^2 = 0.393 and 0.490, respectively).

BAS 670H acid (parent recovered in initial extracts only) dissipated to an observed DT_{50} at approximately 35 days posttreatment, and continued to dissipate until about 55 days posttreatment afterwhich the concentrations remained relatively stable decreasing from 97.64% of the applied at day 0 to 24.96% at 56 days and were 17.24-22.01% thereafter. The calculated half-life, determined using first-order dissipation was 151 days ($r^2 = 0.607$).

No major nonvolatile transformation products were detected. One minor nonvolatile product, UK6 detected at maximum 4.03% of the applied, was tentatively identified as the alcohol of BAS 670H acid (M670H09). Extractable [^{14}C]residues decreased from 107.78% of the applied at day 0 to 26.51% at 175 days and were 27.45-31.42% at 266-350 days, while nonextractable [^{14}C]residues increased from 0.40% of the applied to 74.12% and were 68.09-69.52% at the same respective intervals. Organic matter fractionation of 14- to 350-day extracted soil found 7.41-18.57%, 14.59-39.61% and 7.43-14.10% of the applied associated with the humin, fulvic acids and humic acids, respectively. [^{14}C]Residues associated with the fulvic acids were almost completely organo-soluble; <2% of the applied remained associated with the aqueous phase following ethyl acetate partitioning. HPLC analysis of fulvic acid extracts detected parent [^{14}C]BAS 670H acid at a maximum 33.91% of the applied at 175 days and at 33.89% at study termination, while BAS 670H acid alcohol (UK6) was detected at a maximum 6.54%. At study termination, volatilized $^{14}CO_2$ totaled 6.73% of the applied; volatile [^{14}C]organic compounds were not detected (LOD not reported) at any interval.

A transformation pathway proposed by the study author involved hydrolysis of the -COOH side chain and oxidation of the phenyl-CH_3 to yield the alcohol of BAS 670H acid (M670H09, maximum 4.03% of applied), with formation of soil bound residues (maximum 74.12% of applied) and a minor amount of mineralization to CO_2 (maximum 6.73% of applied).

In a supplemental experiment, the presence of BAS 670H acid, at 0.15 mg/kg dry wt. soil, had no significant impact on the microbial viability of the test soil.

Results Synopsis:

Soil type: Sandy loam from North Carolina.

Half-life (observed, total BAS 670H):	*ca.* 56 to >350 days.
Half-life (observed, BAS 670H initial extract):	*ca.* 35 days.
Major transformation products:	None.
Minor transformation products:	BAS 670H acid alcohol (M670H09, UK6; maximum 4.03% of applied). Five unidentified compounds (UK1-5, each ≤2.27%). CO_2 (maximum 6.73%).

Study 3- Aerobic Soil Metabolism of Topramezone in Several USA Soils

Singh, M. 2002. *Aerobic Degradation of (^{14}C-phenyl)-BAS 670 H in US Soils.*. Performed by BASF, Research Triangle Park, NC Lab. Project ID # 58525
BASF Reg. Document #2002/5003685.Completed on 12/17/2002
MRID 45902421

This study, conducted with [phenyl-U-^{14}C]-labeled BAS 670H, is classified **as acceptable.** However, not all of the transformation products detected at ≥10% of the applied were not identified. The kinetics data can be used towards the environmental fate assessment.

A study (MRID 45902419) investigating the degradation of [phenyl-U-^{14}C]- and [pyrazol-4-^{14}C]-labeled BAS 670H in NC sandy loam soil submitted concurrently with this study was classified acceptable. An additional study investigating the aerobic soil metabolism of BAS 670H labeled in the isoxazole ring moiety is not required at this time.

The degradation of BAS 670H in soil is mediated by microorganisms. Under the experimental conditions of the study, BAS 670H was stable (pseudo-first order, linear half-lives 125 to 300 days) in five different USA soils. Identified degradates were BAS 670H Acid (M670H05), and BAS 670H cyano (M670H01), and CO_2. In some soils, they were identified as major metabolites but as minor metabolites in other soils.

EXECUTIVE SUMMARY:

The biotransformation of [phenyl-U-^{14}C]-labeled [3-(4,5-dihydro-isoxazol-3-yl)-4-methanesulfonyl-2-methyl-phenyl]-(5-hydroxy-1-methyl-1H-pyrazol-4-yl)methanone (BAS 670H) was studied in loam soil (pH 6.6, organic matter 6.3%) from Idaho (ID), silt loam soil (pH 6.8, organic matter 1.4%) from Indiana (IN), loam soil (pH 6.6, organic matter 6.4%) from Iowa (IA), clay loam soil (pH 6.0, organic matter 7.0) from Minnesota (MN) and silt loam soil (pH 5.9, organic matter 4.9%) from South Dakota (SD) for 383-388 days under aerobic conditions in darkness at 27 ± 1°C and soil moisture of 75% of 1/3 bar. [^{14}C]BAS 670H was applied at a nominal rate of 0.14 mg a.i./kg soil dry wt. (equivalent to 0.16 kg a.i./ha). This experiment was conducted in accordance with USEPA Subdivision N Guideline §162-1 and in compliance with GLP Standards 40 CFR, Part 160. The test system consisted of glass dishes containing treated soil that were housed within a glass column connected to a flow-through trapping system for the continuous collection of CO_2 and volatile organic compounds. Single or duplicate samples were collected after 0, 15-18, 30-35, 62-67, 92-97, 131-152, 262-279 and 383-388 days of incubation. Soil samples were extracted four times with 0.1M pH 8 phosphate buffer:methanol (1:1, v:v). Soil extracts were combined, concentrated and purified using a C18 solid phase extraction. Soil extracts, extracted soil and trapping solutions were analyzed for total radioactivity using LSC. Extracts were analyzed for [^{14}C]BAS 670H and its transformation products by reverse-phase HPLC; [^{14}C]compounds were identified by comparison to the retention times of reference standards. Identifications were confirmed using multiple reaction monitoring LC/MS/MS.

No supporting records were provided to establish that aerobicity, soil moisture and incubation temperature were maintained throughout the 383- to 388-day incubations.

Overall recovery of radiolabeled material for all five test soils averaged 98.50 ± 6.60% (range 83.96-112.82%) of the applied, with no consistent patterns of decline throughout the incubations for any soil. Recoveries of radiolabeled material averaged 95.75 ± 6.26% (range 83.96-104.74%) for the ID loam, 100.78 ± 7.23% (range 85.68-112.82%) for the IN silt loam, 97.31 ± 4.31% (range 87.15-103.57%) for the IA loam, 98.99 ± 7.34% (range 86.30-107.39%) for the MN clay loam and 99.62 ± 6.32 (range 85.79-107.38%) for the SD silt loam. BAS 670H slowly degraded in the five soils with degradation most rapid in the MN clay loam and slowest in the IA loam. Parent [^{14}C]BAS 670H decreased from 86.19-98.49% of the applied at day 0 in all five soils to 10.24-14.23% in the MN clay loam soil, 18.76-22.31% in the ID loam, IN silt loam and SD silt loam soils and 27.02-37.87% in the IA loam soil at study termination (383-388 days). Based on first-order linear regression analysis, [^{14}C]BAS 670H degraded with reviewer-calculated half-lives of 125, 181, 182, 196 and 302 days in the MN clay loam, ID loam, IN silt loam, SD silt loam and IA loam soils, respectively. BAS 670H dissipated to an observed DT_{50} of 90-150, 100-160, 125, 110, 290 days in the MN clay loam, ID loam, IN silt loam, SD silt loam and IA loam soils, respectively.

Two nonvolatile transformation products, BAS 670H acid (M670H05) and BAS 670H cyano (M670H01), were detected in all five soils, with BAS 670H acid detected as a major transformation product in the ID loam, MN clay loam and SD silt loam soils. BAS 670H cyano was found to co-elute with a minor transformation product, Unknown 2 (Unk2, RT *ca.* 13-14 min.). Unk2 was tentatively identified as the alcohol of BAS 670H acid (M670H09) in an aerobic soil metabolism study investigating the degradation of BAS 670H transformation product BAS 670H acid (MRID 45902420). An additional unidentified transformation product, Unknown 1 (Unk1, RT *ca.* 10-11 min.), was detected in all five soils, but as a major product only in the MN clay loam soil. BAS 670H acid (M670H05) was detected at maximums of 11.72% of the applied (97 days) in the ID loam, 15.67% (279 days) in the MN clay loam and 8.00% (279 days) in the SD silt loam and was 7.60-9.63%, 11.39-12.38% and 5.22-10.36%, respectively, at study termination (383-388 days). BAS 670H acid was detected at maximums of 3.04% and 6.23% in the IA loam and IN silt loam soils, respectively. BAS 670H cyano (M670H01)/Unk2 was detected at maximums of 3.84-4.43% in the IN silt loam, IA loam and SD silt loam soils, 7.07% in the MN clay loam soil and 10.32% in the ID loam soil. Unk1 was detected at maximums of 0.62-2.13% in the IN silt loam, IA loam and SD silt loam soils, 5.76% in the ID loam soil and 13.16% (383 days) in the MN clay loam soil. For all five soils, extractable [^{14}C]residues decreased from 90.89-104.50% of the applied at day 0 to 31.58-50.31% at study termination, while nonextractable [^{14}C]residues were 1.05-4.27% at day 0 and 28.83-49.89% at 383-388 days. Organic matter fractionation of 131- to 388-day extracted soil found 7.77-20.86%, 1.04-16.68% and 7.87-29.34% of the applied associated with the humin, fulvic acids and humic acids, respectively. Analysis of fulvic acid extracts detected [^{14}C]BAS 670H at 0.57-10.58% of the applied, with BAS 670H acid, BAS 670H cyano/Unk2 and Unk1 each detected at 0.03-1.77%. At study termination, volatilized $^{14}CO_2$ totaled 3.28-6.99% for the IA loam, MN clay loam and SD silt loam soils and 13.81-14.22% for the ID loam and IN silt loam soils. Quantitative results for volatile [^{14}C]organic compounds were not provided.

A transformation pathway proposed by the study author involved removal of the pyrazole ring moiety via hydrolysis/oxidation to yield BAS 670H acid (M670H05, maximums of 3.20-15.67% of applied), with further hydrolysis/oxidation yielding the alcohol of BAS 670H acid (Unk2, M670H09; co-eluted with BAS 670H cyano). A second pathway involved removal of the oxazole ring moiety to yield BAS 670H cyano (M670H01; BAS 670 H cyano/Unk2 maximums 3.84-10.32% of applied). Ultimate degradation of BAS 670H resulted in soil bound residues (maximums 36.42-52.55% of applied) and mineralization to CO_2 (maximums 3.28-14.22% of applied).

Results Synopsis:

Soil type: Loam from Idaho.

DT_{50} (observed):	100-160 days
Linear half-life (0-388-days):	181.3 days (r^2 = 0.886).
Nonlinear half-life (0- 388 days):	143.5 days (r^2 = 0.924).
Major transformation products:	BAS 670H acid (M670H05, maximum 11.72% of applied). BAS 670H cyano (M670H01)/Unk2 (maximum 10.32%). CO_2 (maximum 13.81%).
Minor transformation products:	Unk1 (maximum 5.76%). Ten unidentified HPLC regions (each ≤4.99% of applied).

Soil type: Silt loam from Indiana.

DT_{50} (observed):	125 days
Linear half-life (0-388 days):	182.0 days (r^2 = 0.958).
Nonlinear half-life (0-388 days):	151.9 days (r^2 = 0.918).
Major transformation products:	CO_2 (maximum 14.22% of applied).
Minor transformation products:	BAS 670H acid (M670H05, maximum 7.15%). BAS 670H cyano (M670H01)/Unk2 (maximum 4.43%). Unk1 (maximum 1.47%). Ten unidentified HPLC regions (each ≤3.52% of applied).

Soil type: Loam from Iowa.

DT_{50} (observed):	290 days
Linear half-life (0-388 days):	301.5 days (r^2 = 0.848).
Nonlinear half-life (0-388 days):	305.0 days (r^2 = 0.804).
Major transformation products:	None.
Minor transformation products:	BAS 670H acid (M670H05, maximum 3.20% of applied). BAS 670H cyano (M670H01)/Unk2 (maximum 3.84%). Unk1 (maximum 0.62% of applied).

CO$_2$ (maximum 3.28%).
Five unidentified HPLC regions (each ≤6.81% of applied).

Soil type: Clay loam from Minnesota.

DT_{50} (observed):	90-150 days
Linear half-life (0-383 days):	124.5 days (r^2 = 0.924).
Nonlinear half-life (0-383 days):	128.6 days (r^2 = 0.933).
Major transformation products:	BAS 670H acid (M670H05, maximum 15.67% of applied). Unk1 (maximum 13.16%).
Minor transformation products:	BAS 670H cyano (M670H01)/Unk2 (maximum 7.07%). CO_2 (maximum 6.32%). Nine unidentified HPLC regions (each ≤5.06% of applied).

Soil type: Silt loam from South Dakota.

DT_{50} (observed):	110 days
Linear half-life (0-383 days):	195.9 days (r^2 = 0.942).
Nonlinear half-life (0-383 days):	156.6 days (r^2 = 0.915).
Major transformation products:	BAS 670H acid (M670H05, maximum 10.36% of applied).
Minor transformation products:	BAS 670H cyano (M670H01)/Unk2 (maximum 4.03%). Unk1 (maximum 2.13% of applied). CO_2 (maximum 6.99%). Six unidentified HPLC regions (each ≤6.94% of applied).

162-3 Anaerobic Aquatic Metabolism (PMRA DACO 8.2.3.5.6)

Guirguis, A. 2002.*Anaerobic Aquatic Metabolism of ^{14}C-BAS 670 H.*Conducted by BASF, Research Triangle Park, NC.and BASF Aktiengesellshaft, Limburgenhof, Germany.BASF Study No.58523. BASF Reg. Doc. 2002/5003696. Completed on 12/16/2002
45902422

This study may be acceptable if the deficiencies noted in the study are adequately addressed by the study author.

No final scientific conclusions can be made at this time. However, it appears that metabolites formed under anaerobic conditions are different from those formed under aerobic conditions.

EXECUTIVE SUMMARY:

The biotransformation of [phenyl-U-^{14}C]- and [pyrazol-4-^{14}C]-labelled [3-(4,5-dihydro-isoxazol-3-yl)-4-methanesulfonyl-2-methyl-phenyl]-(5-hydroxy-1-methyl-1H-pyrazol-4-yl)methanone (BAS 670H) was studied in reservoir water-silt loam sediment (water pH 8.2, organic carbon 15.6 mg/L; sediment pH 7.8, organic matter 8.3%) from South Dakota for 362 days under anaerobic conditions in darkness at 25 ± 1°C. Based on the water volume, [^{14}C]BAS 670H was applied at a nominal rate of 0.2 mg a.i./L. The sediment:water ratio used was 1:4 (25 g wet wt. sediment:100 ml water). This experiment was conducted in accordance with USEPA Subdivision N Guideline §162-3 and in compliance with USEPA GLP Standards 40 CFR, Part 160. The test system consisted of 250-ml centrifuge bottles containing water-sediment under a static nitrogen atmosphere. Sediment and water (amended with 0.5% glucose) were pre-incubated *ca.* 1 month, then following treatment, duplicate systems were collected after 0, 7, 15, 30, 62, 91, 120, 182 and 362 days of incubation. Centrifuge bottles taken at each interval were attached to a flow-through trapping system for the collection of CO_2 and volatile organic compounds. Water layers were concentrated, centrifuged and filtered. Initial (0 day) sediment samples were not extracted. The 7-day sediment samples were sequentially extracted three times with 10mM pH 8-9 potassium phosphate buffer:methanol (1:1, v:v), followed by three times with methanol and finally three times again with the 10mM pH 8-9 phosphate buffer:methanol; however, all remaining (15- to 362-day) sediment samples were extracted four times with 10mM pH 8-9 potassium phosphate buffer:methanol (1:1, v:v). Sediment phosphate buffer:methanol extracts were combined, concentrated and filtered. Water layers, sediment extracts, extracted sediment and trapping solutions were analysed for total radioactivity using LSC. Concentrated water layers and sediment extracts were analysed for [^{14}C]BAS 670H and its transformation products by reverse-phase HPLC; parent BAS 670H and the major transformation product, M670H10, were identified by co-chromatography with reference standards. Identification of parent BAS 670H and transformation products M670H10 and M670H01 were confirmed using LC/MS and LC/MS/MS. Structures were proposed for transformation products M670H11 and M67012 based on MS analyses.

The test conditions outlined in the study appear to have been maintained throughout the 1-year incubation; however, supporting temperature data were not provided. Conditions in the water-sediment systems were strongly reducing throughout the study with redox potentials (both labels) averaging -303.9 ± 20.0 mV. For both labels, dissolved oxygen levels in the total systems were 0.01-0.05 mg/L throughout the study, while pH values gradually decreased from 7.18-7.31 at 0-15 days to 6.71-6.99 at 9-12 months.

Overall recovery (both labels) of radiolabeled material averaged 98.47 ± 4.50% (range 91.02-105.27%) of the applied, with gradual declines in material balances throughout the 1-year study (Reviewer's Comments No. 1 and 2). Recoveries of radiolabeled material averaged 98.28 ± 3.54% (range 92.42-104.40%) and 98.66 ± 5.28% (range 91.02-105.27%) for the [phenyl-U-^{14}C]- and [pyrazol-4-^{14}C]-label treated systems, respectively. Following application of [^{14}C]BAS 670H to the water layer, [^{14}C]residues (both labels) partitioned from the water layer into the sediment with average (n = 2) distribution ratios (water:sediment) of 33-34:1 at day 0, 2:1 at 1 week, 1:1 at 2 weeks, 1:2-3 at 1 month, 1:4 at 2-3 months, then were 1:4-6 thereafter for the [phenyl-U-^{14}C]-label and 1:6-9 for the [pyrazol-4-^{14}C]-label.

In the water layers, [^{14}C]BAS 670H (both labels) decreased from means of 98.75-99.24% of the applied at day 0 to 43.76-46.42% at 2 weeks, 12.27-14.49% at 1 month, 0.49-1.40% at 2-3 months, then was not detected (LOD *ca.* 0.5-1.0%) by 4 months in [phenyl-U-^{14}C]-label treated water and 9 months in [pyrazol-4-^{14}C]-label treated water. In the sediment, [^{14}C]BAS 670H (both labels) decreased from means of 5.83-8.75% at 1 week (day 0 sediment not extracted) to 2.06-4.54% at 2 weeks, 0.89-2.63% at 1-2 months and was <1.0% thereafter. Based on nonlinear/normal (2-parameter, unweighted) regression analysis, [^{14}C]BAS 670H (both labels) dissipated in the water layers and total systems with reviewer-calculated half-lives of 11.4-11.5 and 12.1-13.0 days, respectively; observed DT_{50} values in the sediments were 1-2 weeks.

For both labels, one major nonvolatile transformation product, 6-[5-hydroxy-1-methyl-1H-pyrazol-4-yl)carbonyl]-5-methyl-2,3-dihydro-4H-1-benzothiopyran-4-one (M670H10) and one minor product, [3-cyano-4-methane-sulfonyl-2-methyl-phenyl]-(5-hydroxy-1-methyl-1H-pyrazol-4-yl)methanone (M670H01) were detected and identified via LC/MS and LC/MS/MS, with structures proposed for two additional minor products, M670H11 and M670H12. Based on the replicate data provided, M670H10 was detected at maximums of 15.39-15.73% (2-3 months), 26.23-34.23% (2 months) and 41.62-48.05% (2 months) of the applied in the water, sediment and total systems, respectively, and was 2.27-11.81%, 1.81-22.71% and 4.08-33.64%, respectively, at study termination (1 year). In the water, sediment and total systems, M670H01 was detected at maximum means of 3.63-3.64%, 2.35-2.38% and 5.27-5.28%, respectively; M670H11 at 4.30-5.29%, 1.51-2.15% and 5.36-5.39%, respectively; and M670H12 at 4.14-4.32%, 1.48-1.64% and 4.32-4.75%, respectively. One unidentified [^{14}C] compound, Unk 1 (R_t 6:27), was detected in the sediment at maximum means of 3.49-8.55% of the applied, but was not detected in the water layers at any interval. Additional unidentified [^{14}C]compounds (four to six) were detected at combined maximum means of 5.15-5.64% of the applied. Extractable [^{14}C]residues in the sediment increased from means of 12.13-13.04% at 7 days (day 0 sediments were not extracted) to 28.64-34.80% at 2 months and were 16.95-25.36% at 1 year, while nonextractable residues 2.93-3.02% at day 0 to 55.22-74.14% at 4-6 months and were 51.70-64.36% thereafter. Organic matter fractionation of 7- to 362-day extracted sediment found means of 8.45-41.27%, 14.25-27.15% and 1.95-7.43% of the applied associated with the humin, fulvic acids and humic acids, respectively. Formation of volatilized $^{14}CO_2$ and volatile [^{14}C]organic compounds was not significant totalling means of ≤0.14% of the applied radioactivity at any sampling interval.

Transformation pathways were proposed by the study author involved transformation of BAS 670H (both labels) degrading to 6-[5-hydroxy-1-methyl-1H-pyrazol-4-yl)carbonyl]-5-methyl-2,3-dihydro-4H-1-benzothiopyran-4-one (M670H10; maximums of 15.39-15.73%, 26.23-34.23% and 41.62-48.08% of applied in water, sediment and total system, respectively). BAS 670H (both labels) may also yield proposed structural isomer M670H11 (maximum means of 4.30-5.29%, 1.51-2.15% and 5.36-5.39% in water, sediment and total system, respectively) which could form proposed degradate M670H12 (maximum means of 4.14-4.32%, 1.48-1.64% and 4.32-4.75% in water, sediment and total system, respectively) with M670H12 further degrading to [3-cyano-4-methanesulfonyl-2-methyl-phenyl]-(5-hydroxy-1-methyl-1H-pyrazol-4-yl)-methanone (M670H01; maximum means of 3.63-3.64%, 2.35-2.38% and 5.27-5.28% in water, sediment and total system, respectively). Ultimate formation of bound [^{14}C]residues was significant (maximum means of 59.64-74.14% of applied), while formation of volatilized [^{14}C]residues was minor (means ≤0.14% of applied).

Reported Results:
Test system used: Reservoir water-silt loam sediment from South Dakota.

[Phenyl-U-^{14}C]-label:

Nonlinear half-life (0- to 91-day data) in water:	11.4 days ($r^2 = 0.994$).
Half-life (observed) in sediment:	7-15 days.
Nonlinear half-life (0- to 120-day data) in total system:	12.1 days ($r^2 = 0.994$).

[Pyrazol-4-^{14}C]-label:

Nonlinear half-life (0- to 182-day data) in water:	11.5 days ($r^2 = 0.998$).
Half-life (observed) in sediment:	7-15 days.
Nonlinear half-life (0- to 182-day data) in total system:	13.0 days ($r^2 = 0.995$).

For both labels, the following major transformation product was reported:

- M670H10 (6-[5-Hydroxy-1-methyl-1H-pyrazol-4-yl)carbonyl]-5-methyl-2,3-dihydro-4H-1-benzothiopyran-4-one) (maximums of 15.39-15.73%, 26.23-34.23% and 41.62-48.05% of applied in water, sediment and total system, respectively).

For both labels, the following minor transformation products were reported:

- M670H01 ([3-Cyano-4-methanesulfonyl-2-methyl-phenyl]-(5-hydroxy-1-methyl-1H-pyrazol-4-yl)-methanone) (means of ≤5.28% of applied in total system).
- M670H11 (proposed structural isomer; means of ≤5.39% in total system).
- M670H12 (structure proposed; means of ≤4.75% in total system).
- Unk 1 (R_t 6:27; means of ≤8.55% in sediment).
- Four to six unidentified [^{14}C]compounds (individually means of ≤4.12% of applied in total system).
- CO_2 + volatile organic compounds (means of ≤0.14% of applied).

Deviations and Deficiencies

1) Individual replicate results for parent [^{14}C]BAS 670H and its degradates (HPLC analyses) were only provided for five of the ten sampling intervals, and there were sufficient levels of variability between replicates at the same sampling interval and between means for consecutive sampling intervals such that the validity of the reported results cannot be confidently assessed without submission of the additional replicate data. This deviation may affect the validity of the study.

2) Storage conditions and intervals of sediment samples prior to and after extraction and of sediment extracts and water layers prior to analysis were not reported and it was not established that the variable results were not the consequence of instability during storage. This deviation may affect the validity of the study.

3) As a consequence of the variable results for parent BAS 670H and its degradates, method validations may be required to establish that the extraction and concentration methods employed did not artificially degrade parent BAS 670H and its transformation products prior to analysis. This deviation may affect the validity of the study.

4) One unidentified [^{14}C]compound, Unk1 (R_t 6:27), was detected in [phenyl-U-^{14}C]-label treated sediment at a mean of 8.55% of the applied. Replicate results need to be provided to establish that Unk1 did not exceed 10% of the applied. Subdivision N Guideline § 162-3 requires that all degradates detected at >10% of the applied radioactivity be identified. This deviation, however, does not affect the validity of the study.

162-4 Aerobic Aquatic Metabolism (PMRA DACO 8.2.3.5.5)

162-3 Aerobic Aquatic Metabolism
David, M.D.2002. *BASF 670 H: Aerobic Aquatic Metabolism.* Performed by BASF Corp., Ewing, NJ. BASF Report ENV 01-055. BASF Study 56940. BASF Re. Document # 2002/5003947. Completed on 6/28/2002
45902423

This study is **acceptable** and may be used towards satisfying the USEPA Subdivision N 162-4 Data Requirement. A study investigating the aerobic aquatic metabolism of BAS 670H labeled in the isoxazole ring is not required at this time.

Although no redox gradient in the water-sediment system was included in the pond water-sediment study, the water column was sufficiently oxic and it is highly unlikely that the surface layers of the sediment phase were anoxic.

Scientific Conclusions: *BAS 670H was persistent in the river water-sediment system (half-life > 120 days in water, in sediment and whole system). The cyano-metabolite M670H01 was the only identified metabolite and reach 8.17% in the whole system. Both BAS 670H and the degradate predominantly partitioned into the water column, but partitioning into the sediment increased with time. In the pond-water sediment, the non-linear half-life in the total system was 19 to 24 days. The only major identified metabolite was M670H01.*

There were considerable differences between the physical and chemical characteristics of the river water-sediment and pond-water systems. It is unclear if processes other than biotransformation can control the behavior of BAS670H in aerobic water-sediment systems. The pH of the pond sediment was very low and the pond water had a high electrical conductivity of "dissolved" solids.

EXECUTIVE SUMMARY:

The biotransformation of [phenyl-U-^{14}C]- and [pyrazol-4-^{14}C]-labeled [3-(4,5-dihydro-isoxazol-3-yl)-4-methanesulfonyl-2-methyl-phenyl]-(5-hydroxy-1-methyl-1H-pyrazol-4-yl)methanone (BAS 670H) was studied in river water-loamy sand sediment (water pH 6.78, organic carbon not reported; sediment pH 7.5-7.7, organic matter 0.9%) and pond water-loam sediment (water pH 7.32, organic carbon not reported; sediment pH 4.2-4.9, organic matter 5.3%) systems from Ohio for 120 days under aerobic conditions in darkness at 20 ± 1°C. Based on the water volume, [^{14}C]BAS 670H was applied at a nominal rate of 0.033 mg a.i./L. The sediment:water ratio used was 1:4 (40 g dry wt. sediment:160 mL water). This experiment was conducted in accordance with USEPA Subdivision N Guideline §162-4 and in compliance with USEPA GLP Standards 40 CFR, Part 160. The test system consisted of 250-mL centrifuge bottles containing water-sediment connected in series to a flow-through system for the continuous collection of CO_2 and volatile organics. Sediment and water were pre-incubated *ca.* 3 weeks, then following treatment, duplicate systems of each label and type were collected after 0, 3, 7, 14, 28, 56, 84 and 120 days of incubation. One replicate was placed in frozen storage, while processing of the second replicate was initiated the day of collection. Water layers were acidified to pH <2, then partitioned three times with ethyl acetate; organic phases were combined and concentrated for analysis. Sediment samples were extracted four to six times with 0.1M potassium phosphate buffer:methanol (1:1, v:v); the methanol was removed by rotary evaporation, then the remaining aqueous phase was acidified and processed in the same manner as the water layers. Selected water layers and sediment extracts (intervals not specified), after removal of the methanol (for sediment extracts) and acidification, were applied to pre-conditioned C18 solid phase extraction (SEP) cartridges, rather than being partitioned with ethyl acetate; the SEP cartridge was eluted with methanol:5% ammonium hydroxide (9:1, v:v) with the resulting eluate concentrated for analysis. Water layer extracts, sediment extracts, extracted sediment and trapping solutions were analyzed for total radioactivity using LSC. Concentrated water layer and sediment extracts were analyzed for [^{14}C]BAS 670H and its transformation products by reverse-phase HPLC; parent BAS 670H and one transformation product, M670H01, were identified by comparison to the retention times of reference standards. Identification of parent BAS 670H and M670H01 were confirmed using LC/MS.

The test conditions outlined in the study appear to have been maintained throughout the 4-month incubation; however, supporting temperature data were not provided. For both systems, conditions in the water layers were primarily moderately oxidizing throughout the study with average redox potentials and dissolved oxygen levels of +256 ± 90 mV and 8.22 ± 0.97 mg/L, respectively. In the water layers of the pond water-loam systems, pH levels decreased from 6.10-8.28 during the initial 2 weeks posttreatment to 4.49-4.53 at study termination, while pH levels in the river water-loamy sand systems were 5.46-8.39 with no consistent patterns of increase or decline. Conditions in the sediment layers of the river water-loamy sand systems increased from -129 to -7 mV during the initial week posttreatment to +195 to +291 mV at 3-4 months, but remained reducing (-167 to -56 mV) in the pond water-loam sediment layers throughout.

There were significant differences in the behavior of [^{14}C]BAS 670H in the two systems. [^{14}C]BAS 670H (both labels) dissipated significantly faster and formation of nonextractable [^{14}C]residues was significantly higher in the pond water-loam systems as compared to the river water-loamy sand systems. However, for both systems and labels, only one transformation product, 3-cyano-4-methane-sulfonyl-2-methyl-phenyl]-(5-hydroxy-1-methyl-1H-pyrazol-4-yl)methanone (M670H01), was detected and identified by LC/MS; M670H01 was detected as a major product in the [phenyl-U-^{14}C]BAS 670H treated pond water-loam sediment systems, but as a minor product in the remaining systems. Upon comparison of the systems' properties, the loam sediment had a higher level of organic matter (5.3% vs. 0.9%) and pH levels of 4.2-4.9 which are close to the 4.06 dissociation constant (pK_a) reported for BAS 670H. The pond water had higher levels of hardness (2,604 mg/L vs. 41 mg/L), electrical conductivity (10.65 mmhos/cm vs. 0.15 mmhos/cm) and total dissolved solids (6,044 mg/L vs. 442 mg/L).

<u>In river water-loamy sand sediment systems</u>, recoveries of radiolabeled material averaged 105.00 ± 1.92% (range 101.16-108.16%) and 100.70 ± 2.83% (range 96.24-105.26%) for the [phenyl-U-^{14}C]- and [pyrazol-4-^{14}C]-label treated systems, respectively; with gradual, but not significant, declines in recoveries for both labels throughout the study. Following application of [^{14}C]BAS 670H to the water layer, [^{14}C]residues (both labels) partitioned from the water layer into the sediment with average (n = 2) distribution ratios (water:sediment) of 14:1 at day 0, 7:1 at 3 days, 4:1 at 1 week, 5:1 at 2 weeks and were 2:1 thereafter. At study termination (120 days), [^{14}C]BAS 670H (both labels) was detected at 59.68-63.89%, 19.02-20.25% and 79.93-82.91% of the applied in the water layer, sediment and total system, respectively. The primary reviewer did not determine half-life values as the results would have been extrapolated significantly beyond the final sampling interval. M670H01 (both labels) was detected at maximums of 3.93-7.83%, 0.36-1.60% and 5.53-8.17% in the water layer, sediment and total system, respectively. Unidentified [^{14}C]residues (both labels), consisting of UNK #2 (detected at ≤2.54% in water layer) plus unresolved HPLC regions (each reported as ≤2% of applied), comprised maximums of 4.11-5.68% in the total system. Extractable [^{14}C]residues (both labels) in the sediment increased from 6.35-6.55% at day 0 to 19.14-25.23% at 2 and were 19.38-21.09% at 4 months, while nonextractable [phenyl-U-^{14}C]- and [pyrazol-4-^{14}C]-label residues were detected at maximums of 18.18% (3 months) and 18.73% (1 month), respectively, and were 17.79% and 10.51%, respectively, at study termination. Organic matter fractionation of 120-day extracted sediment (both labels) found 1.91-2.20%, 6.07-9.77% and 1.05-2.56% of the applied associated with the humin, fulvic acids and humic acids, respectively. Formation of volatilized $^{14}CO_2$ was not significant for either label totaling ≤0.89% of the applied radioactivity at study termination; volatile [^{14}C]organic compounds were <0.01% at any interval.

<u>In pond water-loam sediment systems</u>, recoveries of radiolabeled material averaged 104.76 ± 3.47% (range 101.35-111.56%) and 99.43 ± 3.13% (range 92.93-103.31%) for the [phenyl-U-^{14}C]- and [pyrazol-4-^{14}C]-label treated systems, respectively; with no consistent declines in recoveries for either label throughout the study. Following application of [^{14}C]BAS 670H to the water layer, [^{14}C]residues (both labels) partitioned from the water layer into the sediment with

average (n = 2) distribution ratios (water:sediment) of 16:1 at day 0, 2:1 at 3 days, 1:1 at 1-2 weeks and were 1:>20 thereafter. [^{14}C]BAS 670H (both labels) in the water layer decreased from 93.62-95.78% of the applied at day 0 to 56.11-57.66% at 7 days and was 39.96-40.31% at 14 days; 28- to 120-day water layers, containing 0.34-6.68% of applied, were not analyzed by HPLC. In the sediment, [phenyl-U-^{14}C]- and [pyrazol-4-^{14}C]-labeled [^{14}C]BAS 670H increased from 5.57-6.23% to maximums of 27.05% (7 days) and 39.41% (28 days), respectively, and was 5.31% and 16.00%, respectively, at study termination. Based on nonlinear/normal (2-parameter, unweighted) regression analysis, [^{14}C]BAS 670H (both labels) dissipated in the water layer, sediment and total system with reviewer-calculated half-lives of 11 days, 49-78 days and 19-24 days, respectively. In the sediments, [phenyl-U-^{14}C]- and [pyrazol-4-^{14}C]-labeled M670H01 was detected at maximums of 10.21% (3 months) and 6.38% (4 months), respectively, while neither was detected at >2.04% in the water layers. For both labels, two unidentified [^{14}C]residues (UNK #1, UNK #2) were each detected at ≤3.48% in sediment extracts, while unresolved HPLC regions (each reportedly ≤2.0% of applied) plus any non-analyzed water extract residues comprised ≤11.64% in the total system at any sampling interval. Extractable [phenyl-U-^{14}C]- and [pyrazol-4-^{14}C]-label residues in the sediment increased from 5.66-6.23% of the applied at day 0 to maximums of 36.06% (2 months) and 42.15% (1 month), respectively, and were 21.38% and 27.35%, respectively, at study termination. Nonextractable [^{14}C]residues (both labels) increased from 0.11-0.36% at day 0 to maximums of 72.69-79.06% at study termination. Organic matter fractionation of 28- to 120-day extracted sediment (both labels) found 9.78-15.55%, 22.62-28.54% and 13.32-22.27% of the applied associated with the humin, fulvic acids and humic acids, respectively. Formation of volatilized $^{14}CO_2$ was not significant for either label totaling ≤1.41% of the applied radioactivity at study termination; volatile [^{14}C]organic compounds were <0.01% at any interval.

The transformation pathway was proposed by the study author involved opening of the oxazole ring to yield [3-cyano-4-methanesulfonyl-2-methyl-phenyl]-(5-hydroxy-1-methyl-1H-pyrazol-4-yl)-methanone (M670H01; maximums of ≤7.83%, 0.36-10.21% and 5.53-10.21% of applied in water layer, sediment and total system, respectively), with additional formation of minor unidentified [^{14}C]residues (each <3.5% of applied in total system) and CO_2 (<1.5% of applied).

Results Synopsis:

Test system used: River water-loamy sand sediment from Ohio.
[Phenyl-U-^{14}C]-label:

Half-life (observed) in water:	>120 days.
Half-life (observed) in sediment:	>120 days.
Half-life (observed) in total system:	>120 days.

[Pyrazol-4-^{14}C]-label:

Half-life (observed) in water:	>120 days.
Half-life (observed) in sediment:	>120 days.
Half-life (observed) in total system:	>120 days.

Both labels:

Major transformation products: None.

Minor transformation products: [3-Cyano-4-methanesulfonyl-2-methyl-phenyl]-(5-hydroxy-1-methyl-1H-pyrazol-4-yl)-methanone (M670H01; maximums of 5.53-8.17% of applied in total system).
UNK #2 (≤2.54% in sediment).
CO_2 (≤0.89% of applied).

Test system used: Pond water-loam sediment from Ohio.

[Phenyl-U-^{14}C]-label:

Nonlinear half-life (0- to 14-day data) in water: 10.7 days ($r^2 = 0.976$).
Nonlinear half-life (7- to 120 day data) in sediment: 77.7 days ($r^2 = 0.808$).
Nonlinear half-life (0- to 120-day data) in total system: 19.0 days ($r^2 = 0.968$).

Major transformation products: [3-Cyano-4-methanesulfonyl-2-methyl-phenyl]-(5-hydroxy-1-methyl-1H-pyrazol-4-yl)-methanone (M670H01; maximum of 10.21% of applied in sediment).

Minor transformation products: UNK #1 and UNK #2 (each ≤3.15% in sediment).
CO_2 (≤0.44% of applied).

[Pyrazol-4-^{14}C]-label:

Nonlinear half-life (0- to 14-day data) in water: 10.9 days ($r^2 = 0.926$).
Nonlinear half-life (28- to 120-day data) in sediment: 49.2 days ($r^2 = 0.839$).
Nonlinear half-life (0- to 120-day data) in total system: 24.2 days ($r^2 = 0.968$).

Major transformation products: None.

Minor transformation products: [3-Cyano-4-methanesulfonyl-2-methyl-phenyl]-(5-hydroxy-1-methyl-1H-pyrazol-4-yl)-methanone (M670H01; maximums of 2.04% and 6.38% of applied in water layer and sediment, respectively).
UNK #1 and UNK #2 (each ≤3.48% in sediment).
CO_2 (≤1.41% of applied).

Mobility in Soil (USEPA 163-1; PMRA Data Code 8.2.4.2)

Parent and Metabolite M670H05

Zirnstein, M. 2002.*Adsorption/Desorption- Study of BAS 670 H (Metabolite of BAS 670 H) on Six North American Soils*. Performed by BASF Agricultural Center, Crop Protection Division. Mimburgerhof, Germany. Study ID # P1020020.Completed 12/10/2002. BASF Reg. Document # 2002/1998895
45902425

The adsorption/desorption characteristics of [phenyl-U-^{14}C]-labeled [3-(4,5-dihydro-isoxazol-3-yl)-4-methanesulfonyl-2-methyl-phenyl]-(5-hydroxy-1-methyl-1H-pyrazol-4-yl)methanone (BAS

670H) and 3-(4,5-dihydro-isoxazol-3-yl)-4-methanesulfonyl-2-methyl-benzoic acid (M670H05) were studied in six U.S. soils: a sandy loam soil [pH 5.7, organic carbon 1.22%] from North Carolina, a clay loam soil [pH 6.1, organic carbon 4.07%] from Minnesota, two loam soils [pH 6.7, organic carbon 3.66% and pH 6.8, organic carbon 3.72%] from Idaho and Iowa, respectively, and two silt loam soils [pH 5.9, organic carbon 2.85% and pH 6.9, organic carbon 0.81%] from South Dakota and Indiana, respectively, in a batch equilibrium experiment. The experiment was conducted in accordance with the USEPA Pesticide Assessment Guidelines, Subdivision N, Section §163-1, and in compliance with the OECD Principles of Good Laboratory Practice and the GLP Principles of the German "Chemikaliengesetz". The adsorption phase of the study was carried out by equilibrating soil with [phenyl-U-^{14}C]-labeled BAS 670H and M670H05 at nominal concentrations of 0.04, 0.2, 0.5, 2.0, and 5.0 mg a.i/kg soil for all test soils. The test soils were dried (105°C) and sieved at <2 mm prior to use in the study. The soils were equilibrated in the dark at approximately 23°C for 24 hours. The equilibrating solution used was 0.01M $CaCl_2$, with soil:solution ratios of 1:1 (w:v) for all test soils. The desorption phase of the study was carried out by replacing the adsorption solution with an equivalent volume of pesticide-free 0.01M $CaCl_2$ solution and equilibrating in the dark at approximately 23°C for 24 hours. The desorption step was conducted twice for all soils.

The supernatant solution after adsorption and each desorption phase was separated by centrifugation and aliquots were analyzed for total radioactivity using LSC. At the end of the desorption phase (two steps), the high-dose soils were extracted by shaking with a phosphate buffer:methanol solution (1:1, v:v; pH 8.5; BAS 670H) or methanol (M670H05). The samples were centrifuged and aliquots were analyzed for total radioactivity using LSC. The soils were combusted prior to LSC analysis. High-dose adsorption and desorption supernatant samples were analyzed for [^{14}C]BAS 670H or [^{14}C]M670H05 using HPLC.

Based on HPLC analysis of high-dose adsorption and desorption supernatant samples for each test soil, [^{14}C]BAS 670H and [^{14}C]M670H05 were stable in aqueous solution, representing 100% of the applied radioactivity. For both test substances, the mass balance at the end of the adsorption phase was not reported. For **[phenyl-U-^{14}C]BAS 670H-treated soils**, mean mass balances for high-dose soils at the end of the desorption phase (two steps) were 101.0%, 93.1%, 90.4%, 100.1%, 87.2%, and 102.7% of the applied for the Idaho loam, South Dakota silt loam, Iowa loam, Indiana silt loam, Minnesota clay loam, and North Carolina sandy loam soils, respectively. For **[phenyl-U-^{14}C]M670H05-treated soils**, mean mass balances for high-dose soils at the end of the desorption phase (two steps) were 101.2%, 101.6%, 101.8%, 100.2%, 101.9%, and 100.5% of the applied for the Idaho loam, South Dakota silt loam, Iowa loam, Indiana silt loam, Minnesota clay loam, and North Carolina sandy loam soils, respectively.

After 24 hours of equilibration 45.4-61.2%, 63.7-79.1%, 58.3-74.4%, 21.9-39.9%, 75.8-87.3%, and 72.3-89.5% of the applied **[phenyl-U-^{14}C]BAS 670H** was adsorbed to the Idaho loam, South Dakota silt loam, Iowa loam, Indiana silt loam, Minnesota clay loam, and North Carolina sandy loam soils, respectively. Reviewer-calculated adsorption K_d values were 1.60, 3.34, 2.45, 0.60, 6.03, and 6.32 for the Idaho loam, South Dakota silt loam, Iowa loam, Indiana silt loam, Minnesota clay loam, and North Carolina sandy loam soils, respectively. Registrant-calculated adsorption K_d values were 1.814, 3.731, 2.594, 0.556, 7.468, and 6.933 for the Idaho loam, South Dakota silt loam, Iowa loam, Indiana silt loam, Minnesota clay loam, and North Carolina sandy loam soils, respectively; corresponding adsorption K_{oc} values were 48.342, 130.926, 69.720, 68.605, 183.605, and 568.303. Freundlich K_{ads} values (PMRA reviewer-calculated) were 1.40, 2.59, 1.97, 0.43, 4.87, and 3.69 for the Idaho loam, South Dakota silt loam, Iowa loam, Indiana silt loam, Minnesota clay loam, and North Carolina sandy loam soils, respectively; corresponding Freundlich K_{oc} values were 38, 91, 53, 54, 120, and 303. At the end of the desorption phase (two steps), 65.3-113.0%, 32.0-69.0%, 42.3-83.0%, 120.7-232.5%, 17.8-39.9%, and 13.1-32.6% of the applied [phenyl-U-^{14}C] was desorbed from the Idaho loam, South Dakota silt loam, Iowa loam, Indiana silt loam, Minnesota clay loam, and North Carolina sandy loam soils, respectively. Desorption K_d values were 2.394, 5.222, 3.780, 1.004, 9.949, and 17.764 for the Idaho loam, South Dakota silt loam, Iowa loam, Indiana silt loam, Minnesota clay loam, and North Carolina sandy loam soils, respectively; corresponding desorption K_{oc} values were not reported. Freundlich K_{des} values were 1.47, 2.68, 2.35, 0.54, 4.6, and 3.95 for the Idaho loam, South Dakota silt loam, Iowa loam, Indiana silt loam, Minnesota clay loam, and North Carolina sandy loam soils, respectively; corresponding Freundlich K_{oc} values were 40, 94, 63, 66, 113, and 324.

The reviewer-calculated r^2 value for the relationship of Kd vs. % organic carbon is 0.0132, for Kd vs. pH is 0.7285, and for Kd vs. % clay is 0.0268.

After 24 hours of equilibration 5.9-8.1% and 10.1-17.6% of the applied **[phenyl-U-^{14}C]M670H05** was adsorbed to the Minnesota clay loam and North Carolina sandy loam soils, respectively. A maximum of 0.1% of the applied [phenyl-U-^{14}C]M670H05 was adsorbed to the Indiana silt loam soil. No adsorption was observed for the South Dakota silt loam or Idaho and Iowa loam soils. Reviewer-calculated adsorption K_d values were 0.19, 0.14, 0.11, 0.11, 0.31, and 0.32 for the Idaho loam, South Dakota silt loam, Iowa loam, Indiana silt loam, Minnesota clay loam, and North Carolina sandy loam soils, respectively. Registrant-calculated adsorption K_d values were 0.114 and 0.199 for the Minnesota clay loam and North Carolina sandy loam soils, respectively; corresponding adsorption K_{oc} values were 2.804 and 16.287. Reliable adsorption isotherms could not be established for the Idaho loam, South Dakota silt loam, Iowa loam, and Indiana silt loam soils. The adsorption K_{oc} value for the Indiana silt loam soil was 0.025. Freundlich K_{ads} values (PMRA reviewer-calculated) were 0.11 and 0.18 for the Minnesota clay loam and North Carolina sandy loam soils, respectively; corresponding Freundlich K_{oc} values were 3 and 14. The % [phenyl-U-^{14}C]M670H05 desorbed as a % of the adsorbed in the Minnesota clay loam and North Carolina sandy loam soils could not be determined due to discrepancies in the data provided in the study report. Desorption K_d values were 0.002, 0.227, and 0.788 for the Indiana silt loam, Minnesota clay loam, and North Carolina sandy loam soils, respectively; corresponding desorption K_{oc} values were not reported. Reliable desorption isotherms could not be established for the Idaho loam, South Dakota silt loam, and Iowa loam soils. Freundlich K_{des} values were 0.18 and 0.35 for the Minnesota clay loam and North Carolina sandy loam soils, respectively; corresponding Freundlich K_{oc} values were 5 and 29.

The reviewer-calculated r^2 value for the relationship of Kd vs. % organic carbon is 0.0025, for Kd vs. pH is 0.4856, and for Kd vs. % clay is 0.005. For **phenyl-U-[14]C]BAS 670H-** treated soils, Freundlich K_{des} values were slightly higher than those obtained for adsorption. For the **[phenyl-U-[14]C]M670H05-** treated Minnesota clay loam and North Carolina sandy loam soils, Freundlich K_{des} values were slightly higher than those obtained for adsorption (Freundlich values could not be determined for other test soils)..

Results Synopsis: The reviewer calculated adsorption and desorption K-values:

[Phenyl-U-[14]C]BAS 670H:

Soil type: Idaho loam
Adsorption K_d: 1.6
Adsorption K_f: 1.40 — Adsorption $K_{f\text{-}OC}$: 38
Desorption K_f: 1.47 — Desorption $K_{f\text{-}OC}$: 40
Mobility classification: very high

Soil type: South Dakota silt loam
Adsorption K_d: 3.34
Adsorption K_f: 2.59 — Adsorption $K_{f\text{-}OC}$: 91
Desorption K_f: 2.68 — Desorption $K_{f\text{-}OC}$: 94
Mobility classification: high

Soil type: Iowa loam
Adsorption K_d: 2.45
Adsorption K_f: 1.97 — Adsorption $K_{f\text{-}OC}$: 53
Desorption K_f: 2.35 — Desorption $K_{f\text{-}OC}$: 63
Mobility classification: high

Soil type: Indiana silt loam
Adsorption K_d: 0.6
Adsorption K_f: 0.43 — Adsorption $K_{f\text{-}OC}$: 54
Desorption K_f:: 0.54 — Desorption $K_{f\text{-}OC}$: 66
Mobility classification: high

Soil type: Minnesota clay loam

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Adsorption K_d: 6.03
Adsorption K_f: 4.87

Adsorption $K_{f\text{-}OC}$: 120

Desorption K_f: 4.6

Desorption $K_{f\text{-}OC}$: 113

Mobility classification: high

Soil type: North Carolina sandy loam
Adsorption K_d: 6.32
Adsorption K_f: 3.69

Adsorption $K_{f\text{-}OC}$: 303

Desorption K_f: 3.95

Desorption $K_{f\text{-}OC}$: 324

Mobility classification: moderate

[Phenyl-U-^{14}C]M670H05:
Soil type: Idaho loam
Adsorption K_d: 0.19
Adsorption K_f: n/a

Adsorption $K_{f\text{-}OC}$: n/a

Desorption K_f: n/a

Desorption $K_{f\text{-}OC}$: n/a

Mobility classification: n/a

Soil type: South Dakota silt loam
Adsorption K_d: 0.14
Adsorption K_f: n/a

Adsorption $K_{f\text{-}OC}$: n/a

Desorption K_f: n/a

Desorption $K_{f\text{-}OC}$: n/a

Mobility classification: n/a

Soil type: Iowa loam
Adsorption K_d: 0.11
Adsorption K_f: n/a

Adsorption $K_{f\text{-}OC}$: n/a

Desorption K_f: n/a

Desorption $K_{f\text{-}OC}$: n/a

Mobility classification: n/a

Soil type: Indiana silt loam
Adsorption K_d: 0.11
Adsorption K_f: n/a

Desorption K_f: n/a

Adsorption $K_{f\text{-}OC}$: n/a

Desorption $K_{f\text{-}OC}$: n/a

Mobility classification: n/a

Soil type: Minnesota clay loam
Adsorption K_d: 0.31
Adsorption K_f: 0.11

Adsorption $K_{f\text{-}OC}$: 3

Desorption K_f: 0.18

Desorption $K_{f\text{-}OC}$: 5

Mobility classification: very high

Soil type: North Carolina sandy loam
Adsorption K_d: 0.32
Adsorption K_f: 0.18

Adsorption $K_{f\text{-}OC}$: 14

Desorption K_f: 0.35

Desorption $K_{f\text{-}OC}$: 29

Mobility classification: very high

Metabolite M670H10

Zimstein, M. 2003. *Adsorption/desorption- study of BAS 670 H metabolite M670H10* (Reg. No. 4969168) on six North American soils. Unpublished study performed by BASF Aktiengesellschaft, BASF Agricultural Center Limburgerhof, Limburgerhof, Germany; sponsored and submitted by BASF Corporation, Agricultural Products, Research Triangle Park, NC. Laboratory Project Identification: 168585. BASF Registration Document Number: 2003/1009251. Experiment initiation April 04, 2003 and completion April 28, 2003 (p. 12). Final report issued December 11, 2003.
46242703

The adsorption/desorption characteristics of [pyrazole-4-^{14}C]-labeled M670H10 (6-[(5-hydroxy-1-methyl-1H-pyrazol-4-yl)carbonyl]-5-methyl-2,3-dihydro-4H-1-benzothiopyran-4-one), a transformation product of BAS 670 H, were studied in six U.S. soils: a loam soil [pH 6.7, organic carbon 3.66%] from Idaho, a silt loam soil [pH 5.9, organic carbon 2.85%] from South Dakota, a loam soil [pH 6.8, organic carbon 3.72%] from Iowa, a silt loam soil [pH 6.9, organic carbon 0.81%] from Indiana, a clay loam soil [pH 6.1, organic carbon 4.07%] from Minnesota, and a sandy loam soil [pH 5.7, organic carbon 1.22%] from North Carolina, in a batch equilibrium experiment. The experiment was conducted in accordance with the USEPA Pesticide Guidelines, Subdivision N, Section §163-1, and in compliance with USEPA 40 CFR Part 160. The adsorption phase of the study was carried out by equilibrating soil with [pyrazole-4-^{14}C]M670H10 at nominal test concentrations of 0.02, 0.1, 0.5, 2.0, and 10.0 mg a.i./kg soil for all test soils. The soils were equilibrated in the dark for 24 hours at 20.1 ± 0.4°C. The equilibrating solution used was 0.01M $CaCl_2$ with soil:solution ratios of 1:2 (w:v) for all test soils. The desorption phase of the study was carried out by replacing the adsorption solution with an equivalent volume of pesticide-free 0.01M $CaCl_2$ solution and equilibrating in the dark for 24 hours at 20.1 ± 0.4°C. Two desorption steps were conducted for all test soils.

The supernatant solution after adsorption and two desorption cycles was separated by centrifugation and aliquots were analyzed for total radioactivity using LSC. Following the second desorption step, the high-dose soils were extracted by shaking with a phosphate buffer:methanol solution (1:1, v:v). The samples were centrifuged, and the extracts were decanted and analyzed for total radioactivity using LSC. Following extraction, the soils were combusted prior to LSC analysis. To determine the stability of [pyrazole-4-^{14}C]M670H10, aliquots of the high-dose standard solution (10 mg a.i./kg soil) were analyzed by HPLC prior to the beginning of the adsorption phase and following extraction. In addition, aliquots of high-dose supernatants following adsorption, two desorption steps, and extraction were checked by HPLC analysis.

[^{14}C]M670H10 was stable in soilless high-dose test solution (10.0 mg a.i./kg soil) during the study, based on HPLC analysis of the solution at the beginning and end of the study. In contrast, some degradation of [^{14}C]M670H10 was observed in the high-dose test samples, based on HPLC analyses of the aqueous supernatants following adsorption and two desorption steps, and organic extraction. An unidentified minor compound (retention time of 6.16 min), comprising <5% of the applied in any one fraction, formed in all high-dose test soils, except for the North Carolina sandy loam soil. The mass balance at the end of the adsorption phase was not reported. Mean mass balances at the end of the second desorption cycle were 93.8%, 89.4%, 83.9%, 99.1%, 91.6%, and 93.6% of the applied for the Idaho loam, South Dakota silt loam, Iowa loam, Indiana silt loam, Minnesota clay loam, and North Carolina sandy loam soils, respectively.

After 24 hours of equilibrium, 87.1-92.8%, 97.0-100.1%, 95.9-100.8%, 66.2-84.5%, 102.1-104.0%, and 98.7-100.0% of the applied [pyrazole-4-^{14}C]M670H10 was adsorbed to the Idaho loam, South Dakota silt loam, Iowa loam, Indiana silt loam, Minnesota clay loam, and North Carolina sandy loam soils, respectively. Registrant-calculated adsorption K_d values were 13.796, 34.732, 30.036, 6.940, 81.038, and 91.010 for the Idaho loam, South Dakota silt loam, Iowa loam, Indiana silt loam, Minnesota clay loam, and North Carolina sandy loam soils, respectively; corresponding adsorption K_{oc} values were 376.925, 1218.666, 807.431, 856.745, 1991.11, and 7459.842. Registrant-calculated Freundlich K_{ads} values were 10.661, 23.852, 19.491, 4.349, 52.609, and 69.242 for the Idaho loam, South Dakota silt loam, Iowa loam, Indiana silt loam, Minnesota clay loam, and North Carolina sandy loam soils, respectively; corresponding Freundlich adsorption K_{oc} values were 291.284, 836.925, 523.958, 536.854, 1292.611, and 5675.611.

At the end of the desorption phase, 23.6%, 12.3%, 15.2%, 36.3%, 5.0%, and 3.1% of the applied [pyrazole-4-^{14}C]M670H10 desorbed from the high-dose Idaho loam, South Dakota silt loam, Iowa loam, Indiana silt loam, Minnesota clay loam, and North Carolina sandy loam soils, respectively (reviewer-calculated). Registrant-calculated desorption K_d values were 12.712, 42.871, 30.329, 9.936, 101.383, and 170.199 for the Idaho loam, South Dakota silt loam, Iowa loam, Indiana silt loam, Minnesota clay loam, and North Carolina sandy loam soils, respectively; corresponding desorption K_{oc} values were not reported. Registrant-calculated Freundlich K_{des} values were 10.473, 24.637, 19.658, 6.004, 51.460, and 97.949 for the Idaho loam, South Dakota silt loam, Iowa loam, Indiana silt loam, Minnesota clay loam, and North Carolina sandy loam soils, respectively; corresponding Freundlich desorption K_{oc} values were 286.136, 864.467, 528.445, 741.198, 1264.367, and 8028.618.

Results Synopsis: The study author calculated Freundlich adsorption K_F values using the following equation: $\log C_{Asoil} = \log K_F + 1/n \log C_{AW}$.

Soil type: Idaho Loam
Amount adsorbed: 87.1-92.8% of the applied
Adsorption K_d: 13.796
Adsorption K_{oc}: 376.925
Freundlich K_{ads}: 10.661
Freundlich adsorption K_{oc}: 291.284
Amount desorbed: 23.6% of the adsorbed
Desorption K_d: 12.712
Desorption K_{oc}: Not reported
Freundlich K_{des}: 10.473
Freundlich desorption K_{oc}: 286.136
Mobility classification: moderate

Soil type: South Dakota Silt loam
Amount adsorbed: 97.0-100.1% of the applied
Adsorption K_d: 34.732
Adsorption K_{oc}: 1218.666
Freundlich K_{ads}: 23.852
Freundlich adsorption K_{oc}: 836.925
Amount desorbed: 12.3% of the adsorbed
Desorption K_d: 42.871
Desorption K_{oc}: Not reported
Freundlich K_{des}: 24.637
Freundlich desorption K_{oc}: 864.467
Mobility classification: low

Soil type: Iowa Loam
Amount adsorbed: 95.9-100.8% of the applied
Adsorption K_d: 30.036
Adsorption K_{oc}: 807.431

Freundlich K_{ads}: 19.491
Freundlich adsorption K_{oc}: 523.958
Amount desorbed: 15.2% of the adsorbed
Desorption K_d: 30.329
Desorption K_{oc}: Not reported
Freundlich K_{des}: 19.658
Freundlich desorption K_{oc}: 528.445
Mobility classification: low

Soil type: Indiana Silt loam
Amount adsorbed: 66.2-84.5% of the applied
Adsorption K_d: 6.940
Adsorption K_{oc}: 856.745
Freundlich K_{ads}: 4.349
Freundlich adsorption K_{oc}: 536.854
Amount desorbed: 36.3% of the adsorbed
Desorption K_d: 9.936
Desorption K_{oc}: Not reported
Freundlich K_{des}: 6.004
Freundlich desorption K_{oc}: 741.198
Mobility classification: low

Soil type: Minnesota Clay loam
Amount adsorbed: 102.1-104.0% of the applied
Adsorption K_d: 81.038
Adsorption K_{oc}: 1991.11
Freundlich K_{ads}: 52.609
Freundlich adsorption K_{oc}: 1292.611
Amount desorbed: 5.0% of the adsorbed
Desorption K_d: 101.383
Desorption K_{oc}: Not reported
Freundlich K_{des}: 51.460
Freundlich desorption K_{oc}: 1264.367
Mobility classification: low

Soil type: North Carolina Sandy loam
Amount adsorbed: 98.7-100.0% of the applied
Adsorption K_d: 91.010
Adsorption K_{oc}: 7459.842
Freundlich K_{ads}: 69.242
Freundlich adsorption K_{oc}: 5675.611
Amount desorbed: 3.1% of the adsorbed
Desorption K_d: 170.199

Desorption K_{oc}: Not reported
Freundlich K_{des}: 97.949
Freundlich desorption K_{oc}: 8028.618
Mobility classification: low

Terrestrial Field Dissipation (USEPA 164-; PMRA Data Code 8.3.2.1)

USA sites

Jackson, S. and Saha, M.. 2002. *2000 Field Dissipation of BAS 670 H in Terrestrial Use Pattern.* Performed by Ag Search Co. and BASF Research Triangle Park, NC. BASF study # 63880. BASF Reg. Doc. # 2002/5003700. Completed on 11/26/2002.
45902426

Soil dissipation/accumulation of BAS 670H under US field conditions was conducted in a bareground plot in Indiana (SC formulation), two bareground plots in South Dakota (one trial with each of the SC and DF formulations), and in a bareground and a cropped plot in California (SC formulation). The Indiana test site was located in Ecoregion 8.1, the South Dakota test site was located in Ecoregion 9.2, and the California test site was located in Ecoregion 11.1. The experiment was carried out in accordance with USEPA Subdivision N Guideline §164-1 and in compliance with the USEPA GLP standards. For each test plot, BAS 670H was broadcast twice (14-day interval) at a target application rate of 0.025 kg a.i./ha (0.022 lb a.i./A) for the first application and 0.075 kg a.i./ha (0.067 lb a.i./A) for the second application in 6 x 24 m (IN test plot), 3 x 34 m (SD test plots) or 6 x 31 m (CA test plots) sampling plots. Based on the proposed Canadian label, the maximum application rate is 25 g a.i./ha per year. Rainfall was

supplemented with irrigation at each of the three test sites and the total water input was >100% of the historical average rainfall or evapotranspiration during the study period at each of the test sites. A control plot was located 15-158 m away from the treated plots at each of the three test sites.

The application rate was verified at all three test locations and for both applications by placing 10 Speedisks™ in each of the three replicate plots just prior to each application. Mean recoveries of BAS 670H from the Speedisks™ ranged from 78-101% of the target rate for all applications. Field spikes were prepared at all three test locations and at six different times during the study period by fortifying untreated soil with BAS 670H at a concentration of 2 ppm. Mean corrected recoveries from the field spikes were 111% for the Indiana test site, 90% for the South Dakota test site and 110.5% for the California test site (reviewer-calculated means). Field spikes were stored frozen for up to 665 days prior to extraction.

For each study trial, soil samples were taken at 0, 3, 5, 9 and 13 days after the first application and at approximately 0, 1, 2, 3 5, 7, 10, 14, 21, 30, 60, 90, 120, 180 (excluding the two SD study

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trials), 270, 360, and 450 days following the second application to a depth of 0-120 cm. Soil samples were extracted three times by shaking with methanol:phosphate buffer (1:1, v:v), cleaned-up using a solid phase extraction (coupled SAX/C_{18}) cartridge, and analyzed for **BAS 670H** and the transformation product **M670H05** (3-(4,5-dihydro-isoxazol-3-yl)-4-methanesulfonyl-2-methylbenzoic acid) by LC/MS/MS following up to a maximum of 30 months of storage. The LOQ was 0.001 mg/kg for each analyte.

In the Indiana bareground test plot, the mean day-0 concentration of BAS 670H in the 0-2.5 cm soil depth following the first application was 0.059 mg a.i./kg, which is 84.3% of the target application rate (reviewer-calculated based on a theoretical application rate of 0.070 mg a.i./kg in the 0-2.5 cm soil depth). Following the second application, BAS 670H was detected in the 0-2.5 cm soil depth at a maximum concentration of 0.159 mg a.i./kg at day 0, decreased to 0.015 mg a.i./kg by 14 days, and was 0.003 mg a.i./kg (1 of 3 replicates) at 450 days posttreatment (the last sampling interval). BAS 670H was detected in the 2.5-5 cm soil depth at a maximum concentration of 0.063 mg a.i./kg at 2 days following the second application, decreased to 0.013 mg a.i./kg by 14 days, and was last detected at 0.002 mg a.i./kg (1 of 3 replicates) at 358 days. BAS 670H was detected in the 5-15 cm soil depth at a maximum concentration of 0.011 mg a.i./kg (1-2 days following the second application), was detected in the 15-30 and 30-45 cm soil depths at ≤0.005 mg a.i./kg (individual replicates), and was not detected in the 45-60 cm soil depth above 0.001 mg a.i./kg. No major transformation products were detected at the test site. The transformation product **M670H05** was not detected above 0.01 mg/kg at any sampling interval during the study period. The registrant-calculated DT50 value of M670H05 was 10.9 days and the DT75 value was 36.1 days.

Under field conditions at the Indiana test site, BAS 670H had a reviewer-calculated half-life value of 67 days ($r^2 = 0.44$), calculated using linear regression and based on residues in the 0-2.5 cm soil depth. However, the reviewer notes that the dissipation of BAS 670H was biphasic, with an initial rapid decline phase occurring through approximately 14 days, followed by a slower decline phase to the end of the study period. The registrant-calculated DT50 value was 4.2 days and the DT75 value was 12.5 days. The total carryover of residues of BAS 670H and M670H05 was 0.35% and 0% of the total applied BAS 670H, respectively (based on two applications at the target application rate) at the end of the 450-day study period following the second application.

In the South Dakota bareground test plot conducted with the SC formulation, the mean day-0 concentration of BAS 670H in the 0-2.5 cm soil depth following the first application was 0.049 mg a.i./kg, which is 70.0% of the target application rate (reviewer-calculated based on a theoretical application rate of 0.070 mg a.i./kg in the 0-2.5 cm soil depth). Following the second application, BAS 670H was detected in the 0-2.5 cm soil depth at a maximum concentration of 0.172 mg a.i./kg at day 0, ranged from 0.072-0.106 mg a.i./kg from 5 to 14 days, decreased to 0.055 mg a.i./kg by 30 days, and was 0.020 mg a.i./kg at 452 days posttreatment (the last sampling interval). BAS 670H was detected in the 2.5-5 cm soil depth at a maximum concentration of 0.104 mg a.i./kg at 1 day following the second application, and ranged from 0.004-0.022 mg a.i./kg from 2 to 452 days. BAS 670H was not detected in the 5-15 cm soil depth above 0.003 mg a.i./kg (individual replicates), and was not detected below that depth. One major transformation product was detected at the test site, **M670H05. M670H05** was initially detected in the 0-2.5 cm soil depth at 0.001 mg/kg at 5 days after the first application, increased to a maximum concentration of 0.025 mg/kg by 2 days after the second application (which is 8.8% of the total applied BAS 670H, based on two applications at the target application rate), decreased to 0.012-0.013 mg/kg by 30-60 days, and was 0.001 mg/kg (single replicate) at 452 days posttreatment (the last sampling interval). M670H05 was detected in the 2.5-5 cm and 5-15 cm soil depths at maximum concentrations of 0.012 mg/kg and 0.002 mg/kg, respectively, both at 21 days after the second application. M670H05 was not detected below the 5-15 cm soil depth. The registrant-calculated DT50 value of M670H05 was 57.1 days and the DT75 value was 155 days.

Under field conditions at the South Dakota test site conducted with the SC formulation, BAS 670H had a reviewer-calculated half-life value of 182 days ($r^2 = 0.73$, excluding outliers at 1 and 5 days), calculated using linear regression and based on residues in the 0-2.5 cm soil depth. However, the reviewer notes that the dissipation of BAS 670H was biphasic, with an initial rapid decline phase occurring through approximately 30 days, followed by a slower decline phase to the end of the study period. The registrant-calculated DT50 value was 3.1 days and the DT75 value was 40.0 days. The total carryover of residues of BAS 670H and M670H05 was 11.3% and 0% of the total applied BAS 670H, respectively (based on two applications at the target application rate) at the end of the 452-day study period following the second application.

In the South Dakota bareground test plot conducted with the DF formulation, the mean day-0 concentration of BAS 670H in the 0-2.5 cm soil depth following the first application was 0.054 mg a.i./kg, which is 77.1% of the target application rate (reviewer-calculated based on a theoretical application rate of 0.070 mg a.i./kg in the 0-2.5 cm soil depth). Following the second application, BAS 670H was detected in the 0-2.5 cm soil depth at a maximum concentration of 0.162 mg a.i./kg at day 0, decreased to 0.080 mg a.i./kg by 14 days, and was 0.013 mg a.i./kg at 452 days posttreatment (the last sampling interval). BAS 670H was detected in the 2.5-5 cm soil depth at 0.002-0.011 mg a.i./kg from 0 to 452 days following the second application. BAS 670H was not detected in the 5-15 and 15-30 cm soil depths above 0.003 mg a.i./kg (individual replicates), and was not detected below the 15-30 cm depth. One major transformation product was detected at the test site, **M670H05. M670H05** was initially detected in the 0-2.5 cm soil depth at 0.001 mg/kg after the first application, increased to a maximum concentration of 0.033 mg/kg by 2 days after the second application (which is 11.7% of the total applied BAS 670H, based on two applications at the target application rate), ranged from 0.012-0.032 mg/kg from 3 to 60 days, and was 0.002 mg/kg at 362 days posttreatment. M670H05 was detected in the 2.5-5 cm and 5-15 cm soil depths at maximum concentrations of 0.016 mg/kg (3 days following the second application) and 0.002 mg/kg (21 days), respectively. M670H05 was not detected below the 5-15 cm soil depth. The registrant-calculated DT50 value of M670H05 was 31.6 days and the DT75 value was 77.6 days.

Under field conditions at the South Dakota test site conducted with the DF formulation, BAS 670H had a reviewer-calculated half-life value of 158 days ($r^2 = 0.84$), calculated using linear regression and based on residues in the 0-2.5 cm soil depth. However, the reviewer notes that the dissipation of BAS 670H was biphasic, with an initial rapid decline phase occurring through approximately 5 days, followed by a slower decline phase to the end of the study period. The registrant-calculated DT50 value was 16.7 days and the DT75 value was 210 days. The total carryover of residues of BAS 670H and M670H05 was 8.8% and 0% of the total applied BAS 670H, respectively (based on two applications at the target application rate) at the end of the 452-day study period following the second application.

In the California bareground test plot, the mean day-0 concentration of BAS 670H in the 0-2.5 cm soil depth following the first application was 0.027 mg a.i./kg, which is 39.7% of the target rate (reviewer-calculated based on a theoretical application rate of 0.068 mg a.i./kg in the 0-2.5 cm soil depth). Following the second application, BAS 670H was detected in the 0-2.5 cm soil depth at a maximum concentration of 0.121 mg a.i./kg at day 0, decreased to 0.043-0.045 mg a.i./kg by 7-14 days, and was 0.005 mg a.i./kg at 450 days posttreatment (the last sampling interval). BAS 670H was detected in the 2.5-5 cm soil depth at a maximum concentration of 0.048 mg a.i./kg at 7 days following the second application, and decreased to 0.002 mg a.i./kg by 450 days. BAS 670H was detected in the 5-15 cm soil depth at a maximum concentration of 0.012 mg a.i./kg at 14-21 days following the second application, was detected in the 15-30 cm soil depth at a maximum concentration of 0.007 mg a.i./kg (individual replicate) at 21 days, and was not detected below the 15-30 cm depth. One major transformation product was detected at the test site, **M670H05. M670H05** was initially detected in the 0-2.5 cm soil depth at 0.001 mg/kg at 3 days after the first application, increased to a maximum concentration of 0.020 mg/kg by 3 days after the second application (which is 7.3% of the total applied BAS 670H, based on two applications at the target rate), ranged from 0.004-0.016 mg/kg from 5 to 182 days, and was 0.003 mg/kg (single replicate) at 450 days posttreatment (the last sampling interval). M670H05 was detected in the 2.5-5 cm, 5-15 cm, and 15-30 cm soil depths at maximum concentrations of 0.013 mg/kg (7 days following the second application), 0.004 mg/kg (14 days), and 0.002 mg/kg (21 days, single replicate), respectively. M670H05 was not detected below the 15-30 cm soil depth. The registrant-calculated DT50 value of M670H05 was 50.8 days and the DT75 value was 291 days.

Under field conditions at the California bareground test site, BAS 670H had a reviewer-calculated half-life value of 98 days ($r^2 = 0.53$), calculated using linear regression and based on residues in the 0-2.5 cm soil depth. However, the reviewer notes that the dissipation of BAS 670H was biphasic, with an initial rapid decline phase occurring through approximately 7 days, followed by a slower decline phase to the end of the study period. The registrant-calculated DT50 value was 18.5 days and the DT75 value was 57.8 days. The total carryover of residues of BAS 670H and M670H05 was 2.6% and 2.2% of the total applied BAS 670H, respectively (based on two applications at the target application rate) at the end of the 450-day study period following the second application.

In the California cropped test plot, the mean day-0 concentration of BAS 670H in the 0-2.5 cm soil depth following the first application was 0.017 mg a.i./kg, which is 25.0% of the target application rate (reviewer-calculated based on a theoretical application rate of 0.068 mg a.i./kg in the 0-2.5 cm soil depth), and decreased to <0.001 mg a.i./kg by 13 days (1 day prior to the second application). Following the second application, BAS 670H was detected in the 0-2.5 cm soil depth at a maximum concentration of 0.044 mg a.i./kg at 2 days, ranged from 0.008-0.026 mg a.i./kg from 5 to 14 days, and was last detected at 0.003 mg a.i./kg (1 of 3 replicates) at 120 days posttreatment. BAS 670H was detected in the 2.5-5 cm soil depth at a maximum concentration of 0.010 mg a.i./kg at 3 and 7 days following the second application, and was last detected at 0.001 mg a.i./kg at 182 days. BAS 670H was detected in the 5-15 cm soil depth at a maximum concentration of 0.008 mg a.i./kg at 7-14 days following the second application, and was last detected at 0.001 mg a.i./kg at 268 days. BAS 670H was detected in the 15-30 cm depth at ≤0.006 mg a.i./kg, in the 30-45 cm depth at ≤0.003 mg a.i./kg, in the 45-60 cm depth at ≤0.002 mg a.i./kg, and in the 60-75 cm depth at ≤0.001 mg a.i./kg, based on individual replicates. No major transformation products were detected at the test site. The transformation product **M670H05** was not detected above 0.01 mg/kg at any sampling interval during the study period. The registrant-calculated DT50 value of M670H05 was <1 days and the DT75 value was 21.1 days.

Under field conditions at the California cropped test site, BAS 670H had a reviewer-calculated half-life value of 29 days ($r^2 = 0.43$), calculated using linear regression and based on residues in the 0-2.5 cm soil depth. The registrant-calculated DT50 value was 22.0 days and the DT75 value was 59 days. The total carryover of residues of BAS 670H and M670H05 was 0% and 0% of the total applied BAS 670H, respectively (based on two applications at the target application rate) at the end of the 450-day study period following the second application.

The major route of dissipation of BAS 670H under terrestrial field conditions in the study trials conducted in Indiana, South Dakota, and California could not be determined because the only transformation product analyzed for, M670H05, was not detected above 9% of the total applied amount in four of the five study trials, and was only 12% in the fifth study trial (based on two applications at the target application rate), leaching was not observed, and volatilization and run off were not studied. However, a laboratory aerobic soil metabolism study conducted with BAS 670H indicated that no major transformation products were formed and that bound residues comprised 60-65% of the applied radioactivity by the end of the study period. Total carryover accounted for up to 11.3% of the total applied BAS 670H in the five study trials.

RESULTS SYNOPSIS

Indiana Bareground Plot (SC Formulation)
Location/soil type: LaGrange County, Indiana/Sandy loam (0-45 cm) over loamy sand (45-60 cm) over sand (60-90 cm).
Half-life: 67 days (reviewer-calculated).
DT50: 4.2 days (registrant-calculated).

DT75: 12.5 days (registrant-calculated).
Major transformation products detected: None.
Dissipation routes: Transformation.

South Dakota Bareground Plot (SC Formulation)
Location/soil type: Marshall County, South Dakota/Clay loam (0-45 and 60-90 cm).
Half-life: 182 days (reviewer-calculated excluding outliers at 1 and 5 days).
DT50: 3.1 days (registrant-calculated).
DT75: 40.0 days (registrant-calculated).
Major transformation products detected: M670H05.
Dissipation routes: Transformation.

South Dakota Bareground Plot (DF Formulation)
Location/soil type: Marshall County, South Dakota/Clay loam (0-45 and 60-90 cm).
Half-life: 158 days (reviewer-calculated).
DT50: 16.7 days (registrant-calculated).
DT75: 210 days (registrant-calculated).
Major transformation products detected: M670H05.
Dissipation routes: Transformation.

California Bareground Plot (SC Formulation)
Location/soil type: Tulare County, California/Sandy loam (0-75 and 90-120 cm).
Half-life: 98 days (reviewer-calculated).
DT50: 18.5 days (registrant-calculated).
DT75: 57.8 days (registrant-calculated).
Major transformation products detected: M670H05.
Dissipation routes: Transformation.

California Cropped Plot (SC Formulation)
Location/soil type: Tulare County, California/Sandy loam (0-75 and 90-120 cm).
Half-life: 29 days (reviewer-calculated).
DT50: 22.0 days (registrant-calculated).
DT75: 59 days (registrant-calculated).
Major transformation products detected: None.
Dissipation routes: Transformation.

Canadian Site

Jackson, S. and Saha, M.. 2002. *2000 Field Dissipation of BAS 670 H in Terrestrial Use Patterns for Canada*. Performed by Agricultural Research and BASF, Research Triangle Park, NC. BASF study # 59933. BASF Reg. Doc. # 2002/5003699. Completed on 12/13/2002
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Soil dissipation/accumulation of BAS 670H under Canadian field conditions was conducted in a bareground plot in Ontario (Ecoregion 8.3). The experiment was carried out in accordance with the Health Canada Guideline T-1-255 and in compliance with the USEPA GLP standards. BAS 670H was broadcast twice (18-day interval) at a target application rate of 0.025 kg a.i./ha (0.022 lb a.i./A) for the first application and 0.075 kg a.i./ha (0.067 lb a.i./A) for the second application in three replicate test plots measuring 6 x 24 m. Based on the proposed Canadian label, the maximum application rate is 25 g a.i./ha per year. Rainfall was supplemented with irrigation to reach 102% of the historical average rainfall during the study period. A control plot was located approximately 41 m away from the treated plots.

The application rate was verified for both applications by placing 10 Speedisks™ in each of the three replicate plots just prior to each application. Mean recoveries of BAS 670H from the Speedisks™ were 85% and 99% of the target rate for the first and second applications, respectively. Field spikes were prepared at six different times during the study period by fortifying untreated soil with BAS 670H at a concentration of 2.5 ppm. Corrected recoveries from the field spikes ranged from 84-102%, with a reviewer-calculated mean of 93.5%.

Soil samples were taken at -1, 0, 3, 5, 10, and 13 days after the first application and at 0, 1, 2, 3, 5, 7, 10, 16, 23, 34, 62, 94, 120, 279, 364, and 398 days after the second application to a depth of 120 cm. Soil samples were extracted three times by shaking with methanol:phosphate buffer (1:1, v:v), cleaned-up using a solid phase extraction (coupled SAX/C_{18}) cartridge, and analyzed for **BAS 670H** and the transformation product **M670H05** (3-(4,5-dihydro-isoxazol-3-yl)-4-methanesulfonyl-2-methylbenzoic acid) by LC/MS/MS following up to a maximum of 29 months of storage. The LOQ was 0.001 mg/kg for each analyte.

The mean day-0 concentration of BAS 670H in the 0-2.5 cm soil depth following the first application was 0.034 mg a.i./kg, which is 50% of the target application rate (reviewer-calculated based on a theoretical application rate of 0.068 mg a.i./kg in the 0-2.5 cm soil depth). Following the second application, BAS 670H was detected in the 0-2.5 cm soil depth at a maximum concentration of 0.123 mg a.i./kg at 1 day posttreatment, decreased to 0.050 mg a.i./kg by 23 days, and was 0.011 mg a.i./kg at 398 days posttreatment. BAS 670H was detected in the 2.5-5 cm soil depth throughout the study period, and reached a maximum of 0.019 mg a.i./kg at 398 days after the second application (the last sampling interval). BAS 670H was not detected in the 5-15 cm soil depth above 0.002 mg a.i./kg, and was not detected in the 15-30 cm soil depth above 0.001 mg a.i./kg. One major transformation product was detected at the test site, **M670H05** (3-(4,5-dihydro-isoxazol-3-yl)-4-methanesulfonyl-2-methylbenzoic acid). **M670H05** was initially detected in the 0-2.5 cm soil depth at 0.002 mg/kg at 3 days after the first application, increased to a maximum concentration of 0.011 mg/kg by 34 days after the second application (which is 4% of the total applied BAS 670H, based on two applications at the target rate), and decreased to 0.002 mg/kg by 398 days after the second application (the last sampling interval). M670H05 was detected in the 2.5-5 cm soil depth at a maximum of 0.004 mg/kg at 62 and 120 days posttreatment, and was detected at 0.002 mg/kg at the end of the study period. M670H05 was not detected in the 5-15 cm soil depth above 0.001-0.002 mg/kg (single replicates), and was not detected below the 5-15 cm soil depth.

Under field conditions at the test site, BAS 670H had a reviewer-calculated half-life value of 158 days ($r^2 = 0.65$), calculated using linear regression and based on residues in the 0-2.5 cm soil depth. However, the reviewer notes that the dissipation of BAS 670H was biphasic with an initial rapid decline phase occurring through approximately 20 days, followed by a slower decline phase to the end of the study period. The registrant-calculated DT50 value was 29.3 days and the DT75 value was >398 days. The total carryover of residues of BAS 670H and M670H05 was 11.2% and 1.4% of the total applied BAS 670H, respectively (based on two applications at the target application rate) at the end of the 398-day study period following the second application.

The major route of dissipation of BAS 670H could not be determined at the field site because the only transformation product analyzed for, M670H05, was not detected above 4% of the total applied amount (based on two applications at the target rate). Leaching was not observed, volatilization and run off were not studied, and total carryover accounted for only approximately 13% of the total applied BAS 670H. However, a laboratory aerobic soil metabolism study indicated that BAS 670H is degraded into CO_2 and bound residues without the formation of any major transformation products.

RESULTS SYNOPSIS

Location/soil type: Cambridge, Ontario, Canada/Loam (0-75 cm) over silt loam-silty clay loam (75-120 cm).
Half-life: 158 days (reviewer-calculated).
DT50: 29.3 days (registrant-calculated).
DT75: >398 days (registrant-calculated).
Major transformation products detected: M670H05.
Dissipation routes: Transformation.

Bioaccumulation in Fish (USEPA 165-4; PMRA Data Code:9.5.6)

165-4 Bioaccumulation in Fish
Nietschmann, D.A. 2002 *Uptake, Depuration, Bioconcentration and Metabolism of Carbon-14 Labeled BAS 670 H in Bluegill Sunfish (Leponis macrochiris) Under Flow-Through Conditions*. Performed by BASF, Research Triangle Park, NC. Study Identification #: 56754. Completed 8/12/2002. BASF Reg. Doc. 2002/5002984
45902322; 2003-0839

The study was classified as **unacceptable**. The study was conducted at rates less than 1% of the LC50, and the uptake phase should have been longer than 28 days since steady state was not reached (BCF was still increasing), and residues in the water and fish tissues were not characterized. Since the LogKow is not ≥3, a bioaccumulation study is only conditionally required, and thus, the applicant does not need to redo the study.

BAS 670H did not accumulate in the test species. The n-octanol/water partition coefficient of this chemical is << than 1,000, thus the potential for bioaccumulate is low.

Laboratory Accumulation - Fish

The bioaccumulation of [pyrazole-4-^{14}C][3-(4,5-dihydro-isoxazol-3yl)-4-methanesulfonyl-2-methyl-phenyl]-(5-hydroxy-1methyl-1H-pyrazol-4-yl)methanone (BAS 670H) was studied in bluegill (*Lepomis macrochirus*) at nominal concentrations of 0.030 and 0.300 mg/L under flow-through aquarium conditions. This experiment was conducted in accordance with USEPA Subdivision N Guideline §165-4 and in compliance with 40 CFR Part 160 GLP standards. The test system consisted of four 90-L glass aquaria fitted with overflows to maintain a volume of 70 L at a loading rate of 130 fish per vessel. One low-dose (Group B) and two high-dose (Groups C and D) aquaria were treated. A fourth aquarium (Group A) was untreated and served as a solvent control. High-dose Group D received effluent from the high-dose Group C aquarium per diluter cycle. The exposure period lasted 28 days, and the subsequent depuration period lasted 14 days. During 28 days of exposure, the pH of the water was 7.38-8.30, the dissolved oxygen was 5.36-8.34 mg/L (about 60% saturation), and the temperature was 22.2-23.5°C. During the 14 days of depuration, the pH of the water was 7.75-8.10, the dissolved oxygen was 7.5-8.69 mg/L, and the temperature was 19.8-23.3°C. Five fish were collected on days 0, 1, 2, 3, 7, and 21 of exposure, and 30 fish were collected on days 14 and 28 from the control, low dose, and Group C high-dose groups. Sixty-five fish were collected on day 14 of exposure and 64 fish were collected on day 28 of exposure from the overflow high-dose group. Water samples were collected from the control and all treated aquaria on days 0, 1, 2, 3, 7, 14, 21, and 28 during exposure. Five fish were collected from each aquarium on days 1, 2, 3, 7, and 14 of depuration. Water samples were collected from the control, low-dose, and Group C high-dose aquaria on days 1, 2, 3, 7, and 14 of depuration. No water samples were collected from the Group D high-dose aquarium during the depuration period. Aliquots of the aquaria water and portions of homogenized edible and nonedible fish tissue were analyzed for total radioactivity using LSC. Fish tissues were not analyzed for [^{14}C]BAS 670H due to low levels of radioactivity. To determine the stability of the test substance in solution, aliquots of the low-dose and high-dose (Group C) diluter stock solutions were collected 4 days prior to study initiation, and on days 7 and 28 of exposure and were analyzed for [^{14}C]BAS 670H by HPLC. Water samples from the control and treated aquaria collected at each sampling interval were not analyzed for [^{14}C]BAS 670H due to low levels of radioactivity. [^{14}C]BAS 670H was stable in diluter stock solutions for the low-dose and the Group C high-dose treatment groups sampled on days 7 and 28 of exposure; the radiochemical purities were ≥96%.

In fish exposed at **0.030 mg/L**, the maximum concentrations of total [^{14}C]residues were 0.0088 mg/kg in the whole fish tissue at 21-28 days, 0.020 mg/kg in the nonedible tissue at 21-28 days, and were below the level of quantification in the edible tissue at all sampling intervals. The maximum registrant-calculated TRR bioconcentration factors (BCF) were 0.30, 0.69, and <0.048 for the whole fish, non-edible tissues, and edible tissues, respectively. These corresponded to Maximum TRR of 8.8, 20 and <MQL (1.1-1.4 µg/kg). Steady state concentrations were observed at 21 days for the whole fish and nonedible tissues.

[^{14}C]Residues in the fish tissues and water were not characterized due to low levels of radioactivity.

After 14 days of depuration, total [^{14}C]residues in whole fish tissues had decreased by 30% (0.0062 mg/kg) of the 28-day exposure values. [^{14}C]Residues in the fish tissues and water were not characterized due to low levels of radioactivity.

Two fish from the treatment group died during the exposure period. The fish were reported to be in good health during the study.

In fish exposed at **0.300 mg/L**, the maximum concentrations of total [^{14}C]residues were 0.064 mg/kg in the whole fish tissue at 28 days, 0.140 mg/kg in the nonedible tissue at 28 days, and 0.0094 mg/kg in the edible tissue at 14 days. The maximum registrant-calculated TRR bioconcentration factors (BCF) were 0.24, 0.52, and 0.034 for the whole fish, non-edible tissues, and edible tissues, respectively. These corresponded to maximum TTR levels of 64, 140 and 9.4 µg/kg. Steady state concentrations in the whole fish and nonedible tissues may have occurred at 28 days; however, it was uncertain whether [^{14}C]residues would continue to increase beyond the last sampling interval (28 days) since the maximum concentration occurred on day 28. Steady state concentrations in the edible tissues occurred at 14 days. [^{14}C]Residues in the fish tissues and water were not characterized due to low levels of radioactivity.

After 14 days of depuration, total [^{14}C]residues in whole fish tissues had decreased by 38% (0.040 mg/kg) of the 28-day exposure values. [^{14}C]Residues in the fish tissues and water during depuration were not characterized due to low levels of radioactivity.

In fish tissues from the Group D high-dose overflow aquarium, maximum total [^{14}C]residues were 0.058 mg/kg in the whole fish tissue, 0.120 mg/kg in the nonedible tissue, and 0.0085 mg/kg in the edible tissue, each at 28 days. The maximum registrant-calculated TRR bioconcentration factors (BCF) were 0.21, 0.44, and 0.031 for the whole fish, non-edible and edible tissues, respectively.

Three fish from the Group C treatment aquarium and one fish from the Group D overflow aquarium died during the exposure period. The fish were reported to be in good health during the study.

Total lipid content in composite whole fish issues were an average (3-4 samples) of 4.0%, 5.5%, and 4.3% in the control, low-dose, and high-dose (Group C) groups on day 14 of exposure, and 4.7%, 5.0% and 4.2%, respectively, on day 28 of exposure.

APPENDIX B.2 CHARACTERISTICS OF SOILS AND WATER-SEDIMENT SYSTEMS USED IN THE ENVIRONMENTAL FATE STUDIES

Table B.2-1 Soils (Aerobic Metabolism Studies); Cation Exchange Capacity, % Organic Matter and pH appear in bold because they are important properties controlling sorption of chemicals on soils

Property	Idaho	Indiana	Iowa	Minnesota	South Dakota	North Carolina
Soil texture:	Loam.	Silt loam.	Loam.	Clay loam.	Silt loam.	Sandy loam.
%sand (2000-50 µm):	40	30	36	33	22	63
%silt (50-2 µm):	42	56	40	38	52	26
%clay (<2 µm):	18	14	24	29	26	11
pH (in saturated paste):	**6.6**	**6.8**	**6.6**	**6.0**	**5.9**	**6.3**
Organic carbon (%):	Not reported.					Not reported.
Organic matter (%):	**6.3**	**1.4**	**6.4**	**7.0**	**4.9**	**2.6**
CEC (meq/100 g):	**20.3**	**10.4**	**27.8**	**25.6**	**23.6**	**7.6**
Moisture at 1/3 bar (%):	32.1	24.5	33.1	33.2	29.1	17.1
Bulk density (disturbed, g/cm³):	0.94	1.21	1.14	1.04	1.08	Not reported.
Soil identification:	Haw soil series.	Crosby/Brookston soil association.	Webster soil series.	Doran soil series.	Wentworth-Chancellor soil series.	Not reported.

Property	Idaho	Indiana	Iowa	Minnesota	South Dakota	North Carolina
Soil Taxonomic classification:	Fine-loamy, mixed, superactive, mesic Calciargidic Argixerolls.	Fine, mixed, active, mesic Aeric Epiaqualfs/ Fine-loamy, mixed, superactive, mesic Typic Argiaquolls.	Fine-loamy, mixed, superactive, mesic Typic Endoaquolls.	Fine, smectitic, frgid Aquertic Argiudolls.	Fine-silty, mixed, superactive, mesic Udic Haplustolls/Fine , smectitic, mesic Vertic Argiaquolls.	Not reported.

Table B.2- 2 <u>Soils - Batch Equilibrium Adsorption/Desorption Studies</u>

Property	Idaho	Indiana	Iowa	Minnesota	South Dakota	North Carolina
Soil Texture	Loam	Silt loam	Loam	Clay loam	Silt loam	Sandy loam
% sand	40	30	36	33	22	57
% silt	42	56	40	38	52	32
% clay	18	14	24	29	26	11
pH	6.7	6.9	6.8	6.1	5.9	5.7
Organic carbon (%)	3.66	0.81	3.72	4.07	2.85	1.22
Organic matter (%)	6.3	1.4	6.4	7.0	4.9	2.1
CEC (meq/100 g)	20.3	10.4	27.8	25.6	23.6	6.6
Moisture at 1/3 atm (%)	32.1	24.5	33.1	33.2	29.1	15.4
Bulk density (gm/cc)	0.94	1.21	1.14	1.04	1.08	Not reported
Biomass (mg microbial C/100 g or CFU or other)	Not reported	Not reported	Not reported	Not reported	Not reported	Not reported
Soil taxonomic classification	Not reported	Not reported	Not reported	Not reported	Not reported	Not reported

Anaerobic Aquatic Study

Redox potentials and dissolved oxygen were -317.6 to -294.7 mV and 0.01-0.03 mg/L, respectively . Duration of Study was 362 days. South Dakota reservoir water-silt loam sediment See Tables for detailed description of water and sediment.

Geographic location:	White Lake reservoir, Marshall County, White Township/Section 36, South Dakota.

Water Description

Property	**Details**
Temperature (°C):	Not reported.
pH:	8.2.
Oxygen concentration (mg/L):	Not reported.
Dissolved organic carbon (%):	Not reported.
Total organic carbon (mg/L):	15.6
Hardness (mg equivalent $CaCO_3$/L):	1,232
Electrical conductivity (mmhos/cm):	2.34
Sodium Absorption Ratio (SAR):	1.02
Total dissolved solids (mg/L):	1,944
Total suspended solids (mg/L):	4
Turbidity (NTU):	1.14

Sediment

Property	**Details**
Textural classification:	Silt loam.
%sand (2000-50 μm):	26
%silt (50-2 μm):	56
%clay (<2 μm):	18
pH (1:1 soil:water, v:v):	7.8
Organic carbon (%):	Not reported.
Organic matter (%):	8.3
CEC (meq/100 g):	25.

Property	Details
Moisture at 1/3 bar (%):	59.0
Bulk density (disturbed, g/cm^3):	0.86
Particle density (gm/cm^3):	2.21

Aerobic Aquatic Study

Water

Property	Grand River		Homestead Pond	
Temperature (°C)[1]:	14.5		8.2	
pH[1]:	6.78		7.32	
Redox potential (mV):	Initial[1]:	Final[2]:	Initial[1]:	Final[2]
	+58.4	+298, +299	+46.5	+365, +382
Oxygen concentration (mg/L):	Initial[3]:	Final:	Initial:	Final:
	7.83, 8.74	7.29, 8.03	7.34, 8.22	7.81, 7.93
Dissolved organic carbon (%):	Not reported.			
Hardness (mg equivalent $CaCO_3$/L):	41		2,604	
Electrical conductivity (mmhos/cm):	0.15		10.65	
Total dissolved solids (mg/L):	442		6,044	

Sediments

Property		Grand River	Homestead Pond
Textural classification:		Loamy sand.	Loam.
%sand (2000-50 μm):		86	40
%silt (50-2 μm):		12	46
%clay (<2 μm):		2	14
pH:	soil:water (1:1):	7.7	4.9
	1N KCl:	7.5	4.2
Organic carbon (%):		Not reported.	
Organic matter (%):		0.9	5.3

Property	Grand River	Homestead Pond
CEC (meq/100 g):	12.8	5.9
Moisture at 1/3 bar (%):	9.5	36.1
Bulk density (disturbed, g/cm^3):	1.31	0.69

APPENDIX B.3

- **Estimation of Physical and Chemical Properties of Transformation Products of Topramezone**

Early in the review process of topramezone , the physical/chemical properties and environmental fate estimates for the metabolites of topramezone were performed with the EPI (Estimation Programs Interface) Suite™, Version 3.10 available at that time[1]

The EPI (Estimation Programs Interface) Suite™ is a Windows® based suite of physical/chemical property and environmental fate estimation models developed by the EPA''s Office of Pollution Prevention Toxics and Syracuse Research Corporation (SRC). EPI Suite™ uses a single input to run the following estimation models: KOWWIN™, AOPWIN™, HENRYWIN™, MPBPWIN™, BIOWIN™, PCKOCWIN™, WSKOWWIN™, BCFWIN™, HYDROWIN™, and STPWIN™, WVOLWIN™, and LEV3EPI™. EPI Suite™ was previously called EPIWIN.

(EPIWIN) transfers a single SMILES notation to ten separate structure estimation programs that require SMILES notations (refer to Table B.3-1 for the SMILES notations for the metabolites of topramezone and to Table B.3-2 for the estimates).

The ten stand-alone programs, that are part of the EPI Suite of Programs, are:

KOWWIN™: Estimates the log octanol-water partition coefficient, log Kow, of chemicals using an atom/fragment contribution method.

- **AOPWIN™**: Estimates the gas-phase reaction rate for the reaction between the most prevalent atmospheric oxidant, hydroxyl radicals, and a chemical. Gas-phase ozone radical reaction rates are also estimated for olefins and acetylenes. In addition, AOPWIN™ informs the user if nitrate radical reaction will be important. Atmospheric half-lives for each chemical are automatically calculated using assumed average hydroxyl radical and ozone concentrations.

KOWWIN™: Estimates the log octanol-water partition coefficient, log Kow, of chemicals using an atom/fragment contribution method

[1] In August of 2004 a new version was released (Version 3.12) For information, see http://www.epa.gov/opptintr/exposure/docs/episuite.htm

HENRYWIN™: Calculates the Henry''s Law constant (air/water partition coefficient) using both the group contribution and the bond contribution methods.

MPBPWIN™: Melting point, boiling point, and vapor pressure of organic chemicals are estimated using a combination of techniques.

BIOWIN™: Estimates aerobic biodegradability of organic chemicals using 6 different models; two of these are the original Biodegradation Probability Program (BPP™).

PCKOCWIN™: The ability of a chemical to sorb to soil and sediment, its soil adsorption coefficient (Koc), is estimated by this program. EPI's Koc estimations are based on the Sabljic molecular connectivity method with improved correction factors.

WSKOWWIN™: Estimates an octanol-water partition coefficient using the algorithms in the

KOWWIN™ program and estimates a chemical''s water solubility from this value. This method uses correction factors to modify the water solubility estimate based on regression against log Kow.

HYDROWIN™: Acid- and base-catalyzed hydrolysis constants for specific organic classes are estimated by HYDROWIN™. A chemical''s hydrolytic half-life under typical environmental conditions is also determined. Neutral hydrolysis rates are currently not estimated.

BCFWIN™: This program calculates the BioConcentration Factor and its logarithm from the log Kow. The methodology is analogous to that for WSKOWWIN. Both are based on log Kow and correction factors.

WVOLWIN™: Estimates the rate of volatilization of a chemical from rivers and lakes; calculates the half-life for these two processes from their rates. The model makes certain default assumptions-water body depth; wind velocity; etc.

STPWIN™: Using several outputs from EPIWIN, this program predicts the removal of a chemical in a Sewage Treatment Plant; values are given for the total removal and three contributing processes (biodegradation, sorption to sludge, and stripping to air) for a standard system and set of operating conditions.

LEV3EPI™: This level III fugacity model predicts partitioning of chemicals between air, soil, sediment, and water under steady state conditions for a default model "environment"; various defaults can be changed by the user.

Metabolites of Topramezone

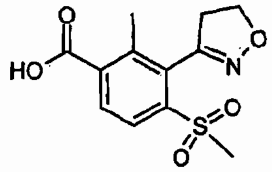
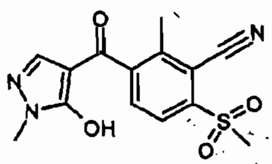
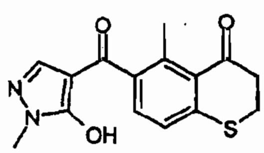
Chemical Species	Chemical Name(s)	Smiles String
CAS Reg. No: 223646-24-0  **M670H05** **(BAS 670 H acid)** Aerobic Soil Very mobile	CAS Name 3-(4,5-Dihydro-isoxazol-3-yl)-4-methanesulfonyl-2-methyl-benzoic acid (USEPA/OPP chemical database): NA Pyrazole elimination by cleavage of the 4-pyrazole−methanone bridge. Note the carboxylic acid grouo	Cc1c(c(ccc1C(=O)O)S(=O)(=O)C)C1=NOCC1 (Consystant, ISIS 2.3) CC1=C(C(O)=O)C=CC(S(=O)(C)=O)=C1C2=NOCC2 (MRID 45902423)
CAS Reg. No: Not reported;**M670H01** **(BAS 670 H cyano)**  Aerobic Soil Aerobic Water-sediment system (pond water)	CAS Name [3-Cyano-4-methane-sulfonyl-2-methyl-phenyl](5-hydroxy-1-methyl-1H-pyrazol-4-yl)methanone. (USEPA/OPP chemical database): NA Isoxazol ring opening	CC1=C(C(C2C=NN(C)C2O)=O)C=CC(S(=O)(C)=O)=C1C#N (MRID 45902423)
CAS Reg No: Not reported  Anaerobic water-sediment	CAS Name: 6-[(5-Hydroxy-1-methyl-1H-pyrazol-4-yl)carbonyl]-5-methyl-2,3-dihydro-4H-1-benzothiopyran-4-one. Reduction of sulfonyl, S (VI) to sulfide (S-II); Cyclization to form heterocyclic ring "thiopyran" (USEPA/OPP chemical database): NA	Cc1c2c(ccc1C(=O)c1c(n(nc1)C)O)SCCC2=O.

Table B.3-2 EPIWIN (Version 3.1) Estimates for Topramezone Metabolites

Physical and Chemical Property	M670H05 (BAS 670 H acid) (benzoic) CAS Reg. No: 223646-24-0	M670H01 (BAS 670 H cyano)	M670H10
Solubility in Water, 25° C, mgL^{-1}	2,427	1.79×10^{5}	53.3
Log Kow	0.94	-1.82	2.75
Log BCF	0.50	0.50	3.75
Vapor Pressure, mmHg, 25°C	8.8×10^{-9}	3.1×10^{-12}	5.1×10^{-10}
Henry's Law Constant, $atm-m^3mole^{-1}$	EPI Estimate 1.4×10^{-12}	EPI Estimate 7.4×10^{-18}	EPI Estimate 3.74×10^{-18}
Molecular Weight Melting Point Boiling Point	283.30 189.67 450.91	321.35 209.76 493.93	302.5 196.26 465.02
Koc	369.6	20.1	303
Acid/Base Catalyzed Hydrolysis	Rate constants cannot be estimated for this chemical	Rate constants cannot be estimated for this chemical	Rate constants cannot be estimated for this chemical
Level III Fugacity Model, Half-life, in hrs (days) Air Water Soil Sediment	 79.3 (3.3) 900 (37.5) 900 (37.5) 3.6×10^{3} (150)	 1.54 (0.06) 900 (37.5) 900 (37.5) 3.6×10^{3} (150)	 3.81 (0.16) 900 (37.5) 900 (3.7.5) 3.6×10^{3} (150)

Appendix C Aquatic Exposure Modeling

The aquatic exposure assessment for topramezone was based solely on model-simulated environmental concentrations in surface water. As a new chemical, there are no monitoring data for topramezone.

As a low application rate herbicide (25 g/ha), it was decided to use a Tier II model for estimating concentrations in surface water for the ecological risk assessment. The concentrations in surface water were generated with standard cropping scenarios (Leovey, 2002) using PRZM3 (Vers. 3.12 beta compiled(05/24/01, Carsel, 1997) and EXAMS (Vers. 2.98.04 compiled 07/18/04, Burns, 2002). PRZM and EXAMS were linked by the program (PE4-PL, vers. 01).

PRZM simulates pesticide fate and transport as a result of leaching, direct spray drift, runoff and erosion from an agricultural field and EXAMS estimates environmental fate and transport of pesticides in to a surface water body for a 30-year period (1961 to 1990). The EECs for surface water uses a single or multiple sites which typically represent a high-end exposure scenario from pesticide use on a particular crop or noncrop use site. For description, documentation and direct links to run these models can be found in:
http://www.epa.gov/oppefed1/models/water/index.htm

The standard scenario for ecological exposure simulates the fate of a pesticide transported as a result of runoff and erosion, and or spray drift from an 10-ha agricultural field directly into a surface water body (PRZM). The small field is assumed to be 100% cropped. The surface water body in which the EECs are simulated (EXAMS) is the standard pond (10,000-m^2 pond, 2-m deep).

Application information

The proposed label (December 2004) was used for information on application rates and methods. Thus, estimates where made for aerial and ground applications and at the proposed applications rates (one application at 0.022 lb ai/acre and for 2 applications at 0.011 lb ai/acre and a 7 day re-application interval).

Scenarios

As a new chemical, specific use areas were not known. However, considering that corn is a widespread crop in the USA, ten representative corn crop scenarios were selected. Of particular interest was the selection of the Florida sweet corn scenario, as sweet corn in Florida is predominantly grown around the Everglades, primarily in Palm Beach County and in a potential vulnerable area. In addition, sweet corn sweet corn must be harvested within a very short time for optimal maturity and moisture.(average 70 to 85 days after planting, that is in less than 3 months). Thus, planting dates are staggered over periods of weeks to extend the harvesting period. Grain corn and popcorn have longer times between planting and harvest.

The ten scenarios (Table C-1) were used as representative corn-growing sites where topramezone may be used. The scenarios are described in the above URL and are based on the document , Leovey, Elizabeth. 2002. PRZM Standard Crop/Location Scenarios, Procedure to Develop and Approve New Scenarios, and PRZM Turf Modeling Scenarios to Date. February 27, 2002. USEPA. OPP. Environmental Fate and Effects Division, Arlington, VA.

Table C-2 Standard Corn Scenarios Used to Run PRZM and EXAMS

Corn Scenario	Location	Met File
California Corn	Stanislaus/San Joaquin Counties in the Central Valley	w23232.dvf
Florida Sweet Corn	Palm Beach County	w12844.dvf
Illinois Corn	McLean County	w14923.dvf
Mississippi Corn	Southern Mississippi Valley Uplands	w13893.dvf
North Carolina Corn East	Pitt County	w13722.dvf
North Carolina Corn West	Henderson County.	w03812.dvf
North Dakota Corn	Pembina County in the Red River Valley	w14914.dvf
Ohio Corn	Darke and/or Pickaway Counties	w93815.dvf
Pennsylvania Corn	Lancaster County	14737.dvf
Texas Corn	Claypan area, Milam County	w13958.dvf

Input Parameters

Environmental fate data and physical and chemical properties (Table 2) were selected from the submitted studies and in accordance with *Guidance for Selecting Input Parameters in Modeling the Environmental Fate and Transport of Pesticides*, Version II, February 28, 2002. Detailed description, documentation, and direct links for running these models can also be found in:
http://www.epa.gov/oppefed1/models/water/index.htm

Table C-3 Input Parameters Selected to Run the PRZM and EXAMS Models

Parameter	Value/Selection criteria	Source
Maximum Application Rate per Season, lb ai/acre (g/ha)	0.022 lb topramezone/acre (25 g topramezone/ha) Can also be applied in 2 sequential 0.011 lb ai/acre per applications, 7 days apart, but not to exceed 0.022 lbs ai/acre per season	Proposed label of end-use product BAS 670 336SC

Parameter	Value/Selection criteria	Source
Application Method and Depth of Incorporation (cm)	Ground Aerial No incorporation (model default 4-cm)	Proposed label of end-use product BAS 670 336SC
Soil Partition Coefficient (K_{ads}; mL/g)	mean K_{ads} = 2.8 (n = 6; 1.40, 2.30, 1.97, 4.87, 2.59, 3.69)	45902425
Aerobic Soil Metabolism Half-life (days) [Linear T½]	241.28days (90th percent upper bound of mean) (n=5; 181.3, 182.0, 301.5, 124.5, 195.9)	45902419; 45902421
Spray Drift Fraction (ground spray / aerial)	ECO: 0.01/ 0.05	Model
Application Efficiency (ground spray / aerial)	0.99 / 0.95	Model
Molecular Weight, Daltons	363.39	Physical and Chemical Property
Vapor Pressure	$7.5 * 10^{-13}$ torrs	Physical and Chemical Property
Henry's Law Constant[1]	$2.39 * 10^{-17}$ atm-m^{3}mol^{-1} @ 20°C	Estimated not used
Solubility in Water at 20°C Topramezone is a weak acid (pKa 4.6) The solubility of topramezone is pH dependent	15,000 mgL^{-1}	Physical and Chemical Property
Aerobic Aquatic Metabolism Half-life (days)	0[2] - stable The default value was used because uncertainty in the results for aerobic water-sediment systems 482.56 days[3]	45902422 Data uncertain 2 times aerobic soil metabolism per EFED Guidance.
Anaerobic Aquatic Metabolism Half-life (days)	30.52 days 90th percent upper bound of mean total system (13.4 and 18.6 days)	45902423
Hydrolysis Half-life @ pH 7 (days)	Stable	45902416
Aquatic, Direct Photolysis Half-life @ pH 7	Stable	45902417

[1] Henry's Law Constant is calculated by EXAMS if Vapor Pressure is entered. Henry's Law Constant is only given to aid in an appreciation of the limited potential for losses through volatilization.

[2] Based upon the aerobic aquatic degradation from the Grand River. Aerobic aquatic metabolism was available for two water bodies (Grand River and Homestead Pond - both in Ohio). The half-life was > 120 days in a 120 day study (both rings and all systems: water, sediment, total) in Grand River Water and less than for 25 days (19.0 and 24.2 days for the two different labeled rings) for the total systems (sediment half-life was 49.2 to 77.7 days) in the Homestead Pond. The reason(s) for apparent differences in aerobic aquatic metabolism between water sources could not be determined. But the chemistry of the Homestead Pond water (high salinity - 10.65 mmhos/cm, high dissolved solids - 6,044 mg/L) and sediment acidity (pH < 5) does not appear to be representative of naturally occurring water body. This issue is discussed in the Risk Characterization chapter. More information concerning the water/sediment source is needed before this information would be considered in the assessment

[3] Aerobic soil metabolism times two.

Estimated Environmental Concentrations (EECs) for the ten corn scenarios

Tables through Tables provide Tier II surface water EECs. The topramezone concentrations represent, the 1-in-10-year annual exceedence probability for peak, 96-hr, 21-day, 60-day, and 90-day for each scenarios

Aerial Applications

Table C-4 EECs for Aerial Applications(Single)

1 - **Aerial application** at 0.022 lb ai/acre per season. Concentrations are in µgL^{-1}(ppb)					
Scenario	*Peak*	*96-hr*	*21-day*	*60-day*	*90-day*
Florida (Sweet)	**1.79**	**1.79**	**1.77**	**1.72**	**1.62**
California	0.54	0.54	0.53	0.52	0.51
Illinois	1.16	1.16	1.15	1.15	1.14
Mississippi	1.49	1.49	1.48	1.45	1.44
N.Carolina E.	0.78	0.77	0.77	0.76	0.75
N. Carolina W.	1.13	1.13	1.12	1.11	1.10
North Dakota	1.02	1.01	1.01	1.00	0.99
Ohio	0.88	0.88	0.88	0.87	0.86
Pennsylvania	0.81	0.81	0.80	0.79	0.79
Texas	1.34	1.34	1.33	1.31	1.30

Table C-5 EECs for Aerial Applications (Split)

2 - **Aerial applications** at 0.011 lb ai/acre per application, 7 days apart. Concentrations are in µgL^{-1}(ppb)					
Scenario	*Peak*	*96-hr*	*21-day*	*60-day*	*90-day*
Florida (Sweet)	**1.94**	**1.93**	**1.92**	**1.90**	**1.72**
Florida (Sweet)[1]	*1.22*	*1.22*	*1.20*	*1.16*	*0.99*
California	0.55	0.55	0.54	0.53	0.52
Illinois	1.32	1.31	1.31	1.30	1.29
Mississippi	1.46	1.46	1.45	1.43	1.41

Scenario	Peak	96-hr	21-day	60-day	90-day
N. Carolina E	0.82	0.82	0.81	0.80	0.79
N. Carolina W.	1.11	1.11	1.10	1.09	1.08
North Dakota	0.98	0.97	0.97	0.96	0.96
Ohio	0.99	0.98	0.98	0.97	0.96
Pennsylvania	0.80	0.79	0.79	0.78	0.77
Texas	1.37	1.37	1.36	1.35	1.33

[1] Aerobic aquatic metabolism assumed to be equal to 482.56 days (2 x the aerobic soil metabolism half-life).

Ground Applications

Table C-6 EECs for Ground Applications (Single)

1-Ground Application at 0.022 lb ai/acre per. Concentrations are in µgL⁻¹(ppb)					
Scenario	*Peak*	*96-hr*	*21-day*	*60-day*	*90-day*
Florida (Sweet)	1.69	1.68	1.67	1.61	1.52
California	0.38	0.38	0.38	0.37	0.37
Illinois	0.99	0.98	0.98	0.97	0.96
Mississippi	1.34	1.34	1.33	1.31	1.28
N.Carolina E.	0.58	0.58	0.58	0.57	0.57
N. Carolina W.	0.95	0.95	0.94	0.93	0.92
North Dakota	0.79	0.79	0.78	0.77	0.77
Ohio	0.70	0.70	0.70	0.69	0.68
Pennsylvania	0.83	0.83	0.82	0.81	0.81
Texas	1.2	1.2	1.19	1.18	1.17

Table C-7 EECs for Ground Applications (Split)

2- Ground applications at 0.011 lb ai/acre per application, 7 days apart. Concentrations are in µgL⁻¹(ppb)					
Scenario	*Peak*	*96-hr*	*21-day*	*60-day*	*90-day*
Florida (Sweet)	1.85	1.85	1.83	1.80	1.62
California	0.56	0.56	0.56	0.55	0.53

Illinois	1.15	1.15	1.48	1.14	1.13
Mississippi	1.31	1.31	1.30	1.28	1.26
N.Carolina E.	0.64	0.63	0.63	0.62	0.61
N. Carolina W.	1.15	1.15	1.14	1.13	1.12
North Dakota	0.75	0.75	0.74	0.73	0.73
Ohio	0.79	0.79	0.78	0.78	0.77
Pennsylvania	0.59	0.59	0.59	0.58	0.58
Texas	1.24	1.23	1.23	1.21	1.20

The results for aerial and ground applications suggest that it is runoff and not spray drift during application what may be controlling the degree of exposure in an aquatic system. The peak EECs for the Florida corn scenario was 1.73 µg/L (6.5% less) when the spray drift contribution from two applications was not added to the pond (peak EEC from a single application 1.58 µg/L with no drift contribution). Drift contributed to as much as 50 percent of the topramezone to the EECs in the California corn scenario, because runoff is quite low since irrigation (corn is apparently not normally irrigated) is not added. However, it should be recognized that the estimates are as good as the quality of environmental fate data used as input parameters. Considering that there are uncertainties about the kinetics and transformation products in water-sediment systems, these estimates carry these uncertainties. The decrease from peak concentration to 90-days is very slow even when using the 482.56 day half-life for aerobic aquatic degradation.

<u>Uncertainties</u>

Several uncertainties (beyond the normal ones, e.g., first order kinetics, validity of Koc model) should be noted for the estimated EECs for topramezone. The first is that the range of soil pH used in the aerobic soil metabolism studies and sorption studies was quite narrow (5.7 to 6.9) to adequately correlate pH with mobility. The persistence, mobility, and toxicity for other chemicals (e.g., some sulfonylurea herbicides) have been found sulfonylurea herbicides) to correlated with pH. A second uncertainty concerns the persistence in the aerobic aquatic environment and which factors control the persistence of topramezone in aerobic water-sediment systems. The third uncertainty is the assessment only considers the parent compound[2]. Additional data or information would be needed to improve on these limitations.

[2] The maximum exposure concentration of metabolites formed in the water column have been estimated as 1.0 μgL^{-1}(ppb) for "M670H10" (anaerobic conditions) and 1.1 μgL^{-1}(ppb) for "M670H01" (aerobic conditions). These estimates were made by multiplying the molecular ratio of each metabolite by the maximum of all of the peak concentrations of parent topramezone (1.2 μgL^{-1}), assuming that all of the topramezone converts completely to "M670H10" or to "M670H01". However, these estimates must be look at with caution given the uncertainties identified in the biotransformation of topramezone in water-sediment systems. There are no ecotoxicity data for these metabolites.

Analytical Chemistry Method to Quantify Residues of Topramezone in Water

A High-Performance Liquid Chromatography (HPLC), with UV detection, analytical chemistry method to quantify residues of topramezone in water was submitted (45902431), together with validation (45902432) study. These methods were evaluated by PMRA. Accuracy, concentration range linearity, specificity, and precision were adequate for the concentration range used for this study of 0.05 to 1.5 mgL^{-1} of topramezone, but Limit of Quantification (LOQ) was established at 0.06 mgL^{-1} (60 μgL^{-1}; 60 ppb). The estimated exposure concentrations in surface water for the five modeled scenarios did not exceed 2 μgL^{-1} (2 ppb). Therefore, this method is not adequate to quantify concentrations in water at or below toxic effects. Moreover, it is unlikely that concentrations in surface water resulting from runoff and/or spray drift from the proposed applications of corn could exceed 60 μgL^{-1}). Therefore this analytical chemistry method cannot be used for monitoring or enforcement.

To identify the studies cited in this Appendix, see Appendix K (Environmental Fate Bibliography).

Appendix D Model Outputs

If last letter in file name is "g" the application is by ground spray any other letter is aerial (including a).

DRINKING WATER

stored as FLSCRN0a.out
Chemical: Topramezone
PRZM environment: FLsweetcornC.txt modified Satday, 12 October 2002 at 16:43:14
EXAMS environment: ir298.exv modified Thuday, 29 August 2002 at 14:34:12
Metfile: w12844.dvf modified Wedday, 3 July 2002 at 09:04:30
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	0.164	0.1602	0.1453	0.125	0.1179	0.04174
1962	0.5563	0.5383	0.4703	0.3594	0.2985	0.1017
1963	1.666	1.615	1.429	1.08	0.8896	0.2881
1964	1.199	1.167	1.065	0.8791	0.7337	0.2442
1965	0.3197	0.3094	0.2871	0.2247	0.1866	0.07852
1966	0.2145	0.2081	0.2008	0.163	0.1479	0.05654
1967	0.2951	0.2859	0.2685	0.2157	0.1805	0.07147
1968	0.2978	0.2904	0.2729	0.2285	0.1963	0.0712
1969	0.9367	0.9065	0.8189	0.6331	0.523	0.1725
1970	0.6268	0.6097	0.5673	0.447	0.3702	0.1306
1971	0.9024	0.8805	0.7753	0.597	0.4938	0.173
1972	1.424	1.378	1.228	1.026	0.8612	0.2811
1973	0.4216	0.4081	0.375	0.3418	0.2939	0.1078
1974	0.1463	0.1416	0.129	0.1209	0.1106	0.04069
1975	0.2131	0.2063	0.1842	0.1504	0.1394	0.05152
1976	0.3743	0.3645	0.3456	0.2811	0.238	0.08302
1977	1.653	1.6	1.487	1.212	1.009	0.3292
1978	0.2989	0.2893	0.2544	0.2255	0.2008	0.07564

1979	2.735	2.647	2.323	1.763	1.452	0.464
1980	0.5301	0.513	0.475	0.3748	0.3462	0.1287
1981	0.3622	0.3506	0.3168	0.2574	0.223	0.08408
1982	1.736	1.704	1.518	1.153	0.9515	0.3062
1983	0.3017	0.2921	0.2711	0.2079	0.1731	0.0713
1984	0.9003	0.8747	0.7703	0.6005	0.5017	0.1711
1985	0.4049	0.3946	0.3608	0.3098	0.2668	0.09799
1986	0.1788	0.1731	0.1664	0.1373	0.1305	0.05211
1987	0.7466	0.7225	0.6416	0.5031	0.423	0.1438
1988	1.266	1.234	1.088	0.8737	0.7302	0.2406
1989	0.4519	0.4383	0.385	0.2953	0.2493	0.08601
1990	0.381	0.3689	0.3249	0.2528	0.2289	0.08457

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	2.735	2.647	2.323	1.763	1.452	0.464
0.0645161290322581	1.736	1.704	1.518	1.212	1.009	0.3292
0.0967741935483871	1.666	1.615	1.487	1.153	0.9515	0.3062
0.129032258064516	1.653	1.6	1.429	1.08	0.8896	0.2881
0.161290322580645	1.424	1.378	1.228	1.026	0.8612	0.2811
0.193548387096774	1.266	1.234	1.088	0.8791	0.7337	0.2442
0.225806451612903	1.199	1.167	1.065	0.8737	0.7302	0.2406
0.258064516129032	0.9367	0.9065	0.8189	0.6331	0.523	0.173
0.290322580645161	0.9024	0.8805	0.7753	0.6005	0.5017	0.1725
0.32258064516129	0.9003	0.8747	0.7703	0.597	0.4938	0.1711
0.354838709677419	0.7466	0.7225	0.6416	0.5031	0.423	0.1438
0.387096774193548	0.6268	0.6097	0.5673	0.447	0.3702	0.1306
0.419354838709677	0.5563	0.5383	0.475	0.3748	0.3462	0.1287
0.451612903225806	0.5301	0.513	0.4703	0.3594	0.2985	0.1078
0.483870967741936	0.4519	0.4383	0.385	0.3418	0.2939	0.1017
0.516129032258065	0.4216	0.4081	0.375	0.3098	0.2668	0.09799
0.548387096774194	0.4049	0.3946	0.3608	0.2953	0.2493	0.08601
0.580645161290323	0.381	0.3689	0.3456	0.2811	0.238	0.08457
0.612903225806452	0.3743	0.3645	0.3249	0.2574	0.2289	0.08408
0.645161290322581	0.3622	0.3506	0.3168	0.2528	0.223	0.08302
0.67741935483871	0.3197	0.3094	0.2871	0.2285	0.2008	0.07852
0.709677419354839	0.3017	0.2921	0.2729	0.2255	0.1963	0.07564
0.741935483870968	0.2989	0.2904	0.2711	0.2247	0.1866	0.07147
0.774193548387097	0.2978	0.2893	0.2685	0.2157	0.1805	0.0713
0.806451612903226	0.2951	0.2859	0.2544	0.2079	0.1731	0.0712
0.838709677419355	0.2145	0.2081	0.2008	0.163	0.1479	0.05654
0.870967741935484	0.2131	0.2063	0.1842	0.1504	0.1394	0.05211
0.903225806451613	0.1788	0.1731	0.1664	0.1373	0.1305	0.05152

0.935483870967742   0.164   0.1602 0.1453 0.125   0.1179 0.04174
0.967741935483871   0.1463 0.1416 0.129   0.1209 0.1106 0.04069

0.1   1.6647 1.6135 1.4812 1.1457 0.94531   0.30439
Average of yearly averages: 0.1443

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

Data used for this run:
Output File: FLSCRN0a
Metfile: w12844.dvf
PRZM scenario: FLsweetcornC.txt
EXAMS environment file: ir298.exv
Chemical Name: Topramezone

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	363.69	g/mol	
Henry's Law Const.	henry		atm-m^3/mol	
Vapor Pressure	vapr	7.5e-13	torr	
Solubility	sol	15000	mg/L	
Kd	Kd	2.8	mg/L	
Koc	Koc		mg/L	
Photolysis half-life	kdp	0	days	Half-life
Aerobic Aquatic Metabolism	kbacw	0	days	Halfife
Anaerobic Aquatic Metabolism	kbacs	30.52	days	Halfife
Aerobic Soil Metabolism	asm	241.28	days	Halfife
Hydrolysis:	pH 7	0	days	Half-life
Method:	CAM	1	integer	See PRZM manual
Incorporation Depth:	DEPI	4	cm	
Application Rate:	TAPP	0.0246	kg/ha	
Application Efficiency:	APPEFF	0.95	fraction	
Spray Drift	DRFT	0.16	fraction of application rate applied to pond	
Application Date	Date	16-04	dd/mm or dd/mmm or dd-mm or dd-mmm	
Record 17:	FILTRA			
	IPSCND			
	UPTKF			
Record 18:	PLVKRT			
	PLDKRT			
	FEXTRC	0.5		
Flag for Index Res. Run	IR	IR		
Flag for runoff calc.	RUNOFF	total	none, monthly or total(average of entire run)	

stored as FLSCRN0g.out

Chemical: Topramezone
PRZM environment: FLsweetcornC.txt modified Satday, 12 October 2002 at 16:43:14
EXAMS environment: ir298.exv modified Thuday, 29 August 2002 at 14:34:12
Metfile: w12844.dvf modified Wedday, 3 July 2002 at 09:04:30
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	0.1246	0.1214	0.1109	0.08714	0.07558	0.02825
1962	0.5121	0.4956	0.4329	0.3308	0.275	0.09054
1963	1.667	1.615	1.43	1.081	0.8904	0.2847
1964	1.174	1.143	1.047	0.8685	0.7254	0.2391
1965	0.2974	0.2878	0.2673	0.2093	0.1738	0.06633
1966	0.1807	0.1755	0.1693	0.1377	0.1151	0.04343
1967	0.2745	0.266	0.2485	0.1987	0.1662	0.05899
1968	0.2624	0.2562	0.2389	0.1981	0.1669	0.05875
1969	0.9075	0.8781	0.7943	0.6152	0.5084	0.1643
1970	0.6084	0.5919	0.5493	0.4342	0.3597	0.1206
1971	0.884	0.8621	0.7594	0.5855	0.4845	0.1648
1972	1.411	1.365	1.217	1.013	0.8514	0.2775
1973	0.3915	0.3789	0.3502	0.3158	0.2731	0.09685
1974	0.1006	0.09741	0.08584	0.07613	0.06693	0.02692
1975	0.1772	0.1715	0.1532	0.1195	0.1034	0.03821
1976	0.3327	0.3222	0.3066	0.2475	0.2102	0.07107
1977	1.662	1.608	1.493	1.22	1.016	0.3276
1978	0.2439	0.236	0.2079	0.1856	0.1649	0.06335
1979	2.77	2.68	2.353	1.786	1.471	0.468
1980	0.5045	0.4882	0.4509	0.3495	0.3148	0.1187
1981	0.3303	0.3196	0.2902	0.2345	0.198	0.07214
1982	1.73	1.697	1.514	1.15	0.9485	0.3037
1983	0.2702	0.2619	0.245	0.188	0.1554	0.05882
1984	0.8925	0.8673	0.7634	0.5937	0.4964	0.1628
1985	0.374	0.3632	0.3313	0.2797	0.2426	0.08663
1986	0.15	0.1452	0.1406	0.1109	0.0975	0.03883
1987	0.7187	0.6956	0.6168	0.4826	0.4066	0.1344
1988	1.246	1.214	1.072	0.8637	0.7225	0.2353
1989	0.38	0.3688	0.3243	0.2489	0.2114	0.07416
1990	0.3499	0.3388	0.2987	0.2291	0.1962	0.07266

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	2.77	2.68	2.353	1.786	1.471	0.468
0.0645161290322581	1.73	1.697	1.514	1.22	1.016	0.3276
0.0967741935483871	1.667	1.615	1.493	1.15	0.9485	0.3037

0.129032258064516	1.662	1.608	1.43	1.081	0.8904	0.2847
0.161290322580645	1.411	1.365	1.217	1.013	0.8514	0.2775
0.193548387096774	1.246	1.214	1.072	0.8685	0.7254	0.2391
0.225806451612903	1.174	1.143	1.047	0.8637	0.7225	0.2353
0.258064516129032	0.9075	0.8781	0.7943	0.6152	0.5084	0.1648
0.290322580645161	0.8925	0.8673	0.7634	0.5937	0.4964	0.1643
0.32258064516129	0.884	0.8621	0.7594	0.5855	0.4845	0.1628
0.354838709677419	0.7187	0.6956	0.6168	0.4826	0.4066	0.1344
0.387096774193548	0.6084	0.5919	0.5493	0.4342	0.3597	0.1206
0.419354838709677	0.5121	0.4956	0.4509	0.3495	0.3148	0.1187
0.451612903225806	0.5045	0.4882	0.4329	0.3308	0.275	0.09685
0.483870967741936	0.3915	0.3789	0.3502	0.3158	0.2731	0.09054
0.516129032258065	0.38	0.3688	0.3313	0.2797	0.2426	0.08663
0.548387096774194	0.374	0.3632	0.3243	0.2489	0.2114	0.07416
0.580645161290323	0.3499	0.3388	0.3066	0.2475	0.2102	0.07266
0.612903225806452	0.3327	0.3222	0.2987	0.2345	0.198	0.07214
0.645161290322581	0.3303	0.3196	0.2902	0.2291	0.1962	0.07107
0.67741935483871	0.2974	0.2878	0.2673	0.2093	0.1738	0.06633
0.709677419354839	0.2745	0.266	0.2485	0.1987	0.1669	0.06335
0.741935483870968	0.2702	0.2619	0.245	0.1981	0.1662	0.05899
0.774193548387097	0.2624	0.2562	0.2389	0.188	0.1649	0.05882
0.806451612903226	0.2439	0.236	0.2079	0.1856	0.1554	0.05875
0.838709677419355	0.1807	0.1755	0.1693	0.1377	0.1151	0.04343
0.870967741935484	0.1772	0.1715	0.1532	0.1195	0.1034	0.03883
0.903225806451613	0.15	0.1452	0.1406	0.1109	0.0975	0.03821
0.935483870967742	0.1246	0.1214	0.1109	0.08714	0.07558	0.02825
0.967741935483871	0.1006	0.09741	0.08584	0.07613	0.06693	0.02692

0.1	1.6665	1.6143	1.4867	1.1431	0.94269	0.3018

Average of yearly averages: 0.134914333333333

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

Data used for this run:
Output File: FLSCRN0g
Metfile: w12844.dvf
PRZM scenario: FLsweetcornC.txt
EXAMS environment file: ir298.exv
Chemical Name: Topramezone

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	363.69	g/mol	
Henry's Law Const.	henry		atm-m^3/mol	

Vapor Pressure vapr 7.5e-13 torr
Solubility sol 15000 mg/L
Kd Kd 2.8 mg/L
Koc Koc . mg/L
Photolysis half-life kdp 0 days Half-life
Aerobic Aquatic Metabolism kbacw 0 days Halfife
Anaerobic Aquatic Metabolism kbacs 30.52 days Halfife
Aerobic Soil Metabolism asm 241.28 days Halfife
Hydrolysis: pH 7 0 days Half-life
Method: CAM 1 integer See PRZM manual
Incorporation Depth: DEPI 4 cm
Application Rate: TAPP 0.0246 kg/ha
Application Efficiency: APPEFF 0.99 fraction
Spray Drift DRFT 0.064 fraction of application rate applied to pond
Application Date Date 16-04 dd/mm or dd/mmm or dd-mm or dd-mmm
Record 17: FILTRA
IPSCND
UPTKF
Record 18: PLVKRT
PLDKRT
FEXTRC 0.5
Flag for Index Res. Run IR IR
Flag for runoff calc. RUNOFF total none, monthly or total(average of entire run)

stored as ILCorn0.out
Chemical: Topramezone
PRZM environment: ILCornC.txt modified Satday, 12 October 2002 at 17:01:38
EXAMS environment: ir298.exv modified Thuday, 29 August 2002 at 14:34:12
Metfile: w14923.dvf modified Wedday, 3 July 2002 at 09:04:40
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	0.2481	0.2445	0.2303	0.2206	0.2034	0.1029
1962	0.7549	0.7442	0.7097	0.6547	0.6011	0.2805
1963	0.343	0.3381	0.3188	0.2884	0.2892	0.1791
1964	0.3557	0.3506	0.338	0.3019	0.2953	0.1626
1965	0.2869	0.2828	0.2756	0.2576	0.243	0.1309
1966	1.034	1.019	0.984	0.8886	0.815	0.3688
1967	0.964	0.9534	0.9079	0.7998	0.7267	0.3636
1968	0.2436	0.2402	0.2291	0.2208	0.2087	0.1471
1969	0.2198	0.2167	0.2048	0.193	0.1841	0.09728

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1970	1.001	0.9898	0.9638	0.8597	0.7824	0.3501
1971	0.3749	0.3695	0.3486	0.3274	0.3178	0.2011
1972	0.6727	0.663	0.6401	0.5891	0.5454	0.2634
1973	0.4294	0.4233	0.4064	0.3693	0.3402	0.1899
1974	1.044	1.031	0.9829	0.8753	0.8054	0.3752
1975	0.2703	0.2665	0.2578	0.2522	0.241	0.1598
1976	0.4243	0.4183	0.3972	0.369	0.3427	0.1677
1977	0.448	0.4416	0.4253	0.3819	0.3725	0.2013
1978	0.4854	0.4784	0.4502	0.3959	0.3606	0.1872
1979	0.2502	0.2467	0.2333	0.2149	0.2089	0.121
1980	0.6373	0.6286	0.6031	0.5498	0.5078	0.2374
1981	0.2294	0.2261	0.2175	0.2027	0.1988	0.1291
1982	0.4536	0.447	0.4263	0.3913	0.3594	0.1761
1983	0.5162	0.5108	0.4893	0.4297	0.3901	0.2022
1984	0.6034	0.5948	0.5697	0.5255	0.4827	0.2457
1985	0.5359	0.5284	0.4977	0.4387	0.4025	0.2098
1986	0.7146	0.7042	0.6851	0.6148	0.5616	0.269
1987	0.8303	0.8188	0.7723	0.6841	0.6281	0.3164
1988	0.3483	0.3433	0.3234	0.2889	0.2701	0.1675
1989	0.2674	0.2635	0.2481	0.2299	0.2158	0.1209
1990	0.425	0.419	0.398	0.369	0.3474	0.1717

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	1.044	1.031	0.984	0.8886	0.815	0.3752
0.0645161290322581	1.034	1.019	0.9829	0.8753	0.8054	0.3688
0.0967741935483871	1.001	0.9898	0.9638	0.8597	0.7824	0.3636
0.129032258064516	0.964	0.9534	0.9079	0.7998	0.7267	0.3501
0.161290322580645	0.8303	0.8188	0.7723	0.6841	0.6281	0.3164
0.193548387096774	0.7549	0.7442	0.7097	0.6547	0.6011	0.2805
0.225806451612903	0.7146	0.7042	0.6851	0.6148	0.5616	0.269
0.258064516129032	0.6727	0.663	0.6401	0.5891	0.5454	0.2634
0.290322580645161	0.6373	0.6286	0.6031	0.5498	0.5078	0.2457
0.32258064516129	0.6034	0.5948	0.5697	0.5255	0.4827	0.2374
0.354838709677419	0.5359	0.5284	0.4977	0.4387	0.4025	0.2098
0.387096774193548	0.5162	0.5108	0.4893	0.4297	0.3901	0.2022
0.419354838709677	0.4854	0.4784	0.4502	0.3959	0.3725	0.2013
0.451612903225806	0.4536	0.447	0.4263	0.3913	0.3606	0.2011
0.483870967741936	0.448	0.4416	0.4253	0.3819	0.3594	0.1899
0.516129032258065	0.4294	0.4233	0.4064	0.3693	0.3474	0.1872
0.548387096774194	0.425	0.419	0.398	0.369	0.3427	0.1791
0.580645161290323	0.4243	0.4183	0.3972	0.369	0.3402	0.1761
0.612903225806452	0.3749	0.3695	0.3486	0.3274	0.3178	0.1717

0.645161290322581	0.3557	0.3506	0.338	0.3019	0.2953	0.1677
0.67741935483871	0.3483	0.3433	0.3234	0.2889	0.2892	0.1675
0.709677419354839	0.343	0.3381	0.3188	0.2884	0.2701	0.1626
0.741935483870968	0.2869	0.2828	0.2756	0.2576	0.243	0.1598
0.774193548387097	0.2703	0.2665	0.2578	0.2522	0.241	0.1471
0.806451612903226	0.2674	0.2635	0.2481	0.2299	0.2158	0.1309
0.838709677419355	0.2502	0.2467	0.2333	0.2208	0.2089	0.1291
0.870967741935484	0.2481	0.2445	0.2303	0.2206	0.2087	0.121
0.903225806451613	0.2436	0.2402	0.2291	0.2149	0.2034	0.1209
0.935483870967742	0.2294	0.2261	0.2175	0.2027	0.1988	0.1029
0.967741935483871	0.2198	0.2167	0.2048	0.193	0.1841	0.09728

0.1 0.9973 0.98616 0.95821 0.85371 0.77683 0.36225

Average of yearly averages: 0.209842666666667

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

Data used for this run:
Output File: ILCorn0
Metfile: w14923.dvf
PRZM scenario: ILCornC.txt
EXAMS environment file: ir298.exv
Chemical Name: Topramezone

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	363.39	g/mol	
Henry's Law Const.	henry		atm-m^3/mol	
Vapor Pressure	vapr	7.5e-13	torr	
Solubility	sol	15000	mg/L	
Kd	Kd	2.8	mg/L	
Koc	Koc		mg/L	
Photolysis half-life	kdp	0	days	Half-life
Aerobic Aquatic Metabolism	kbacw	0	days	Halfife
Anaerobic Aquatic Metabolism	kbacs	30.52	days	Halfife
Aerobic Soil Metabolism	asm	241.28	days	Halfife
Hydrolysis:	pH 7	0	days	Half-life
Method:	CAM	1	integer	See PRZM manual
Incorporation Depth:	DEPI	4	cm	
Application Rate:	TAPP	0.0246	kg/ha	
Application Efficiency:	APPEFF	0.95	fraction	
Spray Drift	DRFT	0.16	fraction of application rate applied to pond	
Application Date	Date	05-05	dd/mm or dd/mmm or dd-mm or dd-mmm	
Record 17:	FILTRA			
	IPSCND			

UPTKF
Record 18: PLVKRT
PLDKRT
FEXTRC 0.5
Flag for Index Res. Run IR IR
Flag for runoff calc. RUNOFF total none, monthly or total(average of entire run)

stored as ILCorn0g.out
Chemical: Topramezone
PRZM environment: ILCornC.txt modified Satday, 12 October 2002 at 17:01:38
EXAMS environment: ir298.exv modified Thuday, 29 August 2002 at 14:34:12
Metfile: w14923.dvf modified Wedday, 3 July 2002 at 09:04:40
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	0.1983	0.1955	0.1891	0.1802	0.1668	0.07838
1962	0.6886	0.6789	0.6487	0.6029	0.5544	0.2572
1963	0.2768	0.2728	0.2581	0.2316	0.2338	0.1509
1964	0.2963	0.2921	0.2828	0.2537	0.2358	0.1338
1965	0.219	0.2159	0.2078	0.1904	0.1807	0.1007
1966	0.9841	0.97	0.939	0.8482	0.7787	0.3485
1967	0.9257	0.9158	0.8729	0.7693	0.6991	0.3431
1968	0.2215	0.2185	0.2065	0.1823	0.1663	0.1176
1969	0.1508	0.1486	0.1407	0.1257	0.1193	0.06561
1970	0.9497	0.9383	0.9167	0.8192	0.7458	0.3291
1971	0.3102	0.3069	0.293	0.2704	0.267	0.1738
1972	0.6048	0.5961	0.5762	0.5341	0.4958	0.2388
1973	0.3621	0.3569	0.3443	0.3154	0.2885	0.1621
1974	0.9972	0.9837	0.9385	0.8355	0.7667	0.3553
1975	0.2067	0.2038	0.1949	0.1861	0.1778	0.1307
1976	0.3427	0.338	0.3217	0.3038	0.2835	0.1391
1977	0.4001	0.3944	0.3812	0.3387	0.3202	0.1741
1978	0.4114	0.4054	0.3816	0.3353	0.3058	0.1594
1979	0.1848	0.1821	0.1715	0.1589	0.1474	0.0903
1980	0.5819	0.574	0.5505	0.4985	0.4617	0.2118
1981	0.1717	0.1692	0.1621	0.1477	0.1388	0.09877
1982	0.3885	0.3829	0.3662	0.3384	0.3115	0.1477
1983	0.4724	0.4673	0.4473	0.3929	0.3567	0.175
1984	0.5512	0.5433	0.5151	0.4774	0.4393	0.2204
1985	0.4648	0.4583	0.4318	0.3806	0.349	0.1829
1986	0.6529	0.644	0.6288	0.5662	0.5177	0.2446
1987	0.7755	0.7648	0.7216	0.64	0.5885	0.2941

1988	0.2751	0.2713	0.2556	0.2251	0.209	0.139
1989	0.2026	0.1997	0.188	0.1729	0.1612	0.09029
1990	0.3562	0.3512	0.3343	0.3087	0.2899	0.1432

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	0.9972	0.9837	0.939	0.8482	0.7787	0.3553
0.0645161290322581	0.9841	0.97	0.9385	0.8355	0.7667	0.3485
0.0967741935483871	0.9497	0.9383	0.9167	0.8192	0.7458	0.3431
0.129032258064516	0.9257	0.9158	0.8729	0.7693	0.6991	0.3291
0.161290322580645	0.7755	0.7648	0.7216	0.64	0.5885	0.2941
0.193548387096774	0.6886	0.6789	0.6487	0.6029	0.5544	0.2572
0.225806451612903	0.6529	0.644	0.6288	0.5662	0.5177	0.2446
0.258064516129032	0.6048	0.5961	0.5762	0.5341	0.4958	0.2388
0.290322580645161	0.5819	0.574	0.5505	0.4985	0.4617	0.2204
0.32258064516129	0.5512	0.5433	0.5151	0.4774	0.4393	0.2118
0.354838709677419	0.4724	0.4673	0.4473	0.3929	0.3567	0.1829
0.387096774193548	0.4648	0.4583	0.4318	0.3806	0.349	0.175
0.419354838709677	0.4114	0.4054	0.3816	0.3387	0.3202	0.1741
0.451612903225806	0.4001	0.3944	0.3812	0.3384	0.3115	0.1738
0.483870967741936	0.3885	0.3829	0.3662	0.3353	0.3058	0.1621
0.516129032258065	0.3621	0.3569	0.3443	0.3154	0.2899	0.1594
0.548387096774194	0.3562	0.3512	0.3343	0.3087	0.2885	0.1509
0.580645161290323	0.3427	0.338	0.3217	0.3038	0.2835	0.1477
0.612903225806452	0.3102	0.3069	0.293	0.2704	0.267	0.1432
0.645161290322581	0.2963	0.2921	0.2828	0.2537	0.2358	0.1391
0.67741935483871	0.2768	0.2728	0.2581	0.2316	0.2338	0.139
0.709677419354839	0.2751	0.2713	0.2556	0.2251	0.209	0.1338
0.741935483870968	0.2215	0.2185	0.2078	0.1904	0.1807	0.1307
0.774193548387097	0.219	0.2159	0.2065	0.1861	0.1778	0.1176
0.806451612903226	0.2067	0.2038	0.1949	0.1823	0.1668	0.1007
0.838709677419355	0.2026	0.1997	0.1891	0.1802	0.1663	0.09877
0.870967741935484	0.1983	0.1955	0.188	0.1729	0.1612	0.0903
0.903225806451613	0.1848	0.1821	0.1715	0.1589	0.1474	0.09029
0.935483870967742	0.1717	0.1692	0.1621	0.1477	0.1388	0.07838
0.967741935483871	0.1508	0.1486	0.1407	0.1257	0.1193	0.06561
0.1	0.9473	0.93605	0.91232	0.81421	0.74113	0.3417

Average of yearly averages: 0.183208333333333

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

Data used for this run:

Output File: ILCorn0g
Metfile: w14923.dvf
PRZM scenario: ILCornC.txt
EXAMS environment file: ir298.exv
Chemical Name: Topramezone

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	363.39	g/mol	
Henry's Law Const.	henry		atm-m^3/mol	
Vapor Pressure	vapr	7.5e-13	torr	
Solubility	sol	15000	mg/L	
Kd	Kd	2.8	mg/L	
Koc	Koc		mg/L	
Photolysis half-life	kdp	0	days	Half-life
Aerobic Aquatic Metabolism	kbacw	0	days	Halfife
Anaerobic Aquatic Metabolism	kbacs	30.52	days	Halfife
Aerobic Soil Metabolism	asm	241.28	days	Halfife
Hydrolysis:	pH 7	0	days	Half-life
Method:	CAM	1	integer	See PRZM manual
Incorporation Depth:	DEPI	4	cm	
Application Rate:	TAPP	0.0246	kg/ha	
Application Efficiency:	APPEFF	0.99	fraction	
Spray Drift	DRFT	0.064	fraction of application rate applied to pond	
Application Date	Date	05-05	dd/mm or dd/mmm or dd-mm or dd-mmm	
Record 17:	FILTRA			
	IPSCND			
	UPTKF			
Record 18:	PLVKRT			
	PLDKRT			
	FEXTRC	0.5		
Flag for Index Res. Run	IR	IR		
Flag for runoff calc.	RUNOFF	total	none, monthly or total(average of entire run)	

stored as MSCorn.out
Chemical: Topramezone
PRZM environment: MScornC.txt modified Satday, 12 October 2002 at 17:06:02
EXAMS environment: ir298.exv modified Thuday, 29 August 2002 at 14:34:12
Metfile: w13893.dvf modified Wedday, 3 July 2002 at 09:06:20
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	0.9339	0.916	0.8454	0.7142	0.6292	0.2664
1962	0.21	0.206	0.196	0.1763	0.1572	0.1211

1963	0.4659	0.4569	0.4215	0.3552	0.3134	0.1709
1964	1.119	1.097	1.017	0.8655	0.7645	0.3247
1965	0.4794	0.4702	0.4405	0.3747	0.3314	0.1856
1966	0.7191	0.7054	0.6543	0.5506	0.4896	0.2432
1967	0.3586	0.3518	0.3247	0.2857	0.2555	0.1415
1968	0.5373	0.5269	0.4909	0.435	0.3885	0.1623
1969	0.3273	0.3212	0.2966	0.2507	0.2218	0.1326
1970	0.6863	0.6731	0.6303	0.5373	0.48	0.2132
1971	0.228	0.2236	0.2064	0.1782	0.1591	0.08697
1972	0.3145	0.3085	0.2847	0.2391	0.2137	0.1264
1973	1.494	1.465	1.365	1.174	1.039	0.4343
1974	0.859	0.8426	0.7774	0.7116	0.6815	0.3212
1975	0.3061	0.3003	0.2783	0.2465	0.2235	0.1341
1976	0.9149	0.8973	0.8275	0.7058	0.6365	0.2402
1977	0.4426	0.4342	0.4009	0.3395	0.3045	0.2333
1978	1.018	1.003	0.9297	0.7816	0.6891	0.306
1979	0.6321	0.6203	0.5823	0.5145	0.4576	0.2074
1980	0.4637	0.4548	0.4206	0.3802	0.3506	0.1465
1981	0.2802	0.2749	0.2538	0.2211	0.1978	0.1504
1982	0.7455	0.7312	0.6829	0.5766	0.5095	0.2466
1983	0.7794	0.7645	0.7053	0.6013	0.5353	0.2453
1984	1.063	1.043	0.9724	0.8342	0.7377	0.317
1985	1.001	0.9816	0.9057	0.7603	0.67	0.306
1986	0.3606	0.3563	0.3307	0.2938	0.2408	0.1344
1987	0.3215	0.3154	0.296	0.2614	0.2342	0.1598
1988	0.3715	0.3645	0.3365	0.2831	0.2507	0.1677
1989	0.2376	0.233	0.223	0.202	0.1822	0.1091
1990	0.4678	0.4589	0.4279	0.3698	0.3317	0.1864

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	1.494	1.465	1.365	1.174	1.039	0.4343
0.0645161290322581	1.119	1.097	1.017	0.8655	0.7645	0.3247
0.0967741935483871	1.063	1.043	0.9724	0.8342	0.7377	0.3212
0.129032258064516	1.018	1.003	0.9297	0.7816	0.6891	0.317
0.161290322580645	1.001	0.9816	0.9057	0.7603	0.6815	0.306
0.193548387096774	0.9339	0.916	0.8454	0.7142	0.67	0.306
0.225806451612903	0.9149	0.8973	0.8275	0.7116	0.6365	0.2664
0.258064516129032	0.859	0.8426	0.7774	0.7058	0.6292	0.2466
0.290322580645161	0.7794	0.7645	0.7053	0.6013	0.5353	0.2453
0.32258064516129	0.7455	0.7312	0.6829	0.5766	0.5095	0.2432
0.354838709677419	0.7191	0.7054	0.6543	0.5506	0.4896	0.2402
0.387096774193548	0.6863	0.6731	0.6303	0.5373	0.48	0.2333

0.419354838709677	0.6321	0.6203	0.5823	0.5145	0.4576	0.2132
0.451612903225806	0.5373	0.5269	0.4909	0.435	0.3885	0.2074
0.483870967741936	0.4794	0.4702	0.4405	0.3802	0.3506	0.1864
0.516129032258065	0.4678	0.4589	0.4279	0.3747	0.3317	0.1856
0.548387096774194	0.4659	0.4569	0.4215	0.3698	0.3314	0.1709
0.580645161290323	0.4637	0.4548	0.4206	0.3552	0.3134	0.1677
0.612903225806452	0.4426	0.4342	0.4009	0.3395	0.3045	0.1623
0.645161290322581	0.3715	0.3645	0.3365	0.2938	0.2555	0.1598
0.67741935483871	0.3606	0.3563	0.3307	0.2857	0.2507	0.1504
0.709677419354839	0.3586	0.3518	0.3247	0.2831	0.2408	0.1465
0.741935483870968	0.3273	0.3212	0.2966	0.2614	0.2342	0.1415
0.774193548387097	0.3215	0.3154	0.296	0.2507	0.2235	0.1344
0.806451612903226	0.3145	0.3085	0.2847	0.2465	0.2218	0.1341
0.838709677419355	0.3061	0.3003	0.2783	0.2391	0.2137	0.1326
0.870967741935484	0.2802	0.2749	0.2538	0.2211	0.1978	0.1264
0.903225806451613	0.2376	0.233	0.223	0.202	0.1822	0.1211
0.935483870967742	0.228	0.2236	0.2064	0.1782	0.1591	0.1091
0.967741935483871	0.21	0.206	0.196	0.1763	0.1572	0.08697

0.1	1.0585	1.039	0.96813	0.82894	0.73284	0.32078
				Average of yearly averages:		0.207352333333333

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

Data used for this run:
Output File: MSCorn
Metfile: w13893.dvf
PRZM scenario: MScornC.txt
EXAMS environment file: ir298.exv
Chemical Name: Topramezone

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	363.69	g/mol	
Henry's Law Const.	henry		atm-m^3/mol	
Vapor Pressure	vapr	7.5e-13	torr	
Solubility	sol	15000	mg/L	
Kd	Kd	2.8	mg/L	
Koc	Koc		mg/L	
Photolysis half-life	kdp	0	days	Half-life
Aerobic Aquatic Metabolism	kbacw	0	days	Halfife
Anaerobic Aquatic Metabolism	kbacs	30.52	days	Halfife
Aerobic Soil Metabolism	asm	241.28	days	Halfife
Hydrolysis:	pH 7	0	days	Half-life
Method:	CAM	1	integer	See PRZM manual

Incorporation Depth: DEPI 4 cm
Application Rate: TAPP 0.0246 kg/ha
Application Efficiency: APPEFF 0.95 fraction
Spray Drift DRFT 0.16 fraction of application rate applied to pond
Application Date Date 15-04 dd/mm or dd/mmm or dd-mm or dd-mmm
Record 17: FILTRA
IPSCND
UPTKF
Record 18: PLVKRT
PLDKRT
FEXTRC 0.5
Flag for Index Res. Run IR IR
Flag for runoff calc. RUNOFF total none, monthly or total(average of entire run)

stored as MSCorng.out
Chemical: Topramezone
PRZM environment: MScornC.txt modified Satday, 12 October 2002 at 17:06:02
EXAMS environment: ir298.exv modified Thuday, 29 August 2002 at 14:34:12
Metfile: w13893.dvf modified Wedday, 3 July 2002 at 09:06:20
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	0.881	0.8642	0.7977	0.6745	0.5943	0.2536
1962	0.1844	0.1808	0.1678	0.1455	0.13	0.09981
1963	0.4023	0.3946	0.364	0.3063	0.2704	0.1517
1964	1.081	1.06	0.9804	0.8351	0.7378	0.312
1965	0.4767	0.4676	0.4384	0.3729	0.3298	0.167
1966	0.6678	0.655	0.6072	0.5112	0.4528	0.2269
1967	0.296	0.2904	0.268	0.2321	0.2084	0.1209
1968	0.5385	0.528	0.4921	0.4369	0.3904	0.1427
1969	0.2476	0.243	0.2245	0.189	0.1675	0.1117
1970	0.6288	0.6167	0.5787	0.4904	0.4381	0.1957
1971	0.1494	0.1466	0.1354	0.1138	0.1021	0.06416
1972	0.2462	0.2415	0.2229	0.1872	0.168	0.1054
1973	1.469	1.441	1.342	1.154	1.022	0.4261
1974	0.8062	0.7908	0.7296	0.6741	0.6508	0.3083
1975	0.2449	0.2403	0.2221	0.1943	0.174	0.1132
1976	0.9289	0.911	0.8401	0.7168	0.6468	0.2239
1977	0.373	0.366	0.338	0.2841	0.2536	0.2166
1978	0.9842	0.97	0.8993	0.7561	0.6666	0.2925
1979	0.5794	0.5684	0.5284	0.4692	0.4178	0.1897

1980	0.4639	0.455	0.4208	0.3798	0.3509	0.1263
1981	0.2453	0.2406	0.2314	0.1974	0.1628	0.1303
1982	0.6851	0.672	0.627	0.5292	0.4678	0.2305
1983	0.745	0.7307	0.6741	0.5729	0.51	0.2292
1984	1.031	1.012	0.9403	0.8079	0.7147	0.3039
1985	0.9548	0.9365	0.8641	0.7254	0.6394	0.2924
1986	0.3626	0.3582	0.3325	0.2945	0.2385	0.1137
1987	0.3228	0.3167	0.2966	0.261	0.2315	0.1401
1988	0.2937	0.2881	0.2661	0.2237	0.1976	0.1483
1989	0.2257	0.2213	0.2125	0.1937	0.175	0.08719
1990	0.4036	0.3959	0.3692	0.3165	0.2833	0.1678

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	1.469	1.441	1.342	1.154	1.022	0.4261
0.0645161290322581	1.081	1.06	0.9804	0.8351	0.7378	0.312
0.0967741935483871	1.031	1.012	0.9403	0.8079	0.7147	0.3083
0.129032258064516	0.9842	0.97	0.8993	0.7561	0.6666	0.3039
0.161290322580645	0.9548	0.9365	0.8641	0.7254	0.6508	0.2925
0.193548387096774	0.9289	0.911	0.8401	0.7168	0.6468	0.2924
0.225806451612903	0.881	0.8642	0.7977	0.6745	0.6394	0.2536
0.258064516129032	0.8062	0.7908	0.7296	0.6741	0.5943	0.2305
0.290322580645161	0.745	0.7307	0.6741	0.5729	0.51	0.2292
0.32258064516129	0.6851	0.672	0.627	0.5292	0.4678	0.2269
0.354838709677419	0.6678	0.655	0.6072	0.5112	0.4528	0.2239
0.387096774193548	0.6288	0.6167	0.5787	0.4904	0.4381	0.2166
0.419354838709677	0.5794	0.5684	0.5284	0.4692	0.4178	0.1957
0.451612903225806	0.5385	0.528	0.4921	0.4369	0.3904	0.1897
0.483870967741936	0.4767	0.4676	0.4384	0.3798	0.3509	0.1678
0.516129032258065	0.4639	0.455	0.4208	0.3729	0.3298	0.167
0.548387096774194	0.4036	0.3959	0.3692	0.3165	0.2833	0.1517
0.580645161290323	0.4023	0.3946	0.364	0.3063	0.2704	0.1483
0.612903225806452	0.373	0.366	0.338	0.2945	0.2536	0.1427
0.645161290322581	0.3626	0.3582	0.3325	0.2841	0.2385	0.1401
0.67741935483871	0.3228	0.3167	0.2966	0.261	0.2315	0.1303
0.709677419354839	0.296	0.2904	0.268	0.2321	0.2084	0.1263
0.741935483870968	0.2937	0.2881	0.2661	0.2237	0.1976	0.1209
0.774193548387097	0.2476	0.243	0.2314	0.1974	0.175	0.1137
0.806451612903226	0.2462	0.2415	0.2245	0.1943	0.174	0.1132
0.838709677419355	0.2453	0.2406	0.2229	0.1937	0.168	0.1117
0.870967741935484	0.2449	0.2403	0.2221	0.189	0.1675	0.1054
0.903225806451613	0.2257	0.2213	0.2125	0.1872	0.1628	0.09981
0.935483870967742	0.1844	0.1808	0.1678	0.1455	0.13	0.08719

0.967741935483871 0.1494 0.1466 0.1354 0.1138 0.1021 0.06416

0.1 1.02632 1.0078 0.9362 0.80272 0.70989 0.30786
Average of yearly averages: 0.189718666666667

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

Data used for this run:
Output File: MSCorng
Metfile: w13893.dvf
PRZM scenario: MScornC.txt
EXAMS environment file: ir298.exv
Chemical Name: Topramezone
Description Variable Name Value Units Comments
Molecular weight mwt 363.69 g/mol
Henry's Law Const. henry atm-m^3/mol
Vapor Pressure vapr 7.5e-13 torr
Solubility sol 15000 mg/L
Kd Kd 2.8 mg/L
Koc Koc mg/L
Photolysis half-life kdp 0 days Half-life
Aerobic Aquatic Metabolism kbacw 0 days Halfife
Anaerobic Aquatic Metabolism kbacs 30.52 days Halfife
Aerobic Soil Metabolism asm 241.28 days Halfife
Hydrolysis: pH 7 0 days Half-life
Method: CAM 1 integer See PRZM manual
Incorporation Depth: DEPI 4 cm
Application Rate: TAPP 0.0246 kg/ha
Application Efficiency: APPEFF 0.99 fraction
Spray Drift DRFT 0.064 fraction of application rate applied to pond
Application Date Date 15-04 dd/mm or dd/mmm or dd-mm or dd-mmm
Record 17: FILTRA
IPSCND
UPTKF
Record 18: PLVKRT
PLDKRT
FEXTRC 0.5
Flag for Index Res. Run IR IR
Flag for runoff calc. RUNOFF total none, monthly or total(average of entire run)

stored as NCCornE.out
Chemical: Topramezone

PRZM environment: NCcornEC.txt modified Satday, 12 October 2002 at 17:10:28
EXAMS environment: ir298.exv modified Thuday, 29 August 2002 at 14:34:12
Metfile: w13722.dvf modified Wedday, 3 July 2002 at 09:05:50
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	0.212	0.2093	0.1992	0.1792	0.166	0.08282
1962	0.2281	0.2252	0.218	0.199	0.1867	0.1111
1963	0.3838	0.379	0.3592	0.3278	0.3022	0.1623
1964	0.1962	0.1937	0.1836	0.1667	0.1677	0.1136
1965	0.2811	0.2782	0.2684	0.2414	0.2239	0.1301
1966	0.3258	0.3217	0.3067	0.2955	0.2767	0.1511
1967	0.4133	0.408	0.3892	0.3637	0.341	0.1788
1968	0.1984	0.1959	0.1864	0.1789	0.1737	0.1058
1969	0.225	0.2222	0.2154	0.2031	0.1892	0.109
1970	0.2418	0.2387	0.2305	0.2088	0.1981	0.1156
1971	0.2885	0.2848	0.2787	0.2557	0.237	0.1327
1972	0.4299	0.4244	0.4054	0.3801	0.3542	0.1852
1973	0.6134	0.6055	0.5736	0.5211	0.4821	0.2487
1974	0.4272	0.4218	0.4056	0.3673	0.3422	0.1946
1975	0.2433	0.2402	0.2299	0.2061	0.197	0.1242
1976	0.3126	0.3086	0.3016	0.2771	0.2554	0.1398
1977	0.2381	0.2353	0.2231	0.1986	0.1893	0.1145
1978	0.9307	0.9186	0.8833	0.7902	0.7248	0.3462
1979	0.2858	0.2823	0.2743	0.2596	0.2488	0.1632
1980	0.3575	0.353	0.3347	0.2973	0.2916	0.1666
1981	0.286	0.2823	0.2714	0.2472	0.2308	0.1421
1982	0.2453	0.2422	0.2295	0.218	0.2063	0.1149
1983	0.2292	0.2263	0.2172	0.1948	0.1831	0.1048
1984	0.4136	0.4086	0.3874	0.3715	0.3564	0.1859
1985	0.3592	0.3546	0.3423	0.3194	0.2982	0.1679
1986	0.3527	0.3482	0.33	0.2971	0.2753	0.1562
1987	0.5211	0.5145	0.494	0.446	0.418	0.2193
1988	0.5425	0.5356	0.5077	0.4734	0.4408	0.232
1989	0.4011	0.3959	0.3816	0.3442	0.3171	0.1776
1990	0.3908	0.3858	0.3716	0.3441	0.318	0.1712

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	0.9307	0.9186	0.8833	0.7902	0.7248	0.3462
0.0645161290322581	0.6134	0.6055	0.5736	0.5211	0.4821	0.2487
0.0967741935483871	0.5425	0.5356	0.5077	0.4734	0.4408	0.232
0.129032258064516	0.5211	0.5145	0.494	0.446	0.418	0.2193

0.161290322580645	0.4299	0.4244	0.4056	0.3801	0.3564	0.1946
0.193548387096774	0.4272	0.4218	0.4054	0.3715	0.3542	0.1859
0.225806451612903	0.4136	0.4086	0.3892	0.3673	0.3422	0.1852
0.258064516129032	0.4133	0.408	0.3874	0.3637	0.341	0.1788
0.290322580645161	0.4011	0.3959	0.3816	0.3442	0.318	0.1776
0.32258064516129	0.3908	0.3858	0.3716	0.3441	0.3171	0.1712
0.354838709677419	0.3838	0.379	0.3592	0.3278	0.3022	0.1679
0.387096774193548	0.3592	0.3546	0.3423	0.3194	0.2982	0.1666
0.419354838709677	0.3575	0.353	0.3347	0.2973	0.2916	0.1632
0.451612903225806	0.3527	0.3482	0.33	0.2971	0.2767	0.1623
0.483870967741936	0.3258	0.3217	0.3067	0.2955	0.2753	0.1562
0.516129032258065	0.3126	0.3086	0.3016	0.2771	0.2554	0.1511
0.548387096774194	0.2885	0.2848	0.2787	0.2596	0.2488	0.1421
0.580645161290323	0.286	0.2823	0.2743	0.2557	0.237	0.1398
0.612903225806452	0.2858	0.2823	0.2714	0.2472	0.2308	0.1327
0.645161290322581	0.2811	0.2782	0.2684	0.2414	0.2239	0.1301
0.67741935483871	0.2453	0.2422	0.2305	0.218	0.2063	0.1242
0.709677419354839	0.2433	0.2402	0.2299	0.2088	0.1981	0.1156
0.741935483870968	0.2418	0.2387	0.2295	0.2061	0.197	0.1149
0.774193548387097	0.2381	0.2353	0.2231	0.2031	0.1893	0.1145
0.806451612903226	0.2292	0.2263	0.218	0.199	0.1892	0.1136
0.838709677419355	0.2281	0.2252	0.2172	0.1986	0.1867	0.1111
0.870967741935484	0.225	0.2222	0.2154	0.1948	0.1831	0.109
0.903225806451613	0.212	0.2093	0.1992	0.1792	0.1737	0.1058
0.935483870967742	0.1984	0.1959	0.1864	0.1789	0.1677	0.1048
0.967741935483871	0.1962	0.1937	0.1836	0.1667	0.166	0.08282

0.1	0.54036	0.53349	0.50633	0.47066	0.43852	0.23073

Average of yearly averages: 0.158260666666667

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

Data used for this run:
Output File: NCCornE
Metfile: w13722.dvf
PRZM scenario: NCcornEC.txt
EXAMS environment file: ir298.exv
Chemical Name: Topramezone

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	363.69	g/mol	
Henry's Law Const.	henry		atm-m^3/mol	
Vapor Pressure	vapr	7.5e-13	torr	
Solubility	sol	15000	mg/L	

Kd Kd 2.8 mg/L
Koc Koc mg/L
Photolysis half-life kdp 0 days Half-life
Aerobic Aquatic Metabolism kbacw 0 days Halfife
Anaerobic Aquatic Metabolism kbacs 30.52 days Halfife
Aerobic Soil Metabolism asm 241.28 days Halfife
Hydrolysis: pH 7 0 days Half-life
Method: CAM 1 integer See PRZM manual
Incorporation Depth: DEPI 4 cm
Application Rate: TAPP 0.0246 kg/ha
Application Efficiency: APPEFF 0.95 fraction
Spray Drift DRFT 0.16 fraction of application rate applied to pond
Application Date Date 16-04 dd/mm or dd/mmm or dd-mm or dd-mmm
Record 17: FILTRA
IPSCND
UPTKF
Record 18: PLVKRT
PLDKRT
FEXTRC 0.5
Flag for Index Res. Run IR IR
Flag for runoff calc. RUNOFF total none, monthly or total(average of entire run)

stored as NCCornEg.out
Chemical: Topramezone
PRZM environment: NCcornEC.txt modified Satday, 12 October 2002 at 17:10:28
EXAMS environment: ir298.exv modified Thuday, 29 August 2002 at 14:34:12
Metfile: w13722.dvf modified Wedday, 3 July 2002 at 09:05:50
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	0.1425	0.1407	0.1337	0.1212	0.1129	0.05419
1962	0.1671	0.1649	0.1611	0.1481	0.1368	0.07642
1963	0.3214	0.3175	0.3008	0.2733	0.2524	0.129
1964	0.1315	0.1298	0.123	0.1176	0.1096	0.07824
1965	0.223	0.2204	0.2127	0.1909	0.1757	0.09535
1966	0.2573	0.2541	0.2408	0.2289	0.2158	0.1172
1967	0.3342	0.33	0.3154	0.2942	0.2776	0.1461
1968	0.1277	0.1261	0.1201	0.1089	0.1028	0.07013
1969	0.1616	0.1595	0.1521	0.1426	0.1337	0.07332
1970	0.1602	0.1582	0.1544	0.1413	0.1366	0.08017
1971	0.2204	0.2176	0.2104	0.195	0.181	0.09802
1972	0.3627	0.358	0.3426	0.3195	0.299	0.1529
1973	0.5433	0.5363	0.508	0.4633	0.4294	0.2189

1974	0.3582	0.3537	0.3413	0.3087	0.286	0.1626
1975	0.1768	0.1746	0.1669	0.1496	0.1382	0.08916
1976	0.2425	0.2395	0.2353	0.2179	0.2012	0.1056
1977	0.1679	0.1661	0.1574	0.1399	0.1291	0.07915
1978	0.8735	0.8621	0.8303	0.7434	0.682	0.3206
1979	0.2131	0.2104	0.2045	0.1933	0.181	0.1298
1980	0.3069	0.3029	0.2873	0.2552	0.2404	0.1335
1981	0.2153	0.2126	0.2055	0.1888	0.1766	0.1079
1982	0.1597	0.1577	0.1495	0.144	0.137	0.07947
1983	0.1578	0.1557	0.1494	0.1342	0.1233	0.069
1984	0.3529	0.3487	0.3305	0.3054	0.2961	0.1536
1985	0.2821	0.2785	0.2704	0.2563	0.2405	0.1348
1986	0.2849	0.2812	0.2665	0.2404	0.2235	0.1226
1987	0.4401	0.4345	0.4186	0.3794	0.3574	0.1884
1988	0.4644	0.4585	0.4347	0.4095	0.3826	0.2017
1989	0.3269	0.3227	0.3103	0.2811	0.2593	0.1449
1990	0.319	0.3149	0.3012	0.2815	0.2606	0.1382

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	0.8735	0.8621	0.8303	0.7434	0.682	0.3206
0.0645161290322581	0.5433	0.5363	0.508	0.4633	0.4294	0.2189
0.0967741935483871	0.4644	0.4585	0.4347	0.4095	0.3826	0.2017
0.129032258064516	0.4401	0.4345	0.4186	0.3794	0.3574	0.1884
0.161290322580645	0.3627	0.358	0.3426	0.3195	0.299	0.1626
0.193548387096774	0.3582	0.3537	0.3413	0.3087	0.2961	0.1536
0.225806451612903	0.3529	0.3487	0.3305	0.3054	0.286	0.1529
0.258064516129032	0.3342	0.33	0.3154	0.2942	0.2776	0.1461
0.290322580645161	0.3269	0.3227	0.3103	0.2815	0.2606	0.1449
0.32258064516129	0.3214	0.3175	0.3012	0.2811	0.2593	0.1382
0.354838709677419	0.319	0.3149	0.3008	0.2733	0.2524	0.1348
0.387096774193548	0.3069	0.3029	0.2873	0.2563	0.2405	0.1335
0.419354838709677	0.2849	0.2812	0.2704	0.2552	0.2404	0.1298
0.451612903225806	0.2821	0.2785	0.2665	0.2404	0.2235	0.129
0.483870967741936	0.2573	0.2541	0.2408	0.2289	0.2158	0.1226
0.516129032258065	0.2425	0.2395	0.2353	0.2179	0.2012	0.1172
0.548387096774194	0.223	0.2204	0.2127	0.195	0.181	0.1079
0.580645161290323	0.2204	0.2176	0.2104	0.1933	0.181	0.1056
0.612903225806452	0.2153	0.2126	0.2055	0.1909	0.1766	0.09802
0.645161290322581	0.2131	0.2104	0.2045	0.1888	0.1757	0.09535
0.67741935483871	0.1768	0.1746	0.1669	0.1496	0.1382	0.08916
0.709677419354839	0.1679	0.1661	0.1611	0.1481	0.137	0.08017
0.741935483870968	0.1671	0.1649	0.1574	0.144	0.1368	0.07947

0.774193548387097	0.1616	0.1595	0.1544	0.1426	0.1366	0.07915
0.806451612903226	0.1602	0.1582	0.1521	0.1413	0.1337	0.07824
0.838709677419355	0.1597	0.1577	0.1495	0.1399	0.1291	0.07642
0.870967741935484	0.1578	0.1557	0.1494	0.1342	0.1233	0.07332
0.903225806451613	0.1425	0.1407	0.1337	0.1212	0.1129	0.07013
0.935483870967742	0.1315	0.1298	0.123	0.1176	0.1096	0.069
0.967741935483871	0.1277	0.1261	0.1201	0.1089	0.1028	0.05419

0.1 0.46197 0.4561 0.43309 0.40649 0.38008 0.20037

Average of yearly averages: 0.125030666666667

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

Data used for this run:
Output File: NCCornEg
Metfile: w13722.dvf
PRZM scenario: NCcornEC.txt
EXAMS environment file: ir298.exv
Chemical Name: Topramezone

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	363.69	g/mol	
Henry's Law Const.	henry		atm-m^3/mol	
Vapor Pressure	vapr	7.5e-13	torr	
Solubility	sol	15000	mg/L	
Kd	Kd	2.8	mg/L	
Koc	Koc		mg/L	
Photolysis half-life	kdp	0	days	Half-life
Aerobic Aquatic Metabolism	kbacw	0	days	Halfife
Anaerobic Aquatic Metabolism	kbacs	30.52	days	Halfife
Aerobic Soil Metabolism	asm	241.28	days	Halfife
Hydrolysis:	pH 7	0	days	Half-life
Method:	CAM	1	integer	See PRZM manual
Incorporation Depth:	DEPI	4	cm	
Application Rate:	TAPP	0.0246	kg/ha	
Application Efficiency:	APPEFF	0.99	fraction	
Spray Drift	DRFT	0.064	fraction of application rate applied to pond	
Application Date	Date	16-04	dd/mm or dd/mmm or dd-mm or dd-mmm	
Record 17:	FILTRA			
	IPSCND			
	UPTKF			
Record 18:	PLVKRT			
	PLDKRT			
	FEXTRC	0.5		

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

stored as TXcorn.out
Chemical: Topramezone
PRZM environment: TXcornC.txt modified Satday, 12 October 2002 at 17:28:20
EXAMS environment: ir298.exv modified Thuday, 29 August 2002 at 14:34:12
Metfile: w13958.dvf modified Wedday, 3 July 2002 at 09:06:24
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	0.3961	0.3891	0.3636	0.3166	0.2845	0.1345
1962	0.3869	0.3801	0.3532	0.3312	0.3223	0.1691
1963	1.307	1.284	1.192	1.016	0.909	0.3971
1964	0.4656	0.4587	0.4282	0.3884	0.3606	0.2164
1965	0.4571	0.4491	0.4232	0.3696	0.3317	0.1709
1966	0.5263	0.517	0.4973	0.4298	0.3841	0.1838
1967	0.4048	0.3977	0.3779	0.347	0.3153	0.1535
1968	0.3688	0.3624	0.3493	0.3035	0.2749	0.1411
1969	0.7969	0.7828	0.7342	0.6471	0.5805	0.2685
1970	0.5802	0.5699	0.5531	0.4858	0.4344	0.2106
1971	0.2718	0.267	0.2481	0.218	0.2143	0.1467
1972	0.8058	0.7962	0.7734	0.6735	0.6024	0.2711
1973	0.4302	0.4227	0.3928	0.3645	0.3368	0.1706
1974	0.426	0.4185	0.3889	0.3403	0.3265	0.1671
1975	0.8963	0.8854	0.8405	0.7796	0.707	0.3154
1976	0.898	0.8895	0.8355	0.7187	0.6507	0.3078
1977	0.842	0.8299	0.7888	0.6793	0.6058	0.2837
1978	0.637	0.6258	0.5931	0.5493	0.5046	0.2542
1979	0.4767	0.4683	0.4481	0.3986	0.3668	0.1759
1980	1.211	1.19	1.104	0.998	0.9106	0.3991
1981	0.6274	0.6164	0.5943	0.52	0.4645	0.2347
1982	0.5422	0.537	0.5055	0.4731	0.4279	0.2122
1983	0.8019	0.7878	0.7395	0.6594	0.626	0.298
1984	0.1924	0.189	0.1757	0.1497	0.1503	0.09806
1985	0.3906	0.3838	0.3586	0.3383	0.3146	0.1522
1986	0.8708	0.8607	0.8285	0.7338	0.6632	0.2948
1987	0.3225	0.3168	0.3053	0.2635	0.2359	0.149
1988	0.7105	0.698	0.6481	0.5703	0.5263	0.2398
1989	0.3352	0.3294	0.3136	0.3013	0.2875	0.1455
1990	0.6271	0.616	0.5731	0.5058	0.4581	0.2116

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	1.307	1.284	1.192	1.016	0.9106	0.3991
0.0645161290322581	1.211	1.19	1.104	0.998	0.909	0.3971
0.0967741935483871	0.898	0.8895	0.8405	0.7796	0.707	0.3154
0.129032258064516	0.8963	0.8854	0.8355	0.7338	0.6632	0.3078
0.161290322580645	0.8708	0.8607	0.8285	0.7187	0.6507	0.298
0.193548387096774	0.842	0.8299	0.7888	0.6793	0.626	0.2948
0.225806451612903	0.8058	0.7962	0.7734	0.6735	0.6058	0.2837
0.258064516129032	0.8019	0.7878	0.7395	0.6594	0.6024	0.2711
0.290322580645161	0.7969	0.7828	0.7342	0.6471	0.5805	0.2685
0.32258064516129	0.7105	0.698	0.6481	0.5703	0.5263	0.2542
0.354838709677419	0.637	0.6258	0.5943	0.5493	0.5046	0.2398
0.387096774193548	0.6274	0.6164	0.5931	0.52	0.4645	0.2347
0.419354838709677	0.6271	0.616	0.5731	0.5058	0.4581	0.2164
0.451612903225806	0.5802	0.5699	0.5531	0.4858	0.4344	0.2122
0.483870967741936	0.5422	0.537	0.5055	0.4731	0.4279	0.2116
0.516129032258065	0.5263	0.517	0.4973	0.4298	0.3841	0.2106
0.548387096774194	0.4767	0.4683	0.4481	0.3986	0.3668	0.1838
0.580645161290323	0.4656	0.4587	0.4282	0.3884	0.3606	0.1759
0.612903225806452	0.4571	0.4491	0.4232	0.3696	0.3368	0.1709
0.645161290322581	0.4302	0.4227	0.3928	0.3645	0.3317	0.1706
0.67741935483871	0.426	0.4185	0.3889	0.347	0.3265	0.1691
0.709677419354839	0.4048	0.3977	0.3779	0.3403	0.3223	0.1671
0.741935483870968	0.3961	0.3891	0.3636	0.3383	0.3153	0.1535
0.774193548387097	0.3906	0.3838	0.3586	0.3312	0.3146	0.1522
0.806451612903226	0.3869	0.3801	0.3532	0.3166	0.2875	0.149
0.838709677419355	0.3688	0.3624	0.3493	0.3035	0.2845	0.1467
0.870967741935484	0.3352	0.3294	0.3136	0.3013	0.2749	0.1455
0.903225806451613	0.3225	0.3168	0.3053	0.2635	0.2359	0.1411
0.935483870967742	0.2718	0.267	0.2481	0.218	0.2143	0.1345
0.967741935483871	0.1924	0.189	0.1757	0.1497	0.1503	0.09806

0.1 0.89783 0.88909 0.84 0.77502 0.70262 0.31464

Average of yearly averages: 0.219098666666667

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

Data used for this run:
Output File: TXcorn
Metfile: w13958.dvf
PRZM scenario: TXcornC.txt
EXAMS environment file: ir298.exv

Chemical Name: Topramezone

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	363.69	g/mol	
Henry's Law Const.	henry		atm-m^3/mol	
Vapor Pressure	vapr	7.5e-13	torr	
Solubility	sol	15000	mg/L	
Kd	Kd	2.8	mg/L	
Koc	Koc		mg/L	
Photolysis half-life	kdp	0	days	Half-life
Aerobic Aquatic Metabolism	kbacw	0	days	Halfife
Anaerobic Aquatic Metabolism	kbacs	30.52	days	Halfife
Aerobic Soil Metabolism	asm	241.28	days	Halfife
Hydrolysis:	pH 7	0	days	Half-life
Method:	CAM	1	integer	See PRZM manual
Incorporation Depth:	DEPI	4	cm	
Application Rate:	TAPP	0.0246	kg/ha	
Application Efficiency:	APPEFF	0.95	fraction	
Spray Drift	DRFT	0.16	fraction of application rate applied to pond	
Application Date	Date	16-03	dd/mm or dd/mmm or dd-mm or dd-mmm	
Record 17:	FILTRA			
	IPSCND			
	UPTKF			
Record 18:	PLVKRT			
	PLDKRT			
	FEXTRC	0.5		
Flag for Index Res. Run	IR	IR		
Flag for runoff calc.	RUNOFF	total		none, monthly or total(average of entire run)

stored as TXcorng.out
Chemical: Topramezone
PRZM environment: TXcornC.txt modified Satday, 12 October 2002 at 17:28:20
EXAMS environment: ir298.exv modified Thuday, 29 August 2002 at 14:34:12
Metfile: w13958.dvf modified Wedday, 3 July 2002 at 09:06:24
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	0.3724	0.3658	0.3416	0.2979	0.2671	0.1137
1962	0.337	0.3311	0.3076	0.2935	0.2798	0.1475
1963	1.282	1.259	1.169	0.9959	0.8915	0.385
1964	0.3915	0.3852	0.36	0.3314	0.3106	0.1967
1965	0.4212	0.4137	0.3897	0.3391	0.3047	0.1492
1966	0.4809	0.4724	0.4565	0.3948	0.3531	0.1626

1967	0.353	0.3468	0.3273	0.3021	0.2757	0.1311
1968	0.3271	0.3214	0.3104	0.2697	0.2428	0.1182
1969	0.7546	0.7413	0.696	0.6154	0.5525	0.2509
1970	0.5479	0.5386	0.5246	0.4621	0.4134	0.1906
1971	0.227	0.2243	0.2097	0.1865	0.1827	0.124
1972	0.779	0.77	0.7475	0.652	0.5834	0.2537
1973	0.3759	0.3693	0.3432	0.3103	0.2891	0.1489
1974	0.3842	0.3775	0.3508	0.3026	0.282	0.1453
1975	0.8694	0.8581	0.8158	0.7612	0.6912	0.2998
1976	0.8654	0.8565	0.8052	0.6932	0.6225	0.292
1977	0.807	0.795	0.7552	0.6506	0.5803	0.2667
1978	0.6003	0.5898	0.5601	0.523	0.4751	0.2361
1979	0.4055	0.3983	0.3835	0.344	0.3182	0.1544
1980	1.175	1.154	1.071	0.9723	0.8886	0.3871
1981	0.6015	0.5908	0.5715	0.501	0.4478	0.2158
1982	0.5017	0.4929	0.4641	0.4391	0.3979	0.1923
1983	0.7476	0.7344	0.6881	0.6169	0.5898	0.2817
1984	0.1311	0.1289	0.1204	0.1098	0.1011	0.07341
1985	0.3321	0.3263	0.3052	0.2806	0.2638	0.1298
1986	0.8518	0.8412	0.8088	0.7148	0.6467	0.2784
1987	0.2884	0.2834	0.2723	0.2356	0.2101	0.1264
1988	0.645	0.6336	0.5884	0.5203	0.4826	0.2211
1989	0.2804	0.2776	0.2703	0.2541	0.2399	0.1228
1990	0.5906	0.5801	0.5397	0.475	0.4311	0.1917

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	1.282	1.259	1.169	0.9959	0.8915	0.3871
0.0645161290322581	1.175	1.154	1.071	0.9723	0.8886	0.385
0.0967741935483871	0.8694	0.8581	0.8158	0.7612	0.6912	0.2998
0.129032258064516	0.8654	0.8565	0.8088	0.7148	0.6467	0.292
0.161290322580645	0.8518	0.8412	0.8052	0.6932	0.6225	0.2817
0.193548387096774	0.807	0.795	0.7552	0.652	0.5898	0.2784
0.225806451612903	0.779	0.77	0.7475	0.6506	0.5834	0.2667
0.258064516129032	0.7546	0.7413	0.696	0.6169	0.5803	0.2537
0.290322580645161	0.7476	0.7344	0.6881	0.6154	0.5525	0.2509
0.32258064516129	0.645	0.6336	0.5884	0.523	0.4826	0.2361
0.354838709677419	0.6015	0.5908	0.5715	0.5203	0.4751	0.2211
0.387096774193548	0.6003	0.5898	0.5601	0.501	0.4478	0.2158
0.419354838709677	0.5906	0.5801	0.5397	0.475	0.4311	0.1967
0.451612903225806	0.5479	0.5386	0.5246	0.4621	0.4134	0.1923
0.483870967741936	0.5017	0.4929	0.4641	0.4391	0.3979	0.1917
0.516129032258065	0.4809	0.4724	0.4565	0.3948	0.3531	0.1906

0.548387096774194	0.4212	0.4137	0.3897	0.344	0.3182	0.1626
0.580645161290323	0.4055	0.3983	0.3835	0.3391	0.3106	0.1544
0.612903225806452	0.3915	0.3852	0.36	0.3314	0.3047	0.1492
0.645161290322581	0.3842	0.3775	0.3508	0.3103	0.2891	0.1489
0.67741935483871	0.3759	0.3693	0.3432	0.3026	0.282	0.1475
0.709677419354839	0.3724	0.3658	0.3416	0.3021	0.2798	0.1453
0.741935483870968	0.353	0.3468	0.3273	0.2979	0.2757	0.1311
0.774193548387097	0.337	0.3311	0.3104	0.2935	0.2671	0.1298
0.806451612903226	0.3321	0.3263	0.3076	0.2806	0.2638	0.1264
0.838709677419355	0.3271	0.3214	0.3052	0.2697	0.2428	0.124
0.870967741935484	0.2884	0.2834	0.2723	0.2541	0.2399	0.1228
0.903225806451613	0.2804	0.2776	0.2703	0.2356	0.2101	0.1182
0.935483870967742	0.227	0.2243	0.2097	0.1865	0.1827	0.1137
0.967741935483871	0.1311	0.1289	0.1204	0.1098	0.1011	0.07341

0.1 0.869 0.85794 0.8151 0.75656 0.68675 0.29902

Average of yearly averages: 0.199563666666667

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

Data used for this run:
Output File: TXcorng
Metfile: w13958.dvf
PRZM scenario: TXcornC.txt
EXAMS environment file: ir298.exv
Chemical Name: Topramezone

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	363.69	g/mol	
Henry's Law Const.	henry		atm-m^3/mol	
Vapor Pressure	vapr	7.5e-13	torr	
Solubility	sol	15000	mg/L	
Kd	Kd	2.8	mg/L	
Koc	Koc		mg/L	
Photolysis half-life	kdp	0	days	Half-life
Aerobic Aquatic Metabolism	kbacw	0	days	Halfife
Anaerobic Aquatic Metabolism	kbacs	30.52	days	Halfife
Aerobic Soil Metabolism	asm	241.28	days	Halfife
Hydrolysis:	pH 7	0	days	Half-life
Method:	CAM	1	integer	See PRZM manual
Incorporation Depth:	DEPI	4	cm	
Application Rate:	TAPP	0.0246	kg/ha	
Application Efficiency:	APPEFF	0.99	fraction	
Spray Drift	DRFT	0.064	fraction of application rate applied to pond	

Application Date Date 16-03 dd/mm or dd/mmm or dd-mm or dd-mmm
Record 17: FILTRA
IPSCND
UPTKF
Record 18: PLVKRT
PLDKRT
FEXTRC 0.5
Flag for Index Res. Run IR IR
Flag for runoff calc. RUNOFF total none, monthly or total(average of entire run)

ECOLOGICAL EXPOSURE 1 APPLICATION

stored as CACornA.out
Chemical: Topramezone
PRZM environment: CAcornC.txt modified Satday, 12 October 2002 at 17:32:58
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	0.1099	0.1096	0.1087	0.08277	0.07236	0.04426
1962	0.5389	0.5375	0.5322	0.5222	0.4798	0.2201
1963	0.543	0.5422	0.5393	0.5327	0.5273	0.4965
1964	0.4991	0.4985	0.4957	0.4893	0.4843	0.4616
1965	0.5023	0.5017	0.4988	0.4924	0.4873	0.4585
1966	0.4911	0.4908	0.4897	0.4757	0.457	0.4395
1967	0.5409	0.5402	0.5373	0.5304	0.5253	0.4861
1968	0.4867	0.486	0.4831	0.4767	0.4715	0.4455
1969	0.4726	0.472	0.4695	0.4635	0.4586	0.4293
1970	0.46	0.4593	0.4566	0.4505	0.4456	0.4227
1971	0.475	0.4744	0.4717	0.4657	0.461	0.4304
1972	0.4428	0.4421	0.4395	0.4335	0.4288	0.4027
1973	0.4241	0.4235	0.421	0.4152	0.4105	0.3862
1974	0.4204	0.4198	0.4174	0.4119	0.408	0.3822
1975	0.4052	0.4046	0.4024	0.3972	0.393	0.3642
1976	0.3806	0.38	0.3778	0.3725	0.3683	0.3396
1977	0.3736	0.3731	0.3708	0.3683	0.3649	0.3395
1978	0.3946	0.394	0.3916	0.3862	0.382	0.355
1979	0.3937	0.3932	0.3909	0.3856	0.3814	0.3595
1980	0.4073	0.4067	0.4043	0.3989	0.3947	0.3676
1981	0.4145	0.4139	0.4123	0.407	0.4026	0.3779

1982	0.4203	0.4197	0.4173	0.4119	0.4077	0.3876
1983	0.5293	0.5285	0.525	0.5175	0.5116	0.4514
1984	0.4761	0.4754	0.4726	0.466	0.4607	0.4313
1985	0.4395	0.4389	0.4363	0.4305	0.4258	0.4016
1986	0.4555	0.4549	0.4521	0.4459	0.441	0.4112
1987	0.4295	0.4289	0.4263	0.4202	0.4155	0.3905
1988	0.4616	0.4608	0.4581	0.4523	0.4473	0.4065
1989	0.4541	0.4533	0.45	0.4449	0.4417	0.4056
1990	0.5056	0.5048	0.5014	0.4936	0.4875	0.4501

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	0.543	0.5422	0.5393	0.5327	0.5273	0.4965
0.0645161290322581	0.5409	0.5402	0.5373	0.5304	0.5253	0.4861
0.0967741935483871	0.5389	0.5375	0.5322	0.5222	0.5116	0.4616
0.129032258064516	0.5293	0.5285	0.525	0.5175	0.4875	0.4585
0.161290322580645	0.5056	0.5048	0.5014	0.4936	0.4873	0.4514
0.193548387096774	0.5023	0.5017	0.4988	0.4924	0.4843	0.4501
0.225806451612903	0.4991	0.4985	0.4957	0.4893	0.4798	0.4455
0.258064516129032	0.4911	0.4908	0.4897	0.4767	0.4715	0.4395
0.290322580645161	0.4867	0.486	0.4831	0.4757	0.461	0.4313
0.32258064516129	0.4761	0.4754	0.4726	0.466	0.4607	0.4304
0.354838709677419	0.475	0.4744	0.4717	0.4657	0.4586	0.4293
0.387096774193548	0.4726	0.472	0.4695	0.4635	0.457	0.4227
0.419354838709677	0.4616	0.4608	0.4581	0.4523	0.4473	0.4112
0.451612903225806	0.46	0.4593	0.4566	0.4505	0.4456	0.4065
0.483870967741936	0.4555	0.4549	0.4521	0.4459	0.4417	0.4056
0.516129032258065	0.4541	0.4533	0.45	0.4449	0.441	0.4027
0.548387096774194	0.4428	0.4421	0.4395	0.4335	0.4288	0.4016
0.580645161290323	0.4395	0.4389	0.4363	0.4305	0.4258	0.3905
0.612903225806452	0.4295	0.4289	0.4263	0.4202	0.4155	0.3876
0.645161290322581	0.4241	0.4235	0.421	0.4152	0.4105	0.3862
0.67741935483871	0.4204	0.4198	0.4174	0.4119	0.408	0.3822
0.709677419354839	0.4203	0.4197	0.4173	0.4119	0.4077	0.3779
0.741935483870968	0.4145	0.4139	0.4123	0.407	0.4026	0.3676
0.774193548387097	0.4073	0.4067	0.4043	0.3989	0.3947	0.3642
0.806451612903226	0.4052	0.4046	0.4024	0.3972	0.393	0.3595
0.838709677419355	0.3946	0.394	0.3916	0.3862	0.382	0.355
0.870967741935484	0.3937	0.3932	0.3909	0.3856	0.3814	0.3396
0.903225806451613	0.3806	0.38	0.3778	0.3725	0.3683	0.3395
0.935483870967742	0.3736	0.3731	0.3708	0.3683	0.3649	0.2201
0.967741935483871	0.1099	0.1096	0.1087	0.08277	0.07236	0.04426

0.1 0.53794 0.5366 0.53148 0.52173 0.50919 0.46129
Average of yearly averages: 0.391488666666667

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

Data used for this run:
Output File: CACornA
Metfile: w23232.dvf
PRZM scenario: CAcornC.txt
EXAMS environment file: pond298.exv
Chemical Name: Topramezone

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	363.69	g/mol	
Henry's Law Const.	henry		atm-m^3/mol	
Vapor Pressure	vapr	7.5e-13	torr	
Solubility	sol	15000	mg/L	
Kd	Kd	2.8	mg/L	
Koc	Koc		mg/L	
Photolysis half-life	kdp	0	days	Half-life
Aerobic Aquatic Metabolism	kbacw	0	days	Halfife
Anaerobic Aquatic Metabolism	kbacs	30.52	days	Halfife
Aerobic Soil Metabolism	asm	241.28	days	Halfife
Hydrolysis:	pH 7	0	days	Half-life
Method:	CAM	1	integer	See PRZM manual
Incorporation Depth:	DEPI	4	cm	
Application Rate:	TAPP	0.0246	kg/ha	
Application Efficiency:	APPEFF	0.95	fraction	
Spray Drift	DRFT	0.05	fraction of application rate applied to pond	
Application Date	Date	15-04	dd/mm or dd/mmm or dd-mm or dd-mmm	
Record 17:	FILTRA			
	IPSCND			
	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 CACornG.out
Chemical: Topramezone
PRZM environment: CAcornC.txt modified Satday, 12 October 2002 at 17:32:58
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	0.07247	0.07229	0.07156	0.0442	0.0329	0.0134
1962	0.4837	0.4822	0.4771	0.4677	0.4238	0.1595
1963	0.4532	0.4526	0.4502	0.4477	0.4447	0.4183
1964	0.3812	0.3808	0.3792	0.3757	0.373	0.359
1965	0.3649	0.3645	0.3627	0.3588	0.3559	0.3378
1966	0.3618	0.3614	0.3601	0.3454	0.3203	0.3038
1967	0.373	0.3725	0.3706	0.3661	0.3623	0.3417
1968	0.3107	0.3104	0.3095	0.3069	0.3046	0.2916
1969	0.2873	0.287	0.2859	0.2833	0.2812	0.2676
1970	0.2884	0.2882	0.2865	0.2717	0.2635	0.2562
1971	0.2821	0.2817	0.2803	0.2772	0.275	0.2601
1972	0.2418	0.2415	0.2404	0.2381	0.2364	0.2278
1973	0.2188	0.2184	0.2175	0.2146	0.213	0.2081
1974	0.2134	0.2132	0.212	0.2094	0.2077	0.2019
1975	0.1952	0.1949	0.194	0.1917	0.1897	0.1814
1976	0.1696	0.1693	0.1684	0.1662	0.1644	0.1559
1977	0.1769	0.1767	0.1733	0.1616	0.1604	0.155
1978	0.183	0.1827	0.1817	0.1793	0.1774	0.1705
1979	0.1943	0.194	0.1926	0.191	0.1828	0.1742
1980	0.1951	0.1948	0.1938	0.1913	0.1894	0.1822
1981	0.2132	0.2129	0.2117	0.207	0.1979	0.1917
1982	0.222	0.2216	0.2207	0.2184	0.2119	0.2013
1983	0.3207	0.3202	0.3179	0.3131	0.3095	0.2661
1984	0.2676	0.2673	0.2659	0.263	0.2609	0.2473
1985	0.2514	0.251	0.2498	0.2285	0.222	0.2171
1986	0.2465	0.2463	0.2452	0.2424	0.2403	0.227
1987	0.2169	0.2166	0.2154	0.2125	0.2104	0.2054
1988	0.2522	0.2518	0.2504	0.2475	0.2449	0.2231
1989	0.2705	0.2701	0.268	0.2657	0.2644	0.2225
1990	0.3043	0.3038	0.3017	0.2969	0.2932	0.2685

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	0.4837	0.4822	0.4771	0.4677	0.4447	0.4183
0.0645161290322581	0.4532	0.4526	0.4502	0.4477	0.4238	0.359
0.0967741935483871	0.3812	0.3808	0.3792	0.3757	0.373	0.3417
0.129032258064516	0.373	0.3725	0.3706	0.3661	0.3623	0.3378
0.161290322580645	0.3649	0.3645	0.3627	0.3588	0.3559	0.3038
0.193548387096774	0.3618	0.3614	0.3601	0.3454	0.3203	0.2916

0.225806451612903	0.3207	0.3202	0.3179	0.3131	0.3095	0.2685
0.258064516129032	0.3107	0.3104	0.3095	0.3069	0.3046	0.2676
0.290322580645161	0.3043	0.3038	0.3017	0.2969	0.2932	0.2661
0.32258064516129	0.2884	0.2882	0.2865	0.2833	0.2812	0.2601
0.354838709677419	0.2873	0.287	0.2859	0.2772	0.275	0.2562
0.387096774193548	0.2821	0.2817	0.2803	0.2717	0.2644	0.2473
0.419354838709677	0.2705	0.2701	0.268	0.2657	0.2635	0.2278
0.451612903225806	0.2676	0.2673	0.2659	0.263	0.2609	0.227
0.483870967741936	0.2522	0.2518	0.2504	0.2475	0.2449	0.2231
0.516129032258065	0.2514	0.251	0.2498	0.2424	0.2403	0.2225
0.548387096774194	0.2465	0.2463	0.2452	0.2381	0.2364	0.2171
0.580645161290323	0.2418	0.2415	0.2404	0.2285	0.222	0.2081
0.612903225806452	0.222	0.2216	0.2207	0.2184	0.213	0.2054
0.645161290322581	0.2188	0.2184	0.2175	0.2146	0.2119	0.2019
0.67741935483871	0.2169	0.2166	0.2154	0.2125	0.2104	0.2013
0.709677419354839	0.2134	0.2132	0.212	0.2094	0.2077	0.1917
0.741935483870968	0.2132	0.2129	0.2117	0.207	0.1979	0.1822
0.774193548387097	0.1952	0.1949	0.194	0.1917	0.1897	0.1814
0.806451612903226	0.1951	0.1948	0.1938	0.1913	0.1894	0.1742
0.838709677419355	0.1943	0.194	0.1926	0.191	0.1828	0.1705
0.870967741935484	0.183	0.1827	0.1817	0.1793	0.1774	0.1595
0.903225806451613	0.1769	0.1767	0.1733	0.1662	0.1644	0.1559
0.935483870967742	0.1696	0.1693	0.1684	0.1616	0.1604	0.155
0.967741935483871	0.07247	0.07229	0.07156	0.0442	0.0329	0.0134

0.1	0.38038	0.37997	0.37834	0.37474	0.37193	0.34131
			Average of yearly averages:		0.2312	

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

Data used for this run:
Output File: CACornG
Metfile: w23232.dvf
PRZM scenario: CAcornC.txt
EXAMS environment file: pond298.exv
Chemical Name: Topramezone

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	363.69	g/mol	
Henry's Law Const.	henry		atm-m^3/mol	
Vapor Pressure	vapr	7.5e-13	torr	
Solubility	sol	15000	mg/L	
Kd	Kd	2.8	mg/L	
Koc	Koc		mg/L	

Photolysis half-life kdp 0 days Half-life
Aerobic Aquatic Metabolism kbacw 0 days Halfife
Anaerobic Aquatic Metabolism kbacs 30.52 days Halfife
Aerobic Soil Metabolism asm 241.28 days Halfife
Hydrolysis: pH 7 0 days Half-life
Method: CAM 1 integer See PRZM manual
Incorporation Depth: DEPI 4 cm
Application Rate: TAPP 0.0246 kg/ha
Application Efficiency: APPEFF 0.99 fraction
Spray Drift DRFT 0.01 fraction of application rate applied to pond
Application Date Date 15-04 dd/mm or dd/mmm or dd-mm or dd-mmm
Record 17: FILTRA
IPSCND
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 FLSCORN0.out
Chemical: Topramezone
PRZM environment: FLsweetcornC.txt modified Satday, 12 October 2002 at 16:43:14
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 15:33:30
Metfile: w12844.dvf modified Wedday, 3 July 2002 at 09:04:30
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	0.2253	0.2246	0.2234	0.2201	0.1619	0.03992
1962	0.3151	0.3143	0.3115	0.3061	0.2766	0.2124
1963	0.4393	0.4198	0.4081	0.3915	0.3495	0.2954
1964	0.7752	0.774	0.7684	0.7473	0.6345	0.4532
1965	1.466	1.462	1.453	1.43	1.21	0.8014
1966	1.574	1.572	1.561	1.537	1.44	1.295
1967	1.485	1.482	1.473	1.451	1.435	1.326
1968	1.322	1.32	1.311	1.292	1.278	1.171
1969	1.45	1.447	1.437	1.415	1.285	1.092
1970	1.376	1.374	1.365	1.346	1.332	1.199
1971	1.228	1.226	1.215	1.193	1.095	0.9928
1972	1.93	1.926	1.907	1.797	1.504	1.15
1973	1.83	1.827	1.814	1.785	1.764	1.583
1974	1.432	1.43	1.421	1.406	1.391	1.268

1975	1.246	1.244	1.235	1.215	1.2	1.092
1976	1.156	1.153	1.144	1.127	1.029	0.9554
1977	1.112	1.11	1.106	1.094	1.083	0.9987
1978	1.241	1.239	1.232	1.208	1.109	0.9909
1979	1.184	1.182	1.174	1.156	1.143	1.037
1980	0.9661	0.9645	0.9579	0.9453	0.9354	0.8569
1981	1.214	1.211	1.2	1.157	0.9962	0.8119
1982	1.609	1.606	1.597	1.566	1.369	1.14
1983	1.759	1.755	1.748	1.722	1.602	1.428
1984	1.794	1.791	1.777	1.703	1.62	1.522
1985	1.731	1.728	1.716	1.69	1.671	1.5
1986	1.445	1.442	1.433	1.412	1.396	1.284
1987	1.621	1.618	1.607	1.575	1.38	1.181
1988	1.545	1.542	1.532	1.508	1.49	1.369
1989	1.356	1.354	1.344	1.323	1.307	1.196
1990	1.167	1.165	1.158	1.14	1.126	1.041

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	1.93	1.926	1.907	1.797	1.764	1.583
0.0645161290322581	1.83	1.827	1.814	1.785	1.671	1.522
0.0967741935483871	1.794	1.791	1.777	1.722	1.62	1.5
0.129032258064516	1.759	1.755	1.748	1.703	1.602	1.428
0.161290322580645	1.731	1.728	1.716	1.69	1.504	1.369
0.193548387096774	1.621	1.618	1.607	1.575	1.49	1.326
0.225806451612903	1.609	1.606	1.597	1.566	1.44	1.295
0.258064516129032	1.574	1.572	1.561	1.537	1.435	1.284
0.290322580645161	1.545	1.542	1.532	1.508	1.396	1.268
0.32258064516129	1.485	1.482	1.473	1.451	1.391	1.199
0.354838709677419	1.466	1.462	1.453	1.43	1.38	1.196
0.387096774193548	1.45	1.447	1.437	1.415	1.369	1.181
0.419354838709677	1.445	1.442	1.433	1.412	1.332	1.171
0.451612903225806	1.432	1.43	1.421	1.406	1.307	1.15
0.483870967741936	1.376	1.374	1.365	1.346	1.285	1.14
0.516129032258065	1.356	1.354	1.344	1.323	1.278	1.092
0.548387096774194	1.322	1.32	1.311	1.292	1.21	1.092
0.580645161290323	1.246	1.244	1.235	1.215	1.2	1.041
0.612903225806452	1.241	1.239	1.232	1.208	1.143	1.037
0.645161290322581	1.228	1.226	1.215	1.193	1.126	0.9987
0.67741935483871	1.214	1.211	1.2	1.157	1.109	0.9928
0.709677419354839	1.184	1.182	1.174	1.156	1.095	0.9909
0.741935483870968	1.167	1.165	1.158	1.14	1.083	0.9554
0.774193548387097	1.156	1.153	1.144	1.127	1.029	0.8569

0.806451612903226	1.112	1.11	1.106	1.094	0.9962	0.8119
0.838709677419355	0.9661	0.9645	0.9579	0.9453	0.9354	0.8014
0.870967741935484	0.7752	0.774	0.7684	0.7473	0.6345	0.4532
0.903225806451613	0.4393	0.4198	0.4081	0.3915	0.3495	0.2954
0.935483870967742	0.3151	0.3143	0.3115	0.3061	0.2766	0.2124
0.967741935483871	0.2253	0.2246	0.2234	0.2201	0.1619	0.03992

0.1 1.7905 1.7874 1.7741 1.7201 1.6182 1.4928

Average of yearly averages: 1.042764

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

Data used for this run:
Output File: FLSCORN0
Metfile: w12844.dvf
PRZM scenario: FLsweetcornC.txt
EXAMS environment file: pond298.exv
Chemical Name: Topramezone

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	363.69	g/mol	
Henry's Law Const.	henry		atm-m^3/mol	
Vapor Pressure	vapr	7.5e-13	torr	
Solubility	sol	15000	mg/L	
Kd	Kd	2.8	mg/L	
Koc	Koc		mg/L	
Photolysis half-life	kdp	0	days	Half-life
Aerobic Aquatic Metabolism	kbacw	0	days	Halfife
Anaerobic Aquatic Metabolism	kbacs	30.52	days	Halfife
Aerobic Soil Metabolism	asm	241.28	days	Halfife
Hydrolysis:	pH 7	0	days	Half-life
Method:	CAM	1	integer	See PRZM manual
Incorporation Depth:	DEPI	4	cm	
Application Rate:	TAPP	0.0246	kg/ha	
Application Efficiency:	APPEFF	0.95	fraction	
Spray Drift	DRFT	0.05	fraction of application rate applied to pond	
Application Date	Date	21-10	dd/mm or dd/mmm or dd-mm or dd-mmm	
Record 17:	FILTRA			
	IPSCND			
	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 FLSCRN0g.out
Chemical: Topramezone
PRZM environment: FLsweetcornC.txt modified Satday, 12 October 2002 at 16:43:14
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 15:33:30
Metfile: w12844.dvf modified Wedday, 3 July 2002 at 09:04:30
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	0.1835	0.1827	0.1822	0.1797	0.1289	0.03179
1962	0.2403	0.2399	0.2372	0.2332	0.2124	0.1705
1963	0.3497	0.3293	0.3163	0.2971	0.2621	0.227
1964	0.677	0.6759	0.6711	0.649	0.54	0.3696
1965	1.38	1.377	1.368	1.347	1.127	0.717
1966	1.481	1.479	1.469	1.446	1.356	1.22
1967	1.398	1.396	1.387	1.366	1.351	1.244
1968	1.221	1.219	1.211	1.193	1.181	1.075
1969	1.335	1.332	1.322	1.303	1.176	0.9874
1970	1.268	1.266	1.258	1.24	1.227	1.096
1971	1.1	1.098	1.088	1.067	0.9738	0.8789
1972	1.832	1.827	1.809	1.697	1.4	1.043
1973	1.737	1.733	1.721	1.694	1.674	1.494
1974	1.323	1.321	1.313	1.298	1.285	1.165
1975	1.127	1.125	1.117	1.099	1.086	0.9817
1976	1.022	1.02	1.011	0.9965	0.9026	0.8379
1977	0.9854	0.9838	0.9805	0.9707	0.9608	0.8818
1978	1.111	1.109	1.102	1.079	0.984	0.8729
1979	1.06	1.058	1.05	1.034	1.022	0.9209
1980	0.8321	0.8308	0.8251	0.8146	0.8061	0.7328
1981	1.081	1.078	1.068	1.026	0.8662	0.6857
1982	1.494	1.491	1.483	1.453	1.255	1.028
1983	1.65	1.646	1.639	1.614	1.499	1.329
1984	1.689	1.686	1.673	1.596	1.519	1.426
1985	1.629	1.626	1.615	1.59	1.572	1.403
1986	1.333	1.33	1.321	1.302	1.287	1.178
1987	1.507	1.504	1.494	1.463	1.268	1.071
1988	1.437	1.434	1.424	1.402	1.386	1.268
1989	1.24	1.238	1.229	1.209	1.195	1.088
1990	1.043	1.042	1.035	1.019	1.007	0.927

Sorted results
Prob. Peak 96 hr 21 Day 60 Day 90 Day Yearly

0.0322580645161290	1.832	1.827	1.809	1.697	1.674	1.494
0.0645161290322581	1.737	1.733	1.721	1.694	1.572	1.426
0.0967741935483871	1.689	1.686	1.673	1.614	1.519	1.403
0.129032258064516	1.65	1.646	1.639	1.596	1.499	1.329
0.161290322580645	1.629	1.626	1.615	1.59	1.4	1.268
0.193548387096774	1.507	1.504	1.494	1.463	1.386	1.244
0.225806451612903	1.494	1.491	1.483	1.453	1.356	1.22
0.258064516129032	1.481	1.479	1.469	1.446	1.351	1.178
0.290322580645161	1.437	1.434	1.424	1.402	1.287	1.165
0.32258064516129	1.398	1.396	1.387	1.366	1.285	1.096
0.354838709677419	1.38	1.377	1.368	1.347	1.268	1.088
0.387096774193548	1.335	1.332	1.322	1.303	1.255	1.075
0.419354838709677	1.333	1.33	1.321	1.302	1.227	1.071
0.451612903225806	1.323	1.321	1.313	1.298	1.195	1.043
0.483870967741936	1.268	1.266	1.258	1.24	1.181	1.028
0.516129032258065	1.24	1.238	1.229	1.209	1.176	0.9874
0.548387096774194	1.221	1.219	1.211	1.193	1.127	0.9817
0.580645161290323	1.127	1.125	1.117	1.099	1.086	0.927
0.612903225806452	1.111	1.109	1.102	1.079	1.022	0.9209
0.645161290322581	1.1	1.098	1.088	1.067	1.007	0.8818
0.67741935483871	1.081	1.078	1.068	1.034	0.984	0.8789
0.709677419354839	1.06	1.058	1.05	1.026	0.9738	0.8729
0.741935483870968	1.043	1.042	1.035	1.019	0.9608	0.8379
0.774193548387097	1.022	1.02	1.011	0.9965	0.9026	0.7328
0.806451612903226	0.9854	0.9838	0.9805	0.9707	0.8662	0.717
0.838709677419355	0.8321	0.8308	0.8251	0.8146	0.8061	0.6857
0.870967741935484	0.677	0.6759	0.6711	0.649	0.54	0.3696
0.903225806451613	0.3497	0.3293	0.3163	0.2971	0.2621	0.227
0.935483870967742	0.2403	0.2399	0.2372	0.2332	0.2124	0.1705
0.967741935483871	0.1835	0.1827	0.1822	0.1797	0.1289	0.03179

0.1	1.6851	1.682	1.6696	1.6122	1.517	1.3956

Average of yearly averages: 0.945029666666667

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

Data used for this run:
Output File: FLSCRN0g
Metfile: w12844.dvf
PRZM scenario: FLsweetcornC.txt
EXAMS environment file: pond298.exv
Chemical Name: Topramezone
Description Variable Name Value Units Comments

Molecular weight mwt 363.69 g/mol
Henry's Law Const. henry atm-m^3/mol
Vapor Pressure vapr 7.5e-13 torr
Solubility sol 15000 mg/L
Kd Kd 2.8 mg/L
Koc Koc mg/L
Photolysis half-life kdp 0 days Half-life
Aerobic Aquatic Metabolism kbacw 0 days Halfife
Anaerobic Aquatic Metabolism kbacs 30.52 days Halfife
Aerobic Soil Metabolism asm 241.28 days Halfife
Hydrolysis: pH 7 0 days Half-life
Method: CAM 1 integer See PRZM manual
Incorporation Depth: DEPI 4 cm
Application Rate: TAPP 0.0246 kg/ha
Application Efficiency: APPEFF 0.99 fraction
Spray Drift DRFT 0.01 fraction of application rate applied to pond
Application Date Date 21-10 dd/mm or dd/mmm or dd-mm or dd-mmm
Record 17: FILTRA
IPSCND
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 ILCorn0.out
Chemical: Topramezone
PRZM environment: ILCornC.txt modified Satday, 12 October 2002 at 17:01:38
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 15:33:30
Metfile: w14923.dvf modified Wedday, 3 July 2002 at 09:04:40
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	0.1374	0.1371	0.1363	0.1342	0.1326	0.07712
1962	0.4397	0.439	0.4361	0.4296	0.4257	0.3076
1963	0.4982	0.4973	0.4937	0.4859	0.4805	0.4315
1964	0.5683	0.5674	0.5649	0.5582	0.5517	0.4944
1965	0.5851	0.5843	0.5815	0.5759	0.5712	0.5238
1966	0.9204	0.9189	0.9144	0.9074	0.8985	0.7252
1967	1.12	1.118	1.113	1.098	1.085	0.9261
1968	0.9825	0.9814	0.9774	0.9748	0.9685	0.9293
1969	0.8894	0.8882	0.8832	0.8783	0.8735	0.8305

1970	1.159	1.157	1.15	1.137	1.124	0.9526
1971	1.055	1.053	1.048	1.041	1.038	0.9833
1972	1.15	1.149	1.144	1.141	1.133	1.017
1973	1.101	1.099	1.096	1.087	1.075	1.006
1974	1.337	1.335	1.328	1.312	1.298	1.125
1975	1.159	1.158	1.154	1.151	1.145	1.096
1976	1.118	1.116	1.112	1.108	1.099	1.022
1977	1.097	1.095	1.092	1.076	1.067	0.999
1978	1.098	1.096	1.09	1.076	1.064	0.9846
1979	0.9709	0.9695	0.9639	0.9561	0.9527	0.9093
1980	1.072	1.07	1.065	1.052	1.041	0.9301
1981	0.9408	0.9393	0.9355	0.9293	0.9282	0.8917
1982	0.9668	0.9654	0.9616	0.955	0.946	0.8675
1983	0.9978	0.9963	0.9907	0.9742	0.9612	0.8791
1984	1.065	1.063	1.056	1.044	1.034	0.9324
1985	1.068	1.067	1.06	1.046	1.035	0.9509
1986	1.147	1.146	1.141	1.13	1.118	0.9971
1987	1.251	1.249	1.242	1.226	1.214	1.084
1988	1.137	1.136	1.129	1.115	1.106	1.051
1989	1.019	1.017	1.011	1.002	0.9962	0.9508
1990	1.013	1.012	1.007	1	0.9917	0.9168

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	1.337	1.335	1.328	1.312	1.298	1.125
0.0645161290322581	1.251	1.249	1.242	1.226	1.214	1.096
0.0967741935483871	1.159	1.158	1.154	1.151	1.145	1.084
0.129032258064516	1.159	1.157	1.15	1.141	1.133	1.051
0.161290322580645	1.15	1.149	1.144	1.137	1.124	1.022
0.193548387096774	1.147	1.146	1.141	1.13	1.118	1.017
0.225806451612903	1.137	1.136	1.129	1.115	1.106	1.006
0.258064516129032	1.12	1.118	1.113	1.108	1.099	0.999
0.290322580645161	1.118	1.116	1.112	1.098	1.085	0.9971
0.32258064516129	1.101	1.099	1.096	1.087	1.075	0.9846
0.354838709677419	1.098	1.096	1.092	1.076	1.067	0.9833
0.387096774193548	1.097	1.095	1.09	1.076	1.064	0.9526
0.419354838709677	1.072	1.07	1.065	1.052	1.041	0.9509
0.451612903225806	1.068	1.067	1.06	1.046	1.038	0.9508
0.483870967741936	1.065	1.063	1.056	1.044	1.035	0.9324
0.516129032258065	1.055	1.053	1.048	1.041	1.034	0.9301
0.548387096774194	1.019	1.017	1.011	1.002	0.9962	0.9293
0.580645161290323	1.013	1.012	1.007	1	0.9917	0.9261
0.612903225806452	0.9978	0.9963	0.9907	0.9748	0.9685	0.9168

0.645161290322581	0.9825	0.9814	0.9774	0.9742	0.9612	0.9093
0.67741935483871	0.9709	0.9695	0.9639	0.9561	0.9527	0.8917
0.709677419354839	0.9668	0.9654	0.9616	0.955	0.946	0.8791
0.741935483870968	0.9408	0.9393	0.9355	0.9293	0.9282	0.8675
0.774193548387097	0.9204	0.9189	0.9144	0.9074	0.8985	0.8305
0.806451612903226	0.8894	0.8882	0.8832	0.8783	0.8735	0.7252
0.838709677419355	0.5851	0.5843	0.5815	0.5759	0.5712	0.5238
0.870967741935484	0.5683	0.5674	0.5649	0.5582	0.5517	0.4944
0.903225806451613	0.4982	0.4973	0.4937	0.4859	0.4805	0.4315
0.935483870967742	0.4397	0.439	0.4361	0.4296	0.4257	0.3076
0.967741935483871	0.1374	0.1371	0.1363	0.1342	0.1326	0.07712
0.1	1.159	1.1579	1.1536	1.15	1.1438	1.0807

Average of yearly averages: 0.859724

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

Data used for this run:
Output File: ILCorn0
Metfile: w14923.dvf
PRZM scenario: ILCornC.txt
EXAMS environment file: pond298.exv
Chemical Name: Topramezone

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	363.39	g/mol	
Henry's Law Const.	henry		atm-m^3/mol	
Vapor Pressure	vapr	7.5e-13	torr	
Solubility	sol	15000	mg/L	
Kd	Kd	2.8	mg/L	
Koc	Koc		mg/L	
Photolysis half-life	kdp	0	days	Half-life
Aerobic Aquatic Metabolism	kbacw	0	days	Halfife
Anaerobic Aquatic Metabolism	kbacs	30.52	days	Halfife
Aerobic Soil Metabolism	asm	241.28	days	Halfife
Hydrolysis:	pH 7	0	days	Half-life
Method:	CAM	1	integer	See PRZM manual
Incorporation Depth:	DEPI	4	cm	
Application Rate:	TAPP	0.0246	kg/ha	
Application Efficiency:	APPEFF	0.95	fraction	
Spray Drift	DRFT	0.05	fraction of application rate applied to pond	
Application Date	Date	05-05	dd/mm or dd/mmm or dd-mm or dd-mmm	
Record 17:	FILTRA			
	IPSCND			

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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 ILCorn0g.out
Chemical: Topramezone
PRZM environment: ILCornC.txt modified Satday, 12 October 2002 at 17:01:38
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 15:33:30
Metfile: w14923.dvf modified Wedday, 3 July 2002 at 09:04:40
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	0.09575	0.09558	0.09497	0.09349	0.09236	0.04989
1962	0.3684	0.3678	0.3654	0.3601	0.3564	0.2517
1963	0.4027	0.402	0.3991	0.3928	0.3881	0.3502
1964	0.4485	0.4479	0.4456	0.4409	0.436	0.3918
1965	0.4441	0.4435	0.4412	0.4371	0.4331	0.4027
1966	0.775	0.7737	0.7701	0.7643	0.7571	0.5962
1967	0.972	0.9703	0.966	0.9527	0.9416	0.792
1968	0.8434	0.8426	0.8393	0.8323	0.8271	0.7843
1969	0.7113	0.7103	0.7064	0.6997	0.6965	0.673
1970	0.9827	0.9811	0.9747	0.9631	0.9527	0.7939
1971	0.8778	0.8765	0.872	0.86	0.8597	0.8211
1972	0.9687	0.9672	0.9618	0.9576	0.9519	0.8528
1973	0.9121	0.9108	0.908	0.9014	0.8918	0.8375
1974	1.153	1.151	1.145	1.132	1.119	0.9596
1975	0.9844	0.9834	0.9796	0.9713	0.9652	0.9265
1976	0.921	0.9199	0.916	0.9126	0.9065	0.8478
1977	0.9056	0.9041	0.9014	0.8886	0.8784	0.8225
1978	0.8958	0.8946	0.8896	0.8781	0.8686	0.8067
1979	0.7679	0.7668	0.7621	0.7548	0.7511	0.727
1980	0.8696	0.8685	0.8648	0.8545	0.8444	0.7477
1981	0.7469	0.7462	0.7433	0.737	0.7324	0.7071
1982	0.7612	0.7601	0.7552	0.7512	0.7444	0.6805
1983	0.7957	0.7943	0.7895	0.7764	0.7661	0.6922
1984	0.8624	0.861	0.8553	0.8444	0.8364	0.7486
1985	0.8616	0.8604	0.8553	0.844	0.8354	0.7681
1986	0.9462	0.9452	0.9412	0.9326	0.9233	0.8164
1987	1.053	1.052	1.046	1.033	1.024	0.908
1988	0.9364	0.9352	0.9299	0.9169	0.9091	0.8739

1989	0.8166	0.8155	0.8105	0.803	0.7961	0.7694
1990	0.8073	0.8062	0.8032	0.7988	0.7908	0.733

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	1.153	1.151	1.145	1.132	1.119	0.9596
0.0645161290322581	1.053	1.052	1.046	1.033	1.024	0.9265
0.0967741935483871	0.9844	0.9834	0.9796	0.9713	0.9652	0.908
0.129032258064516	0.9827	0.9811	0.9747	0.9631	0.9527	0.8739
0.161290322580645	0.972	0.9703	0.966	0.9576	0.9519	0.8528
0.193548387096774	0.9687	0.9672	0.9618	0.9527	0.9416	0.8478
0.225806451612903	0.9462	0.9452	0.9412	0.9326	0.9233	0.8375
0.258064516129032	0.9364	0.9352	0.9299	0.9169	0.9091	0.8225
0.290322580645161	0.921	0.9199	0.916	0.9126	0.9065	0.8211
0.32258064516129	0.9121	0.9108	0.908	0.9014	0.8918	0.8164
0.354838709677419	0.9056	0.9041	0.9014	0.8886	0.8784	0.8067
0.387096774193548	0.8958	0.8946	0.8896	0.8781	0.8686	0.7939
0.419354838709677	0.8778	0.8765	0.872	0.86	0.8597	0.792
0.451612903225806	0.8696	0.8685	0.8648	0.8545	0.8444	0.7843
0.483870967741936	0.8624	0.861	0.8553	0.8444	0.8364	0.7694
0.516129032258065	0.8616	0.8604	0.8553	0.844	0.8354	0.7681
0.548387096774194	0.8434	0.8426	0.8393	0.8323	0.8271	0.7486
0.580645161290323	0.8166	0.8155	0.8105	0.803	0.7961	0.7477
0.612903225806452	0.8073	0.8062	0.8032	0.7988	0.7908	0.733
0.645161290322581	0.7957	0.7943	0.7895	0.7764	0.7661	0.727
0.67741935483871	0.775	0.7737	0.7701	0.7643	0.7571	0.7071
0.709677419354839	0.7679	0.7668	0.7621	0.7548	0.7511	0.6922
0.741935483870968	0.7612	0.7601	0.7552	0.7512	0.7444	0.6805
0.774193548387097	0.7469	0.7462	0.7433	0.737	0.7324	0.673
0.806451612903226	0.7113	0.7103	0.7064	0.6997	0.6965	0.5962
0.838709677419355	0.4485	0.4479	0.4456	0.4409	0.436	0.4027
0.870967741935484	0.4441	0.4435	0.4412	0.4371	0.4331	0.3918
0.903225806451613	0.4027	0.402	0.3991	0.3928	0.3881	0.3502
0.935483870967742	0.3684	0.3678	0.3654	0.3601	0.3564	0.2517
0.967741935483871	0.09575	0.09558	0.09497	0.09349	0.09236	0.04989

0.1	0.98423	0.98317	0.97911	0.97048	0.96395	0.90459

Average of yearly averages: 0.704403

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

Data used for this run:

Output File: ILCorn0g
Metfile: w14923.dvf
PRZM scenario: ILCornC.txt
EXAMS environment file: pond298.exv
Chemical Name: Topramezone

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	363.39	g/mol	
Henry's Law Const.	henry		atm-m^3/mol	
Vapor Pressure	vapr	7.5e-13	torr	
Solubility	sol	15000	mg/L	
Kd	Kd	2.8	mg/L	
Koc	Koc		mg/L	
Photolysis half-life	kdp	0	days	Half-life
Aerobic Aquatic Metabolism	kbacw	0	days	Halfife
Anaerobic Aquatic Metabolism	kbacs	30.52	days	Halfife
Aerobic Soil Metabolism	asm	241.28	days	Halfife
Hydrolysis:	pH 7	0	days	Half-life
Method:	CAM	1	integer	See PRZM manual
Incorporation Depth:	DEPI	4	cm	
Application Rate:	TAPP	0.0246	kg/ha	
Application Efficiency:	APPEFF	0.99	fraction	
Spray Drift	DRFT	0.01	fraction of application rate applied to pond	
Application Date	Date	05-05	dd/mm or dd/mmm or dd-mm or dd-mmm	
Record 17:	FILTRA			
	IPSCND			
	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 MSCorn.out
Chemical: Topramezone
PRZM environment: MScornC.txt modified Satday, 12 October 2002 at 17:06:02
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 15:33:30
Metfile: w13893.dvf modified Wedday, 3 July 2002 at 09:06:20
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	0.3912	0.3899	0.3859	0.381	0.3763	0.2608
1962	0.4378	0.4369	0.4337	0.4273	0.4231	0.3978

1963	0.5736	0.5726	0.5684	0.559	0.5517	0.4977
1964	0.9636	0.9618	0.9542	0.9376	0.9252	0.7583
1965	0.9319	0.93	0.9253	0.9111	0.9008	0.824
1966	1.098	1.096	1.088	1.072	1.059	0.9507
1967	1.021	1.019	1.012	0.9987	0.9885	0.9317
1968	1.002	1	0.9928	0.9865	0.9777	0.8884
1969	0.9987	0.9975	0.9919	0.9781	0.967	0.9072
1970	1.075	1.073	1.069	1.053	1.04	0.9295
1971	0.9358	0.9346	0.9294	0.9183	0.909	0.8598
1972	0.8665	0.8652	0.8597	0.8467	0.8375	0.7957
1973	1.369	1.367	1.358	1.337	1.319	1.093
1974	1.447	1.444	1.435	1.411	1.392	1.257
1975	1.27	1.268	1.26	1.246	1.236	1.179
1976	1.336	1.333	1.321	1.303	1.294	1.124
1977	1.314	1.312	1.303	1.283	1.268	1.22
1978	1.511	1.509	1.499	1.475	1.456	1.288
1979	1.437	1.435	1.426	1.408	1.393	1.275
1980	1.21	1.207	1.198	1.187	1.179	1.14
1981	1.166	1.164	1.157	1.143	1.131	1.086
1982	1.273	1.271	1.263	1.245	1.23	1.115
1983	1.336	1.334	1.325	1.303	1.286	1.154
1984	1.494	1.492	1.481	1.458	1.44	1.263
1985	1.563	1.561	1.55	1.525	1.506	1.352
1986	1.302	1.301	1.295	1.282	1.272	1.226
1987	1.2	1.198	1.193	1.181	1.172	1.138
1988	1.186	1.184	1.178	1.161	1.147	1.092
1989	1.03	1.028	1.023	1.009	0.9985	0.9749
1990	1.064	1.062	1.056	1.041	1.03	0.965

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	1.563	1.561	1.55	1.525	1.506	1.352
0.0645161290322581	1.511	1.509	1.499	1.475	1.456	1.288
0.0967741935483871	1.494	1.492	1.481	1.458	1.44	1.275
0.129032258064516	1.447	1.444	1.435	1.411	1.393	1.263
0.161290322580645	1.437	1.435	1.426	1.408	1.392	1.257
0.193548387096774	1.369	1.367	1.358	1.337	1.319	1.226
0.225806451612903	1.336	1.334	1.325	1.303	1.294	1.22
0.258064516129032	1.336	1.333	1.321	1.303	1.286	1.179
0.290322580645161	1.314	1.312	1.303	1.283	1.272	1.154
0.32258064516129	1.302	1.301	1.295	1.282	1.268	1.14
0.354838709677419	1.273	1.271	1.263	1.246	1.236	1.138
0.387096774193548	1.27	1.268	1.26	1.245	1.23	1.124

0.419354838709677	1.21	1.207	1.198	1.187	1.179	1.115
0.451612903225806	1.2	1.198	1.193	1.181	1.172	1.093
0.483870967741936	1.186	1.184	1.178	1.161	1.147	1.092
0.516129032258065	1.166	1.164	1.157	1.143	1.131	1.086
0.548387096774194	1.098	1.096	1.088	1.072	1.059	0.9749
0.580645161290323	1.075	1.073	1.069	1.053	1.04	0.965
0.612903225806452	1.064	1.062	1.056	1.041	1.03	0.9507
0.645161290322581	1.03	1.028	1.023	1.009	0.9985	0.9317
0.67741935483871	1.021	1.019	1.012	0.9987	0.9885	0.9295
0.709677419354839	1.002	1	0.9928	0.9865	0.9777	0.9072
0.741935483870968	0.9987	0.9975	0.9919	0.9781	0.967	0.8884
0.774193548387097	0.9636	0.9618	0.9542	0.9376	0.9252	0.8598
0.806451612903226	0.9358	0.9346	0.9294	0.9183	0.909	0.824
0.838709677419355	0.9319	0.93	0.9253	0.9111	0.9008	0.7957
0.870967741935484	0.8665	0.8652	0.8597	0.8467	0.8375	0.7583
0.903225806451613	0.5736	0.5726	0.5684	0.559	0.5517	0.4977
0.935483870967742	0.4378	0.4369	0.4337	0.4273	0.4231	0.3978
0.967741935483871	0.3912	0.3899	0.3859	0.381	0.3763	0.2608

0.1 1.4893 1.4872 1.4764 1.4533 1.4353 1.2738

Average of yearly averages: 0.998116666666667

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

Data used for this run:
Output File: MSCorn
Metfile: w13893.dvf
PRZM scenario: MScornC.txt
EXAMS environment file: pond298.exv
Chemical Name: Topramezone

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	363.69	g/mol	
Henry's Law Const.	henry		atm-m^3/mol	
Vapor Pressure	vapr	7.5e-13	torr	
Solubility	sol	15000	mg/L	
Kd	Kd	2.8	mg/L	
Koc	Koc		mg/L	
Photolysis half-life	kdp	0	days	Half-life
Aerobic Aquatic Metabolism	kbacw	0	days	Halfife
Anaerobic Aquatic Metabolism	kbacs	30.52	days	Halfife
Aerobic Soil Metabolism	asm	241.28	days	Halfife
Hydrolysis:	pH 7	0	days	Half-life
Method:	CAM	1	integer	See PRZM manual

Incorporation Depth: DEPI 4 cm
Application Rate: TAPP 0.0246 kg/ha
Application Efficiency: APPEFF 0.95 fraction
Spray Drift DRFT 0.05 fraction of application rate applied to pond
Application Date Date 15-04 dd/mm or dd/mmm or dd-mm or dd-mmm
Record 17: FILTRA
IPSCND
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 MSCorng.out
Chemical: Topramezone
PRZM environment: MScornC.txt modified Satday, 12 October 2002 at 17:06:02
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 15:33:30
Metfile: w13893.dvf modified Wedday, 3 July 2002 at 09:06:20
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	0.3581	0.3575	0.3555	0.3519	0.3433	0.2393
1962	0.3778	0.3771	0.3744	0.3689	0.3651	0.3457
1963	0.4908	0.4898	0.4857	0.4772	0.4717	0.4218
1964	0.8624	0.8607	0.8538	0.8388	0.8275	0.672
1965	0.8302	0.8285	0.8247	0.8122	0.8029	0.7237
1966	0.9714	0.9699	0.9633	0.9487	0.9369	0.8428
1967	0.8809	0.8795	0.8738	0.861	0.8525	0.8124
1968	0.8771	0.8754	0.8687	0.8623	0.855	0.7591
1969	0.8398	0.8388	0.8344	0.823	0.8136	0.7728
1970	0.9163	0.9149	0.9112	0.8978	0.8866	0.7913
1971	0.769	0.7681	0.7645	0.757	0.7516	0.7154
1972	0.6941	0.6931	0.6888	0.6785	0.6714	0.6468
1973	1.214	1.212	1.204	1.185	1.169	0.9542
1974	1.302	1.3	1.292	1.27	1.252	1.124
1975	1.112	1.11	1.103	1.09	1.079	1.042
1976	1.2	1.198	1.187	1.171	1.164	0.984
1977	1.152	1.151	1.143	1.125	1.112	1.083
1978	1.362	1.359	1.351	1.329	1.311	1.154
1979	1.284	1.282	1.274	1.257	1.244	1.141
1980	1.074	1.072	1.063	1.055	1.047	1.001
1981	1.018	1.017	1.012	1.002	0.9944	0.946

1982	1.111	1.109	1.102	1.086	1.073	0.9755
1983	1.182	1.18	1.171	1.152	1.137	1.016
1984	1.344	1.341	1.332	1.31	1.294	1.129
1985	1.413	1.411	1.401	1.379	1.361	1.221
1986	1.183	1.181	1.176	1.164	1.155	1.091
1987	1.076	1.075	1.07	1.06	1.052	0.9989
1988	1.02	1.019	1.013	0.9987	0.9867	0.9516
1989	0.8917	0.8907	0.8864	0.8773	0.8707	0.8288
1990	0.8937	0.8924	0.8876	0.8748	0.8647	0.8183

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	1.413	1.411	1.401	1.379	1.361	1.221
0.0645161290322581	1.362	1.359	1.351	1.329	1.311	1.154
0.0967741935483871	1.344	1.341	1.332	1.31	1.294	1.141
0.129032258064516	1.302	1.3	1.292	1.27	1.252	1.129
0.161290322580645	1.284	1.282	1.274	1.257	1.244	1.124
0.193548387096774	1.214	1.212	1.204	1.185	1.169	1.091
0.225806451612903	1.2	1.198	1.187	1.171	1.164	1.083
0.258064516129032	1.183	1.181	1.176	1.164	1.155	1.042
0.290322580645161	1.182	1.18	1.171	1.152	1.137	1.016
0.32258064516129	1.152	1.151	1.143	1.125	1.112	1.001
0.354838709677419	1.112	1.11	1.103	1.09	1.079	0.9989
0.387096774193548	1.111	1.109	1.102	1.086	1.073	0.984
0.419354838709677	1.076	1.075	1.07	1.06	1.052	0.9755
0.451612903225806	1.074	1.072	1.063	1.055	1.047	0.9542
0.483870967741936	1.02	1.019	1.013	1.002	0.9944	0.9516
0.516129032258065	1.018	1.017	1.012	0.9987	0.9867	0.946
0.548387096774194	0.9714	0.9699	0.9633	0.9487	0.9369	0.8428
0.580645161290323	0.9163	0.9149	0.9112	0.8978	0.8866	0.8288
0.612903225806452	0.8937	0.8924	0.8876	0.8773	0.8707	0.8183
0.645161290322581	0.8917	0.8907	0.8864	0.8748	0.8647	0.8124
0.67741935483871	0.8809	0.8795	0.8738	0.8623	0.855	0.7913
0.709677419354839	0.8771	0.8754	0.8687	0.861	0.8525	0.7728
0.741935483870968	0.8624	0.8607	0.8538	0.8388	0.8275	0.7591
0.774193548387097	0.8398	0.8388	0.8344	0.823	0.8136	0.7237
0.806451612903226	0.8302	0.8285	0.8247	0.8122	0.8029	0.7154
0.838709677419355	0.769	0.7681	0.7645	0.757	0.7516	0.672
0.870967741935484	0.6941	0.6931	0.6888	0.6785	0.6714	0.6468
0.903225806451613	0.4908	0.4898	0.4857	0.4772	0.4717	0.4218
0.935483870967742	0.3778	0.3771	0.3744	0.3689	0.3651	0.3457
0.967741935483871	0.3581	0.3575	0.3555	0.3519	0.3433	0.2393

0.1 1.3398 1.3369 1.328 1.306 1.2898 1.1398

Average of yearly averages: 0.873413333333334

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

Data used for this run:
Output File: MSCorng
Metfile: w13893.dvf
PRZM scenario: MScornC.txt
EXAMS environment file: pond298.exv
Chemical Name: Topramezone

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	363.69	g/mol	
Henry's Law Const.	henry		atm-m^3/mol	
Vapor Pressure	vapr	7.5e-13	torr	
Solubility	sol	15000	mg/L	
Kd	Kd	2.8	mg/L	
Koc	Koc		mg/L	
Photolysis half-life	kdp	0	days	Half-life
Aerobic Aquatic Metabolism	kbacw	0	days	Halfife
Anaerobic Aquatic Metabolism	kbacs	30.52	days	Halfife
Aerobic Soil Metabolism	asm	241.28	days	Halfife
Hydrolysis:	pH 7	0	days	Half-life
Method:	CAM	1	integer	See PRZM manual
Incorporation Depth:	DEPI	4	cm	
Application Rate:	TAPP	0.0246	kg/ha	
Application Efficiency:	APPEFF	0.99	fraction	
Spray Drift	DRFT	0.01	fraction of application rate applied to pond	
Application Date	Date	15-04	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 NCCornE.out
Chemical: Topramezone
PRZM environment: NCcornEC.txt modified Satday, 12 October 2002 at 17:10:28
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 15:33:30

Metfile: w13722.dvf modified Wedday, 3 July 2002 at 09:05:50
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	0.09736	0.09712	0.09619	0.09539	0.09488	0.06226
1962	0.1828	0.1825	0.1819	0.1802	0.1782	0.1405
1963	0.3118	0.3113	0.3088	0.3038	0.3002	0.2407
1964	0.3227	0.3221	0.3197	0.318	0.3147	0.29
1965	0.3877	0.387	0.385	0.379	0.3745	0.3305
1966	0.4484	0.4477	0.4447	0.4398	0.4367	0.3859
1967	0.5198	0.519	0.5167	0.5141	0.51	0.4486
1968	0.4873	0.4867	0.4839	0.4783	0.4773	0.4455
1969	0.4855	0.4847	0.4818	0.4776	0.4733	0.4367
1970	0.4884	0.4877	0.4863	0.4812	0.4786	0.4417
1971	0.5162	0.5154	0.5121	0.5078	0.5026	0.4559
1972	0.5881	0.5871	0.5847	0.5782	0.5741	0.506
1973	0.7099	0.7087	0.7039	0.6986	0.6924	0.6008
1974	0.717	0.7159	0.7137	0.7048	0.697	0.6338
1975	0.6582	0.6573	0.6537	0.6443	0.6391	0.6037
1976	0.6495	0.6485	0.6466	0.6404	0.6331	0.5821
1977	0.6098	0.609	0.605	0.5957	0.5905	0.5549
1978	0.8681	0.8671	0.8647	0.8538	0.8436	0.7004
1979	0.7612	0.7601	0.7577	0.7525	0.7474	0.7037
1980	0.7527	0.7513	0.7457	0.7328	0.7271	0.6746
1981	0.713	0.712	0.7092	0.7008	0.6935	0.6511
1982	0.6645	0.6637	0.6598	0.6558	0.6514	0.6062
1983	0.6146	0.6137	0.6108	0.6026	0.5964	0.559
1984	0.6722	0.6712	0.6667	0.6565	0.6519	0.5852
1985	0.6703	0.6692	0.6659	0.6622	0.6568	0.5999
1986	0.6689	0.6679	0.6634	0.6542	0.6471	0.5936
1987	0.7336	0.7326	0.7306	0.7236	0.7194	0.6408
1988	0.7917	0.7905	0.7855	0.7817	0.7762	0.6921
1989	0.7762	0.775	0.7711	0.7625	0.7542	0.6907
1990	0.7596	0.7584	0.7545	0.748	0.7402	0.6754

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	0.8681	0.8671	0.8647	0.8538	0.8436	0.7037
0.0645161290322581	0.7917	0.7905	0.7855	0.7817	0.7762	0.7004
0.0967741935483871	0.7762	0.775	0.7711	0.7625	0.7542	0.6921
0.129032258064516	0.7612	0.7601	0.7577	0.7525	0.7474	0.6907
0.161290322580645	0.7596	0.7584	0.7545	0.748	0.7402	0.6754
0.193548387096774	0.7527	0.7513	0.7457	0.7328	0.7271	0.6746

0.225806451612903	0.7336	0.7326	0.7306	0.7236	0.7194	0.6511
0.258064516129032	0.717	0.7159	0.7137	0.7048	0.697	0.6408
0.290322580645161	0.713	0.712	0.7092	0.7008	0.6935	0.6338
0.32258064516129	0.7099	0.7087	0.7039	0.6986	0.6924	0.6062
0.354838709677419	0.6722	0.6712	0.6667	0.6622	0.6568	0.6037
0.387096774193548	0.6703	0.6692	0.6659	0.6565	0.6519	0.6008
0.419354838709677	0.6689	0.6679	0.6634	0.6558	0.6514	0.5999
0.451612903225806	0.6645	0.6637	0.6598	0.6542	0.6471	0.5936
0.483870967741936	0.6582	0.6573	0.6537	0.6443	0.6391	0.5852
0.516129032258065	0.6495	0.6485	0.6466	0.6404	0.6331	0.5821
0.548387096774194	0.6146	0.6137	0.6108	0.6026	0.5964	0.559
0.580645161290323	0.6098	0.609	0.605	0.5957	0.5905	0.5549
0.612903225806452	0.5881	0.5871	0.5847	0.5782	0.5741	0.506
0.645161290322581	0.5198	0.519	0.5167	0.5141	0.51	0.4559
0.67741935483871	0.5162	0.5154	0.5121	0.5078	0.5026	0.4486
0.709677419354839	0.4884	0.4877	0.4863	0.4812	0.4786	0.4455
0.741935483870968	0.4873	0.4867	0.4839	0.4783	0.4773	0.4417
0.774193548387097	0.4855	0.4847	0.4818	0.4776	0.4733	0.4367
0.806451612903226	0.4484	0.4477	0.4447	0.4398	0.4367	0.3859
0.838709677419355	0.3877	0.387	0.385	0.379	0.3745	0.3305
0.870967741935484	0.3227	0.3221	0.3197	0.318	0.3147	0.29
0.903225806451613	0.3118	0.3113	0.3088	0.3038	0.3002	0.2407
0.935483870967742	0.1828	0.1825	0.1819	0.1802	0.1782	0.1405
0.967741935483871	0.09736	0.09712	0.09619	0.09539	0.09488	0.06226

0.1	0.7747	0.77351	0.76976	0.7615	0.75352	0.69196

Average of yearly averages: 0.517742

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

Data used for this run:
Output File: NCCornE
Metfile: w13722.dvf
PRZM scenario: NCcornEC.txt
EXAMS environment file: pond298.exv
Chemical Name: Topramezone

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	363.69	g/mol	
Henry's Law Const.	henry		atm-m^3/mol	
Vapor Pressure	vapr	7.5e-13	torr	
Solubility	sol	15000	mg/L	
Kd	Kd	2.8	mg/L	

Koc Koc mg/L
Photolysis half-life kdp 0 days Half-life
Aerobic Aquatic Metabolism kbacw 0 days Halfife
Anaerobic Aquatic Metabolism kbacs 30.52 days Halfife
Aerobic Soil Metabolism asm 241.28 days Halfife
Hydrolysis: pH 7 0 days Half-life
Method: CAM 1 integer See PRZM manual
Incorporation Depth: DEPI 4 cm
Application Rate: TAPP 0.0246 kg/ha
Application Efficiency: APPEFF 0.95 fraction
Spray Drift DRFT 0.05 fraction of application rate applied to pond
Application Date Date 16-04 dd/mm or dd/mmm or dd-mm or dd-mmm
Record 17: FILTRA
IPSCND
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 NCCornEg.out
Chemical: Topramezone
PRZM environment: NCcornEC.txt modified Satday, 12 October 2002 at 17:10:28
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 15:33:30
Metfile: w13722.dvf modified Wedday, 3 July 2002 at 09:05:50
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	0.05243	0.05233	0.05199	0.05118	0.05084	0.0323
1962	0.1056	0.1054	0.1049	0.1036	0.1026	0.07684
1963	0.2073	0.207	0.2052	0.2018	0.1993	0.1521
1964	0.1991	0.1987	0.1978	0.1964	0.1947	0.1806
1965	0.2465	0.246	0.2445	0.2408	0.2377	0.2048
1966	0.2919	0.2915	0.2895	0.286	0.2832	0.2485
1967	0.3544	0.3538	0.3526	0.3502	0.3481	0.3031
1968	0.3129	0.3125	0.3108	0.307	0.3039	0.2909
1969	0.3056	0.3051	0.3033	0.2998	0.297	0.2746
1970	0.2984	0.298	0.2961	0.2935	0.2933	0.2733
1971	0.3245	0.324	0.3219	0.3186	0.3157	0.2838
1972	0.3951	0.3944	0.3932	0.3895	0.3859	0.3335
1973	0.5159	0.515	0.5113	0.5089	0.5051	0.4294
1974	0.5257	0.525	0.5235	0.5175	0.5116	0.463

1975	0.4649	0.4642	0.4615	0.455	0.4499	0.4298
1976	0.4555	0.4548	0.453	0.4488	0.4439	0.4072
1977	0.4119	0.4114	0.4087	0.4022	0.3976	0.3777
1978	0.6777	0.6768	0.6739	0.6657	0.6578	0.5289
1979	0.5686	0.5678	0.5656	0.5618	0.5572	0.5322
1980	0.5653	0.5643	0.5601	0.5503	0.5429	0.5018
1981	0.5181	0.5173	0.5158	0.5106	0.5057	0.4775
1982	0.4633	0.4627	0.4601	0.4587	0.4556	0.4303
1983	0.4157	0.4151	0.4132	0.4077	0.4028	0.3811
1984	0.4762	0.4755	0.4723	0.465	0.4592	0.4078
1985	0.4733	0.4726	0.4696	0.4668	0.4639	0.4233
1986	0.472	0.4713	0.468	0.4619	0.4573	0.4176
1987	0.5357	0.5349	0.533	0.5288	0.5271	0.4674
1988	0.6003	0.5994	0.5956	0.5902	0.587	0.5207
1989	0.5816	0.5808	0.5775	0.5717	0.5657	0.5188
1990	0.5658	0.565	0.5624	0.5576	0.5521	0.5037

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	0.6777	0.6768	0.6739	0.6657	0.6578	0.5322
0.0645161290322581	0.6003	0.5994	0.5956	0.5902	0.587	0.5289
0.0967741935483871	0.5816	0.5808	0.5775	0.5717	0.5657	0.5207
0.129032258064516	0.5686	0.5678	0.5656	0.5618	0.5572	0.5188
0.161290322580645	0.5658	0.565	0.5624	0.5576	0.5521	0.5037
0.193548387096774	0.5653	0.5643	0.5601	0.5503	0.5429	0.5018
0.225806451612903	0.5357	0.5349	0.533	0.5288	0.5271	0.4775
0.258064516129032	0.5257	0.525	0.5235	0.5175	0.5116	0.4674
0.290322580645161	0.5181	0.5173	0.5158	0.5106	0.5057	0.463
0.32258064516129	0.5159	0.515	0.5113	0.5089	0.5051	0.4303
0.354838709677419	0.4762	0.4755	0.4723	0.4668	0.4639	0.4298
0.387096774193548	0.4733	0.4726	0.4696	0.465	0.4592	0.4294
0.419354838709677	0.472	0.4713	0.468	0.4619	0.4573	0.4233
0.451612903225806	0.4649	0.4642	0.4615	0.4587	0.4556	0.4176
0.483870967741936	0.4633	0.4627	0.4601	0.455	0.4499	0.4078
0.516129032258065	0.4555	0.4548	0.453	0.4488	0.4439	0.4072
0.548387096774194	0.4157	0.4151	0.4132	0.4077	0.4028	0.3811
0.580645161290323	0.4119	0.4114	0.4087	0.4022	0.3976	0.3777
0.612903225806452	0.3951	0.3944	0.3932	0.3895	0.3859	0.3335
0.645161290322581	0.3544	0.3538	0.3526	0.3502	0.3481	0.3031
0.67741935483871	0.3245	0.324	0.3219	0.3186	0.3157	0.2909
0.709677419354839	0.3129	0.3125	0.3108	0.307	0.3039	0.2838
0.741935483870968	0.3056	0.3051	0.3033	0.2998	0.297	0.2746
0.774193548387097	0.2984	0.298	0.2961	0.2935	0.2933	0.2733

0.806451612903226	0.2919	0.2915	0.2895	0.286	0.2832	0.2485
0.838709677419355	0.2465	0.246	0.2445	0.2408	0.2377	0.2048
0.870967741935484	0.2073	0.207	0.2052	0.2018	0.1993	0.1806
0.903225806451613	0.1991	0.1987	0.1978	0.1964	0.1947	0.1521
0.935483870967742	0.1056	0.1054	0.1049	0.1036	0.1026	0.07684
0.967741935483871	0.05243	0.05233	0.05199	0.05118	0.05084	0.0323

0.1	0.5803	0.5795	0.57631	0.57071	0.56485	0.52051

Average of yearly averages: 0.362418

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

Data used for this run:
Output File: NCCornEg
Metfile: w13722.dvf
PRZM scenario: NCcornEC.txt
EXAMS environment file: pond298.exv
Chemical Name: Topramezone

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	363.69	g/mol	
Henry's Law Const.	henry		atm-m^3/mol	
Vapor Pressure	vapr	7.5e-13	torr	
Solubility	sol	15000	mg/L	
Kd	Kd	2.8	mg/L	
Koc	Koc		mg/L	
Photolysis half-life	kdp	0	days	Half-life
Aerobic Aquatic Metabolism	kbacw	0	days	Halfife
Anaerobic Aquatic Metabolism	kbacs	30.52	days	Halfife
Aerobic Soil Metabolism	asm	241.28	days	Halfife
Hydrolysis:	pH 7	0	days	Half-life
Method:	CAM	1	integer	See PRZM manual
Incorporation Depth:	DEPI	4	cm	
Application Rate:	TAPP	0.0246	kg/ha	
Application Efficiency:	APPEFF	0.99	fraction	
Spray Drift	DRFT	0.01	fraction of application rate applied to pond	
Application Date	Date	16-04	dd/mm or dd/mmm or dd-mm or dd-mmm	
Record 17:	FILTRA			
	IPSCND			
	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 NCCornWa.out
Chemical: Topramezone
PRZM environment: NCcornWC.txt modified Satday, 12 October 2002 at 18:11:14
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 16:33:30
Metfile: w03812.dvf modified Wedday, 3 July 2002 at 10:05:50
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1965	0.2146	0.2141	0.2123	0.2091	0.2065	0.1252
1966	0.3741	0.3735	0.3707	0.3659	0.3629	0.2875
1967	0.4824	0.4817	0.479	0.4726	0.4682	0.4027
1968	0.5116	0.5108	0.5075	0.5009	0.4958	0.4516
1969	0.5425	0.5416	0.5389	0.5356	0.5311	0.4808
1970	0.5065	0.5058	0.5029	0.5008	0.499	0.4731
1971	0.5795	0.5785	0.576	0.5735	0.5697	0.5057
1972	0.8249	0.8235	0.8209	0.8134	0.8059	0.6706
1973	1.024	1.023	1.016	1.002	0.9905	0.8467
1974	1.113	1.111	1.107	1.096	1.086	0.9675
1975	1.147	1.146	1.142	1.131	1.119	1.014
1976	1.143	1.142	1.135	1.12	1.109	1.022
1977	1.06	1.06	1.054	1.049	1.041	0.9772
1978	1.002	1.001	0.997	0.9868	0.9766	0.9118
1979	0.913	0.9118	0.9078	0.9003	0.8924	0.8407
1980	1.082	1.081	1.075	1.067	1.058	0.9143
1981	1.047	1.046	1.04	1.027	1.015	0.9463
1982	0.9518	0.9503	0.9478	0.9397	0.9301	0.884
1983	0.8872	0.886	0.8832	0.8762	0.8675	0.8177
1984	1.034	1.033	1.026	1.022	1.013	0.8878
1985	0.9029	0.9018	0.8987	0.89	0.8873	0.8561
1986	0.8635	0.8623	0.8585	0.847	0.8379	0.7905
1987	1.067	1.065	1.058	1.05	1.038	0.884
1988	0.9344	0.9333	0.9285	0.917	0.9093	0.8804
1989	1.122	1.121	1.117	1.108	1.098	0.9566
1990	1.098	1.097	1.09	1.082	1.076	0.9938

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.037037037037037	1.147	1.146	1.142	1.131	1.119	1.022
0.0740740740740741	1.143	1.142	1.135	1.12	1.109	1.014

0.111111111111111	1.122	1.121	1.117	1.108	1.098	0.9938
0.148148148148148	1.113	1.111	1.107	1.096	1.086	0.9772
0.185185185185185	1.098	1.097	1.09	1.082	1.076	0.9675
0.222222222222222	1.082	1.081	1.075	1.067	1.058	0.9566
0.259259259259259	1.067	1.065	1.058	1.05	1.041	0.9463
0.296296296296296	1.06	1.06	1.054	1.049	1.038	0.9143
0.333333333333333	1.047	1.046	1.04	1.027	1.015	0.9118
0.37037037037037	1.034	1.033	1.026	1.022	1.013	0.8878
0.407407407407407	1.024	1.023	1.016	1.002	0.9905	0.884
0.444444444444444	1.002	1.001	0.997	0.9868	0.9766	0.884
0.481481481481481	0.9518	0.9503	0.9478	0.9397	0.9301	0.8804
0.518518518518518	0.9344	0.9333	0.9285	0.917	0.9093	0.8561
0.555555555555556	0.913	0.9118	0.9078	0.9003	0.8924	0.8467
0.592592592592593	0.9029	0.9018	0.8987	0.89	0.8873	0.8407
0.62962962962963	0.8872	0.886	0.8832	0.8762	0.8675	0.8177
0.666666666666667	0.8635	0.8623	0.8585	0.847	0.8379	0.7905
0.703703703703704	0.8249	0.8235	0.8209	0.8134	0.8059	0.6706
0.740740740740741	0.5795	0.5785	0.576	0.5735	0.5697	0.5057
0.777777777777778	0.5425	0.5416	0.5389	0.5356	0.5311	0.4808
0.814814814814815	0.5116	0.5108	0.5075	0.5009	0.499	0.4731
0.851851851851852	0.5065	0.5058	0.5029	0.5008	0.4958	0.4516
0.888888888888889	0.4824	0.4817	0.479	0.4726	0.4682	0.4027
0.925925925925926	0.3741	0.3735	0.3707	0.3659	0.3629	0.2875
0.962962962962963	0.2146	0.2141	0.2123	0.2091	0.2065	0.1252

0.1 1.1283 1.1273 1.1224 1.1116 1.1013 0.99986

Average of yearly averages: 0.7611

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

Data used for this run:
Output File: NCCornWa
Metfile: w03812.dvf
PRZM scenario: NCcornWC.txt
EXAMS environment file: pond298.exv
Chemical Name: Topramezone

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	363.69	g/mol	
Henry's Law Const.	henry		atm-m^3/mol	
Vapor Pressure	vapr	7.5e-13	torr	
Solubility	sol	15000	mg/L	
Kd	Kd	2.8	mg/L	
Koc	Koc		mg/L	

Photolysis half-life kdp 0 days Half-life
Aerobic Aquatic Metabolism kbacw 0 days Halfife
Anaerobic Aquatic Metabolism kbacs 30.52 days Halfife
Aerobic Soil Metabolism asm 241.28 days Halfife
Hydrolysis: pH 7 0 days Half-life
Method: CAM 1 integer See PRZM manual
Incorporation Depth: DEPI 4 cm
Application Rate: TAPP 0.0246 kg/ha
Application Efficiency: APPEFF 0.95 fraction
Spray Drift DRFT 0.05 fraction of application rate applied to pond
Application Date Date 01-05 dd/mm or dd/mmm or dd-mm or dd-mmm
Record 17: FILTRA
IPSCND
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 NCCornWg.out
Chemical: Topramezone
PRZM environment: NCcornWC.txt modified Satday, 12 October 2002 at 18:11:14
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 16:33:30
Metfile: w03812.dvf modified Wedday, 3 July 2002 at 10:05:50
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1965	0.1745	0.1741	0.1726	0.17	0.1679	0.0995
1966	0.3012	0.3007	0.2984	0.2939	0.2917	0.23
1967	0.3818	0.3811	0.3787	0.3739	0.3699	0.3189
1968	0.3867	0.3861	0.3836	0.3785	0.3747	0.3449
1969	0.398	0.3973	0.3948	0.3932	0.3901	0.3561
1970	0.3474	0.3471	0.3455	0.3414	0.3413	0.3329
1971	0.412	0.4113	0.409	0.4056	0.403	0.3552
1972	0.6537	0.6526	0.6498	0.6438	0.6382	0.5178
1973	0.8546	0.8531	0.8475	0.8362	0.8264	0.6935
1974	0.9392	0.9378	0.9341	0.9255	0.9172	0.814
1975	0.9722	0.9708	0.9665	0.9572	0.9474	0.8566
1976	0.9636	0.9623	0.9569	0.9441	0.9335	0.8612
1977	0.8682	0.8674	0.8643	0.8617	0.8553	0.8103
1978	0.8066	0.8055	0.8028	0.7954	0.7874	0.7403

1979	0.7123	0.7114	0.7087	0.7044	0.6981	0.6649
1980	0.8896	0.8883	0.8837	0.8783	0.871	0.7406
1981	0.8542	0.8531	0.8482	0.8376	0.8279	0.7732
1982	0.7554	0.7543	0.7505	0.7452	0.738	0.7069
1983	0.6857	0.6847	0.6806	0.6763	0.6699	0.6368
1984	0.8368	0.8355	0.8301	0.8253	0.819	0.7087
1985	0.7188	0.7181	0.715	0.7085	0.7037	0.6746
1986	0.6574	0.6564	0.6539	0.6454	0.6388	0.6065
1987	0.8731	0.8718	0.8661	0.8577	0.8487	0.7039
1988	0.7545	0.7538	0.7507	0.7441	0.7393	0.6995
1989	0.9228	0.9212	0.918	0.9128	0.9048	0.7781
1990	0.9006	0.8993	0.8939	0.8859	0.8814	0.8166

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.037037037037037	0.9722	0.9708	0.9665	0.9572	0.9474	0.8612
0.0740740740740741	0.9636	0.9623	0.9569	0.9441	0.9335	0.8566
0.111111111111111	0.9392	0.9378	0.9341	0.9255	0.9172	0.8166
0.148148148148148	0.9228	0.9212	0.918	0.9128	0.9048	0.814
0.185185185185185	0.9006	0.8993	0.8939	0.8859	0.8814	0.8103
0.222222222222222	0.8896	0.8883	0.8837	0.8783	0.871	0.7781
0.259259259259259	0.8731	0.8718	0.8661	0.8617	0.8553	0.7732
0.296296296296296	0.8682	0.8674	0.8643	0.8577	0.8487	0.7406
0.333333333333333	0.8546	0.8531	0.8482	0.8376	0.8279	0.7403
0.37037037037037	0.8542	0.8531	0.8475	0.8362	0.8264	0.7087
0.407407407407407	0.8368	0.8355	0.8301	0.8253	0.819	0.7069
0.444444444444444	0.8066	0.8055	0.8028	0.7954	0.7874	0.7039
0.481481481481481	0.7554	0.7543	0.7507	0.7452	0.7393	0.6995
0.518518518518518	0.7545	0.7538	0.7505	0.7441	0.738	0.6935
0.555555555555556	0.7188	0.7181	0.715	0.7085	0.7037	0.6746
0.592592592592593	0.7123	0.7114	0.7087	0.7044	0.6981	0.6649
0.62962962962963	0.6857	0.6847	0.6806	0.6763	0.6699	0.6368
0.666666666666667	0.6574	0.6564	0.6539	0.6454	0.6388	0.6065
0.703703703703704	0.6537	0.6526	0.6498	0.6438	0.6382	0.5178
0.740740740740741	0.412	0.4113	0.409	0.4056	0.403	0.3561
0.777777777777778	0.398	0.3973	0.3948	0.3932	0.3901	0.3552
0.814814814814815	0.3867	0.3861	0.3836	0.3785	0.3747	0.3449
0.851851851851852	0.3818	0.3811	0.3787	0.3739	0.3699	0.3329
0.888888888888889	0.3474	0.3471	0.3455	0.3414	0.3413	0.3189
0.925925925925926	0.3012	0.3007	0.2984	0.2939	0.2917	0.23
0.962962962962963	0.1745	0.1741	0.1726	0.17	0.1679	0.0995
0.1	0.94652	0.94515	0.94094	0.93108	0.92209	0.8286

Average of yearly averages: 0.609288461538462

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

Data used for this run:
Output File: NCCornWg
Metfile: w03812.dvf
PRZM scenario: NCcornWC.txt
EXAMS environment file: pond298.exv
Chemical Name: Topramezone
Description Variable Name Value Units Comments
Molecular weight mwt 363.69 g/mol
Henry's Law Const. henry atm-m^3/mol
Vapor Pressure vapr 7.5e-13 torr
Solubility sol 15000 mg/L
Kd Kd 2.8 mg/L
Koc Koc mg/L
Photolysis half-life kdp 0 days Half-life
Aerobic Aquatic Metabolism kbacw 0 days Halfife
Anaerobic Aquatic Metabolism kbacs 30.52 days Halfife
Aerobic Soil Metabolism asm 241.28 days Halfife
Hydrolysis: pH 7 0 days Half-life
Method: CAM 1 integer See PRZM manual
Incorporation Depth: DEPI 4 cm
Application Rate: TAPP 0.0246 kg/ha
Application Efficiency: APPEFF 0.99 fraction
Spray Drift DRFT 0.01 fraction of application rate applied to pond
Application Date Date 01-05 dd/mm or dd/mmm or dd-mm or dd-mmm
Record 17: FILTRA
IPSCND
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 NDCornA.out
Chemical: Topramezone
PRZM environment: NDcornC.txt modified Satday, 12 October 2002 at 18:14:22
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 16:33:30
Metfile: w14914.dvf modified Wedday, 3 July 2002 at 10:05:52

Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	0.1731	0.1728	0.1717	0.1713	0.1706	0.1064
1962	0.3181	0.3175	0.3157	0.3125	0.3092	0.2439
1963	0.4121	0.4114	0.4098	0.4038	0.4021	0.3435
1964	0.616	0.6148	0.6099	0.5993	0.5957	0.4817
1965	0.611	0.6102	0.6072	0.6037	0.5992	0.5596
1966	0.578	0.5773	0.5745	0.5719	0.5693	0.539
1967	0.5712	0.5705	0.5683	0.5611	0.556	0.5228
1968	0.5568	0.5562	0.5539	0.5498	0.5455	0.5124
1969	0.6167	0.6157	0.6126	0.605	0.5983	0.5433
1970	0.6371	0.6365	0.6332	0.6254	0.6202	0.5763
1971	0.6919	0.6909	0.6882	0.6844	0.6788	0.6118
1972	0.7961	0.7949	0.7918	0.7814	0.7756	0.6894
1973	0.7292	0.7284	0.7251	0.7192	0.7162	0.6847
1974	0.7206	0.7194	0.7156	0.7074	0.7042	0.6656
1975	0.8502	0.8493	0.8439	0.8305	0.8221	0.725
1976	0.7698	0.769	0.7652	0.7563	0.7487	0.7178
1977	0.748	0.7468	0.7418	0.7303	0.7266	0.6821
1978	0.7981	0.797	0.7918	0.7815	0.7731	0.7035
1979	0.7768	0.7756	0.7709	0.7664	0.7606	0.7155
1980	0.7236	0.7226	0.7187	0.7164	0.7111	0.6882
1981	0.9002	0.8988	0.8931	0.8829	0.8746	0.7612
1982	0.813	0.8121	0.8081	0.8032	0.8016	0.7677
1983	0.7714	0.7702	0.7666	0.7599	0.7525	0.7216
1984	0.9012	0.8997	0.8937	0.8801	0.8696	0.7676
1985	1.07	1.068	1.063	1.05	1.044	0.9167
1986	1.039	1.038	1.033	1.024	1.014	0.9541
1987	1.027	1.026	1.02	1.008	1	0.9366
1988	0.9073	0.9062	0.9026	0.8943	0.8853	0.8627
1989	0.8806	0.8795	0.8748	0.8674	0.8604	0.8137
1990	0.8698	0.8686	0.8635	0.8583	0.85	0.7917

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	1.07	1.068	1.063	1.05	1.044	0.9541
0.0645161290322581	1.039	1.038	1.033	1.024	1.014	0.9366
0.0967741935483871	1.027	1.026	1.02	1.008	1	0.9167
0.129032258064516	0.9073	0.9062	0.9026	0.8943	0.8853	0.8627
0.161290322580645	0.9012	0.8997	0.8937	0.8829	0.8746	0.8137
0.193548387096774	0.9002	0.8988	0.8931	0.8801	0.8696	0.7917
0.225806451612903	0.8806	0.8795	0.8748	0.8674	0.8604	0.7677

0.258064516129032	0.8698	0.8686	0.8635	0.8583	0.85	0.7676
0.290322580645161	0.8502	0.8493	0.8439	0.8305	0.8221	0.7612
0.32258064516129	0.813	0.8121	0.8081	0.8032	0.8016	0.725
0.354838709677419	0.7981	0.797	0.7918	0.7815	0.7756	0.7216
0.387096774193548	0.7961	0.7949	0.7918	0.7814	0.7731	0.7178
0.419354838709677	0.7768	0.7756	0.7709	0.7664	0.7606	0.7155
0.451612903225806	0.7714	0.7702	0.7666	0.7599	0.7525	0.7035
0.483870967741936	0.7698	0.769	0.7652	0.7563	0.7487	0.6894
0.516129032258065	0.748	0.7468	0.7418	0.7303	0.7266	0.6882
0.548387096774194	0.7292	0.7284	0.7251	0.7192	0.7162	0.6847
0.580645161290323	0.7236	0.7226	0.7187	0.7164	0.7111	0.6821
0.612903225806452	0.7206	0.7194	0.7156	0.7074	0.7042	0.6656
0.645161290322581	0.6919	0.6909	0.6882	0.6844	0.6788	0.6118
0.67741935483871	0.6371	0.6365	0.6332	0.6254	0.6202	0.5763
0.709677419354839	0.6167	0.6157	0.6126	0.605	0.5992	0.5596
0.741935483870968	0.616	0.6148	0.6099	0.6037	0.5983	0.5433
0.774193548387097	0.611	0.6102	0.6072	0.5993	0.5957	0.539
0.806451612903226	0.578	0.5773	0.5745	0.5719	0.5693	0.5228
0.838709677419355	0.5712	0.5705	0.5683	0.5611	0.556	0.5124
0.870967741935484	0.5568	0.5562	0.5539	0.5498	0.5455	0.4817
0.903225806451613	0.4121	0.4114	0.4098	0.4038	0.4021	0.3435
0.935483870967742	0.3181	0.3175	0.3157	0.3125	0.3092	0.2439
0.967741935483871	0.1731	0.1728	0.1717	0.1713	0.1706	0.1064

0.1	1.01503	1.01402	1.00826	0.99663	0.98853	0.9113
			Average of yearly averages:		0.653536666666667	

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

Data used for this run:
Output File: NDCornA
Metfile: w14914.dvf
PRZM scenario: NDcornC.txt
EXAMS environment file: pond298.exv
Chemical Name: Topramezone

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	363.69	g/mol	
Henry's Law Const.	henry		atm-m^3/mol	
Vapor Pressure	vapr	7.5e-13	torr	
Solubility	sol	15000	mg/L	
Kd	Kd	2.8	mg/L	
Koc	Koc		mg/L	
Photolysis half-life	kdp	0	days	Half-life

Aerobic Aquatic Metabolism kbacw 0 days Halfife
Anaerobic Aquatic Metabolism kbacs 30.52 days Halfife
Aerobic Soil Metabolism asm 241.28 days Halfife
Hydrolysis: pH 7 0 days Half-life
Method: CAM 1 integer See PRZM manual
Incorporation Depth: DEPI 4 cm
Application Rate: TAPP 0.0246 kg/ha
Application Efficiency: APPEFF 0.95 fraction
Spray Drift DRFT 0.05 fraction of application rate applied to pond
Application Date Date 12-05 dd/mm or dd/mmm or dd-mm or dd-mmm
Record 17: FILTRA
IPSCND
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 NDCornG.out
Chemical: Topramezone
PRZM environment: NDcornC.txt modified Satday, 12 October 2002 at 18:14:22
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 16:33:30
Metfile: w14914.dvf modified Wedday, 3 July 2002 at 10:05:52
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	0.1336	0.1334	0.1326	0.1321	0.1315	0.08116
1962	0.2401	0.2397	0.2385	0.2366	0.2342	0.1853
1963	0.3067	0.3062	0.3045	0.3001	0.2998	0.2573
1964	0.4946	0.4936	0.4894	0.4807	0.4786	0.3761
1965	0.4653	0.4647	0.4625	0.4592	0.4563	0.4352
1966	0.412	0.4115	0.4098	0.4074	0.4062	0.3953
1967	0.39	0.3895	0.3883	0.3836	0.3796	0.3634
1968	0.3629	0.3625	0.361	0.3595	0.3567	0.3404
1969	0.422	0.4213	0.4184	0.4135	0.409	0.3629
1970	0.4296	0.4291	0.4271	0.4209	0.4168	0.3896
1971	0.4792	0.4785	0.4763	0.4745	0.4712	0.4209
1972	0.5788	0.5779	0.5762	0.5687	0.5653	0.4969
1973	0.512	0.5115	0.5096	0.5054	0.5023	0.4877
1974	0.504	0.5032	0.5009	0.496	0.4911	0.4641
1975	0.6319	0.6311	0.6269	0.6168	0.6093	0.5227

1976	0.556	0.5555	0.5534	0.5488	0.5454	0.5139
1977	0.5249	0.5241	0.5205	0.5124	0.5066	0.4761
1978	0.5718	0.571	0.5671	0.5601	0.5543	0.4971
1979	0.5552	0.5543	0.5511	0.5454	0.5417	0.5083
1980	0.5008	0.5004	0.4985	0.4944	0.4913	0.4791
1981	0.6713	0.6702	0.6658	0.6586	0.6528	0.554
1982	0.5843	0.5838	0.5816	0.5768	0.5733	0.5594
1983	0.5437	0.5428	0.5394	0.5349	0.5299	0.5101
1984	0.672	0.6709	0.6661	0.6557	0.6477	0.5581
1985	0.8462	0.8449	0.8407	0.8316	0.8254	0.713
1986	0.816	0.8148	0.8111	0.8062	0.799	0.7508
1987	0.7992	0.7981	0.7934	0.7841	0.7788	0.733
1988	0.6985	0.6979	0.6953	0.6896	0.6854	0.6579
1989	0.6496	0.6488	0.6454	0.64	0.6356	0.608
1990	0.6431	0.6422	0.6385	0.6334	0.6276	0.585

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	0.8462	0.8449	0.8407	0.8316	0.8254	0.7508
0.0645161290322581	0.816	0.8148	0.8111	0.8062	0.799	0.733
0.0967741935483871	0.7992	0.7981	0.7934	0.7841	0.7788	0.713
0.129032258064516	0.6985	0.6979	0.6953	0.6896	0.6854	0.6579
0.161290322580645	0.672	0.6709	0.6661	0.6586	0.6528	0.608
0.193548387096774	0.6713	0.6702	0.6658	0.6557	0.6477	0.585
0.225806451612903	0.6496	0.6488	0.6454	0.64	0.6356	0.5594
0.258064516129032	0.6431	0.6422	0.6385	0.6334	0.6276	0.5581
0.290322580645161	0.6319	0.6311	0.6269	0.6168	0.6093	0.554
0.32258064516129	0.5843	0.5838	0.5816	0.5768	0.5733	0.5227
0.354838709677419	0.5788	0.5779	0.5762	0.5687	0.5653	0.5139
0.387096774193548	0.5718	0.571	0.5671	0.5601	0.5543	0.5101
0.419354838709677	0.556	0.5555	0.5534	0.5488	0.5454	0.5083
0.451612903225806	0.5552	0.5543	0.5511	0.5454	0.5417	0.4971
0.483870967741936	0.5437	0.5428	0.5394	0.5349	0.5299	0.4969
0.516129032258065	0.5249	0.5241	0.5205	0.5124	0.5066	0.4877
0.548387096774194	0.512	0.5115	0.5096	0.5054	0.5023	0.4791
0.580645161290323	0.504	0.5032	0.5009	0.496	0.4913	0.4761
0.612903225806452	0.5008	0.5004	0.4985	0.4944	0.4911	0.4641
0.645161290322581	0.4946	0.4936	0.4894	0.4807	0.4786	0.4352
0.67741935483871	0.4792	0.4785	0.4763	0.4745	0.4712	0.4209
0.709677419354839	0.4653	0.4647	0.4625	0.4592	0.4563	0.3953
0.741935483870968	0.4296	0.4291	0.4271	0.4209	0.4168	0.3896
0.774193548387097	0.422	0.4213	0.4184	0.4135	0.409	0.3761
0.806451612903226	0.412	0.4115	0.4098	0.4074	0.4062	0.3634

0.838709677419355	0.39	0.3895	0.3883	0.3836	0.3796	0.3629
0.870967741935484	0.3629	0.3625	0.361	0.3595	0.3567	0.3404
0.903225806451613	0.3067	0.3062	0.3045	0.3001	0.2998	0.2573
0.935483870967742	0.2401	0.2397	0.2385	0.2366	0.2342	0.1853
0.967741935483871	0.1336	0.1334	0.1326	0.1321	0.1315	0.08116

0.1	0.78913	0.78808	0.78359	0.77465	0.76946	0.70749

Average of yearly averages: 0.476092

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

Data used for this run:
Output File: NDCornG
Metfile: w14914.dvf
PRZM scenario: NDcornC.txt
EXAMS environment file: pond298.exv
Chemical Name: Topramezone

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	363.69	g/mol	
Henry's Law Const.	henry		atm-m^3/mol	
Vapor Pressure	vapr	7.5e-13	torr	
Solubility	sol	15000	mg/L	
Kd	Kd	2.8	mg/L	
Koc	Koc		mg/L	
Photolysis half-life	kdp	0	days	Half-life
Aerobic Aquatic Metabolism	kbacw	0	days	Halfife
Anaerobic Aquatic Metabolism	kbacs	30.52	days	Halfife
Aerobic Soil Metabolism	asm	241.28	days	Halfife
Hydrolysis:	pH 7	0	days	Half-life
Method:	CAM	1	integer	See PRZM manual
Incorporation Depth:	DEPI	4	cm	
Application Rate:	TAPP	0.0246	kg/ha	
Application Efficiency:	APPEFF	0.99	fraction	
Spray Drift	DRFT	0.01	fraction of application rate applied to pond	
Application Date	Date	12-05	dd/mm or dd/mmm or dd-mm or dd-mmm	
Record 17:	FILTRA			
	IPSCND			
	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 OHCornA.out
Chemical: Topramezone
PRZM environment: OHCornC.txt modified Satday, 12 October 2002 at 18:15:50
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 16:33:30
Metfile: w93815.dvf modified Wedday, 3 July 2002 at 10:06:06
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	0.3134	0.3129	0.3109	0.3085	0.3069	0.1863
1962	0.4304	0.4297	0.4275	0.4229	0.4225	0.3551
1963	0.499	0.4982	0.4955	0.4929	0.4892	0.4328
1964	0.4836	0.4828	0.4796	0.4757	0.4738	0.4426
1965	0.5164	0.5155	0.512	0.5051	0.4999	0.452
1966	0.4877	0.4871	0.4844	0.4801	0.4764	0.4454
1967	0.6101	0.6091	0.6049	0.5997	0.5969	0.5142
1968	0.8423	0.841	0.8367	0.8271	0.8178	0.6838
1969	0.885	0.8837	0.8787	0.8702	0.8619	0.7781
1970	0.8077	0.8065	0.8027	0.7971	0.7904	0.7462
1971	0.7606	0.7594	0.7545	0.7454	0.7438	0.701
1972	0.8005	0.7996	0.795	0.792	0.7863	0.7139
1973	0.7869	0.7861	0.783	0.774	0.7704	0.714
1974	0.8582	0.8569	0.8528	0.8476	0.8431	0.7533
1975	0.7884	0.7876	0.7827	0.7777	0.7738	0.7398
1976	0.759	0.7578	0.7549	0.7502	0.7438	0.6998
1977	0.693	0.6919	0.6877	0.6838	0.6815	0.6592
1978	0.7063	0.7053	0.7016	0.6943	0.6904	0.6424
1979	0.6892	0.6881	0.6838	0.6783	0.6716	0.628
1980	0.8206	0.8194	0.8142	0.8055	0.7983	0.696
1981	0.857	0.8557	0.853	0.8415	0.8315	0.7536
1982	0.8702	0.869	0.8642	0.8541	0.845	0.7745
1983	0.8238	0.8225	0.8173	0.8083	0.8002	0.7546
1984	0.8551	0.8543	0.8506	0.8404	0.8317	0.7582
1985	0.7585	0.7576	0.7545	0.7518	0.7465	0.7115
1986	0.7306	0.7295	0.7259	0.7211	0.7135	0.6668
1987	0.6999	0.699	0.6941	0.6891	0.6838	0.6436
1988	0.6583	0.6571	0.6545	0.6458	0.6443	0.6163
1989	1.129	1.127	1.122	1.108	1.095	0.8696
1990	1.186	1.185	1.18	1.166	1.153	1.04

Sorted results
Prob. Peak 96 hr 21 Day 60 Day 90 Day Yearly

0.032258064516129	1.186	1.185	1.18	1.166	1.153	1.04
0.0645161290322581	1.129	1.127	1.122	1.108	1.095	0.8696
0.0967741935483871	0.885	0.8837	0.8787	0.8702	0.8619	0.7781
0.129032258064516	0.8702	0.869	0.8642	0.8541	0.845	0.7745
0.161290322580645	0.8582	0.8569	0.853	0.8476	0.8431	0.7582
0.193548387096774	0.857	0.8557	0.8528	0.8415	0.8317	0.7546
0.225806451612903	0.8551	0.8543	0.8506	0.8404	0.8315	0.7536
0.258064516129032	0.8423	0.841	0.8367	0.8271	0.8178	0.7533
0.290322580645161	0.8238	0.8225	0.8173	0.8083	0.8002	0.7462
0.32258064516129	0.8206	0.8194	0.8142	0.8055	0.7983	0.7398
0.354838709677419	0.8077	0.8065	0.8027	0.7971	0.7904	0.714
0.387096774193548	0.8005	0.7996	0.795	0.792	0.7863	0.7139
0.419354838709677	0.7884	0.7876	0.783	0.7777	0.7738	0.7115
0.451612903225806	0.7869	0.7861	0.7827	0.774	0.7704	0.701
0.483870967741936	0.7606	0.7594	0.7549	0.7518	0.7465	0.6998
0.516129032258065	0.759	0.7578	0.7545	0.7502	0.7438	0.696
0.548387096774194	0.7585	0.7576	0.7545	0.7454	0.7438	0.6838
0.580645161290323	0.7306	0.7295	0.7259	0.7211	0.7135	0.6668
0.612903225806452	0.7063	0.7053	0.7016	0.6943	0.6904	0.6592
0.645161290322581	0.6999	0.699	0.6941	0.6891	0.6838	0.6436
0.67741935483871	0.693	0.6919	0.6877	0.6838	0.6815	0.6424
0.709677419354839	0.6892	0.6881	0.6838	0.6783	0.6716	0.628
0.741935483870968	0.6583	0.6571	0.6545	0.6458	0.6443	0.6163
0.774193548387097	0.6101	0.6091	0.6049	0.5997	0.5969	0.5142
0.806451612903226	0.5164	0.5155	0.512	0.5051	0.4999	0.452
0.838709677419355	0.499	0.4982	0.4955	0.4929	0.4892	0.4454
0.870967741935484	0.4877	0.4871	0.4844	0.4801	0.4764	0.4426
0.903225806451613	0.4836	0.4828	0.4796	0.4757	0.4738	0.4328
0.935483870967742	0.4304	0.4297	0.4275	0.4229	0.4225	0.3551
0.967741935483871	0.3134	0.3129	0.3109	0.3085	0.3069	0.1863

0.1	0.88352	0.88223	0.87725	0.86859	0.86021	0.77774
			Average of yearly averages:		0.65242	

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

Data used for this run:
Output File: OHCornA
Metfile: w93815.dvf
PRZM scenario: OHCornC.txt
EXAMS environment file: pond298.exv
Chemical Name: Topramezone
Description Variable Name Value Units Comments

Molecular weight mwt 363.69 g/mol
Henry's Law Const. henry atm-m^3/mol
Vapor Pressure vapr 7.5e-13 torr
Solubility sol 15000 mg/L
Kd Kd 2.8 mg/L
Koc Koc mg/L
Photolysis half-life kdp 0 days Half-life
Aerobic Aquatic Metabolism kbacw 0 days Halfife
Anaerobic Aquatic Metabolism kbacs 30.52 days Halfife
Aerobic Soil Metabolism asm 241.28 days Halfife
Hydrolysis: pH 7 0 days Half-life
Method: CAM 1 integer See PRZM manual
Incorporation Depth: DEPI 4 cm
Application Rate: TAPP 0.0246 kg/ha
Application Efficiency: APPEFF 0.95 fraction
Spray Drift DRFT 0.05 fraction of application rate applied to pond
Application Date Date 08-05 dd/mm or dd/mmm or dd-mm or dd-mmm
Record 17: FILTRA
IPSCND
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 OHCornG.out
Chemical: Topramezone
PRZM environment: OHCornC.txt modified Satday, 12 October 2002 at 18:15:50
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 16:33:30
Metfile: w93815.dvf modified Wedday, 3 July 2002 at 10:06:06
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	0.2768	0.2764	0.2748	0.2731	0.2719	0.164
1962	0.3624	0.3617	0.3599	0.3557	0.3537	0.3016
1963	0.3999	0.3992	0.3968	0.3956	0.3926	0.3517
1964	0.3586	0.3581	0.3557	0.3513	0.3495	0.3375
1965	0.3704	0.3699	0.3674	0.3628	0.3593	0.3279
1966	0.3234	0.323	0.3214	0.3182	0.3165	0.3053
1967	0.4435	0.4427	0.4396	0.4332	0.4313	0.3638
1968	0.6696	0.6685	0.6649	0.6578	0.6506	0.5299

1969	0.7042	0.7033	0.6993	0.6936	0.6875	0.6199
1970	0.6198	0.6189	0.616	0.6106	0.605	0.5804
1971	0.5698	0.5689	0.5654	0.5594	0.5535	0.5289
1972	0.6057	0.6051	0.6018	0.5969	0.5934	0.5386
1973	0.586	0.5854	0.5836	0.5772	0.5718	0.5348
1974	0.6619	0.6608	0.6575	0.6493	0.6473	0.5737
1975	0.5882	0.5875	0.5837	0.5767	0.5737	0.5567
1976	0.5547	0.5538	0.5515	0.546	0.542	0.5133
1977	0.4883	0.4879	0.486	0.482	0.4789	0.4692
1978	0.4951	0.4944	0.4922	0.4862	0.482	0.4512
1979	0.4742	0.4735	0.4705	0.4684	0.4643	0.4352
1980	0.6089	0.608	0.604	0.5961	0.591	0.5049
1981	0.6479	0.6469	0.6447	0.6364	0.6289	0.5643
1982	0.6587	0.6578	0.6543	0.6473	0.6405	0.5853
1983	0.6152	0.6142	0.6103	0.6023	0.5968	0.5639
1984	0.6407	0.6401	0.6377	0.6306	0.6243	0.5674
1985	0.5517	0.5511	0.549	0.5442	0.5408	0.5183
1986	0.5159	0.5151	0.5126	0.5098	0.5049	0.4725
1987	0.4872	0.4867	0.4833	0.4762	0.4737	0.4488
1988	0.4488	0.448	0.4463	0.4413	0.4369	0.421
1989	0.9278	0.9264	0.9233	0.9114	0.9007	0.6848
1990	0.9857	0.9847	0.9808	0.9691	0.9591	0.8614

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	0.9857	0.9847	0.9808	0.9691	0.9591	0.8614
0.0645161290322581	0.9278	0.9264	0.9233	0.9114	0.9007	0.6848
0.0967741935483871	0.7042	0.7033	0.6993	0.6936	0.6875	0.6199
0.129032258064516	0.6696	0.6685	0.6649	0.6578	0.6506	0.5853
0.161290322580645	0.6619	0.6608	0.6575	0.6493	0.6473	0.5804
0.193548387096774	0.6587	0.6578	0.6543	0.6473	0.6405	0.5737
0.225806451612903	0.6479	0.6469	0.6447	0.6364	0.6289	0.5674
0.258064516129032	0.6407	0.6401	0.6377	0.6306	0.6243	0.5643
0.290322580645161	0.6198	0.6189	0.616	0.6106	0.605	0.5639
0.32258064516129	0.6152	0.6142	0.6103	0.6023	0.5968	0.5567
0.354838709677419	0.6089	0.608	0.604	0.5969	0.5934	0.5386
0.387096774193548	0.6057	0.6051	0.6018	0.5961	0.591	0.5348
0.419354838709677	0.5882	0.5875	0.5837	0.5772	0.5737	0.5299
0.451612903225806	0.586	0.5854	0.5836	0.5767	0.5718	0.5289
0.483870967741936	0.5698	0.5689	0.5654	0.5594	0.5535	0.5183
0.516129032258065	0.5547	0.5538	0.5515	0.546	0.542	0.5133
0.548387096774194	0.5517	0.5511	0.549	0.5442	0.5408	0.5049
0.580645161290323	0.5159	0.5151	0.5126	0.5098	0.5049	0.4725

0.612903225806452	0.4951	0.4944	0.4922	0.4862	0.482	0.4692
0.645161290322581	0.4883	0.4879	0.486	0.482	0.4789	0.4512
0.67741935483871	0.4872	0.4867	0.4833	0.4762	0.4737	0.4488
0.709677419354839	0.4742	0.4735	0.4705	0.4684	0.4643	0.4352
0.741935483870968	0.4488	0.448	0.4463	0.4413	0.4369	0.421
0.774193548387097	0.4435	0.4427	0.4396	0.4332	0.4313	0.3638
0.806451612903226	0.3999	0.3992	0.3968	0.3956	0.3926	0.3517
0.838709677419355	0.3704	0.3699	0.3674	0.3628	0.3593	0.3375
0.870967741935484	0.3624	0.3617	0.3599	0.3557	0.3537	0.3279
0.903225806451613	0.3586	0.3581	0.3557	0.3513	0.3495	0.3053
0.935483870967742	0.3234	0.323	0.3214	0.3182	0.3165	0.3016
0.967741935483871	0.2768	0.2764	0.2748	0.2731	0.2719	0.164

0.1	0.70074	0.69982	0.69586	0.69002	0.68381	0.61644
			Average of yearly averages:		0.489206666666667	

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

Data used for this run:
Output File: OHCornG
Metfile: w93815.dvf
PRZM scenario: OHCornC.txt
EXAMS environment file: pond298.exv
Chemical Name: Topramezone

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	363.69	g/mol	
Henry's Law Const.	henry		atm-m^3/mol	
Vapor Pressure	vapr	7.5e-13	torr	
Solubility	sol	15000	mg/L	
Kd	Kd	2.8	mg/L	
Koc	Koc		mg/L	
Photolysis half-life	kdp	0	days	Half-life
Aerobic Aquatic Metabolism	kbacw	0	days	Halfife
Anaerobic Aquatic Metabolism	kbacs	30.52	days	Halfife
Aerobic Soil Metabolism	asm	241.28	days	Halfife
Hydrolysis:	pH 7	0	days	Half-life
Method:	CAM	1	integer	See PRZM manual
Incorporation Depth:	DEPI	4	cm	
Application Rate:	TAPP	0.0246	kg/ha	
Application Efficiency:	APPEFF	0.99	fraction	
Spray Drift	DRFT	0.01	fraction of application rate applied to pond	
Application Date	Date	08-05	dd/mm or dd/mmm or dd-mm or dd-mmm	
Record 17:	FILTRA			

IPSCND
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 PACornA.out
Chemical: Topramezone
PRZM environment: PAcornC.txt modified Satday, 12 October 2002 at 18:25:26
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 16:33:30
Metfile: w14737.dvf modified Wedday, 3 July 2002 at 10:06:12
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	0.07335	0.07325	0.0724	0.06535	0.061	0.03961
1962	0.1315	0.1313	0.1307	0.1295	0.1276	0.1075
1963	0.1878	0.1875	0.1865	0.1832	0.1767	0.1576
1964	0.3214	0.3209	0.3186	0.3136	0.3099	0.2571
1965	0.3314	0.331	0.3292	0.3249	0.3214	0.3003
1966	0.3805	0.38	0.3779	0.373	0.3691	0.3326
1967	0.3855	0.385	0.383	0.3785	0.3756	0.351
1968	0.4447	0.4442	0.4417	0.4355	0.4305	0.3978
1969	0.4772	0.4764	0.4729	0.4653	0.4613	0.4305
1970	0.4765	0.4759	0.474	0.4699	0.4609	0.4436
1971	0.4979	0.4974	0.4949	0.4892	0.4842	0.4607
1972	0.5547	0.5538	0.5497	0.5411	0.5357	0.4923
1973	0.5512	0.5505	0.5478	0.5413	0.5358	0.5081
1974	0.5571	0.5562	0.5535	0.5496	0.5451	0.5057
1975	0.5623	0.5617	0.559	0.5522	0.5465	0.5179
1976	0.524	0.5234	0.5207	0.5143	0.5089	0.4864
1977	0.5142	0.5136	0.5109	0.5042	0.4988	0.4737
1978	0.4944	0.4938	0.4913	0.4856	0.4805	0.4509
1979	0.4594	0.4589	0.4565	0.4507	0.446	0.4204
1980	0.4646	0.464	0.4614	0.4553	0.4504	0.4198
1981	0.4797	0.4791	0.4764	0.4704	0.467	0.4349
1982	0.5932	0.5922	0.588	0.5789	0.5726	0.4905
1983	0.5555	0.5548	0.5521	0.5455	0.5399	0.5162
1984	0.6398	0.639	0.6351	0.6255	0.618	0.5582
1985	0.6926	0.6916	0.6876	0.6781	0.6707	0.6042
1986	0.6204	0.6197	0.6166	0.6088	0.6023	0.5727

1987	0.5965	0.5955	0.5919	0.584	0.579	0.5485
1988	0.8621	0.8608	0.8554	0.8428	0.8327	0.7013
1989	0.9397	0.9384	0.933	0.9218	0.913	0.8189
1990	0.8212	0.8203	0.8163	0.8067	0.7985	0.7682

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	0.9397	0.9384	0.933	0.9218	0.913	0.8189
0.0645161290322581	0.8621	0.8608	0.8554	0.8428	0.8327	0.7682
0.0967741935483871	0.8212	0.8203	0.8163	0.8067	0.7985	0.7013
0.129032258064516	0.6926	0.6916	0.6876	0.6781	0.6707	0.6042
0.161290322580645	0.6398	0.639	0.6351	0.6255	0.618	0.5727
0.193548387096774	0.6204	0.6197	0.6166	0.6088	0.6023	0.5582
0.225806451612903	0.5965	0.5955	0.5919	0.584	0.579	0.5485
0.258064516129032	0.5932	0.5922	0.588	0.5789	0.5726	0.5179
0.290322580645161	0.5623	0.5617	0.559	0.5522	0.5465	0.5162
0.32258064516129	0.5571	0.5562	0.5535	0.5496	0.5451	0.5081
0.354838709677419	0.5555	0.5548	0.5521	0.5455	0.5399	0.5057
0.387096774193548	0.5547	0.5538	0.5497	0.5413	0.5358	0.4923
0.419354838709677	0.5512	0.5505	0.5478	0.5411	0.5357	0.4905
0.451612903225806	0.524	0.5234	0.5207	0.5143	0.5089	0.4864
0.483870967741936	0.5142	0.5136	0.5109	0.5042	0.4988	0.4737
0.516129032258065	0.4979	0.4974	0.4949	0.4892	0.4842	0.4607
0.548387096774194	0.4944	0.4938	0.4913	0.4856	0.4805	0.4509
0.580645161290323	0.4797	0.4791	0.4764	0.4704	0.467	0.4436
0.612903225806452	0.4772	0.4764	0.474	0.4699	0.4613	0.4349
0.645161290322581	0.4765	0.4759	0.4729	0.4653	0.4609	0.4305
0.67741935483871	0.4646	0.464	0.4614	0.4553	0.4504	0.4204
0.709677419354839	0.4594	0.4589	0.4565	0.4507	0.446	0.4198
0.741935483870968	0.4447	0.4442	0.4417	0.4355	0.4305	0.3978
0.774193548387097	0.3855	0.385	0.383	0.3785	0.3756	0.351
0.806451612903226	0.3805	0.38	0.3779	0.373	0.3691	0.3326
0.838709677419355	0.3314	0.331	0.3292	0.3249	0.3214	0.3003
0.870967741935484	0.3214	0.3209	0.3186	0.3136	0.3099	0.2571
0.903225806451613	0.1878	0.1875	0.1865	0.1832	0.1767	0.1576
0.935483870967742	0.1315	0.1313	0.1307	0.1295	0.1276	0.1075
0.967741935483871	0.07335	0.07325	0.0724	0.06535	0.061	0.03961
0.1	0.80834	0.80743	0.80343	0.79384	0.78572	0.69159

Average of yearly averages: 0.452237

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

Data used for this run:
Output File: PACornA
Metfile: w14737.dvf
PRZM scenario: PAcornC.txt
EXAMS environment file: pond298.exv
Chemical Name: Topramezone

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	363.69	g/mol	
Henry's Law Const.	henry		atm-m^3/mol	
Vapor Pressure	vapr	7.5e-13	torr	
Solubility	sol	15000	mg/L	
Kd	Kd	2.8	mg/L	
Koc	Koc		mg/L	
Photolysis half-life	kdp	0	days	Half-life
Aerobic Aquatic Metabolism	kbacw	0	days	Halfife
Anaerobic Aquatic Metabolism	kbacs	30.52	days	Halfife
Aerobic Soil Metabolism	asm	241.28	days	Halfife
Hydrolysis:	pH 7	0	days	Half-life
Method:	CAM	1	integer	See PRZM manual
Incorporation Depth:	DEPI	4	cm	
Application Rate:	TAPP	0.0246	kg/ha	
Application Efficiency:	APPEFF	0.95	fraction	
Spray Drift	DRFT	0.05	fraction of application rate applied to pond	
Application Date	Date	28-04	dd/mm or dd/mmm or dd-mm or dd-mmm	
Record 17:	FILTRA			
	IPSCND			
	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 PACornG.out
Chemical: Topramezone
PRZM environment: PAcornC.txt modified Satday, 12 October 2002 at 18:25:26
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 16:33:30
Metfile: w14737.dvf modified Wedday, 3 July 2002 at 10:06:12
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	0.07427	0.07417	0.07328	0.06593	0.06139	0.0397

1962	0.133	0.1329	0.1323	0.1311	0.129	0.1085
1963	0.1904	0.1901	0.189	0.1857	0.1781	0.1592
1964	0.3274	0.3269	0.3245	0.3195	0.3157	0.2616
1965	0.3368	0.3364	0.3346	0.3302	0.3267	0.3057
1966	0.3871	0.3866	0.3844	0.3795	0.3755	0.3385
1967	0.3917	0.3912	0.3892	0.3846	0.3816	0.357
1968	0.453	0.4524	0.4498	0.4436	0.4385	0.4052
1969	0.487	0.4861	0.4826	0.4748	0.4707	0.4389
1970	0.4865	0.4859	0.484	0.4798	0.47	0.4523
1971	0.5072	0.5066	0.5041	0.4983	0.4932	0.4698
1972	0.5668	0.5659	0.5617	0.5529	0.5474	0.5025
1973	0.5623	0.5616	0.5588	0.5522	0.5466	0.5188
1974	0.5696	0.5687	0.5659	0.562	0.5574	0.5162
1975	0.5736	0.573	0.5703	0.5633	0.5575	0.5288
1976	0.5336	0.533	0.5302	0.5237	0.5182	0.4959
1977	0.5234	0.5227	0.52	0.5132	0.5077	0.4826
1978	0.5027	0.5021	0.4996	0.4937	0.4886	0.4589
1979	0.4662	0.4656	0.4632	0.4574	0.4527	0.427
1980	0.4716	0.471	0.4683	0.4622	0.4572	0.4264
1981	0.4875	0.4869	0.4842	0.4779	0.4745	0.4422
1982	0.6059	0.6049	0.6007	0.5914	0.5849	0.5
1983	0.5662	0.5656	0.5628	0.5561	0.5504	0.5268
1984	0.6544	0.6536	0.6496	0.6398	0.632	0.5706
1985	0.7091	0.7082	0.704	0.6943	0.6867	0.6185
1986	0.6339	0.6332	0.63	0.6221	0.6155	0.5857
1987	0.6102	0.6092	0.6055	0.5975	0.5924	0.5605
1988	0.8859	0.8845	0.8789	0.8661	0.8557	0.7196
1989	0.9667	0.9654	0.9599	0.9483	0.9392	0.8421
1990	0.8431	0.8422	0.8381	0.8282	0.8198	0.7894

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	0.9667	0.9654	0.9599	0.9483	0.9392	0.8421
0.0645161290322581	0.8859	0.8845	0.8789	0.8661	0.8557	0.7894
0.0967741935483871	0.8431	0.8422	0.8381	0.8282	0.8198	0.7196
0.129032258064516	0.7091	0.7082	0.704	0.6943	0.6867	0.6185
0.161290322580645	0.6544	0.6536	0.6496	0.6398	0.632	0.5857
0.193548387096774	0.6339	0.6332	0.63	0.6221	0.6155	0.5706
0.225806451612903	0.6102	0.6092	0.6055	0.5975	0.5924	0.5605
0.258064516129032	0.6059	0.6049	0.6007	0.5914	0.5849	0.5288
0.290322580645161	0.5736	0.573	0.5703	0.5633	0.5575	0.5268
0.32258064516129	0.5696	0.5687	0.5659	0.562	0.5574	0.5188
0.354838709677419	0.5668	0.5659	0.5628	0.5561	0.5504	0.5162

0.387096774193548	0.5662	0.5656	0.5617	0.5529	0.5474	0.5025
0.419354838709677	0.5623	0.5616	0.5588	0.5522	0.5466	0.5
0.451612903225806	0.5336	0.533	0.5302	0.5237	0.5182	0.4959
0.483870967741936	0.5234	0.5227	0.52	0.5132	0.5077	0.4826
0.516129032258065	0.5072	0.5066	0.5041	0.4983	0.4932	0.4698
0.548387096774194	0.5027	0.5021	0.4996	0.4937	0.4886	0.4589
0.580645161290323	0.4875	0.4869	0.4842	0.4798	0.4745	0.4523
0.612903225806452	0.487	0.4861	0.484	0.4779	0.4707	0.4422
0.645161290322581	0.4865	0.4859	0.4826	0.4748	0.47	0.4389
0.67741935483871	0.4716	0.471	0.4683	0.4622	0.4572	0.427
0.709677419354839	0.4662	0.4656	0.4632	0.4574	0.4527	0.4264
0.741935483870968	0.453	0.4524	0.4498	0.4436	0.4385	0.4052
0.774193548387097	0.3917	0.3912	0.3892	0.3846	0.3816	0.357
0.806451612903226	0.3871	0.3866	0.3844	0.3795	0.3755	0.3385
0.838709677419355	0.3368	0.3364	0.3346	0.3302	0.3267	0.3057
0.870967741935484	0.3274	0.3269	0.3245	0.3195	0.3157	0.2616
0.903225806451613	0.1904	0.1901	0.189	0.1857	0.1781	0.1592
0.935483870967742	0.133	0.1329	0.1323	0.1311	0.129	0.1085
0.967741935483871	0.07427	0.07417	0.07328	0.06593	0.06139	0.0397

0.1 0.8297 0.8288 0.82469 0.81481 0.80649 0.70949
Average of yearly averages: 0.46163

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

Data used for this run:
Output File: PACornG
Metfile: w14737.dvf
PRZM scenario: PAcornC.txt
EXAMS environment file: pond298.exv
Chemical Name: Topramezone

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	363.69	g/mol	
Henry's Law Const.	henry		atm-m^3/mol	
Vapor Pressure	vapr	7.5e-13	torr	
Solubility	sol	15000	mg/L	
Kd	Kd	2.8	mg/L	
Koc	Koc		mg/L	
Photolysis half-life	kdp	0	days	Half-life
Aerobic Aquatic Metabolism	kbacw	0	days	Halfife
Anaerobic Aquatic Metabolism	kbacs	30.52	days	Halfife
Aerobic Soil Metabolism	asm	241.28	days	Halfife

Hydrolysis: pH 7 0 days Half-life
Method: CAM 1 integer See PRZM manual
Incorporation Depth: DEPI 4 cm
Application Rate: TAPP 0.0246 kg/ha
Application Efficiency: APPEFF 0.99 fraction
Spray Drift DRFT 0.05 fraction of application rate applied to pond
Application Date Date 28-04 dd/mm or dd/mmm or dd-mm or dd-mmm
Record 17: FILTRA
IPSCND
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 TXcorn.out
Chemical: Topramezone
PRZM environment: TXcornC.txt modified Satday, 12 October 2002 at 17:28:20
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 15:33:30
Metfile: w13958.dvf modified Wedday, 3 July 2002 at 09:06:24
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	0.2007	0.2002	0.1982	0.1968	0.1944	0.1176
1962	0.3604	0.3597	0.3581	0.3522	0.3475	0.2889
1963	0.8277	0.8258	0.8182	0.8034	0.7947	0.6255
1964	0.8346	0.833	0.8263	0.8111	0.8023	0.7423
1965	0.8586	0.857	0.8516	0.8378	0.8277	0.7512
1966	0.8885	0.8875	0.884	0.8723	0.8615	0.772
1967	0.8553	0.8538	0.8497	0.8417	0.8341	0.7592
1968	0.822	0.8206	0.8171	0.8058	0.7956	0.7306
1969	0.9833	0.9815	0.9775	0.9723	0.9624	0.8363
1970	1	0.9987	0.9926	0.981	0.9689	0.8683
1971	0.8844	0.8831	0.8773	0.8667	0.8649	0.83
1972	1.07	1.068	1.063	1.048	1.036	0.8995
1973	1.012	1.01	1.004	0.9895	0.9839	0.9044
1974	0.9665	0.9648	0.9577	0.9413	0.9311	0.8599
1975	1.155	1.153	1.145	1.129	1.121	0.9677
1976	1.277	1.275	1.268	1.251	1.236	1.093
1977	1.339	1.337	1.329	1.31	1.294	1.151
1978	1.293	1.291	1.285	1.277	1.265	1.149

1979	1.21	1.208	1.204	1.195	1.187	1.089
1980	1.437	1.435	1.43	1.421	1.415	1.229
1981	1.341	1.339	1.335	1.318	1.301	1.195
1982	1.282	1.28	1.271	1.261	1.248	1.143
1983	1.336	1.335	1.329	1.313	1.312	1.186
1984	1.115	1.114	1.107	1.092	1.087	1.029
1985	1.038	1.037	1.031	1.02	1.014	0.9336
1986	1.179	1.177	1.169	1.153	1.138	0.9881
1987	1.031	1.029	1.025	1.009	0.9963	0.9479
1988	1.105	1.104	1.096	1.089	1.085	0.9723
1989	0.9901	0.989	0.9858	0.9789	0.9723	0.8992
1990	1.027	1.026	1.018	1.004	0.9922	0.8875

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	1.437	1.435	1.43	1.421	1.415	1.229
0.0645161290322581	1.341	1.339	1.335	1.318	1.312	1.195
0.0967741935483871	1.339	1.337	1.329	1.313	1.301	1.186
0.129032258064516	1.336	1.335	1.329	1.31	1.294	1.151
0.161290322580645	1.293	1.291	1.285	1.277	1.265	1.149
0.193548387096774	1.282	1.28	1.271	1.261	1.248	1.143
0.225806451612903	1.277	1.275	1.268	1.251	1.236	1.093
0.258064516129032	1.21	1.208	1.204	1.195	1.187	1.089
0.290322580645161	1.179	1.177	1.169	1.153	1.138	1.029
0.32258064516129	1.155	1.153	1.145	1.129	1.121	0.9881
0.354838709677419	1.115	1.114	1.107	1.092	1.087	0.9723
0.387096774193548	1.105	1.104	1.096	1.089	1.085	0.9677
0.419354838709677	1.07	1.068	1.063	1.048	1.036	0.9479
0.451612903225806	1.038	1.037	1.031	1.02	1.014	0.9336
0.483870967741936	1.031	1.029	1.025	1.009	0.9963	0.9044
0.516129032258065	1.027	1.026	1.018	1.004	0.9922	0.8995
0.548387096774194	1.012	1.01	1.004	0.9895	0.9839	0.8992
0.580645161290323	1	0.9987	0.9926	0.981	0.9723	0.8875
0.612903225806452	0.9901	0.989	0.9858	0.9789	0.9689	0.8683
0.645161290322581	0.9833	0.9815	0.9775	0.9723	0.9624	0.8599
0.67741935483871	0.9665	0.9648	0.9577	0.9413	0.9311	0.8363
0.709677419354839	0.8885	0.8875	0.884	0.8723	0.8649	0.83
0.741935483870968	0.8844	0.8831	0.8773	0.8667	0.8615	0.772
0.774193548387097	0.8586	0.857	0.8516	0.8417	0.8341	0.7592
0.806451612903226	0.8553	0.8538	0.8497	0.8378	0.8277	0.7512
0.838709677419355	0.8346	0.833	0.8263	0.8111	0.8023	0.7423
0.870967741935484	0.8277	0.8258	0.8182	0.8058	0.7956	0.7306
0.903225806451613	0.822	0.8206	0.8171	0.8034	0.7947	0.6255

0.935483870967742 0.3604 0.3597 0.3581 0.3522 0.3475 0.2889
0.967741935483871 0.2007 0.2002 0.1982 0.1968 0.1944 0.1176

0.1 1.3387 1.3368 1.329 1.3127 1.3003 1.1825
Average of yearly averages: 0.894866666666667

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

Data used for this run:
Output File: TXcorn
Metfile: w13958.dvf
PRZM scenario: TXcornC.txt
EXAMS environment file: pond298.exv
Chemical Name: Topramezone
Description Variable Name Value Units Comments
Molecular weight mwt 363.69 g/mol
Henry's Law Const. henry atm-m^3/mol
Vapor Pressure vapr 7.5e-13 torr
Solubility sol 15000 mg/L
Kd Kd 2.8 mg/L
Koc Koc mg/L
Photolysis half-life kdp 0 days Half-life
Aerobic Aquatic Metabolism kbacw 0 days Halfife
Anaerobic Aquatic Metabolism kbacs 30.52 days Halfife
Aerobic Soil Metabolism asm 241.28 days Halfife
Hydrolysis: pH 7 0 days Half-life
Method: CAM 1 integer See PRZM manual
Incorporation Depth: DEPI 4 cm
Application Rate: TAPP 0.0246 kg/ha
Application Efficiency: APPEFF 0.95 fraction
Spray Drift DRFT 0.05 fraction of application rate applied to pond
Application Date Date 16-03 dd/mm or dd/mmm or dd-mm or dd-mmm
Record 17: FILTRA
IPSCND
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 TXcorng.out

Chemical: Topramezone
PRZM environment: TXcornC.txt modified Satday, 12 October 2002 at 17:28:20
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 15:33:30
Metfile: w13958.dvf modified Wedday, 3 July 2002 at 09:06:24
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	0.1624	0.162	0.1607	0.1596	0.1577	0.08678
1962	0.2922	0.2917	0.2906	0.2859	0.282	0.2307
1963	0.7466	0.7448	0.7377	0.7243	0.7167	0.5556
1964	0.7417	0.7402	0.7342	0.7206	0.7103	0.6585
1965	0.748	0.7466	0.7417	0.7299	0.7205	0.6528
1966	0.7657	0.7648	0.7611	0.7514	0.7422	0.6632
1967	0.7209	0.7197	0.7166	0.7097	0.7036	0.6419
1968	0.6825	0.6813	0.678	0.6689	0.6606	0.6052
1969	0.842	0.8405	0.8375	0.8328	0.8248	0.7102
1970	0.8607	0.8592	0.8538	0.8431	0.8328	0.7397
1971	0.7371	0.7361	0.7305	0.7218	0.7198	0.6978
1972	0.9277	0.9259	0.9215	0.9085	0.8978	0.7695
1973	0.861	0.8597	0.8543	0.842	0.8352	0.7722
1974	0.8163	0.8148	0.8088	0.7949	0.785	0.725
1975	1.013	1.011	1.004	0.9888	0.9817	0.8358
1976	1.135	1.133	1.127	1.112	1.099	0.9659
1977	1.197	1.195	1.188	1.171	1.156	1.025
1978	1.155	1.153	1.148	1.139	1.129	1.022
1979	1.06	1.058	1.054	1.047	1.041	0.9598
1980	1.302	1.3	1.295	1.283	1.279	1.105
1981	1.206	1.205	1.2	1.186	1.171	1.071
1982	1.143	1.141	1.133	1.123	1.112	1.018
1983	1.2	1.199	1.193	1.18	1.174	1.062
1984	0.9881	0.9869	0.982	0.9714	0.9652	0.8981
1985	0.8845	0.8831	0.8782	0.867	0.8628	0.7995
1986	1.037	1.035	1.028	1.013	1	0.8571
1987	0.8859	0.8843	0.8802	0.8665	0.8547	0.815
1988	0.9505	0.9489	0.9427	0.9377	0.936	0.8402
1989	0.8405	0.8394	0.8359	0.8293	0.8221	0.7648
1990	0.8778	0.8762	0.8698	0.8585	0.8483	0.7532

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	1.302	1.3	1.295	1.283	1.279	1.105
0.0645161290322581	1.206	1.205	1.2	1.186	1.174	1.071
0.0967741935483871	1.2	1.199	1.193	1.18	1.171	1.062

0.129032258064516	1.197	1.195	1.188	1.171	1.156	1.025
0.161290322580645	1.155	1.153	1.148	1.139	1.129	1.022
0.193548387096774	1.143	1.141	1.133	1.123	1.112	1.018
0.225806451612903	1.135	1.133	1.127	1.112	1.099	0.9659
0.258064516129032	1.06	1.058	1.054	1.047	1.041	0.9598
0.290322580645161	1.037	1.035	1.028	1.013	1	0.8981
0.32258064516129	1.013	1.011	1.004	0.9888	0.9817	0.8571
0.354838709677419	0.9881	0.9869	0.982	0.9714	0.9652	0.8402
0.387096774193548	0.9505	0.9489	0.9427	0.9377	0.936	0.8358
0.419354838709677	0.9277	0.9259	0.9215	0.9085	0.8978	0.815
0.451612903225806	0.8859	0.8843	0.8802	0.867	0.8628	0.7995
0.483870967741936	0.8845	0.8831	0.8782	0.8665	0.8547	0.7722
0.516129032258065	0.8778	0.8762	0.8698	0.8585	0.8483	0.7695
0.548387096774194	0.861	0.8597	0.8543	0.8431	0.8352	0.7648
0.580645161290323	0.8607	0.8592	0.8538	0.842	0.8328	0.7532
0.612903225806452	0.842	0.8405	0.8375	0.8328	0.8248	0.7397
0.645161290322581	0.8405	0.8394	0.8359	0.8293	0.8221	0.725
0.67741935483871	0.8163	0.8148	0.8088	0.7949	0.785	0.7102
0.709677419354839	0.7657	0.7648	0.7611	0.7514	0.7422	0.6978
0.741935483870968	0.748	0.7466	0.7417	0.7299	0.7205	0.6632
0.774193548387097	0.7466	0.7448	0.7377	0.7243	0.7198	0.6585
0.806451612903226	0.7417	0.7402	0.7342	0.7218	0.7167	0.6528
0.838709677419355	0.7371	0.7361	0.7305	0.7206	0.7103	0.6419
0.870967741935484	0.7209	0.7197	0.7166	0.7097	0.7036	0.6052
0.903225806451613	0.6825	0.6813	0.678	0.6689	0.6606	0.5556
0.935483870967742	0.2922	0.2917	0.2906	0.2859	0.282	0.2307
0.967741935483871	0.1624	0.162	0.1607	0.1596	0.1577	0.08678

0.1 1.1997 1.1986 1.1925 1.1791 1.1695 1.0583

Average of yearly averages: 0.776716

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

Data used for this run:
Output File: TXcorng
Metfile: w13958.dvf
PRZM scenario: TXcornC.txt
EXAMS environment file: pond298.exv
Chemical Name: Topramezone

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	363.69	g/mol	
Henry's Law Const.	henry		atm-m^3/mol	
Vapor Pressure	vapr	7.5e-13	torr	

Solubility sol 15000 mg/L
Kd Kd 2.8 mg/L
Koc Koc mg/L
Photolysis half-life kdp 0 days Half-life
Aerobic Aquatic Metabolism kbacw 0 days Halfife
Anaerobic Aquatic Metabolism kbacs 30.52 days Halfife
Aerobic Soil Metabolism asm 241.28 days Halfife
Hydrolysis: pH 7 0 days Half-life
Method: CAM 1 integer See PRZM manual
Incorporation Depth: DEPI 4 cm
Application Rate: TAPP 0.0246 kg/ha
Application Efficiency: APPEFF 0.99 fraction
Spray Drift DRFT 0.01 fraction of application rate applied to pond
Application Date Date 16-03 dd/mm or dd/mmm or dd-mm or dd-mmm
Record 17: FILTRA
IPSCND
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)

ECOLOGICAL EXPOSURE 2 APPLICATIONS

stored as CACornA2.out
Chemical: Topramezone
PRZM environment: CAcornC.txt modified Satday, 12 October 2002 at 17:32:58
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	0.1154	0.1151	0.1142	0.08579	0.07443	0.04426
1962	0.5479	0.5465	0.5411	0.5309	0.4881	0.2255
1963	0.5488	0.5481	0.5452	0.5384	0.533	0.5037
1964	0.5046	0.5039	0.5011	0.4945	0.4894	0.4683
1965	0.5061	0.5054	0.5025	0.4959	0.4908	0.4644
1966	0.5006	0.5002	0.4991	0.485	0.4644	0.4484
1967	0.537	0.5363	0.5334	0.5267	0.5212	0.4863
1968	0.4864	0.4857	0.4829	0.4763	0.4711	0.4467

1969	0.4726	0.4722	0.4696	0.4633	0.4583	0.4306
1970	0.4599	0.4593	0.4566	0.4503	0.4453	0.424
1971	0.4753	0.4746	0.472	0.4659	0.461	0.432
1972	0.443	0.4424	0.4398	0.4337	0.4289	0.4043
1973	0.4243	0.4237	0.4212	0.4152	0.4104	0.3877
1974	0.4206	0.4201	0.4176	0.4121	0.4086	0.3836
1975	0.4055	0.4049	0.4027	0.3974	0.393	0.3655
1976	0.3806	0.3801	0.3778	0.3724	0.3681	0.3406
1977	0.3755	0.3749	0.3726	0.369	0.3653	0.3406
1978	0.3921	0.3915	0.3892	0.3837	0.3795	0.3554
1979	0.3992	0.3986	0.3963	0.3909	0.3865	0.3658
1980	0.4118	0.4112	0.4088	0.4033	0.399	0.3731
1981	0.4187	0.4181	0.4157	0.41	0.4055	0.3841
1982	0.4337	0.4331	0.4306	0.425	0.4206	0.4016
1983	0.5627	0.5617	0.5579	0.5499	0.5436	0.4755
1984	0.5007	0.5	0.497	0.4899	0.4845	0.4563
1985	0.4597	0.4591	0.4564	0.4502	0.4452	0.4221
1986	0.4714	0.4707	0.4679	0.4614	0.4563	0.4277
1987	0.4419	0.4412	0.4385	0.4322	0.4273	0.4035
1988	0.4531	0.4524	0.4501	0.4446	0.4397	0.4055
1989	0.4555	0.4548	0.4514	0.4464	0.4432	0.4048
1990	0.5081	0.5072	0.5038	0.496	0.4898	0.4515

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	0.5627	0.5617	0.5579	0.5499	0.5436	0.5037
0.0645161290322581	0.5488	0.5481	0.5452	0.5384	0.533	0.4863
0.0967741935483871	0.5479	0.5465	0.5411	0.5309	0.5212	0.4755
0.129032258064516	0.537	0.5363	0.5334	0.5267	0.4908	0.4683
0.161290322580645	0.5081	0.5072	0.5038	0.496	0.4898	0.4644
0.193548387096774	0.5061	0.5054	0.5025	0.4959	0.4894	0.4563
0.225806451612903	0.5046	0.5039	0.5011	0.4945	0.4881	0.4515
0.258064516129032	0.5007	0.5002	0.4991	0.4899	0.4845	0.4484
0.290322580645161	0.5006	0.5	0.497	0.485	0.4711	0.4467
0.32258064516129	0.4864	0.4857	0.4829	0.4763	0.4644	0.432
0.354838709677419	0.4753	0.4746	0.472	0.4659	0.461	0.4306
0.387096774193548	0.4726	0.4722	0.4696	0.4633	0.4583	0.4277
0.419354838709677	0.4714	0.4707	0.4679	0.4614	0.4563	0.424
0.451612903225806	0.4599	0.4593	0.4566	0.4503	0.4453	0.4221
0.483870967741936	0.4597	0.4591	0.4564	0.4502	0.4452	0.4055
0.516129032258065	0.4555	0.4548	0.4514	0.4464	0.4432	0.4048
0.548387096774194	0.4531	0.4524	0.4501	0.4446	0.4397	0.4043
0.580645161290323	0.443	0.4424	0.4398	0.4337	0.4289	0.4035

0.612903225806452	0.4419	0.4412	0.4385	0.4322	0.4273	0.4016
0.645161290322581	0.4337	0.4331	0.4306	0.425	0.4206	0.3877
0.67741935483871	0.4243	0.4237	0.4212	0.4152	0.4104	0.3841
0.709677419354839	0.4206	0.4201	0.4176	0.4121	0.4086	0.3836
0.741935483870968	0.4187	0.4181	0.4157	0.41	0.4055	0.3731
0.774193548387097	0.4118	0.4112	0.4088	0.4033	0.399	0.3658
0.806451612903226	0.4055	0.4049	0.4027	0.3974	0.393	0.3655
0.838709677419355	0.3992	0.3986	0.3963	0.3909	0.3865	0.3554
0.870967741935484	0.3921	0.3915	0.3892	0.3837	0.3795	0.3406
0.903225806451613	0.3806	0.3801	0.3778	0.3724	0.3681	0.3406
0.935483870967742	0.3755	0.3749	0.3726	0.369	0.3653	0.2255
0.967741935483871	0.1154	0.1151	0.1142	0.08579	0.07443	0.04426
0.1	0.54681	0.54548	0.54033	0.53048	0.51816	0.47478

Average of yearly averages: 0.397445333333333

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

Data used for this run:
Output File: CACornA2
Metfile: w23232.dvf
PRZM scenario: CAcornC.txt
EXAMS environment file: pond298.exv
Chemical Name: Topramezone

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	363.39	g/mol	
Henry's Law Const.	henry		atm-m^3/mol	
Vapor Pressure	vapr	7.5e-13	torr	
Solubility	sol	15000	mg/L	
Kd	Kd	2.8	mg/L	
Koc	Koc		mg/L	
Photolysis half-life	kdp	0	days	Half-life
Aerobic Aquatic Metabolism	kbacw	0	days	Halfife
Anaerobic Aquatic Metabolism	kbacs	30.52	days	Halfife
Aerobic Soil Metabolism	asm	241.28	days	Halfife
Hydrolysis:	pH 7	0	days	Half-life
Method:	CAM	1	integer	See PRZM manual
Incorporation Depth:	DEPI	4	cm	
Application Rate:	TAPP	0.0123	kg/ha	
Application Efficiency:	APPEFF	0.95	fraction	
Spray Drift	DRFT	0.05	fraction of application rate applied to pond	
Application Date	Date	15-04	dd/mm or dd/mmm or dd-mm or dd-mmm	
Interval 1	interval	7	days	Set to 0 or delete line for single app.

Record 17: FILTRA
IPSCND
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 CACornG2.out
Chemical: Topramezone
PRZM environment: CAcornC.txt modified Satday, 12 October 2002 at 17:32:58
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	0.1181	0.1179	0.1169	0.0873	0.07543	0.0445
1962	0.567	0.5656	0.56	0.5494	0.5048	0.2315
1963	0.5657	0.5649	0.5619	0.5549	0.5495	0.52
1964	0.5191	0.5184	0.5155	0.5088	0.5035	0.4824
1965	0.5196	0.5189	0.5159	0.5092	0.504	0.4774
1966	0.5144	0.514	0.5128	0.4981	0.4757	0.4599
1967	0.5503	0.5496	0.5466	0.5397	0.5341	0.4988
1968	0.4971	0.4964	0.4935	0.4868	0.4815	0.4571
1969	0.4823	0.4818	0.4792	0.4728	0.4678	0.4399
1970	0.4688	0.4681	0.4654	0.459	0.4539	0.4328
1971	0.4846	0.4839	0.4812	0.475	0.4701	0.4408
1972	0.4507	0.4501	0.4474	0.4413	0.4364	0.4118
1973	0.4311	0.4305	0.4279	0.4219	0.417	0.3943
1974	0.4272	0.4266	0.4241	0.4185	0.415	0.39
1975	0.4112	0.4107	0.4085	0.403	0.3986	0.371
1976	0.3853	0.3848	0.3825	0.377	0.3727	0.3451
1977	0.38	0.3795	0.3772	0.3734	0.3697	0.345
1978	0.3973	0.3967	0.3943	0.3888	0.3845	0.3604
1979	0.4046	0.404	0.4016	0.3961	0.3917	0.3712
1980	0.4177	0.4171	0.4146	0.409	0.4047	0.3787
1981	0.4248	0.4242	0.4217	0.416	0.4114	0.3902
1982	0.4404	0.4398	0.4373	0.4316	0.4271	0.4084
1983	0.5748	0.5738	0.5699	0.5617	0.5553	0.4853
1984	0.5102	0.5095	0.5065	0.4993	0.4938	0.4654
1985	0.4676	0.4669	0.4642	0.4579	0.4528	0.4298

1986	0.4797	0.479	0.4762	0.4696	0.4644	0.4356
1987	0.449	0.4483	0.4456	0.4392	0.4342	0.4104
1988	0.4608	0.4601	0.4577	0.4521	0.4471	0.4126
1989	0.4645	0.4637	0.4603	0.4553	0.452	0.4118
1990	0.5182	0.5174	0.5139	0.5059	0.4996	0.4604

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	0.5748	0.5738	0.5699	0.5617	0.5553	0.52
0.0645161290322581	0.567	0.5656	0.5619	0.5549	0.5495	0.4988
0.0967741935483871	0.5657	0.5649	0.56	0.5494	0.5341	0.4853
0.129032258064516	0.5503	0.5496	0.5466	0.5397	0.5048	0.4824
0.161290322580645	0.5196	0.5189	0.5159	0.5092	0.504	0.4774
0.193548387096774	0.5191	0.5184	0.5155	0.5088	0.5035	0.4654
0.225806451612903	0.5182	0.5174	0.5139	0.5059	0.4996	0.4604
0.258064516129032	0.5144	0.514	0.5128	0.4993	0.4938	0.4599
0.290322580645161	0.5102	0.5095	0.5065	0.4981	0.4815	0.4571
0.32258064516129	0.4971	0.4964	0.4935	0.4868	0.4757	0.4408
0.354838709677419	0.4846	0.4839	0.4812	0.475	0.4701	0.4399
0.387096774193548	0.4823	0.4818	0.4792	0.4728	0.4678	0.4356
0.419354838709677	0.4797	0.479	0.4762	0.4696	0.4644	0.4328
0.451612903225806	0.4688	0.4681	0.4654	0.459	0.4539	0.4298
0.483870967741936	0.4676	0.4669	0.4642	0.4579	0.4528	0.4126
0.516129032258065	0.4645	0.4637	0.4603	0.4553	0.452	0.4118
0.548387096774194	0.4608	0.4601	0.4577	0.4521	0.4471	0.4118
0.580645161290323	0.4507	0.4501	0.4474	0.4413	0.4364	0.4104
0.612903225806452	0.449	0.4483	0.4456	0.4392	0.4342	0.4084
0.645161290322581	0.4404	0.4398	0.4373	0.4316	0.4271	0.3943
0.67741935483871	0.4311	0.4305	0.4279	0.4219	0.417	0.3902
0.709677419354839	0.4272	0.4266	0.4241	0.4185	0.415	0.39
0.741935483870968	0.4248	0.4242	0.4217	0.416	0.4114	0.3787
0.774193548387097	0.4177	0.4171	0.4146	0.409	0.4047	0.3712
0.806451612903226	0.4112	0.4107	0.4085	0.403	0.3986	0.371
0.838709677419355	0.4046	0.404	0.4016	0.3961	0.3917	0.3604
0.870967741935484	0.3973	0.3967	0.3943	0.3888	0.3845	0.3451
0.903225806451613	0.3853	0.3848	0.3825	0.377	0.3727	0.345
0.935483870967742	0.38	0.3795	0.3772	0.3734	0.3697	0.2315
0.967741935483871	0.1181	0.1179	0.1169	0.0873	0.07543	0.0445
0.1	0.56416	0.56337	0.55866	0.54843	0.53117	0.48501

Average of yearly averages: 0.405416666666667

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

Data used for this run:
Output File: CACornG2
Metfile: w23232.dvf
PRZM scenario: CAcornC.txt
EXAMS environment file: pond298.exv
Chemical Name: Topramezone

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	363.39	g/mol	
Henry's Law Const.	henry		atm-m^3/mol	
Vapor Pressure	vapr	7.5e-13	torr	
Solubility	sol	15000	mg/L	
Kd	Kd	2.8	mg/L	
Koc	Koc		mg/L	
Photolysis half-life	kdp	0	days	Half-life
Aerobic Aquatic Metabolism	kbacw	0	days	Halfife
Anaerobic Aquatic Metabolism	kbacs	30.52	days	Halfife
Aerobic Soil Metabolism	asm	241.28	days	Halfife
Hydrolysis:	pH 7	0	days	Half-life
Method:	CAM	1	integer	See PRZM manual
Incorporation Depth:	DEPI	4	cm	
Application Rate:	TAPP	0.0123	kg/ha	
Application Efficiency:	APPEFF	0.99	fraction	
Spray Drift	DRFT	0.05	fraction of application rate applied to pond	
Application Date	Date	15-04	dd/mm or dd/mmm or dd-mm or dd-mmm	
Interval 1	interval	7	days	Set to 0 or delete line for single app.
Record 17:	FILTRA			
	IPSCND			
	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 FLSCORN0.out
Chemical: Topramezone
PRZM environment: FLsweetcornC.txt modified Satday, 12 October 2002 at 16:43:14
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 15:33:30
Metfile: w12844.dvf modified Wedday, 3 July 2002 at 09:04:30
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly

1961	0.2272	0.2262	0.2251	0.2218	0.1607	0.03963
1962	0.2758	0.2753	0.2684	0.2652	0.2433	0.2053
1963	0.4171	0.3974	0.3854	0.3683	0.3231	0.2666
1964	0.7626	0.7614	0.7559	0.7346	0.6181	0.4342
1965	1.483	1.48	1.472	1.452	1.201	0.7908
1966	1.418	1.416	1.409	1.388	1.372	1.278
1967	1.316	1.314	1.306	1.292	1.279	1.172
1968	1.126	1.125	1.117	1.102	1.091	1.001
1969	1.542	1.538	1.526	1.508	1.315	1.009
1970	1.472	1.47	1.46	1.44	1.425	1.282
1971	1.326	1.323	1.312	1.286	1.169	1.059
1972	2.044	2.039	2.019	1.904	1.597	1.235
1973	1.938	1.934	1.921	1.891	1.868	1.675
1974	1.512	1.51	1.5	1.484	1.469	1.34
1975	1.333	1.331	1.322	1.301	1.285	1.171
1976	1.232	1.23	1.219	1.201	1.101	1.037
1977	1.184	1.182	1.178	1.165	1.153	1.064
1978	1.404	1.401	1.391	1.357	1.219	1.076
1979	1.34	1.337	1.328	1.307	1.293	1.17
1980	1.08	1.078	1.071	1.057	1.045	0.9563
1981	1.33	1.327	1.315	1.268	1.094	0.904
1982	1.868	1.864	1.854	1.817	1.563	1.265
1983	1.836	1.832	1.82	1.796	1.719	1.616
1984	2.009	2.005	1.989	1.871	1.712	1.608
1985	1.937	1.934	1.92	1.891	1.869	1.676
1986	1.613	1.61	1.6	1.576	1.558	1.431
1987	1.739	1.735	1.723	1.689	1.492	1.306
1988	1.657	1.654	1.642	1.617	1.598	1.465
1989	1.439	1.437	1.426	1.404	1.387	1.255
1990	1.188	1.186	1.179	1.161	1.147	1.046

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	2.044	2.039	2.019	1.904	1.869	1.676
0.0645161290322581	2.009	2.005	1.989	1.891	1.868	1.675
0.0967741935483871	1.938	1.934	1.921	1.891	1.719	1.616
0.129032258064516	1.937	1.934	1.92	1.871	1.712	1.608
0.161290322580645	1.868	1.864	1.854	1.817	1.598	1.465
0.193548387096774	1.836	1.832	1.82	1.796	1.597	1.431
0.225806451612903	1.739	1.735	1.723	1.689	1.563	1.34
0.258064516129032	1.657	1.654	1.642	1.617	1.558	1.306
0.290322580645161	1.613	1.61	1.6	1.576	1.492	1.282
0.32258064516129	1.542	1.538	1.526	1.508	1.469	1.278

0.354838709677419	1.512	1.51	1.5	1.484	1.425	1.265
0.387096774193548	1.483	1.48	1.472	1.452	1.387	1.255
0.419354838709677	1.472	1.47	1.46	1.44	1.372	1.235
0.451612903225806	1.439	1.437	1.426	1.404	1.315	1.172
0.483870967741936	1.418	1.416	1.409	1.388	1.293	1.171
0.516129032258065	1.404	1.401	1.391	1.357	1.285	1.17
0.548387096774194	1.34	1.337	1.328	1.307	1.279	1.076
0.580645161290323	1.333	1.331	1.322	1.301	1.219	1.064
0.612903225806452	1.33	1.327	1.315	1.292	1.201	1.059
0.645161290322581	1.326	1.323	1.312	1.286	1.169	1.046
0.67741935483871	1.316	1.314	1.306	1.268	1.153	1.037
0.709677419354839	1.232	1.23	1.219	1.201	1.147	1.009
0.741935483870968	1.188	1.186	1.179	1.165	1.101	1.001
0.774193548387097	1.184	1.182	1.178	1.161	1.094	0.9563
0.806451612903226	1.126	1.125	1.117	1.102	1.091	0.904
0.838709677419355	1.08	1.078	1.071	1.057	1.045	0.7908
0.870967741935484	0.7626	0.7614	0.7559	0.7346	0.6181	0.4342
0.903225806451613	0.4171	0.3974	0.3854	0.3683	0.3231	0.2666
0.935483870967742	0.2758	0.2753	0.2684	0.2652	0.2433	0.2053
0.967741935483871	0.2272	0.2262	0.2251	0.2218	0.1607	0.03963

0.1	1.9379	1.934	1.9209	1.889	1.7183	1.6152

Average of yearly averages: 1.094461

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

Data used for this run:
Output File: FLSCORN0
Metfile: w12844.dvf
PRZM scenario: FLsweetcornC.txt
EXAMS environment file: pond298.exv
Chemical Name: Topramezone

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	363.69	g/mol	
Henry's Law Const.	henry		atm-m^3/mol	
Vapor Pressure	vapr	7.5e-13	torr	
Solubility	sol	15000	mg/L	
Kd	Kd	2.8	mg/L	
Koc	Koc		mg/L	
Photolysis half-life	kdp	0	days	Half-life
Aerobic Aquatic Metabolism	kbacw	0	days	Halfife
Anaerobic Aquatic Metabolism	kbacs	30.52	days	Halfife
Aerobic Soil Metabolism	asm	241.28	days	Halfife

Hydrolysis: pH 7 0 days Half-life
Method: CAM 1 integer See PRZM manual
Incorporation Depth: DEPI 4 cm
Application Rate: TAPP 0.0123 kg/ha
Application Efficiency: APPEFF 0.95 fraction
Spray Drift DRFT 0.05 fraction of application rate applied to pond
Application Date Date 21-10 dd/mm or dd/mmm or dd-mm or dd-mmm
Interval 1 interval 7 days Set to 0 or delete line for single app.
Record 17: FILTRA
IPSCND
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 FLSCRN0g.out
Chemical: Topramezone
PRZM environment: FLsweetcornC.txt modified Satday, 12 October 2002 at 16:43:14
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 15:33:30
Metfile: w12844.dvf modified Wedday, 3 July 2002 at 09:04:30
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	0.1853	0.1848	0.1842	0.1817	0.1299	0.03202
1962	0.2042	0.2038	0.193	0.1914	0.1797	0.1637
1963	0.3265	0.3058	0.2925	0.2727	0.2365	0.1973
1964	0.6637	0.6627	0.6579	0.6356	0.5247	0.3502
1965	1.398	1.394	1.388	1.369	1.118	0.7063
1966	1.339	1.337	1.33	1.31	1.295	1.203
1967	1.222	1.22	1.213	1.2	1.188	1.084
1968	1.017	1.015	1.008	0.9947	0.9853	0.8985
1969	1.431	1.427	1.415	1.4	1.21	0.9015
1970	1.367	1.365	1.356	1.338	1.323	1.182
1971	1.202	1.199	1.188	1.164	1.052	0.9486
1972	1.95	1.945	1.926	1.809	1.498	1.131
1973	1.849	1.845	1.832	1.804	1.782	1.59
1974	1.406	1.404	1.395	1.38	1.366	1.24
1975	1.218	1.216	1.207	1.188	1.173	1.064
1976	1.101	1.099	1.089	1.074	0.9792	0.9231
1977	1.061	1.059	1.055	1.044	1.034	0.9505
1978	1.28	1.277	1.268	1.235	1.101	0.9616

1979	1.221	1.219	1.21	1.192	1.178	1.06
1980	0.9503	0.9487	0.9423	0.9301	0.9203	0.8365
1981	1.202	1.199	1.188	1.142	0.9701	0.7817
1982	1.763	1.76	1.751	1.715	1.46	1.159
1983	1.73	1.727	1.714	1.692	1.623	1.525
1984	1.913	1.909	1.893	1.77	1.615	1.516
1985	1.844	1.84	1.827	1.799	1.779	1.587
1986	1.508	1.505	1.495	1.473	1.456	1.332
1987	1.628	1.625	1.614	1.582	1.385	1.202
1988	1.552	1.55	1.539	1.515	1.498	1.367
1989	1.326	1.323	1.314	1.293	1.278	1.15
1990	1.064	1.063	1.056	1.04	1.029	0.9322

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	1.95	1.945	1.926	1.809	1.782	1.59
0.0645161290322581	1.913	1.909	1.893	1.804	1.779	1.587
0.0967741935483871	1.849	1.845	1.832	1.799	1.623	1.525
0.129032258064516	1.844	1.84	1.827	1.77	1.615	1.516
0.161290322580645	1.763	1.76	1.751	1.715	1.498	1.367
0.193548387096774	1.73	1.727	1.714	1.692	1.498	1.332
0.225806451612903	1.628	1.625	1.614	1.582	1.46	1.24
0.258064516129032	1.552	1.55	1.539	1.515	1.456	1.203
0.290322580645161	1.508	1.505	1.495	1.473	1.385	1.202
0.32258064516129	1.431	1.427	1.415	1.4	1.366	1.182
0.354838709677419	1.406	1.404	1.395	1.38	1.323	1.159
0.387096774193548	1.398	1.394	1.388	1.369	1.295	1.15
0.419354838709677	1.367	1.365	1.356	1.338	1.278	1.131
0.451612903225806	1.339	1.337	1.33	1.31	1.21	1.084
0.483870967741936	1.326	1.323	1.314	1.293	1.188	1.064
0.516129032258065	1.28	1.277	1.268	1.235	1.178	1.06
0.548387096774194	1.222	1.22	1.213	1.2	1.173	0.9616
0.580645161290323	1.221	1.219	1.21	1.192	1.118	0.9505
0.612903225806452	1.218	1.216	1.207	1.188	1.101	0.9486
0.645161290322581	1.202	1.199	1.188	1.164	1.052	0.9322
0.67741935483871	1.202	1.199	1.188	1.142	1.034	0.9231
0.709677419354839	1.101	1.099	1.089	1.074	1.029	0.9015
0.741935483870968	1.064	1.063	1.056	1.044	0.9853	0.8985
0.774193548387097	1.061	1.059	1.055	1.04	0.9792	0.8365
0.806451612903226	1.017	1.015	1.008	0.9947	0.9701	0.7817
0.838709677419355	0.9503	0.9487	0.9423	0.9301	0.9203	0.7063
0.870967741935484	0.6637	0.6627	0.6579	0.6356	0.5247	0.3502
0.903225806451613	0.3265	0.3058	0.2925	0.2727	0.2365	0.1973

0.935483870967742 0.2042 0.2038 0.193 0.1914 0.1797 0.1637
0.967741935483871 0.1853 0.1848 0.1842 0.1817 0.1299 0.03202

0.1 1.8485 1.8445 1.8315 1.7961 1.6222 1.5241
Average of yearly averages: 0.999190666666667

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

Data used for this run:
Output File: FLSCRN0g
Metfile: w12844.dvf
PRZM scenario: FLsweetcornC.txt
EXAMS environment file: pond298.exv
Chemical Name: Topramezone
Description Variable Name Value Units Comments
Molecular weight mwt 363.69 g/mol
Henry's Law Const. henry atm-m^3/mol
Vapor Pressure vapr 7.5e-13 torr
Solubility sol 15000 mg/L
Kd Kd 2.8 mg/L
Koc Koc mg/L
Photolysis half-life kdp 0 days Half-life
Aerobic Aquatic Metabolism kbacw 0 days Halfife
Anaerobic Aquatic Metabolism kbacs 30.52 days Halfife
Aerobic Soil Metabolism asm 241.28 days Halfife
Hydrolysis: pH 7 0 days Half-life
Method: CAM 1 integer See PRZM manual
Incorporation Depth: DEPI 4 cm
Application Rate: TAPP 0.0123 kg/ha
Application Efficiency: APPEFF 0.99 fraction
Spray Drift DRFT 0.01 fraction of application rate applied to pond
Application Date Date 21-10 dd/mm or dd/mmm or dd-mm or dd-mmm
Interval 1 interval 7 days Set to 0 or delete line for single app.
Record 17: FILTRA
IPSCND
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 ILCorn0.out
Chemical: Topramezone
PRZM environment: ILCornC.txt modified Satday, 12 October 2002 at 16:01:38
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 15:33:30
Metfile: w14923.dvf modified Wedday, 3 July 2002 at 09:04:40
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	0.157	0.1568	0.1559	0.1535	0.1516	0.08642
1962	0.3814	0.3808	0.3784	0.3754	0.3745	0.2805
1963	0.4679	0.4671	0.4636	0.4563	0.4511	0.3983
1964	0.5443	0.5436	0.5404	0.5359	0.5302	0.4683
1965	0.5635	0.5627	0.5595	0.5545	0.5497	0.504
1966	0.858	0.8567	0.8521	0.8459	0.8385	0.6832
1967	1.162	1.16	1.155	1.139	1.126	0.9282
1968	1.018	1.017	1.012	1.008	1.001	0.9628
1969	0.9363	0.935	0.9301	0.9193	0.9125	0.8683
1970	1.371	1.369	1.361	1.342	1.329	1.091
1971	1.238	1.237	1.23	1.22	1.218	1.157
1972	1.281	1.279	1.272	1.254	1.241	1.146
1973	1.256	1.254	1.246	1.238	1.226	1.136
1974	1.529	1.527	1.521	1.503	1.487	1.285
1975	1.318	1.316	1.31	1.306	1.298	1.25
1976	1.206	1.204	1.2	1.192	1.185	1.126
1977	1.193	1.191	1.187	1.17	1.16	1.086
1978	1.253	1.251	1.245	1.229	1.217	1.107
1979	1.101	1.1	1.093	1.082	1.078	1.035
1980	1.183	1.181	1.176	1.161	1.15	1.036
1981	1.033	1.031	1.027	1.02	1.017	0.9802
1982	1.048	1.047	1.043	1.036	1.026	0.9442
1983	1.066	1.064	1.058	1.04	1.027	0.9441
1984	1.122	1.12	1.113	1.101	1.09	0.9866
1985	1.11	1.108	1.101	1.087	1.076	0.9931
1986	1.21	1.209	1.203	1.193	1.18	1.047
1987	1.305	1.303	1.296	1.279	1.267	1.135
1988	1.186	1.185	1.178	1.161	1.15	1.097
1989	1.071	1.07	1.063	1.053	1.044	0.9976
1990	1.065	1.063	1.058	1.051	1.041	0.9635

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	1.529	1.527	1.521	1.503	1.487	1.285
0.0645161290322581	1.371	1.369	1.361	1.342	1.329	1.25

0.0967741935483871	1.318	1.316	1.31	1.306	1.298	1.157
0.129032258064516	1.305	1.303	1.296	1.279	1.267	1.146
0.161290322580645	1.281	1.279	1.272	1.254	1.241	1.136
0.193548387096774	1.256	1.254	1.246	1.238	1.226	1.135
0.225806451612903	1.253	1.251	1.245	1.229	1.218	1.126
0.258064516129032	1.238	1.237	1.23	1.22	1.217	1.107
0.290322580645161	1.21	1.209	1.203	1.193	1.185	1.097
0.32258064516129	1.206	1.204	1.2	1.192	1.18	1.091
0.354838709677419	1.193	1.191	1.187	1.17	1.16	1.086
0.387096774193548	1.186	1.185	1.178	1.161	1.15	1.047
0.419354838709677	1.183	1.181	1.176	1.161	1.15	1.036
0.451612903225806	1.162	1.16	1.155	1.139	1.126	1.035
0.483870967741936	1.122	1.12	1.113	1.101	1.09	0.9976
0.516129032258065	1.11	1.108	1.101	1.087	1.078	0.9931
0.548387096774194	1.101	1.1	1.093	1.082	1.076	0.9866
0.580645161290323	1.071	1.07	1.063	1.053	1.044	0.9802
0.612903225806452	1.066	1.064	1.058	1.051	1.041	0.9635
0.645161290322581	1.065	1.063	1.058	1.04	1.027	0.9628
0.67741935483871	1.048	1.047	1.043	1.036	1.026	0.9442
0.709677419354839	1.033	1.031	1.027	1.02	1.017	0.9441
0.741935483870968	1.018	1.017	1.012	1.008	1.001	0.9282
0.774193548387097	0.9363	0.935	0.9301	0.9193	0.9125	0.8683
0.806451612903226	0.858	0.8567	0.8521	0.8459	0.8385	0.6832
0.838709677419355	0.5635	0.5627	0.5595	0.5545	0.5497	0.504
0.870967741935484	0.5443	0.5436	0.5404	0.5359	0.5302	0.4683
0.903225806451613	0.4679	0.4671	0.4636	0.4563	0.4511	0.3983
0.935483870967742	0.3814	0.3808	0.3784	0.3754	0.3745	0.2805
0.967741935483871	0.157	0.1568	0.1559	0.1535	0.1516	0.08642

0.1 1.3167 1.3147 1.3086 1.3033 1.2949 1.1559

Average of yearly averages: 0.924110666666666

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

Data used for this run:
Output File: ILCorn0
Metfile: w14923.dvf
PRZM scenario: ILCornC.txt
EXAMS environment file: pond298.exv
Chemical Name: Topramezone

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	363.39	g/mol	
Henry's Law Const.	henry		atm-m^3/mol	

Vapor Pressure vapr 7.5e-13 torr
Solubility sol 15000 mg/L
Kd Kd 2.8 mg/L
Koc Koc mg/L
Photolysis half-life kdp 0 days Half-life
Aerobic Aquatic Metabolism kbacw 0 days Halfife
Anaerobic Aquatic Metabolism kbacs 30.52 days Halfife
Aerobic Soil Metabolism asm 241.28 days Halfife
Hydrolysis: pH 7 0 days Half-life
Method: CAM 1 integer See PRZM manual
Incorporation Depth: DEPI 4 cm
Application Rate: TAPP 0.0123 kg/ha
Application Efficiency: APPEFF 0.95 fraction
Spray Drift DRFT 0.05 fraction of application rate applied to pond
Application Date Date 05-05 dd/mm or dd/mmm or dd-mm or dd-mmm
Interval 1 interval 7 days Set to 0 or delete line for single app.
Record 17: FILTRA
IPSCND
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 ILCorn0g.out
Chemical: Topramezone
PRZM environment: ILCornC.txt modified Satday, 12 October 2002 at 16:01:38
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 15:33:30
Metfile: w14923.dvf modified Wedday, 3 July 2002 at 09:04:40
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	0.1161	0.1159	0.1152	0.1134	0.1121	0.05999
1962	0.3109	0.3104	0.3082	0.3035	0.3036	0.2239
1963	0.3708	0.3702	0.3674	0.3617	0.3574	0.3158
1964	0.4232	0.4226	0.4203	0.4174	0.4131	0.3648
1965	0.4211	0.4205	0.4178	0.4148	0.4113	0.3821
1966	0.712	0.7108	0.7068	0.7008	0.6946	0.5524
1967	1.015	1.013	1.008	0.9951	0.9836	0.7941
1968	0.881	0.8802	0.8768	0.8694	0.8639	0.8192
1969	0.7595	0.7584	0.7547	0.7464	0.7385	0.7124

1970	1.203	1.201	1.194	1.177	1.166	0.9387
1971	1.069	1.067	1.062	1.047	1.046	1.002
1972	1.105	1.103	1.097	1.081	1.069	0.9872
1973	1.075	1.073	1.066	1.058	1.048	0.9729
1974	1.353	1.351	1.346	1.33	1.316	1.126
1975	1.158	1.157	1.153	1.143	1.136	1.086
1976	1.013	1.012	1.009	1.001	0.9975	0.9562
1977	1.005	1.004	1.001	0.9866	0.9752	0.9131
1978	1.057	1.056	1.05	1.038	1.027	0.9343
1979	0.9028	0.9016	0.8959	0.8886	0.8827	0.8579
1980	0.9848	0.9836	0.9792	0.9675	0.9562	0.8583
1981	0.8458	0.845	0.8417	0.8346	0.8294	0.7991
1982	0.8454	0.8441	0.8387	0.8345	0.8268	0.7602
1983	0.8655	0.864	0.859	0.8447	0.8335	0.7598
1984	0.9213	0.9198	0.9138	0.9025	0.8939	0.8049
1985	0.9041	0.9029	0.8976	0.8864	0.8779	0.8119
1986	1.011	1.01	1.006	0.9968	0.9871	0.8686
1987	1.109	1.108	1.101	1.088	1.078	0.9607
1988	0.9868	0.9855	0.98	0.9665	0.956	0.9213
1989	0.8708	0.8696	0.8642	0.856	0.8489	0.8181
1990	0.8638	0.8628	0.858	0.8511	0.8438	0.7815

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	1.353	1.351	1.346	1.33	1.316	1.126
0.0645161290322581	1.203	1.201	1.194	1.177	1.166	1.086
0.0967741935483871	1.158	1.157	1.153	1.143	1.136	1.002
0.129032258064516	1.109	1.108	1.101	1.088	1.078	0.9872
0.161290322580645	1.105	1.103	1.097	1.081	1.069	0.9729
0.193548387096774	1.075	1.073	1.066	1.058	1.048	0.9607
0.225806451612903	1.069	1.067	1.062	1.047	1.046	0.9562
0.258064516129032	1.057	1.056	1.05	1.038	1.027	0.9387
0.290322580645161	1.015	1.013	1.009	1.001	0.9975	0.9343
0.32258064516129	1.013	1.012	1.008	0.9968	0.9871	0.9213
0.354838709677419	1.011	1.01	1.006	0.9951	0.9836	0.9131
0.387096774193548	1.005	1.004	1.001	0.9866	0.9752	0.8686
0.419354838709677	0.9868	0.9855	0.98	0.9675	0.9562	0.8583
0.451612903225806	0.9848	0.9836	0.9792	0.9665	0.956	0.8579
0.483870967741936	0.9213	0.9198	0.9138	0.9025	0.8939	0.8192
0.516129032258065	0.9041	0.9029	0.8976	0.8886	0.8827	0.8181
0.548387096774194	0.9028	0.9016	0.8959	0.8864	0.8779	0.8119
0.580645161290323	0.881	0.8802	0.8768	0.8694	0.8639	0.8049
0.612903225806452	0.8708	0.8696	0.8642	0.856	0.8489	0.7991

0.645161290322581	0.8655	0.864	0.859	0.8511	0.8438	0.7941
0.67741935483871	0.8638	0.8628	0.858	0.8447	0.8335	0.7815
0.709677419354839	0.8458	0.845	0.8417	0.8346	0.8294	0.7602
0.741935483870968	0.8454	0.8441	0.8387	0.8345	0.8268	0.7598
0.774193548387097	0.7595	0.7584	0.7547	0.7464	0.7385	0.7124
0.806451612903226	0.712	0.7108	0.7068	0.7008	0.6946	0.5524
0.838709677419355	0.4232	0.4226	0.4203	0.4174	0.4131	0.3821
0.870967741935484	0.4211	0.4205	0.4178	0.4148	0.4113	0.3648
0.903225806451613	0.3708	0.3702	0.3674	0.3617	0.3574	0.3158
0.935483870967742	0.3109	0.3104	0.3082	0.3035	0.3036	0.2239
0.967741935483871	0.1161	0.1159	0.1152	0.1134	0.1121	0.05999

0.1 1.1531 1.1521 1.1478 1.1375 1.1302 1.00052

Average of yearly averages: 0.771446333333333

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

Data used for this run:
Output File: ILCorn0g
Metfile: w14923.dvf
PRZM scenario: ILCornC.txt
EXAMS environment file: pond298.exv
Chemical Name: Topramezone

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	363.39	g/mol	
Henry's Law Const.	henry		atm-m^3/mol	
Vapor Pressure	vapr	7.5e-13	torr	
Solubility	sol	15000	mg/L	
Kd	Kd	2.8	mg/L	
Koc	Koc		mg/L	
Photolysis half-life	kdp	0	days	Half-life
Aerobic Aquatic Metabolism	kbacw	0	days	Halfife
Anaerobic Aquatic Metabolism	kbacs	30.52	days	Halfife
Aerobic Soil Metabolism	asm	241.28	days	Halfife
Hydrolysis:	pH 7	0	days	Half-life
Method:	CAM	1	integer	See PRZM manual
Incorporation Depth:	DEPI	4	cm	
Application Rate:	TAPP	0.0123	kg/ha	
Application Efficiency:	APPEFF	0.99	fraction	
Spray Drift	DRFT	0.01	fraction of application rate applied to pond	
Application Date	Date	05-05	dd/mm or dd/mmm or dd-mm or dd-mmm	
Interval 1	interval	7	days	Set to 0 or delete line for single app.
Record 17:	FILTRA			

IPSCND
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 MSCorn.out
Chemical: Topramezone
PRZM environment: MScornC.txt modified Satday, 12 October 2002 at 16:06:02
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 15:33:30
Metfile: w13893.dvf modified Wedday, 3 July 2002 at 09:06:20
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	0.2744	0.274	0.2724	0.267	0.249	0.1606
1962	0.3496	0.3489	0.3464	0.3413	0.3378	0.3028
1963	0.508	0.507	0.5028	0.494	0.4883	0.4271
1964	0.913	0.9112	0.9038	0.8879	0.8759	0.7083
1965	0.8995	0.8976	0.8932	0.8796	0.8696	0.7874
1966	1.072	1.07	1.063	1.047	1.034	0.9252
1967	1.002	1.001	0.9942	0.9806	0.9706	0.9134
1968	0.9924	0.9905	0.9832	0.9769	0.9682	0.8754
1969	0.9662	0.9649	0.9595	0.9468	0.9367	0.8859
1970	1.038	1.036	1.031	1.017	1.004	0.9027
1971	0.9208	0.9196	0.9144	0.902	0.8918	0.8448
1972	0.8561	0.8548	0.8494	0.8365	0.8273	0.785
1973	1.252	1.249	1.244	1.225	1.21	1.023
1974	1.405	1.403	1.394	1.37	1.352	1.206
1975	1.239	1.237	1.229	1.215	1.203	1.148
1976	1.318	1.315	1.304	1.286	1.277	1.102
1977	1.297	1.295	1.287	1.267	1.25	1.207
1978	1.512	1.51	1.5	1.476	1.456	1.286
1979	1.44	1.438	1.429	1.411	1.396	1.276
1980	1.214	1.211	1.202	1.191	1.183	1.142
1981	1.17	1.169	1.161	1.144	1.132	1.09
1982	1.156	1.154	1.148	1.132	1.119	1.055
1983	1.296	1.294	1.285	1.264	1.247	1.114
1984	1.468	1.465	1.455	1.431	1.414	1.236
1985	1.546	1.544	1.533	1.509	1.489	1.334
1986	1.289	1.287	1.281	1.268	1.259	1.216

1987	1.205	1.203	1.198	1.186	1.177	1.142
1988	1.156	1.155	1.148	1.133	1.121	1.08
1989	1.018	1.016	1.01	0.9978	0.9903	0.9673
1990	1.035	1.033	1.028	1.013	1.001	0.9542

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	1.546	1.544	1.533	1.509	1.489	1.334
0.0645161290322581	1.512	1.51	1.5	1.476	1.456	1.286
0.0967741935483871	1.468	1.465	1.455	1.431	1.414	1.276
0.129032258064516	1.44	1.438	1.429	1.411	1.396	1.236
0.161290322580645	1.405	1.403	1.394	1.37	1.352	1.216
0.193548387096774	1.318	1.315	1.304	1.286	1.277	1.207
0.225806451612903	1.297	1.295	1.287	1.268	1.259	1.206
0.258064516129032	1.296	1.294	1.285	1.267	1.25	1.148
0.290322580645161	1.289	1.287	1.281	1.264	1.247	1.142
0.32258064516129	1.252	1.249	1.244	1.225	1.21	1.142
0.354838709677419	1.239	1.237	1.229	1.215	1.203	1.114
0.387096774193548	1.214	1.211	1.202	1.191	1.183	1.102
0.419354838709677	1.205	1.203	1.198	1.186	1.177	1.09
0.451612903225806	1.17	1.169	1.161	1.144	1.132	1.08
0.483870967741936	1.156	1.155	1.148	1.133	1.121	1.055
0.516129032258065	1.156	1.154	1.148	1.132	1.119	1.023
0.548387096774194	1.072	1.07	1.063	1.047	1.034	0.9673
0.580645161290323	1.038	1.036	1.031	1.017	1.004	0.9542
0.612903225806452	1.035	1.033	1.028	1.013	1.001	0.9252
0.645161290322581	1.018	1.016	1.01	0.9978	0.9903	0.9134
0.67741935483871	1.002	1.001	0.9942	0.9806	0.9706	0.9027
0.709677419354839	0.9924	0.9905	0.9832	0.9769	0.9682	0.8859
0.741935483870968	0.9662	0.9649	0.9595	0.9468	0.9367	0.8754
0.774193548387097	0.9208	0.9196	0.9144	0.902	0.8918	0.8448
0.806451612903226	0.913	0.9112	0.9038	0.8879	0.8759	0.7874
0.838709677419355	0.8995	0.8976	0.8932	0.8796	0.8696	0.785
0.870967741935484	0.8561	0.8548	0.8494	0.8365	0.8273	0.7083
0.903225806451613	0.508	0.507	0.5028	0.494	0.4883	0.4271
0.935483870967742	0.3496	0.3489	0.3464	0.3413	0.3378	0.3028
0.967741935483871	0.2744	0.274	0.2724	0.267	0.249	0.1606

0.1	1.4652	1.4623	1.4524	1.429	1.4122	1.272

Average of yearly averages: 0.969903333333333

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

Data used for this run:
Output File: MSCorn
Metfile: w13893.dvf
PRZM scenario: MScornC.txt
EXAMS environment file: pond298.exv
Chemical Name: Topramezone
Description Variable Name Value Units Comments
Molecular weight mwt 363.69 g/mol
Henry's Law Const. henry atm-m^3/mol
Vapor Pressure vapr 7.5e-13 torr
Solubility sol 15000 mg/L
Kd Kd 2.8 mg/L
Koc Koc mg/L
Photolysis half-life kdp 0 days Half-life
Aerobic Aquatic Metabolism kbacw 0 days Halfife
Anaerobic Aquatic Metabolism kbacs 30.52 days Halfife
Aerobic Soil Metabolism asm 241.28 days Halfife
Hydrolysis: pH 7 0 days Half-life
Method: CAM 1 integer See PRZM manual
Incorporation Depth: DEPI 4 cm
Application Rate: TAPP 0.0123 kg/ha
Application Efficiency: APPEFF 0.95 fraction
Spray Drift DRFT 0.05 fraction of application rate applied to pond
Application Date Date 15-04 dd/mm or dd/mmm or dd-mm or dd-mmm
Interval 1 interval 7 days Set to 0 or delete line for single app.
Record 17: FILTRA
IPSCND
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 ILCorn0g.out
Chemical: Topramezone
PRZM environment: ILCornC.txt modified Satday, 12 October 2002 at 16:01:38
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 15:33:30
Metfile: w14923.dvf modified Wedday, 3 July 2002 at 09:04:40
Water segment concentrations (ppb)

Year Peak 96 hr 21 Day 60 Day 90 Day Yearly

1961	0.1161	0.1159	0.1152	0.1134	0.1121	0.05999
1962	0.3109	0.3104	0.3082	0.3035	0.3036	0.2239
1963	0.3708	0.3702	0.3674	0.3617	0.3574	0.3158
1964	0.4232	0.4226	0.4203	0.4174	0.4131	0.3648
1965	0.4211	0.4205	0.4178	0.4148	0.4113	0.3821
1966	0.712	0.7108	0.7068	0.7008	0.6946	0.5524
1967	1.015	1.013	1.008	0.9951	0.9836	0.7941
1968	0.881	0.8802	0.8768	0.8694	0.8639	0.8192
1969	0.7595	0.7584	0.7547	0.7464	0.7385	0.7124
1970	1.203	1.201	1.194	1.177	1.166	0.9387
1971	1.069	1.067	1.062	1.047	1.046	1.002
1972	1.105	1.103	1.097	1.081	1.069	0.9872
1973	1.075	1.073	1.066	1.058	1.048	0.9729
1974	1.353	1.351	1.346	1.33	1.316	1.126
1975	1.158	1.157	1.153	1.143	1.136	1.086
1976	1.013	1.012	1.009	1.001	0.9975	0.9562
1977	1.005	1.004	1.001	0.9866	0.9752	0.9131
1978	1.057	1.056	1.05	1.038	1.027	0.9343
1979	0.9028	0.9016	0.8959	0.8886	0.8827	0.8579
1980	0.9848	0.9836	0.9792	0.9675	0.9562	0.8583
1981	0.8458	0.845	0.8417	0.8346	0.8294	0.7991
1982	0.8454	0.8441	0.8387	0.8345	0.8268	0.7602
1983	0.8655	0.864	0.859	0.8447	0.8335	0.7598
1984	0.9213	0.9198	0.9138	0.9025	0.8939	0.8049
1985	0.9041	0.9029	0.8976	0.8864	0.8779	0.8119
1986	1.011	1.01	1.006	0.9968	0.9871	0.8686
1987	1.109	1.108	1.101	1.088	1.078	0.9607
1988	0.9868	0.9855	0.98	0.9665	0.956	0.9213
1989	0.8708	0.8696	0.8642	0.856	0.8489	0.8181
1990	0.8638	0.8628	0.858	0.8511	0.8438	0.7815

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	1.353	1.351	1.346	1.33	1.316	1.126
0.0645161290322581	1.203	1.201	1.194	1.177	1.166	1.086
0.0967741935483871	1.158	1.157	1.153	1.143	1.136	1.002
0.129032258064516	1.109	1.108	1.101	1.088	1.078	0.9872
0.161290322580645	1.105	1.103	1.097	1.081	1.069	0.9729
0.193548387096774	1.075	1.073	1.066	1.058	1.048	0.9607
0.225806451612903	1.069	1.067	1.062	1.047	1.046	0.9562
0.258064516129032	1.057	1.056	1.05	1.038	1.027	0.9387
0.290322580645161	1.015	1.013	1.009	1.001	0.9975	0.9343
0.32258064516129	1.013	1.012	1.008	0.9968	0.9871	0.9213

0.354838709677419	1.011	1.01	1.006	0.9951	0.9836	0.9131
0.387096774193548	1.005	1.004	1.001	0.9866	0.9752	0.8686
0.419354838709677	0.9868	0.9855	0.98	0.9675	0.9562	0.8583
0.451612903225806	0.9848	0.9836	0.9792	0.9665	0.956	0.8579
0.483870967741936	0.9213	0.9198	0.9138	0.9025	0.8939	0.8192
0.516129032258065	0.9041	0.9029	0.8976	0.8886	0.8827	0.8181
0.548387096774194	0.9028	0.9016	0.8959	0.8864	0.8779	0.8119
0.580645161290323	0.881	0.8802	0.8768	0.8694	0.8639	0.8049
0.612903225806452	0.8708	0.8696	0.8642	0.856	0.8489	0.7991
0.645161290322581	0.8655	0.864	0.859	0.8511	0.8438	0.7941
0.67741935483871	0.8638	0.8628	0.858	0.8447	0.8335	0.7815
0.709677419354839	0.8458	0.845	0.8417	0.8346	0.8294	0.7602
0.741935483870968	0.8454	0.8441	0.8387	0.8345	0.8268	0.7598
0.774193548387097	0.7595	0.7584	0.7547	0.7464	0.7385	0.7124
0.806451612903226	0.712	0.7108	0.7068	0.7008	0.6946	0.5524
0.838709677419355	0.4232	0.4226	0.4203	0.4174	0.4131	0.3821
0.870967741935484	0.4211	0.4205	0.4178	0.4148	0.4113	0.3648
0.903225806451613	0.3708	0.3702	0.3674	0.3617	0.3574	0.3158
0.935483870967742	0.3109	0.3104	0.3082	0.3035	0.3036	0.2239
0.967741935483871	0.1161	0.1159	0.1152	0.1134	0.1121	0.05999

0.1	1.1531	1.1521	1.1478	1.1375	1.1302	1.00052

Average of yearly averages: 0.771446333333333

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

Data used for this run:
Output File: ILCorn0g
Metfile: w14923.dvf
PRZM scenario: ILCornC.txt
EXAMS environment file: pond298.exv
Chemical Name: Topramezone

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	363.39	g/mol	
Henry's Law Const.	henry		atm-m^3/mol	
Vapor Pressure	vapr	7.5e-13	torr	
Solubility	sol	15000	mg/L	
Kd	Kd	2.8	mg/L	
Koc	Koc		mg/L	
Photolysis half-life	kdp	0	days	Half-life
Aerobic Aquatic Metabolism	kbacw	0	days	Halfife
Anaerobic Aquatic Metabolism	kbacs	30.52	days	Halfife
Aerobic Soil Metabolism	asm	241.28	days	Halfife

Hydrolysis: pH 7 0 days Half-life
Method: CAM 1 integer See PRZM manual
Incorporation Depth: DEPI 4 cm
Application Rate: TAPP 0.0123 kg/ha
Application Efficiency: APPEFF 0.99 fraction
Spray Drift DRFT 0.01 fraction of application rate applied to pond
Application Date Date 05-05 dd/mm or dd/mmm or dd-mm or dd-mmm
Interval 1 interval 7 days Set to 0 or delete line for single app.
Record 17: FILTRA
IPSCND
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 MSCorn.out
Chemical: Topramezone
PRZM environment: MScornC.txt modified Satday, 12 October 2002 at 16:06:02
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 15:33:30
Metfile: w13893.dvf modified Wedday, 3 July 2002 at 09:06:20
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	0.2744	0.274	0.2724	0.267	0.249	0.1606
1962	0.3496	0.3489	0.3464	0.3413	0.3378	0.3028
1963	0.508	0.507	0.5028	0.494	0.4883	0.4271
1964	0.913	0.9112	0.9038	0.8879	0.8759	0.7083
1965	0.8995	0.8976	0.8932	0.8796	0.8696	0.7874
1966	1.072	1.07	1.063	1.047	1.034	0.9252
1967	1.002	1.001	0.9942	0.9806	0.9706	0.9134
1968	0.9924	0.9905	0.9832	0.9769	0.9682	0.8754
1969	0.9662	0.9649	0.9595	0.9468	0.9367	0.8859
1970	1.038	1.036	1.031	1.017	1.004	0.9027
1971	0.9208	0.9196	0.9144	0.902	0.8918	0.8448
1972	0.8561	0.8548	0.8494	0.8365	0.8273	0.785
1973	1.252	1.249	1.244	1.225	1.21	1.023
1974	1.405	1.403	1.394	1.37	1.352	1.206
1975	1.239	1.237	1.229	1.215	1.203	1.148
1976	1.318	1.315	1.304	1.286	1.277	1.102
1977	1.297	1.295	1.287	1.267	1.25	1.207

1978	1.512	1.51	1.5	1.476	1.456	1.286
1979	1.44	1.438	1.429	1.411	1.396	1.276
1980	1.214	1.211	1.202	1.191	1.183	1.142
1981	1.17	1.169	1.161	1.144	1.132	1.09
1982	1.156	1.154	1.148	1.132	1.119	1.055
1983	1.296	1.294	1.285	1.264	1.247	1.114
1984	1.468	1.465	1.455	1.431	1.414	1.236
1985	1.546	1.544	1.533	1.509	1.489	1.334
1986	1.289	1.287	1.281	1.268	1.259	1.216
1987	1.205	1.203	1.198	1.186	1.177	1.142
1988	1.156	1.155	1.148	1.133	1.121	1.08
1989	1.018	1.016	1.01	0.9978	0.9903	0.9673
1990	1.035	1.033	1.028	1.013	1.001	0.9542

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	1.546	1.544	1.533	1.509	1.489	1.334
0.0645161290322581	1.512	1.51	1.5	1.476	1.456	1.286
0.0967741935483871	1.468	1.465	1.455	1.431	1.414	1.276
0.129032258064516	1.44	1.438	1.429	1.411	1.396	1.236
0.161290322580645	1.405	1.403	1.394	1.37	1.352	1.216
0.193548387096774	1.318	1.315	1.304	1.286	1.277	1.207
0.225806451612903	1.297	1.295	1.287	1.268	1.259	1.206
0.258064516129032	1.296	1.294	1.285	1.267	1.25	1.148
0.290322580645161	1.289	1.287	1.281	1.264	1.247	1.142
0.32258064516129	1.252	1.249	1.244	1.225	1.21	1.142
0.354838709677419	1.239	1.237	1.229	1.215	1.203	1.114
0.387096774193548	1.214	1.211	1.202	1.191	1.183	1.102
0.419354838709677	1.205	1.203	1.198	1.186	1.177	1.09
0.451612903225806	1.17	1.169	1.161	1.144	1.132	1.08
0.483870967741936	1.156	1.155	1.148	1.133	1.121	1.055
0.516129032258065	1.156	1.154	1.148	1.132	1.119	1.023
0.548387096774194	1.072	1.07	1.063	1.047	1.034	0.9673
0.580645161290323	1.038	1.036	1.031	1.017	1.004	0.9542
0.612903225806452	1.035	1.033	1.028	1.013	1.001	0.9252
0.645161290322581	1.018	1.016	1.01	0.9978	0.9903	0.9134
0.67741935483871	1.002	1.001	0.9942	0.9806	0.9706	0.9027
0.709677419354839	0.9924	0.9905	0.9832	0.9769	0.9682	0.8859
0.741935483870968	0.9662	0.9649	0.9595	0.9468	0.9367	0.8754
0.774193548387097	0.9208	0.9196	0.9144	0.902	0.8918	0.8448
0.806451612903226	0.913	0.9112	0.9038	0.8879	0.8759	0.7874
0.838709677419355	0.8995	0.8976	0.8932	0.8796	0.8696	0.785
0.870967741935484	0.8561	0.8548	0.8494	0.8365	0.8273	0.7083

0.903225806451613 0.508 0.507 0.5028 0.494 0.4883 0.4271
0.935483870967742 0.3496 0.3489 0.3464 0.3413 0.3378 0.3028
0.967741935483871 0.2744 0.274 0.2724 0.267 0.249 0.1606

0.1 1.4652 1.4623 1.4524 1.429 1.4122 1.272
Average of yearly averages: 0.969903333333333

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

Data used for this run:
Output File: MSCorn
Metfile: w13893.dvf
PRZM scenario: MScornC.txt
EXAMS environment file: pond298.exv
Chemical Name: Topramezone
Description Variable Name Value Units Comments
Molecular weight mwt 363.69 g/mol
Henry's Law Const. henry atm-m^3/mol
Vapor Pressure vapr 7.5e-13 torr
Solubility sol 15000 mg/L
Kd Kd 2.8 mg/L
Koc Koc mg/L
Photolysis half-life kdp 0 days Half-life
Aerobic Aquatic Metabolism kbacw 0 days Halfife
Anaerobic Aquatic Metabolism kbacs 30.52 days Halfife
Aerobic Soil Metabolism asm 241.28 days Halfife
Hydrolysis: pH 7 0 days Half-life
Method: CAM 1 integer See PRZM manual
Incorporation Depth: DEPI 4 cm
Application Rate: TAPP 0.0123 kg/ha
Application Efficiency: APPEFF 0.95 fraction
Spray Drift DRFT 0.05 fraction of application rate applied to pond
Application Date Date 15-04 dd/mm or dd/mmm or dd-mm or dd-mmm
Interval 1 interval 7 days Set to 0 or delete line for single app.
Record 17: FILTRA
IPSCND
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 MSCorng.out
Chemical: Topramezone
PRZM environment: MScornC.txt modified Satday, 12 October 2002 at 16:06:02
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 15:33:30
Metfile: w13893.dvf modified Wedday, 3 July 2002 at 09:06:20
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	0.2439	0.2435	0.2422	0.2365	0.2173	0.1353
1962	0.2856	0.285	0.2831	0.2789	0.276	0.2469
1963	0.4233	0.4224	0.4189	0.4115	0.4068	0.3484
1964	0.809	0.8074	0.8007	0.7865	0.7758	0.62
1965	0.796	0.7943	0.7908	0.7789	0.77	0.6857
1966	0.9444	0.9428	0.9364	0.9221	0.9106	0.8162
1967	0.8612	0.8599	0.8543	0.8416	0.8332	0.7933
1968	0.8664	0.8648	0.8582	0.8517	0.8445	0.7455
1969	0.8155	0.8146	0.8109	0.803	0.7972	0.7504
1970	0.877	0.8756	0.8712	0.859	0.8484	0.7634
1971	0.7512	0.7503	0.7469	0.7395	0.7342	0.6997
1972	0.6826	0.6816	0.6773	0.6671	0.6602	0.6356
1973	1.091	1.089	1.085	1.068	1.055	0.8805
1974	1.259	1.256	1.248	1.227	1.21	1.071
1975	1.078	1.077	1.07	1.057	1.046	1.01
1976	1.181	1.179	1.168	1.153	1.146	0.961
1977	1.134	1.133	1.125	1.108	1.094	1.07
1978	1.362	1.36	1.351	1.329	1.312	1.153
1979	1.286	1.284	1.276	1.259	1.246	1.142
1980	1.078	1.075	1.067	1.059	1.051	1.003
1981	1.022	1.021	1.016	1.006	0.9979	0.9495
1982	0.9888	0.9874	0.9828	0.9701	0.9587	0.9132
1983	1.139	1.138	1.129	1.111	1.096	0.9739
1984	1.315	1.313	1.303	1.282	1.266	1.1
1985	1.395	1.393	1.383	1.361	1.343	1.203
1986	1.168	1.167	1.161	1.15	1.141	1.08
1987	1.081	1.08	1.075	1.064	1.056	1.003
1988	1	0.9992	0.9944	0.9844	0.9772	0.9392
1989	0.8826	0.8816	0.8774	0.8683	0.8618	0.8208
1990	0.8676	0.8659	0.8613	0.8527	0.8437	0.807

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	1.395	1.393	1.383	1.361	1.343	1.203
0.0645161290322581	1.362	1.36	1.351	1.329	1.312	1.153

0.0967741935483871	1.315	1.313	1.303	1.282	1.266	1.142
0.129032258064516	1.286	1.284	1.276	1.259	1.246	1.1
0.161290322580645	1.259	1.256	1.248	1.227	1.21	1.08
0.193548387096774	1.181	1.179	1.168	1.153	1.146	1.071
0.225806451612903	1.168	1.167	1.161	1.15	1.141	1.07
0.258064516129032	1.139	1.138	1.129	1.111	1.096	1.01
0.290322580645161	1.134	1.133	1.125	1.108	1.094	1.003
0.32258064516129	1.091	1.089	1.085	1.068	1.056	1.003
0.354838709677419	1.081	1.08	1.075	1.064	1.055	0.9739
0.387096774193548	1.078	1.077	1.07	1.059	1.051	0.961
0.419354838709677	1.078	1.075	1.067	1.057	1.046	0.9495
0.451612903225806	1.022	1.021	1.016	1.006	0.9979	0.9392
0.483870967741936	1	0.9992	0.9944	0.9844	0.9772	0.9132
0.516129032258065	0.9888	0.9874	0.9828	0.9701	0.9587	0.8805
0.548387096774194	0.9444	0.9428	0.9364	0.9221	0.9106	0.8208
0.580645161290323	0.8826	0.8816	0.8774	0.8683	0.8618	0.8162
0.612903225806452	0.877	0.8756	0.8712	0.859	0.8484	0.807
0.645161290322581	0.8676	0.8659	0.8613	0.8527	0.8445	0.7933
0.67741935483871	0.8664	0.8648	0.8582	0.8517	0.8437	0.7634
0.709677419354839	0.8612	0.8599	0.8543	0.8416	0.8332	0.7504
0.741935483870968	0.8155	0.8146	0.8109	0.803	0.7972	0.7455
0.774193548387097	0.809	0.8074	0.8007	0.7865	0.7758	0.6997
0.806451612903226	0.796	0.7943	0.7908	0.7789	0.77	0.6857
0.838709677419355	0.7512	0.7503	0.7469	0.7395	0.7342	0.6356
0.870967741935484	0.6826	0.6816	0.6773	0.6671	0.6602	0.62
0.903225806451613	0.4233	0.4224	0.4189	0.4115	0.4068	0.3484
0.935483870967742	0.2856	0.285	0.2831	0.2789	0.276	0.2469
0.967741935483871	0.2439	0.2435	0.2422	0.2365	0.2173	0.1353

0.1	1.3121	1.3101	1.3003	1.2797	1.264	1.1378

Average of yearly averages: 0.844016666666667

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

Data used for this run:
Output File: MSCorng
Metfile: w13893.dvf
PRZM scenario: MScornC.txt
EXAMS environment file: pond298.exv
Chemical Name: Topramezone

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	363.69	g/mol	
Henry's Law Const.	henry		atm-m^3/mol	

Vapor Pressure vapr 7.5e-13 torr
Solubility sol 15000 mg/L
Kd Kd 2.8 mg/L
Koc Koc mg/L
Photolysis half-life kdp 0 days Half-life
Aerobic Aquatic Metabolism kbacw 0 days Halfife
Anaerobic Aquatic Metabolism kbacs 30.52 days Halfife
Aerobic Soil Metabolism asm 241.28 days Halfife
Hydrolysis: pH 7 0 days Half-life
Method: CAM 1 integer See PRZM manual
Incorporation Depth: DEPI 4 cm
Application Rate: TAPP 0.0123 kg/ha
Application Efficiency: APPEFF 0.99 fraction
Spray Drift DRFT 0.01 fraction of application rate applied to pond
Application Date Date 15-04 dd/mm or dd/mmm or dd-mm or dd-mmm
Interval 1 interval 7 days Set to 0 or delete line for single app.
Record 17: FILTRA
IPSCND
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 NCCornE.out
Chemical: Topramezone
PRZM environment: NCcornEC.txt modified Satday, 12 October 2002 at 16:10:28
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 15:33:30
Metfile: w13722.dvf modified Wedday, 3 July 2002 at 09:05:50
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	0.104	0.1038	0.1028	0.1021	0.1017	0.06596
1962	0.189	0.1886	0.188	0.1863	0.1843	0.1458
1963	0.3189	0.3183	0.3158	0.3107	0.307	0.2462
1964	0.3286	0.328	0.3256	0.3237	0.3204	0.295
1965	0.4093	0.4085	0.4062	0.4	0.3951	0.3434
1966	0.4711	0.4704	0.4672	0.4619	0.4587	0.4052
1967	0.53	0.5292	0.5276	0.5239	0.5216	0.4625
1968	0.501	0.5002	0.4974	0.4918	0.4901	0.4579
1969	0.5159	0.515	0.5119	0.5065	0.5018	0.4577

1970	0.5141	0.5133	0.5119	0.5065	0.5037	0.4655
1971	0.5435	0.5426	0.5391	0.5345	0.5291	0.479
1972	0.6342	0.6332	0.6308	0.6244	0.6196	0.5421
1973	0.7503	0.7491	0.744	0.7382	0.7316	0.6379
1974	0.7528	0.7516	0.7493	0.74	0.7318	0.666
1975	0.6871	0.6861	0.6824	0.6726	0.6676	0.6308
1976	0.6731	0.672	0.6701	0.6636	0.6561	0.6039
1977	0.6332	0.6323	0.6282	0.6185	0.6119	0.5751
1978	0.991	0.9897	0.986	0.9741	0.9626	0.7822
1979	0.8558	0.8546	0.852	0.8461	0.84	0.7939
1980	0.8262	0.8247	0.8186	0.8044	0.7999	0.746
1981	0.7763	0.7752	0.7721	0.7631	0.7553	0.7101
1982	0.7161	0.7151	0.7119	0.7097	0.7048	0.6586
1983	0.6648	0.6638	0.6607	0.6518	0.6449	0.6052
1984	0.7153	0.7144	0.7096	0.6988	0.6902	0.6226
1985	0.7219	0.7208	0.7169	0.7129	0.7076	0.6436
1986	0.7294	0.7282	0.7233	0.7136	0.7062	0.6444
1987	0.717	0.716	0.7121	0.7061	0.705	0.649
1988	0.7299	0.7288	0.7242	0.7152	0.7115	0.6501
1989	0.7304	0.7293	0.7255	0.7174	0.7097	0.646
1990	0.7334	0.7322	0.7287	0.7224	0.7151	0.647

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	0.991	0.9897	0.986	0.9741	0.9626	0.7939
0.0645161290322581	0.8558	0.8546	0.852	0.8461	0.84	0.7822
0.0967741935483871	0.8262	0.8247	0.8186	0.8044	0.7999	0.746
0.129032258064516	0.7763	0.7752	0.7721	0.7631	0.7553	0.7101
0.161290322580645	0.7528	0.7516	0.7493	0.74	0.7318	0.666
0.193548387096774	0.7503	0.7491	0.744	0.7382	0.7316	0.6586
0.225806451612903	0.7334	0.7322	0.7287	0.7224	0.7151	0.6501
0.258064516129032	0.7304	0.7293	0.7255	0.7174	0.7115	0.649
0.290322580645161	0.7299	0.7288	0.7242	0.7152	0.7097	0.647
0.32258064516129	0.7294	0.7282	0.7233	0.7136	0.7076	0.646
0.354838709677419	0.7219	0.7208	0.7169	0.7129	0.7062	0.6444
0.387096774193548	0.717	0.716	0.7121	0.7097	0.705	0.6436
0.419354838709677	0.7161	0.7151	0.7119	0.7061	0.7048	0.6379
0.451612903225806	0.7153	0.7144	0.7096	0.6988	0.6902	0.6308
0.483870967741936	0.6871	0.6861	0.6824	0.6726	0.6676	0.6226
0.516129032258065	0.6731	0.672	0.6701	0.6636	0.6561	0.6052
0.548387096774194	0.6648	0.6638	0.6607	0.6518	0.6449	0.6039
0.580645161290323	0.6342	0.6332	0.6308	0.6244	0.6196	0.5751
0.612903225806452	0.6332	0.6323	0.6282	0.6185	0.6119	0.5421

0.645161290322581	0.5435	0.5426	0.5391	0.5345	0.5291	0.479
0.67741935483871	0.53	0.5292	0.5276	0.5239	0.5216	0.4655
0.709677419354839	0.5159	0.515	0.5119	0.5065	0.5037	0.4625
0.741935483870968	0.5141	0.5133	0.5119	0.5065	0.5018	0.4579
0.774193548387097	0.501	0.5002	0.4974	0.49[illegible]8	0.4901	0.4577
0.806451612903226	0.4711	0.4704	0.4672	0.4619	0.4587	0.4052
0.838709677419355	0.4093	0.4085	0.4062	0.4	0.3951	0.3434
0.870967741935484	0.3286	0.328	0.3256	0.3237	0.3204	0.295
0.903225806451613	0.3189	0.3183	0.3158	0.3107	0.307	0.2462
0.935483870967742	0.189	0.1886	0.188	0.1863	0.1843	0.1458
0.967741935483871	0.104	0.1038	0.1028	0.1021	0.1017	0.06596
0.1	0.82121	0.81975	0.81395	0.80027	0.79544	0.74241

Average of yearly averages: 0.542622

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

Data used for this run:
Output File: NCCornE
Metfile: w13722.dvf
PRZM scenario: NCcornEC.txt
EXAMS environment file: pond298.exv
Chemical Name: Topramezone

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	363.69	g/mol	
Henry's Law Const.	henry		atm-m^3/mol	
Vapor Pressure	vapr	7.5e-13	torr	
Solubility	sol	15000	mg/L	
Kd	Kd	2.8	mg/L	
Koc	Koc		mg/L	
Photolysis half-life	kdp	0	days	Half-life
Aerobic Aquatic Metabolism	kbacw	0	days	Halfife
Anaerobic Aquatic Metabolism	kbacs	30.52	days	Halfife
Aerobic Soil Metabolism	asm	241.28	days	Halfife
Hydrolysis:	pH 7	0	days	Half-life
Method:	CAM	1	integer	See PRZM manual
Incorporation Depth:	DEPI	4	cm	
Application Rate:	TAPP	0.0123	kg/ha	
Application Efficiency:	APPEFF	0.95	fraction	
Spray Drift	DRFT	0.05	fraction of application rate applied to pond	
Application Date	Date	16-04	dd/mm or dd/mmm or dd-mm or dd-mmm	
Interval 1	interval	7	days	Set to 0 or delete line for single app.
Record 17:	FILTRA			

IPSCND
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)
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stored as NCCornEg.out
Chemical: Topramezone
PRZM environment: NCcornEC.txt modified Satday, 12 October 2002 at 16:10:28
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 15:33:30
Metfile: w13722.dvf modified Wedday, 3 July 2002 at 09:05:50
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	0.05975	0.05963	0.05922	0.05831	0.05771	0.03653
1962	0.1119	0.1117	0.1112	0.1098	0.1088	0.08271
1963	0.2144	0.2141	0.2123	0.2088	0.2062	0.1581
1964	0.2048	0.2045	0.2035	0.202	0.2003	0.1861
1965	0.2686	0.2681	0.2663	0.2623	0.259	0.2184
1966	0.3151	0.3146	0.3125	0.3088	0.3057	0.2688
1967	0.3664	0.3658	0.3635	0.3624	0.3599	0.3176
1968	0.3265	0.3261	0.3243	0.3204	0.3172	0.3039
1969	0.3367	0.3362	0.3343	0.3297	0.3267	0.2964
1970	0.3245	0.324	0.322	0.3193	0.3189	0.2981
1971	0.3523	0.3518	0.3494	0.3458	0.3427	0.3079
1972	0.4428	0.4421	0.4406	0.4371	0.4333	0.371
1973	0.5574	0.5564	0.5525	0.5496	0.5454	0.4681
1974	0.5623	0.5615	0.5599	0.5535	0.5473	0.4965
1975	0.4944	0.4936	0.4909	0.4839	0.4785	0.4579
1976	0.4794	0.4786	0.4767	0.4723	0.4672	0.4299
1977	0.4356	0.4351	0.4322	0.4254	0.4205	0.3987
1978	0.805	0.8039	0.7995	0.7904	0.7811	0.6141
1979	0.6665	0.6656	0.6632	0.6587	0.6533	0.6262
1980	0.6413	0.6402	0.6354	0.6243	0.616	0.5761
1981	0.5833	0.5825	0.5807	0.5749	0.5694	0.5389
1982	0.5212	0.5207	0.5189	0.5147	0.512	0.4848
1983	0.4673	0.4666	0.4645	0.4583	0.4529	0.4291
1984	0.5205	0.5199	0.5163	0.5086	0.5023	0.4468
1985	0.5265	0.5256	0.5221	0.519	0.5162	0.4688
1986	0.5344	0.5335	0.5299	0.5233	0.5183	0.4705

1987	0.5225	0.5216	0.5178	0.5125	0.5126	0.4759
1988	0.5352	0.5344	0.531	0.525	0.5196	0.4769
1989	0.5332	0.5324	0.5293	0.5241	0.5187	0.4722
1990	0.5379	0.5371	0.5348	0.5304	0.5254	0.474

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	0.805	0.8039	0.7995	0.7904	0.7811	0.6262
0.0645161290322581	0.6665	0.6656	0.6632	0.6587	0.6533	0.6141
0.0967741935483871	0.6413	0.6402	0.6354	0.6243	0.616	0.5761
0.129032258064516	0.5833	0.5825	0.5807	0.5749	0.5694	0.5389
0.161290322580645	0.5623	0.5615	0.5599	0.5535	0.5473	0.4965
0.193548387096774	0.5574	0.5564	0.5525	0.5496	0.5454	0.4848
0.225806451612903	0.5379	0.5371	0.5348	0.5304	0.5254	0.4769
0.258064516129032	0.5352	0.5344	0.531	0.525	0.5196	0.4759
0.290322580645161	0.5344	0.5335	0.5299	0.5241	0.5187	0.474
0.32258064516129	0.5332	0.5324	0.5293	0.5233	0.5183	0.4722
0.354838709677419	0.5265	0.5256	0.5221	0.519	0.5162	0.4705
0.387096774193548	0.5225	0.5216	0.5189	0.5147	0.5126	0.4688
0.419354838709677	0.5212	0.5207	0.5178	0.5125	0.512	0.4681
0.451612903225806	0.5205	0.5199	0.5163	0.5086	0.5023	0.4579
0.483870967741936	0.4944	0.4936	0.4909	0.4839	0.4785	0.4468
0.516129032258065	0.4794	0.4786	0.4767	0.4723	0.4672	0.4299
0.548387096774194	0.4673	0.4666	0.4645	0.4583	0.4529	0.4291
0.580645161290323	0.4428	0.4421	0.4406	0.4371	0.4333	0.3987
0.612903225806452	0.4356	0.4351	0.4322	0.4254	0.4205	0.371
0.645161290322581	0.3664	0.3658	0.3635	0.3624	0.3599	0.3176
0.67741935483871	0.3523	0.3518	0.3494	0.3458	0.3427	0.3079
0.709677419354839	0.3367	0.3362	0.3343	0.3297	0.3267	0.3039
0.741935483870968	0.3265	0.3261	0.3243	0.3204	0.3189	0.2981
0.774193548387097	0.3245	0.324	0.322	0.3193	0.3172	0.2964
0.806451612903226	0.3151	0.3146	0.3125	0.3088	0.3057	0.2688
0.838709677419355	0.2686	0.2681	0.2663	0.2623	0.259	0.2184
0.870967741935484	0.2144	0.2141	0.2123	0.2088	0.2062	0.1861
0.903225806451613	0.2048	0.2045	0.2035	0.202	0.2003	0.1581
0.935483870967742	0.1119	0.1117	0.1112	0.1098	0.1088	0.08271
0.967741935483871	0.05975	0.05963	0.05922	0.05831	0.05771	0.03653
0.1	0.6355	0.63443	0.62993	0.61936	0.61134	0.57238

Average of yearly averages: 0.388364666666667

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

Data used for this run:
Output File: NCCornEg
Metfile: w13722.dvf
PRZM scenario: NCcornEC.txt
EXAMS environment file: pond298.exv
Chemical Name: Topramezone

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	363.69	g/mol	
Henry's Law Const.	henry		atm-m^3/mol	
Vapor Pressure	vapr	7.5e-13	torr	
Solubility	sol	15000	mg/L	
Kd	Kd	2.8	mg/L	
Koc	Koc		mg/L	
Photolysis half-life	kdp	0	days	Half-life
Aerobic Aquatic Metabolism	kbacw	0	days	Halfife
Anaerobic Aquatic Metabolism	kbacs	30.52	days	Halfife
Aerobic Soil Metabolism	asm	241.28	days	Halfife
Hydrolysis:	pH 7	0	days	Half-life
Method:	CAM	1	integer	See PRZM manual
Incorporation Depth:	DEPI	4	cm	
Application Rate:	TAPP	0.0123	kg/ha	
Application Efficiency:	APPEFF	0.99	fraction	
Spray Drift	DRFT	0.01	fraction of application rate applied to pond	
Application Date	Date	16-04	dd/mm or dd/mmm or dd-mm or dd-mmm	
Interval 1	interval	7	days	Set to 0 or delete line for single app.
Record 17:	FILTRA			
	IPSCND			
	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 NCCornEg.out
Chemical: Topramezone
PRZM environment: NCcornEC.txt modified Satday, 12 October 2002 at 16:10:28
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 15:33:30
Metfile: w13722.dvf modified Wedday, 3 July 2002 at 09:05:50
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	0.05975	0.05963	0.05922	0.05831	0.05771	0.03653

1962	0.1119	0.1117	0.1112	0.1098	0.1088	0.08271
1963	0.2144	0.2141	0.2123	0.2088	0.2062	0.1581
1964	0.2048	0.2045	0.2035	0.202	0.2003	0.1861
1965	0.2686	0.2681	0.2663	0.2623	0.259	0.2184
1966	0.3151	0.3146	0.3125	0.3088	0.3057	0.2688
1967	0.3664	0.3658	0.3635	0.3624	0.3599	0.3176
1968	0.3265	0.3261	0.3243	0.3204	0.3172	0.3039
1969	0.3367	0.3362	0.3343	0.3297	0.3267	0.2964
1970	0.3245	0.324	0.322	0.3193	0.3189	0.2981
1971	0.3523	0.3518	0.3494	0.3458	0.3427	0.3079
1972	0.4428	0.4421	0.4406	0.4371	0.4333	0.371
1973	0.5574	0.5564	0.5525	0.5496	0.5454	0.4681
1974	0.5623	0.5615	0.5599	0.5535	0.5473	0.4965
1975	0.4944	0.4936	0.4909	0.4839	0.4785	0.4579
1976	0.4794	0.4786	0.4767	0.4723	0.4672	0.4299
1977	0.4356	0.4351	0.4322	0.4254	0.4205	0.3987
1978	0.805	0.8039	0.7995	0.7904	0.7811	0.6141
1979	0.6665	0.6656	0.6632	0.6587	0.6533	0.6262
1980	0.6413	0.6402	0.6354	0.6243	0.616	0.5761
1981	0.5833	0.5825	0.5807	0.5749	0.5694	0.5389
1982	0.5212	0.5207	0.5189	0.5147	0.512	0.4848
1983	0.4673	0.4666	0.4645	0.4583	0.4529	0.4291
1984	0.5205	0.5199	0.5163	0.5086	0.5023	0.4468
1985	0.5265	0.5256	0.5221	0.519	0.5162	0.4688
1986	0.5344	0.5335	0.5299	0.5233	0.5183	0.4705
1987	0.5225	0.5216	0.5178	0.5125	0.5126	0.4759
1988	0.5352	0.5344	0.531	0.525	0.5196	0.4769
1989	0.5332	0.5324	0.5293	0.5241	0.5187	0.4722
1990	0.5379	0.5371	0.5348	0.5304	0.5254	0.474

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	0.805	0.8039	0.7995	0.7904	0.7811	0.6262
0.0645161290322581	0.6665	0.6656	0.6632	0.6587	0.6533	0.6141
0.0967741935483871	0.6413	0.6402	0.6354	0.6243	0.616	0.5761
0.129032258064516	0.5833	0.5825	0.5807	0.5749	0.5694	0.5389
0.161290322580645	0.5623	0.5615	0.5599	0.5535	0.5473	0.4965
0.193548387096774	0.5574	0.5564	0.5525	0.5496	0.5454	0.4848
0.225806451612903	0.5379	0.5371	0.5348	0.5304	0.5254	0.4769
0.258064516129032	0.5352	0.5344	0.531	0.525	0.5196	0.4759
0.290322580645161	0.5344	0.5335	0.5299	0.5241	0.5187	0.474
0.32258064516129	0.5332	0.5324	0.5293	0.5233	0.5183	0.4722
0.354838709677419	0.5265	0.5256	0.5221	0.519	0.5162	0.4705

0.387096774193548	0.5225	0.5216	0.5189	0.5147	0.5126	0.4688
0.419354838709677	0.5212	0.5207	0.5178	0.5125	0.512	0.4681
0.451612903225806	0.5205	0.5199	0.5163	0.5086	0.5023	0.4579
0.483870967741936	0.4944	0.4936	0.4909	0.4839	0.4785	0.4468
0.516129032258065	0.4794	0.4786	0.4767	0.4723	0.4672	0.4299
0.548387096774194	0.4673	0.4666	0.4645	0.4583	0.4529	0.4291
0.580645161290323	0.4428	0.4421	0.4406	0.4371	0.4333	0.3987
0.612903225806452	0.4356	0.4351	0.4322	0.4254	0.4205	0.371
0.645161290322581	0.3664	0.3658	0.3635	0.3624	0.3599	0.3176
0.67741935483871	0.3523	0.3518	0.3494	0.3458	0.3427	0.3079
0.709677419354839	0.3367	0.3362	0.3343	0.3297	0.3267	0.3039
0.741935483870968	0.3265	0.3261	0.3243	0.3204	0.3189	0.2981
0.774193548387097	0.3245	0.324	0.322	0.3193	0.3172	0.2964
0.806451612903226	0.3151	0.3146	0.3125	0.3088	0.3057	0.2688
0.838709677419355	0.2686	0.2681	0.2663	0.2623	0.259	0.2184
0.870967741935484	0.2144	0.2141	0.2123	0.2088	0.2062	0.1861
0.903225806451613	0.2048	0.2045	0.2035	0.202	0.2003	0.1581
0.935483870967742	0.1119	0.1117	0.1112	0.1098	0.1088	0.08271
0.967741935483871	0.05975	0.05963	0.05922	0.05831	0.05771	0.03653

0.1	0.6355	0.63443	0.62993	0.61936	0.61134	0.57238

Average of yearly averages: 0.388364666666667

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

Data used for this run:
Output File: NCCornEg
Metfile: w13722.dvf
PRZM scenario: NCcornEC.txt
EXAMS environment file: pond298.exv
Chemical Name: Topramezone

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	363.69	g/mol	
Henry's Law Const.	henry		atm-m^3/mol	
Vapor Pressure	vapr	7.5e-13	torr	
Solubility	sol	15000	mg/L	
Kd	Kd	2.8	mg/L	
Koc	Koc		mg/L	
Photolysis half-life	kdp	0	days	Half-life
Aerobic Aquatic Metabolism	kbacw	0	days	Halfife
Anaerobic Aquatic Metabolism	kbacs	30.52	days	Halfife
Aerobic Soil Metabolism	asm	241.28	days	Halfife

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Hydrolysis: pH 7 0 days Half-life
Method: CAM 1 integer See PRZM manual
Incorporation Depth: DEPI 4 cm
Application Rate: TAPP 0.0123 kg/ha
Application Efficiency: APPEFF 0.99 fraction
Spray Drift DRFT 0.01 fraction of application rate applied to pond
Application Date Date 16-04 dd/mm or dd/mmm or dd-mm or dd-mmm
Interval 1 interval 7 days Set to 0 or delete line for single app.
Record 17: FILTRA
IPSCND
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 NCCornWg.out
Chemical: Topramezone
PRZM environment: NCcornWC.txt modified Satday, 12 October 2002 at 18:11:14
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 16:33:30
Metfile: w03812.dvf modified Wedday, 3 July 2002 at 10:05:50
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1965	0.223	0.2225	0.2206	0.2172	0.2146	0.1294
1966	0.4155	0.4148	0.4117	0.4057	0.4027	0.3133
1967	0.5217	0.5208	0.5174	0.5106	0.5051	0.4363
1968	0.5525	0.5517	0.5481	0.5409	0.5355	0.4871
1969	0.5796	0.5787	0.5758	0.5722	0.5673	0.5147
1970	0.5391	0.5383	0.5351	0.5312	0.5306	0.5048
1971	0.617	0.616	0.6133	0.6105	0.6065	0.5388
1972	0.7408	0.7396	0.7356	0.7303	0.7252	0.6324
1973	1.014	1.012	1.006	0.9921	0.9805	0.8162
1974	1.017	1.016	1.012	1.004	0.9958	0.9098
1975	1.12	1.118	1.113	1.102	1.091	0.9702
1976	1.218	1.217	1.21	1.193	1.18	1.055
1977	1.093	1.092	1.089	1.084	1.077	1.024
1978	1.062	1.061	1.057	1.05	1.039	0.9657
1979	0.9737	0.9725	0.9687	0.9631	0.9546	0.9002
1980	1.151	1.15	1.144	1.135	1.125	0.9743
1981	1.148	1.147	1.14	1.126	1.113	1.025

1982	1.035	1.034	1.031	1.022	1.012	0.9635
1983	0.9622	0.9609	0.9574	0.95	0.9407	0.887
1984	1.044	1.043	1.036	1.031	1.022	0.9188
1985	0.9238	0.9226	0.9181	0.9092	0.9064	0.8763
1986	0.8941	0.8927	0.889	0.8772	0.8679	0.8154
1987	1.146	1.145	1.137	1.127	1.115	0.9378
1988	0.9954	0.9942	0.989	0.9774	0.9711	0.9432
1989	1.059	1.058	1.056	1.047	1.041	0.943
1990	1.04	1.039	1.033	1.022	1.018	0.9466

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.037037037037037	1.218	1.217	1.21	1.193	1.18	1.055
0.0740740740740741	1.151	1.15	1.144	1.135	1.125	1.025
0.111111111111111	1.148	1.147	1.14	1.127	1.115	1.024
0.148148148148148	1.146	1.145	1.137	1.126	1.113	0.9743
0.185185185185185	1.12	1.118	1.113	1.102	1.091	0.9702
0.222222222222222	1.093	1.092	1.089	1.084	1.077	0.9657
0.259259259259259	1.062	1.061	1.057	1.05	1.041	0.9635
0.296296296296296	1.059	1.058	1.056	1.047	1.039	0.9466
0.333333333333333	1.044	1.043	1.036	1.031	1.022	0.9432
0.37037037037037	1.04	1.039	1.033	1.022	1.018	0.943
0.407407407407407	1.035	1.034	1.031	1.022	1.012	0.9378
0.444444444444444	1.017	1.016	1.012	1.004	0.9958	0.9188
0.481481481481481	1.014	1.012	1.006	0.9921	0.9805	0.9098
0.518518518518518	0.9954	0.9942	0.989	0.9774	0.9711	0.9002
0.555555555555556	0.9737	0.9725	0.9687	0.9631	0.9546	0.887
0.592592592592593	0.9622	0.9609	0.9574	0.95	0.9407	0.8763
0.62962962962963	0.9238	0.9226	0.9181	0.9092	0.9064	0.8162
0.666666666666667	0.8941	0.8927	0.889	0.8772	0.8679	0.8154
0.703703703703704	0.7408	0.7396	0.7356	0.7303	0.7252	0.6324
0.740740740740741	0.617	0.616	0.6133	0.6105	0.6065	0.5388
0.777777777777778	0.5796	0.5787	0.5758	0.5722	0.5673	0.5147
0.814814814814815	0.5525	0.5517	0.5481	0.5409	0.5355	0.5048
0.851851851851852	0.5391	0.5383	0.5351	0.5312	0.5306	0.4871
0.888888888888889	0.5217	0.5208	0.5174	0.5106	0.5051	0.4363
0.925925925925926	0.4155	0.4148	0.4117	0.4057	0.4027	0.3133
0.962962962962963	0.223	0.2225	0.2206	0.2172	0.2146	0.1294
0.1	1.1489	1.1479	1.1412	1.1294	1.118	1.0243

Average of yearly averages: 0.785723076923077

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

Data used for this run:
Output File: NCCornWg
Metfile: w03812.dvf
PRZM scenario: NCcornWC.txt
EXAMS environment file: pond298.exv
Chemical Name: Topramezone

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	363.69	g/mol	
Henry's Law Const.	henry		atm-m^3/mol	
Vapor Pressure	vapr	7.5e-13	torr	
Solubility	sol	15000	mg/L	
Kd	Kd	2.8	mg/L	
Koc	Koc		mg/L	
Photolysis half-life	kdp	0	days	Half-life
Aerobic Aquatic Metabolism	kbacw	0	days	Halfife
Anaerobic Aquatic Metabolism	kbacs	30.52	days	Halfife
Aerobic Soil Metabolism	asm	241.28	days	Halfife
Hydrolysis:	pH 7	0	days	Half-life
Method:	CAM	1	integer	See PRZM manual
Incorporation Depth:	DEPI	4	cm	
Application Rate:	TAPP	0.0123	kg/ha	
Application Efficiency:	APPEFF	0.99	fraction	
Spray Drift	DRFT	0.05	fraction of application rate applied to pond	
Application Date	Date	01-05	dd/mm or dd/mmm or dd-mm or dd-mmm	
Interval 1	interval	7	days	Set to 0 or delete line for single app.
Record 17:	FILTRA			
	IPSCND			
	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 NCCornWa.out
Chemical: Topramezone
PRZM environment: NCcornWC.txt modified Satday, 12 October 2002 at 18:11:14
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 16:33:30
Metfile: w03812.dvf modified Wedday, 3 July 2002 at 10:05:50
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly

1965	0.2163	0.2158	0.214	0.2107	0.2082	0.1256
1966	0.403	0.4023	0.3993	0.3935	0.3906	0.3039
1967	0.5064	0.5056	0.5023	0.4957	0.4903	0.4235
1968	0.5373	0.5364	0.533	0.5259	0.5207	0.4734
1969	0.5643	0.5634	0.5606	0.557	0.5523	0.5009
1970	0.5261	0.5253	0.5222	0.5183	0.5178	0.4921
1971	0.6013	0.6003	0.5977	0.5951	0.5912	0.5253
1972	0.7208	0.7196	0.7158	0.7106	0.7055	0.6155
1973	0.9835	0.9817	0.9753	0.9621	0.9508	0.7923
1974	0.9866	0.9851	0.9814	0.974	0.9659	0.8823
1975	1.085	1.084	1.078	1.068	1.057	0.9405
1976	1.18	1.178	1.172	1.156	1.143	1.022
1977	1.06	1.059	1.056	1.051	1.044	0.9923
1978	1.031	1.029	1.026	1.018	1.009	0.9367
1979	0.9458	0.9446	0.9409	0.9355	0.9271	0.874
1980	1.116	1.115	1.109	1.1	1.091	0.945
1981	1.113	1.112	1.105	1.091	1.079	0.994
1982	1.005	1.003	1.001	0.992	0.982	0.9348
1983	0.9348	0.9335	0.9302	0.923	0.9139	0.8614
1984	1.013	1.012	1.006	1	0.9916	0.892
1985	0.8982	0.8971	0.8927	0.884	0.8812	0.8513
1986	0.8696	0.8683	0.8646	0.8531	0.8441	0.7929
1987	1.112	1.11	1.103	1.093	1.081	0.9103
1988	0.967	0.9658	0.9608	0.9493	0.9426	0.9156
1989	1.028	1.027	1.025	1.016	1.01	0.9154
1990	1.01	1.009	1.003	0.9926	0.9888	0.9189

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.0370370370370370	1.18	1.178	1.172	1.156	1.143	1.022
0.0740740740740741	1.116	1.115	1.109	1.1	1.091	0.994
0.111111111111111	1.113	1.112	1.105	1.093	1.081	0.9923
0.148148148148148	1.112	1.11	1.103	1.091	1.079	0.945
0.185185185185185	1.085	1.084	1.078	1.068	1.057	0.9405
0.222222222222222	1.06	1.059	1.056	1.051	1.044	0.9367
0.259259259259259	1.031	1.029	1.026	1.018	1.01	0.9348
0.296296296296296	1.028	1.027	1.025	1.016	1.009	0.9189
0.333333333333333	1.013	1.012	1.006	1	0.9916	0.9156
0.37037037037037	1.01	1.009	1.003	0.9926	0.9888	0.9154
0.407407407407407	1.005	1.003	1.001	0.992	0.982	0.9103
0.444444444444444	0.9866	0.9851	0.9814	0.974	0.9659	0.892
0.481481481481481	0.9835	0.9817	0.9753	0.9621	0.9508	0.8823
0.518518518518518	0.967	0.9658	0.9608	0.9493	0.9426	0.874

0.555555555555556	0.9458	0.9446	0.9409	0.9355	0.9271	0.8614
0.592592592592593	0.9348	0.9335	0.9302	0.923	0.9139	0.8513
0.62962962962963	0.8982	0.8971	0.8927	0.884	0.8812	0.7929
0.666666666666667	0.8696	0.8683	0.8646	0.8531	0.8441	0.7923
0.703703703703704	0.7208	0.7196	0.7158	0.7106	0.7055	0.6155
0.740740740740741	0.6013	0.6003	0.5977	0.5951	0.5912	0.5253
0.777777777777778	0.5643	0.5634	0.5606	0.557	0.5523	0.5009
0.814814814814815	0.5373	0.5364	0.533	0.5259	0.5207	0.4921
0.851851851851852	0.5261	0.5253	0.5222	0.5183	0.5178	0.4734
0.888888888888889	0.5064	0.5056	0.5023	0.4957	0.4903	0.4235
0.925925925925926	0.403	0.4023	0.3993	0.3935	0.3906	0.3039
0.962962962962963	0.2163	0.2158	0.214	0.2107	0.2082	0.1256

0.1	1.1139	1.1129	1.1062	1.0951	1.084	0.99281

Average of yearly averages: 0.762765384615385

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

Data used for this run:
Output File: NCCornWa
Metfile: w03812.dvf
PRZM scenario: NCcornWC.txt
EXAMS environment file: pond298.exv
Chemical Name: Topramezone

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	363.69	g/mol	
Henry's Law Const.	henry		atm-m^3/mol	
Vapor Pressure	vapr	7.5e-13	torr	
Solubility	sol	15000	mg/L	
Kd	Kd	2.8	mg/L	
Koc	Koc		mg/L	
Photolysis half-life	kdp	0	days	Half-life
Aerobic Aquatic Metabolism	kbacw	0	days	Halfife
Anaerobic Aquatic Metabolism	kbacs	30.52	days	Halfife
Aerobic Soil Metabolism	asm	241.28	days	Halfife
Hydrolysis:	pH 7	0	days	Half-life
Method:	CAM	1	integer	See PRZM manual
Incorporation Depth:	DEPI	4	cm	
Application Rate:	TAPP	0.0123	kg/ha	
Application Efficiency:	APPEFF	0.95	fraction	
Spray Drift	DRFT	0.05	fraction of application rate applied to pond	
Application Date	Date	01-05	dd/mm or dd/mmm or dd-mm or dd-mmm	
Interval 1	interval	7	days	Set to 0 or delete line for single app.

Record 17: FILTRA
IPSCND
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 NDCornA.out
Chemical: Topramezone
PRZM environment: NDcornC.txt modified Satday, 12 October 2002 at 18:14:22
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 16:33:30
Metfile: w14914.dvf modified Wedday, 3 July 2002 at 10:05:52
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	0.145	0.1448	0.144	0.142	0.141	0.08336
1962	0.3512	0.3505	0.3493	0.3475	0.3449	0.2549
1963	0.4507	0.45	0.4482	0.4417	0.4399	0.3781
1964	0.6558	0.6545	0.6494	0.6381	0.6343	0.5169
1965	0.6387	0.6379	0.6348	0.6298	0.6257	0.5891
1966	0.6049	0.6041	0.6013	0.5982	0.5953	0.5646
1967	0.5952	0.5945	0.5921	0.5846	0.5793	0.5454
1968	0.5814	0.5806	0.5783	0.5747	0.5699	0.5344
1969	0.6542	0.6532	0.6488	0.6413	0.6343	0.5701
1970	0.679	0.6784	0.6749	0.6659	0.6605	0.6126
1971	0.7319	0.7308	0.7281	0.7239	0.718	0.6486
1972	0.751	0.75	0.7464	0.7367	0.7352	0.6818
1973	0.707	0.7061	0.7029	0.6965	0.693	0.6624
1974	0.7162	0.715	0.7115	0.7039	0.6973	0.6545
1975	0.9109	0.9098	0.9038	0.8893	0.8786	0.7527
1976	0.8167	0.8157	0.8116	0.8019	0.795	0.7652
1977	0.8106	0.8093	0.8038	0.7914	0.7834	0.7323
1978	0.8597	0.8585	0.8529	0.8419	0.8329	0.7588
1979	0.8271	0.8258	0.8208	0.8164	0.8104	0.765
1980	0.7661	0.765	0.7604	0.7569	0.7507	0.7291
1981	0.938	0.9365	0.9306	0.9199	0.9112	0.7961
1982	0.8404	0.8396	0.8355	0.8298	0.829	0.798
1983	0.8039	0.8026	0.7985	0.7918	0.7841	0.7511
1984	0.9326	0.9311	0.9249	0.9108	0.9	0.7958
1985	1.018	1.016	1.013	1.005	1.001	0.9008
1986	1.013	1.012	1.007	0.9987	0.9892	0.9273

1987	0.9847	0.9833	0.9775	0.965	0.9606	0.9075
1988	0.8801	0.879	0.8751	0.8675	0.8598	0.841
1989	0.8552	0.8542	0.8496	0.8424	0.8365	0.796
1990	0.8813	0.88	0.8749	0.868	0.86	0.791

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	1.018	1.016	1.013	1.005	1.001	0.9273
0.0645161290322581	1.013	1.012	1.007	0.9987	0.9892	0.9075
0.0967741935483871	0.9847	0.9833	0.9775	0.965	0.9606	0.9008
0.129032258064516	0.938	0.9365	0.9306	0.9199	0.9112	0.841
0.161290322580645	0.9326	0.9311	0.9249	0.9108	0.9	0.798
0.193548387096774	0.9109	0.9098	0.9038	0.8893	0.8786	0.7961
0.225806451612903	0.8813	0.88	0.8751	0.868	0.86	0.796
0.258064516129032	0.8801	0.879	0.8749	0.8675	0.8598	0.7958
0.290322580645161	0.8597	0.8585	0.8529	0.8424	0.8365	0.791
0.32258064516129	0.8552	0.8542	0.8496	0.8419	0.8329	0.7652
0.354838709677419	0.8404	0.8396	0.8355	0.8298	0.829	0.765
0.387096774193548	0.8271	0.8258	0.8208	0.8164	0.8104	0.7588
0.419354838709677	0.8167	0.8157	0.8116	0.8019	0.795	0.7527
0.451612903225806	0.8106	0.8093	0.8038	0.7918	0.7841	0.7511
0.483870967741936	0.8039	0.8026	0.7985	0.7914	0.7834	0.7323
0.516129032258065	0.7661	0.765	0.7604	0.7569	0.7507	0.7291
0.548387096774194	0.751	0.75	0.7464	0.7367	0.7352	0.6818
0.580645161290323	0.7319	0.7308	0.7281	0.7239	0.718	0.6624
0.612903225806452	0.7162	0.715	0.7115	0.7039	0.6973	0.6545
0.645161290322581	0.707	0.7061	0.7029	0.6965	0.693	0.6486
0.67741935483871	0.679	0.6784	0.6749	0.6659	0.6605	0.6126
0.709677419354839	0.6558	0.6545	0.6494	0.6413	0.6343	0.5891
0.741935483870968	0.6542	0.6532	0.6488	0.6381	0.6343	0.5701
0.774193548387097	0.6387	0.6379	0.6348	0.6298	0.6257	0.5646
0.806451612903226	0.6049	0.6041	0.6013	0.5982	0.5953	0.5454
0.838709677419355	0.5952	0.5945	0.5921	0.5846	0.5793	0.5344
0.870967741935484	0.5814	0.5806	0.5783	0.5747	0.5699	0.5169
0.903225806451613	0.4507	0.45	0.4482	0.4417	0.4399	0.3781
0.935483870967742	0.3512	0.3505	0.3493	0.3475	0.3449	0.2549
0.967741935483871	0.145	0.1448	0.144	0.142	0.141	0.08336

0.1	0.98003	0.97862	0.97281	0.96049	0.95566	0.89482

Average of yearly averages: 0.670148666666667

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

Data used for this run:
Output File: NDCornA
Metfile: w14914.dvf
PRZM scenario: NDcornC.txt
EXAMS environment file: pond298.exv
Chemical Name: Topramezone

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	363.69	g/mol	
Henry's Law Const.	henry		atm-m^3/mol	
Vapor Pressure	vapr	7.5e-13	torr	
Solubility	sol	15000	mg/L	
Kd	Kd	2.8	mg/L	
Koc	Koc		mg/L	
Photolysis half-life	kdp	0	days	Half-life
Aerobic Aquatic Metabolism	kbacw	0	days	Halfife
Anaerobic Aquatic Metabolism	kbacs	30.52	days	Halfife
Aerobic Soil Metabolism	asm	241.28	days	Halfife
Hydrolysis:	pH 7	0	days	Half-life
Method:	CAM	1	integer	See PRZM manual
Incorporation Depth:	DEPI	4	cm	
Application Rate:	TAPP	0.0123	kg/ha	
Application Efficiency:	APPEFF	0.95	fraction	
Spray Drift	DRFT	0.05	fraction of application rate applied to pond	
Application Date	Date	12-05	dd/mm or dd/mmm or dd-mm or dd-mmm	
Interval 1	interval	7	days	Set to 0 or delete line for single app.
Record 17:	FILTRA			
	IPSCND			
	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 NDCornG.out
Chemical: Topramezone
PRZM environment: NDcornC.txt modified Satday, 12 October 2002 at 18:14:22
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 16:33:30
Metfile: w14914.dvf modified Wedday, 3 July 2002 at 10:05:52
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly

1961	0.1051	0.105	0.1043	0.1029	0.1019	0.05753
1962	0.2762	0.2757	0.2745	0.2728	0.2711	0.197
1963	0.3465	0.3459	0.3441	0.3392	0.3389	0.2935
1964	0.5356	0.5345	0.5301	0.5207	0.5184	0.4128
1965	0.4936	0.493	0.4908	0.4868	0.4839	0.466
1966	0.4394	0.4389	0.4371	0.4346	0.4335	0.422
1967	0.4143	0.4138	0.4125	0.4075	0.4032	0.3869
1968	0.3883	0.3877	0.3863	0.3851	0.3822	0.3633
1969	0.4605	0.4598	0.4566	0.4508	0.446	0.3908
1970	0.4727	0.4721	0.4699	0.463	0.4583	0.4274
1971	0.5201	0.5194	0.5169	0.515	0.5113	0.4592
1972	0.5326	0.5319	0.5291	0.5246	0.5236	0.4888
1973	0.4863	0.4859	0.4841	0.4801	0.4772	0.4643
1974	0.4988	0.4979	0.4959	0.4918	0.487	0.4525
1975	0.6945	0.6936	0.6887	0.6774	0.6691	0.5514
1976	0.6103	0.6098	0.6075	0.6024	0.5987	0.5632
1977	0.5895	0.5885	0.5845	0.5754	0.5689	0.5283
1978	0.6353	0.6344	0.6301	0.6224	0.6159	0.5545
1979	0.6069	0.606	0.6024	0.5968	0.5926	0.5598
1980	0.5474	0.5469	0.5449	0.5404	0.5371	0.5216
1981	0.7099	0.7087	0.7041	0.6964	0.6902	0.5902
1982	0.6178	0.6172	0.6149	0.6098	0.6061	0.5908
1983	0.5768	0.5759	0.5723	0.5674	0.5622	0.5407
1984	0.704	0.7028	0.6979	0.687	0.6786	0.5873
1985	0.7919	0.7907	0.7879	0.7834	0.7817	0.6963
1986	0.7881	0.7869	0.7833	0.7789	0.772	0.7227
1987	0.7542	0.7532	0.7488	0.7391	0.7373	0.7026
1988	0.6705	0.6699	0.6674	0.6619	0.6578	0.6351
1989	0.6223	0.6215	0.6183	0.6143	0.6109	0.5894
1990	0.6543	0.6533	0.6496	0.6428	0.6374	0.5841

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	0.7919	0.7907	0.7879	0.7834	0.7817	0.7227
0.0645161290322581	0.7881	0.7869	0.7833	0.7789	0.772	0.7026
0.0967741935483871	0.7542	0.7532	0.7488	0.7391	0.7373	0.6963
0.129032258064516	0.7099	0.7087	0.7041	0.6964	0.6902	0.6351
0.161290322580645	0.704	0.7028	0.6979	0.687	0.6786	0.5908
0.193548387096774	0.6945	0.6936	0.6887	0.6774	0.6691	0.5902
0.225806451612903	0.6705	0.6699	0.6674	0.6619	0.6578	0.5894
0.258064516129032	0.6543	0.6533	0.6496	0.6428	0.6374	0.5873
0.290322580645161	0.6353	0.6344	0.6301	0.6224	0.6159	0.5841
0.32258064516129	0.6223	0.6215	0.6183	0.6143	0.6109	0.5632

0.354838709677419	0.6178	0.6172	0.6149	0.6098	0.6061	0.5598
0.387096774193548	0.6103	0.6098	0.6075	0.6024	0.5987	0.5545
0.419354838709677	0.6069	0.606	0.6024	0.5968	0.5926	0.5514
0.451612903225806	0.5895	0.5885	0.5845	0.5754	0.5689	0.5407
0.483870967741936	0.5768	0.5759	0.5723	0.5674	0.5622	0.5283
0.516129032258065	0.5474	0.5469	0.5449	0.5404	0.5371	0.5216
0.548387096774194	0.5356	0.5345	0.5301	0.5246	0.5236	0.4888
0.580645161290323	0.5326	0.5319	0.5291	0.5207	0.5184	0.466
0.612903225806452	0.5201	0.5194	0.5169	0.515	0.5113	0.4643
0.645161290322581	0.4988	0.4979	0.4959	0.4918	0.487	0.4592
0.67741935483871	0.4936	0.493	0.4908	0.4868	0.4839	0.4525
0.709677419354839	0.4863	0.4859	0.4841	0.4801	0.4772	0.4274
0.741935483870968	0.4727	0.4721	0.4699	0.463	0.4583	0.422
0.774193548387097	0.4605	0.4598	0.4566	0.4508	0.446	0.4128
0.806451612903226	0.4394	0.4389	0.4371	0.4346	0.4335	0.3908
0.838709677419355	0.4143	0.4138	0.4125	0.4075	0.4032	0.3869
0.870967741935484	0.3883	0.3877	0.3863	0.3851	0.3822	0.3633
0.903225806451613	0.3465	0.3459	0.3441	0.3392	0.3389	0.2935
0.935483870967742	0.2762	0.2757	0.2745	0.2728	0.2711	0.197
0.967741935483871	0.1051	0.105	0.1043	0.1029	0.1019	0.05753

0.1	0.74977	0.74875	0.74433	0.73483	0.73259	0.69018
			Average of yearly averages:		0.493334333333333	

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

Data used for this run:
Output File: NDCornG
Metfile: w14914.dvf
PRZM scenario: NDcornC.txt
EXAMS environment file: pond298.exv
Chemical Name: Topramezone

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	363.69	g/mol	
Henry's Law Const.	henry		atm-m^3/mol	
Vapor Pressure	vapr	7.5e-13	torr	
Solubility	sol	15000	mg/L	
Kd	Kd	2.8	mg/L	
Koc	Koc		mg/L	
Photolysis half-life	kdp	0	days	Half-life
Aerobic Aquatic Metabolism	kbacw	0	days	Halfife
Anaerobic Aquatic Metabolism	kbacs	30.52	days	Halfife
Aerobic Soil Metabolism	asm	241.28	days	Halfife

Hydrolysis: pH 7 0 days Half-life
Method: CAM 1 integer See PRZM manual
Incorporation Depth: DEPI 4 cm
Application Rate: TAPP 0.0123 kg/ha
Application Efficiency: APPEFF 0.99 fraction
Spray Drift DRFT 0.01 fraction of application rate applied to pond
Application Date Date 12-05 dd/mm or dd/mmm or dd-mm or dd-mmm
Interval 1 interval 7 days Set to 0 or delete line for single app.
Record 17: FILTRA
IPSCND
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 OHCornA.out
Chemical: Topramezone
PRZM environment: OHCornC.txt modified Satday, 12 October 2002 at 18:15:50
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 16:33:30
Metfile: w93815.dvf modified Wedday, 3 July 2002 at 10:06:06
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	0.2594	0.259	0.2571	0.2553	0.255	0.1514
1962	0.4052	0.4045	0.4025	0.3978	0.3957	0.3225
1963	0.4891	0.4883	0.4857	0.484	0.4802	0.4188
1964	0.4804	0.4796	0.4764	0.4705	0.4682	0.4375
1965	0.5157	0.5148	0.5113	0.5044	0.4992	0.4503
1966	0.4908	0.4902	0.4874	0.4824	0.4795	0.4485
1967	0.631	0.63	0.6256	0.6168	0.6122	0.5266
1968	0.894	0.8926	0.8874	0.8795	0.8701	0.7196
1969	0.965	0.9637	0.9583	0.9537	0.9467	0.8457
1970	0.8958	0.8945	0.8902	0.8829	0.8748	0.8254
1971	0.8225	0.8211	0.8159	0.807	0.8014	0.7643
1972	0.8371	0.8363	0.8318	0.8208	0.8139	0.7526
1973	0.8039	0.803	0.8004	0.7917	0.7847	0.7351
1974	0.9401	0.9387	0.9338	0.9204	0.9161	0.8053

1975	0.8587	0.8578	0.8525	0.847	0.8426	0.8073
1976	0.8164	0.8151	0.8121	0.8074	0.8003	0.7557
1977	0.7395	0.7383	0.7331	0.7292	0.7274	0.7046
1978	0.754	0.7528	0.7498	0.7408	0.7346	0.6843
1979	0.7373	0.7362	0.7315	0.7261	0.7191	0.672
1980	0.8991	0.8977	0.8921	0.88	0.8719	0.7557
1981	0.9848	0.9832	0.9791	0.9673	0.956	0.8493
1982	0.9817	0.9804	0.9749	0.9636	0.9534	0.8792
1983	0.9286	0.9271	0.9212	0.9106	0.9017	0.8494
1984	0.9565	0.9557	0.952	0.9412	0.9317	0.8508
1985	0.8424	0.8415	0.8369	0.833	0.8259	0.7915
1986	0.7985	0.7973	0.7935	0.7879	0.7795	0.7319
1987	0.7543	0.7534	0.7481	0.7434	0.7378	0.6966
1988	0.7094	0.7082	0.7056	0.6965	0.6928	0.6634
1989	1.221	1.219	1.215	1.199	1.185	0.9355
1990	1.277	1.276	1.273	1.26	1.249	1.126

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	1.277	1.276	1.273	1.26	1.249	1.126
0.0645161290322581	1.221	1.219	1.215	1.199	1.185	0.9355
0.0967741935483871	0.9848	0.9832	0.9791	0.9673	0.956	0.8792
0.129032258064516	0.9817	0.9804	0.9749	0.9636	0.9534	0.8508
0.161290322580645	0.965	0.9637	0.9583	0.9537	0.9467	0.8494
0.193548387096774	0.9565	0.9557	0.952	0.9412	0.9317	0.8493
0.225806451612903	0.9401	0.9387	0.9338	0.9204	0.9161	0.8457
0.258064516129032	0.9286	0.9271	0.9212	0.9106	0.9017	0.8254
0.290322580645161	0.8991	0.8977	0.8921	0.8829	0.8748	0.8073
0.32258064516129	0.8958	0.8945	0.8902	0.88	0.8719	0.8053
0.354838709677419	0.894	0.8926	0.8874	0.8795	0.8701	0.7915
0.387096774193548	0.8587	0.8578	0.8525	0.847	0.8426	0.7643
0.419354838709677	0.8424	0.8415	0.8369	0.833	0.8259	0.7557
0.451612903225806	0.8371	0.8363	0.8318	0.8208	0.8139	0.7557
0.483870967741936	0.8225	0.8211	0.8159	0.8074	0.8014	0.7526
0.516129032258065	0.8164	0.8151	0.8121	0.807	0.8003	0.7351
0.548387096774194	0.8039	0.803	0.8004	0.7917	0.7847	0.7319
0.580645161290323	0.7985	0.7973	0.7935	0.7879	0.7795	0.7196
0.612903225806452	0.7543	0.7534	0.7498	0.7434	0.7378	0.7046
0.645161290322581	0.754	0.7528	0.7481	0.7408	0.7346	0.6966
0.67741935483871	0.7395	0.7383	0.7331	0.7292	0.7274	0.6843
0.709677419354839	0.7373	0.7362	0.7315	0.7261	0.7191	0.672
0.741935483870968	0.7094	0.7082	0.7056	0.6965	0.6928	0.6634
0.774193548387097	0.631	0.63	0.6256	0.6168	0.6122	0.5266

0.806451612903226	0.5157	0.5148	0.5113	0.5044	0.4992	0.4503
0.838709677419355	0.4908	0.4902	0.4874	0.484	0.4802	0.4485
0.870967741935484	0.4891	0.4883	0.4857	0.4824	0.4795	0.4375
0.903225806451613	0.4804	0.4796	0.4764	0.4705	0.4682	0.4188
0.935483870967742	0.4052	0.4045	0.4025	0.3978	0.3957	0.3225
0.967741935483871	0.2594	0.259	0.2571	0.2553	0.255	0.1514

0.1 0.98449 0.98292 0.97868 0.96693 0.95574 0.87636

Average of yearly averages: 0.69856

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

Data used for this run:
Output File: OHCornA
Metfile: w93815.dvf
PRZM scenario: OHCornC.txt
EXAMS environment file: pond298.exv
Chemical Name: Topramezone

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	363.69	g/mol	
Henry's Law Const.	henry		atm-m^3/mol	
Vapor Pressure	vapr	7.5e-13	torr	
Solubility	sol	15000	mg/L	
Kd	Kd	2.8	mg/L	
Koc	Koc		mg/L	
Photolysis half-life	kdp	0	days	Half-life
Aerobic Aquatic Metabolism	kbacw	0	days	Halfife
Anaerobic Aquatic Metabolism	kbacs	30.52	days	Halfife
Aerobic Soil Metabolism	asm	241.28	days	Halfife
Hydrolysis:	pH 7	0	days	Half-life
Method:	CAM	1	integer	See PRZM manual
Incorporation Depth:	DEPI	4	cm	
Application Rate:	TAPP	0.0123	kg/ha	
Application Efficiency:	APPEFF	0.95	fraction	
Spray Drift	DRFT	0.05	fraction of application rate applied to pond	
Application Date	Date	08-05	dd/mm or dd/mmm or dd-mm or dd-mmm	
Interval 1	interval	7	days	Set to 0 or delete line for single app.
Record 17:	FILTRA			
	IPSCND			
	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 OHCornG.out
Chemical: Topramezone
PRZM environment: OHCornC.txt modified Satday, 12 October 2002 at 18:15:50
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 16:33:30
Metfile: w93815.dvf modified Wedday, 3 July 2002 at 10:06:06
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	0.2224	0.222	0.2204	0.2184	0.2178	0.128
1962	0.3358	0.3352	0.3337	0.3294	0.3262	0.2679
1963	0.3905	0.3899	0.3876	0.386	0.3834	0.3373
1964	0.3546	0.3541	0.3517	0.3479	0.3441	0.3322
1965	0.369	0.3684	0.3659	0.3614	0.358	0.326
1966	0.3258	0.3255	0.3238	0.3212	0.3201	0.3084
1967	0.4645	0.4638	0.4606	0.4545	0.4494	0.3766
1968	0.7228	0.7216	0.717	0.7118	0.7044	0.5672
1969	0.7884	0.7872	0.7832	0.7799	0.7752	0.6903
1970	0.7109	0.7099	0.7064	0.6992	0.6934	0.6629
1971	0.6336	0.6326	0.6287	0.623	0.6168	0.5948
1972	0.6434	0.6427	0.6394	0.6302	0.6243	0.5788
1973	0.6036	0.6027	0.6011	0.5954	0.5892	0.5567
1974	0.7465	0.7454	0.7413	0.7308	0.7229	0.6279
1975	0.6608	0.66	0.6557	0.6482	0.6447	0.6268
1976	0.6138	0.6128	0.6103	0.6049	0.6003	0.5714
1977	0.5404	0.5399	0.5378	0.5334	0.53	0.5163
1978	0.5445	0.5437	0.5417	0.5361	0.5304	0.4948
1979	0.5237	0.5229	0.5195	0.5176	0.5132	0.4809
1980	0.6899	0.6889	0.6846	0.6755	0.6679	0.567
1981	0.7808	0.7795	0.7754	0.7668	0.758	0.6639
1982	0.7742	0.7732	0.7691	0.7607	0.7528	0.6942
1983	0.7237	0.7225	0.718	0.7083	0.702	0.6627
1984	0.7457	0.745	0.7426	0.7348	0.7278	0.6637
1985	0.6437	0.6431	0.6405	0.635	0.631	0.6016
1986	0.5853	0.5844	0.5816	0.5787	0.573	0.5401
1987	0.5433	0.5426	0.5389	0.5321	0.529	0.5039
1988	0.5018	0.5008	0.4988	0.4934	0.4886	0.47
1989	1.023	1.022	1.019	1.006	0.9944	0.7533
1990	1.08	1.079	1.077	1.067	1.058	0.951

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	1.08	1.079	1.077	1.067	1.058	0.951
0.0645161290322581	1.023	1.022	1.019	1.006	0.9944	0.7533
0.0967741935483871	0.7884	0.7872	0.7832	0.7799	0.7752	0.6942
0.129032258064516	0.7808	0.7795	0.7754	0.7668	0.758	0.6903
0.161290322580645	0.7742	0.7732	0.7691	0.7607	0.7528	0.6639
0.193548387096774	0.7465	0.7454	0.7426	0.7348	0.7278	0.6637
0.225806451612903	0.7457	0.745	0.7413	0.7308	0.7229	0.6629
0.258064516129032	0.7237	0.7225	0.718	0.7118	0.7044	0.6627
0.290322580645161	0.7228	0.7216	0.717	0.7083	0.702	0.6279
0.32258064516129	0.7109	0.7099	0.7064	0.6992	0.6934	0.6268
0.354838709677419	0.6899	0.6889	0.6846	0.6755	0.6679	0.6016
0.387096774193548	0.6608	0.66	0.6557	0.6482	0.6447	0.5948
0.419354838709677	0.6437	0.6431	0.6405	0.635	0.631	0.5788
0.451612903225806	0.6434	0.6427	0.6394	0.6302	0.6243	0.5714
0.483870967741936	0.6336	0.6326	0.6287	0.623	0.6168	0.5672
0.516129032258065	0.6138	0.6128	0.6103	0.6049	0.6003	0.567
0.548387096774194	0.6036	0.6027	0.6011	0.5954	0.5892	0.5567
0.580645161290323	0.5853	0.5844	0.5816	0.5787	0.573	0.5401
0.612903225806452	0.5445	0.5437	0.5417	0.5361	0.5304	0.5163
0.645161290322581	0.5433	0.5426	0.5389	0.5334	0.53	0.5039
0.67741935483871	0.5404	0.5399	0.5378	0.5321	0.529	0.4948
0.709677419354839	0.5237	0.5229	0.5195	0.5176	0.5132	0.4809
0.741935483870968	0.5018	0.5008	0.4988	0.4934	0.4886	0.47
0.774193548387097	0.4645	0.4638	0.4606	0.4545	0.4494	0.3766
0.806451612903226	0.3905	0.3899	0.3876	0.386	0.3834	0.3373
0.838709677419355	0.369	0.3684	0.3659	0.3614	0.358	0.3322
0.870967741935484	0.3546	0.3541	0.3517	0.3479	0.3441	0.326
0.903225806451613	0.3358	0.3352	0.3337	0.3294	0.3262	0.3084
0.935483870967742	0.3258	0.3255	0.3238	0.3212	0.3201	0.2679
0.967741935483871	0.2224	0.222	0.2204	0.2184	0.2178	0.128

0.1	0.78764	0.78643	0.78242	0.77859	0.77348	0.69381
			Average of yearly averages:		0.53722	

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

Data used for this run:
Output File: OHCornG
Metfile: w93815.dvf
PRZM scenario: OHCornC.txt
EXAMS environment file: pond298.exv

Chemical Name: Topramezone
Description Variable Name Value Units Comments
Molecular weight mwt 363.69 g/mol
Henry's Law Const. henry atm-m^3/mol
Vapor Pressure vapr 7.5e-13 torr
Solubility sol 15000 mg/L
Kd Kd 2.8 mg/L
Koc Koc mg/L
Photolysis half-life kdp 0 days Half-life
Aerobic Aquatic Metabolism kbacw 0 days Halfife
Anaerobic Aquatic Metabolism kbacs 30.52 days Halfife
Aerobic Soil Metabolism asm 241.28 days Halfife
Hydrolysis: pH 7 0 days Half-life
Method: CAM 1 integer See PRZM manual
Incorporation Depth: DEPI 4 cm
Application Rate: TAPP 0.0123 kg/ha
Application Efficiency: APPEFF 0.99 fraction
Spray Drift DRFT 0.01 fraction of application rate applied to pond
Application Date Date 08-05 dd/mm or dd/mmm or dd-mm or dd-mmm
Interval 1 interval 7 days Set to 0 or delete line for single app.
Record 17: FILTRA
IPSCND
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 PACornA.out
Chemical: Topramezone
PRZM environment: PAcornC.txt modified Satday, 12 October 2002 at 18:25:26
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 16:33:30
Metfile: w14737.dvf modified Wedday, 3 July 2002 at 10:06:12
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	0.07371	0.07361	0.07275	0.06563	0.06123	0.03915
1962	0.1319	0.1317	0.1311	0.1299	0.128	0.1073
1963	0.1886	0.1883	0.1873	0.184	0.1763	0.1576
1964	0.278	0.2775	0.2757	0.2716	0.2684	0.2321
1965	0.3046	0.3042	0.3024	0.2983	0.295	0.2753

1966	0.3434	0.343	0.3411	0.3367	0.333	0.3034
1967	0.3596	0.3591	0.3572	0.3529	0.3495	0.3252
1968	0.4248	0.4242	0.4218	0.4159	0.4111	0.3776
1969	0.4629	0.4621	0.4587	0.4513	0.4474	0.4149
1970	0.4664	0.4658	0.464	0.46	0.4505	0.4315
1971	0.4871	0.4865	0.4841	0.4782	0.4732	0.4516
1972	0.5492	0.5483	0.5442	0.5357	0.5303	0.4856
1973	0.5447	0.5441	0.5413	0.5347	0.5292	0.5033
1974	0.5552	0.5543	0.5516	0.5477	0.5433	0.5024
1975	0.5588	0.5581	0.5553	0.5483	0.5426	0.5158
1976	0.521	0.5204	0.5176	0.511	0.5056	0.4849
1977	0.5119	0.5113	0.5084	0.5016	0.4962	0.4729
1978	0.4926	0.492	0.4897	0.4836	0.4784	0.4505
1979	0.458	0.4574	0.4549	0.449	0.4442	0.4201
1980	0.4518	0.4512	0.4486	0.4427	0.4378	0.4141
1981	0.4796	0.479	0.4763	0.4701	0.4659	0.434
1982	0.5948	0.5938	0.5896	0.5805	0.5741	0.4907
1983	0.5549	0.5542	0.5514	0.5446	0.539	0.5171
1984	0.649	0.6483	0.6443	0.6345	0.6268	0.5628
1985	0.6495	0.6486	0.6449	0.6363	0.6296	0.5832
1986	0.5892	0.5885	0.5854	0.5777	0.5718	0.5445
1987	0.5766	0.5756	0.5722	0.5645	0.5597	0.5263
1988	0.8477	0.8464	0.841	0.8286	0.8187	0.6856
1989	0.9303	0.9291	0.9237	0.9125	0.9038	0.8084
1990	0.8107	0.8097	0.8057	0.7959	0.7889	0.7605

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	0.9303	0.9291	0.9237	0.9125	0.9038	0.8084
0.0645161290322581	0.8477	0.8464	0.841	0.8286	0.8187	0.7605
0.0967741935483871	0.8107	0.8097	0.8057	0.7959	0.7889	0.6856
0.129032258064516	0.6495	0.6486	0.6449	0.6363	0.6296	0.5832
0.161290322580645	0.649	0.6483	0.6443	0.6345	0.6268	0.5628
0.193548387096774	0.5948	0.5938	0.5896	0.5805	0.5741	0.5445
0.225806451612903	0.5892	0.5885	0.5854	0.5777	0.5718	0.5263
0.258064516129032	0.5766	0.5756	0.5722	0.5645	0.5597	0.5171
0.290322580645161	0.5588	0.5581	0.5553	0.5483	0.5433	0.5158
0.32258064516129	0.5552	0.5543	0.5516	0.5477	0.5426	0.5033
0.354838709677419	0.5549	0.5542	0.5514	0.5446	0.539	0.5024
0.387096774193548	0.5492	0.5483	0.5442	0.5357	0.5303	0.4907
0.419354838709677	0.5447	0.5441	0.5413	0.5347	0.5292	0.4856
0.451612903225806	0.521	0.5204	0.5176	0.511	0.5056	0.4849
0.483870967741936	0.5119	0.5113	0.5084	0.5016	0.4962	0.4729

0.516129032258065	0.4926	0.492	0.4897	0.4836	0.4784	0.4516
0.548387096774194	0.4871	0.4865	0.4841	0.4782	0.4732	0.4505
0.580645161290323	0.4796	0.479	0.4763	0.4701	0.4659	0.434
0.612903225806452	0.4664	0.4658	0.464	0.46	0.4505	0.4315
0.645161290322581	0.4629	0.4621	0.4587	0.4513	0.4474	0.4201
0.67741935483871	0.458	0.4574	0.4549	0.449	0.4442	0.4149
0.709677419354839	0.4518	0.4512	0.4486	0.4427	0.4378	0.4141
0.741935483870968	0.4248	0.4242	0.4218	0.4159	0.4111	0.3776
0.774193548387097	0.3596	0.3591	0.3572	0.3529	0.3495	0.3252
0.806451612903226	0.3434	0.343	0.3411	0.3367	0.333	0.3034
0.838709677419355	0.3046	0.3042	0.3024	0.2983	0.295	0.2753
0.870967741935484	0.278	0.2775	0.2757	0.2716	0.2684	0.2321
0.903225806451613	0.1886	0.1883	0.1873	0.184	0.1763	0.1576
0.935483870967742	0.1319	0.1317	0.1311	0.1299	0.128	0.1073
0.967741935483871	0.07371	0.07361	0.07275	0.06563	0.06123	0.03915
0.1	0.79458	0.79359	0.78962	0.77994	0.77297	0.67536

Average of yearly averages: 0.442611666666667

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

Data used for this run:
Output File: PACornA
Metfile: w14737.dvf
PRZM scenario: PAcornC.txt
EXAMS environment file: pond298.exv
Chemical Name: Topramezone

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	363.69	g/mol	
Henry's Law Const.	henry		atm-m^3/mol	
Vapor Pressure	vapr	7.5e-13	torr	
Solubility	sol	15000	mg/L	
Kd	Kd	2.8	mg/L	
Koc	Koc		mg/L	
Photolysis half-life	kdp	0	days	Half-life
Aerobic Aquatic Metabolism	kbacw	0	days	Halfife
Anaerobic Aquatic Metabolism	kbacs	30.52	days	Halfife
Aerobic Soil Metabolism	asm	241.28	days	Halfife
Hydrolysis:	pH 7	0	days	Half-life
Method:	CAM	1	integer	See PRZM manual
Incorporation Depth:	DEPI	4	cm	
Application Rate:	TAPP	0.0123	kg/ha	

Application Efficiency: APPEFF 0.95 fraction
Spray Drift DRFT 0.05 fraction of application rate applied to pond
Application Date Date 28-04 dd/mm or dd/mmm or dd-mm or dd-mmm
Interval 1 interval 7 days Set to 0 or delete line for single app.
Record 17: FILTRA
IPSCND
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 PACornG.out
Chemical: Topramezone
PRZM environment: PAcornC.txt modified Satday, 12 October 2002 at 18:25:26
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 16:33:30
Metfile: w14737.dvf modified Wedday, 3 July 2002 at 10:06:12
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	0.03435	0.03429	0.03342	0.02553	0.02051	0.009868
1962	0.05907	0.05897	0.05864	0.05795	0.05523	0.04268
1963	0.08958	0.08941	0.08886	0.08625	0.07703	0.06399
1964	0.1436	0.1434	0.1429	0.1367	0.1353	0.1169
1965	0.1567	0.1564	0.1553	0.1532	0.1511	0.1418
1966	0.1701	0.1699	0.169	0.167	0.1654	0.1548
1967	0.1897	0.1894	0.1889	0.1881	0.1802	0.1641
1968	0.233	0.2327	0.232	0.2298	0.2272	0.2075
1969	0.2755	0.275	0.2729	0.2684	0.2665	0.2386
1970	0.2854	0.285	0.2842	0.2825	0.2719	0.2492
1971	0.2765	0.2762	0.275	0.2725	0.2707	0.265
1972	0.3468	0.3461	0.3435	0.3378	0.3349	0.2964
1973	0.331	0.3307	0.3294	0.3265	0.3244	0.3112
1974	0.3602	0.3596	0.3574	0.3547	0.3521	0.3082
1975	0.3406	0.3403	0.3389	0.336	0.3339	0.3195
1976	0.299	0.2987	0.2974	0.2948	0.2929	0.2862
1977	0.287	0.2868	0.2856	0.2831	0.2813	0.2724
1978	0.2654	0.2651	0.264	0.2616	0.26	0.2486
1979	0.2265	0.2262	0.2252	0.2233	0.2219	0.2161
1980	0.2393	0.2389	0.2376	0.2355	0.2251	0.21
1981	0.2511	0.2508	0.2495	0.2462	0.2434	0.2312

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1982	0.3753	0.3746	0.3718	0.3658	0.362	0.2887
1983	0.3307	0.3304	0.329	0.3262	0.3241	0.3154
1984	0.4278	0.4274	0.4246	0.418	0.4129	0.3633
1985	0.4246	0.424	0.4217	0.4165	0.4121	0.3848
1986	0.3695	0.3691	0.3676	0.3644	0.362	0.3446
1987	0.3737	0.3731	0.3708	0.3659	0.3625	0.3252
1988	0.6327	0.6316	0.6275	0.618	0.6105	0.4908
1989	0.7181	0.7171	0.7129	0.7036	0.6965	0.6183
1990	0.6118	0.6112	0.6088	0.6035	0.5996	0.5681

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	0.7181	0.7171	0.7129	0.7036	0.6965	0.6183
0.0645161290322581	0.6327	0.6316	0.6275	0.618	0.6105	0.5681
0.0967741935483871	0.6118	0.6112	0.6088	0.6035	0.5996	0.4908
0.129032258064516	0.4278	0.4274	0.4246	0.418	0.4129	0.3848
0.161290322580645	0.4246	0.424	0.4217	0.4165	0.4121	0.3633
0.193548387096774	0.3753	0.3746	0.3718	0.3659	0.3625	0.3446
0.225806451612903	0.3737	0.3731	0.3708	0.3658	0.362	0.3252
0.258064516129032	0.3695	0.3691	0.3676	0.3644	0.362	0.3195
0.290322580645161	0.3602	0.3596	0.3574	0.3547	0.3521	0.3154
0.32258064516129	0.3468	0.3461	0.3435	0.3378	0.3349	0.3112
0.354838709677419	0.3406	0.3403	0.3389	0.336	0.3339	0.3082
0.387096774193548	0.331	0.3307	0.3294	0.3265	0.3244	0.2964
0.419354838709677	0.3307	0.3304	0.329	0.3262	0.3241	0.2887
0.451612903225806	0.299	0.2987	0.2974	0.2948	0.2929	0.2862
0.483870967741936	0.287	0.2868	0.2856	0.2831	0.2813	0.2724
0.516129032258065	0.2854	0.285	0.2842	0.2825	0.2719	0.265
0.548387096774194	0.2765	0.2762	0.275	0.2725	0.2707	0.2492
0.580645161290323	0.2755	0.275	0.2729	0.2684	0.2665	0.2486
0.612903225806452	0.2654	0.2651	0.264	0.2616	0.26	0.2386
0.645161290322581	0.2511	0.2508	0.2495	0.2462	0.2434	0.2312
0.67741935483871	0.2393	0.2389	0.2376	0.2355	0.2272	0.2161
0.709677419354839	0.233	0.2327	0.232	0.2298	0.2251	0.21
0.741935483870968	0.2265	0.2262	0.2252	0.2233	0.2219	0.2075
0.774193548387097	0.1897	0.1894	0.1889	0.1881	0.1802	0.1641
0.806451612903226	0.1701	0.1699	0.169	0.167	0.1654	0.1548
0.838709677419355	0.1567	0.1564	0.1553	0.1532	0.1511	0.1418
0.870967741935484	0.1436	0.1434	0.1429	0.1367	0.1353	0.1169
0.903225806451613	0.08958	0.08941	0.08886	0.08625	0.07703	0.06399
0.935483870967742	0.05907	0.05897	0.05864	0.05795	0.05523	0.04268

0.967741935483871 0.03435 0.03429 0.03342 0.02553 0.02051
0.009868

0.1 0.5934 0.59282 0.59038 0.58495 0.58093 0.4802
Average of yearly averages: 0.268447933333333

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

Data used for this run:
Output File: PACornG
Metfile: w14737.dvf
PRZM scenario: PAcornC.txt
EXAMS environment file: pond298.exv
Chemical Name: Topramezone

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	363.69	g/mol	
Henry's Law Const.	henry		atm-m^3/mol	
Vapor Pressure	vapr	7.5e-13	torr	
Solubility	sol	15000	mg/L	
Kd	Kd	2.8	mg/L	
Koc	Koc		mg/L	
Photolysis half-life	kdp	0	days	Half-life
Aerobic Aquatic Metabolism	kbacw	0	days	Halfife
Anaerobic Aquatic Metabolism	kbacs	30.52	days	Halfife
Aerobic Soil Metabolism	asm	241.28	days	Halfife
Hydrolysis:	pH 7	0	days	Half-life
Method:	CAM	1	integer	See PRZM manual
Incorporation Depth:	DEPI	4	cm	
Application Rate:	TAPP	0.0123	kg/ha	
Application Efficiency:	APPEFF	0.99	fraction	
Spray Drift	DRFT	0.01	fraction of application rate applied to pond	
Application Date	Date	28-04	dd/mm or dd/mmm or dd-mm or dd-mmm	
Interval 1	interval	7	days	Set to 0 or delete line for single app.
Record 17:	FILTRA			
	IPSCND			
	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)	

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stored as TXcorn.out
Chemical: Topramezone
PRZM environment: TXcornC.txt modified Satday, 12 October 2002 at 16:28:20
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 15:33:30
Metfile: w13958.dvf modified Wedday, 3 July 2002 at 09:06:24
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	0.2324	0.2318	0.2297	0.2282	0.2255	0.1335
1962	0.387	0.3863	0.3845	0.3782	0.3732	0.3136
1963	0.8537	0.8518	0.8439	0.8288	0.8198	0.6476
1964	0.8696	0.8679	0.8608	0.8444	0.8324	0.7576
1965	0.9129	0.9112	0.9053	0.8908	0.8796	0.7925
1966	0.9317	0.9307	0.9272	0.9148	0.9035	0.8118
1967	0.9028	0.9012	0.897	0.8886	0.8808	0.7999
1968	0.87	0.8685	0.8647	0.8528	0.8421	0.7719
1969	1.038	1.036	1.032	1.026	1.016	0.8827
1970	1.118	1.116	1.109	1.094	1.081	0.9507
1971	0.9756	0.9741	0.9678	0.9558	0.953	0.9147
1972	1.14	1.138	1.133	1.118	1.104	0.965
1973	1.066	1.065	1.058	1.043	1.036	0.9548
1974	1.01	1.008	1.001	0.9836	0.9736	0.9
1975	1.191	1.189	1.181	1.165	1.157	1.001
1976	1.309	1.306	1.3	1.282	1.267	1.122
1977	1.367	1.365	1.357	1.337	1.321	1.175
1978	1.316	1.314	1.308	1.3	1.287	1.169
1979	1.202	1.2	1.192	1.182	1.178	1.099
1980	1.474	1.471	1.466	1.456	1.45	1.257
1981	1.37	1.369	1.364	1.347	1.329	1.222
1982	1.317	1.315	1.306	1.295	1.282	1.172
1983	1.415	1.413	1.405	1.391	1.377	1.245
1984	1.173	1.172	1.165	1.15	1.147	1.088
1985	1.054	1.053	1.047	1.034	1.029	0.9589
1986	1.215	1.213	1.205	1.188	1.172	1.015
1987	1.07	1.068	1.063	1.046	1.032	0.9777
1988	1.028	1.027	1.024	1.018	1.016	0.9361
1989	0.9752	0.9735	0.9691	0.9602	0.9521	0.8763
1990	1.019	1.017	1.01	0.9957	0.9838	0.878

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	1.474	1.471	1.466	1.456	1.45	1.257
0.0645161290322581	1.415	1.413	1.405	1.391	1.377	1.245
0.0967741935483871	1.37	1.369	1.364	1.347	1.329	1.222
0.129032258064516	1.367	1.365	1.357	1.337	1.321	1.175
0.161290322580645	1.317	1.315	1.308	1.3	1.287	1.172
0.193548387096774	1.316	1.314	1.306	1.295	1.282	1.169
0.225806451612903	1.309	1.306	1.3	1.282	1.267	1.122
0.258064516129032	1.215	1.213	1.205	1.188	1.178	1.099
0.290322580645161	1.202	1.2	1.192	1.182	1.172	1.088
0.32258064516129	1.191	1.189	1.181	1.165	1.157	1.015
0.354838709677419	1.173	1.172	1.165	1.15	1.147	1.001
0.387096774193548	1.14	1.138	1.133	1.118	1.104	0.9777
0.419354838709677	1.118	1.116	1.109	1.094	1.081	0.965
0.451612903225806	1.07	1.068	1.063	1.046	1.036	0.9589
0.483870967741936	1.066	1.065	1.058	1.043	1.032	0.9548
0.516129032258065	1.054	1.053	1.047	1.034	1.029	0.9507
0.548387096774194	1.038	1.036	1.032	1.026	1.016	0.9361
0.580645161290323	1.028	1.027	1.024	1.018	1.016	0.9147
0.612903225806452	1.019	1.017	1.01	0.9957	0.9838	0.9
0.645161290322581	1.01	1.008	1.001	0.9836	0.9736	0.8827
0.67741935483871	0.9756	0.9741	0.9691	0.9602	0.953	0.878
0.709677419354839	0.9752	0.9735	0.9678	0.9558	0.9521	0.8763
0.741935483870968	0.9317	0.9307	0.9272	0.9148	0.9035	0.8118
0.774193548387097	0.9129	0.9112	0.9053	0.8908	0.8808	0.7999
0.806451612903226	0.9028	0.9012	0.897	0.8886	0.8796	0.7925
0.838709677419355	0.87	0.8685	0.8647	0.8528	0.8421	0.7719
0.870967741935484	0.8696	0.8679	0.8608	0.8444	0.8324	0.7576
0.903225806451613	0.8537	0.8518	0.8439	0.8288	0.8198	0.6476
0.935483870967742	0.387	0.3863	0.3845	0.3782	0.3732	0.3136
0.967741935483871	0.2324	0.2318	0.2297	0.2282	0.2255	0.1335

0.1 1.3697 1.3686 1.3633 1.346 1.3282 1.2173

Average of yearly averages: 0.926276666666667

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

Data used for this run:
Output File: TXcorn
Metfile: w13958.dvf
PRZM scenario: TXcornC.txt
EXAMS environment file: pond298.exv
Chemical Name: Topramezone

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	363.69	g/mol	
Henry's Law Const.	henry		atm-m^3/mol	
Vapor Pressure	vapr	7.5e-13	torr	
Solubility	sol	15000	mg/L	
Kd	Kd	2.8	mg/L	
Koc	Koc		mg/L	
Photolysis half-life	kdp	0	days	Half-life
Aerobic Aquatic Metabolism	kbacw	0	days	Halfife
Anaerobic Aquatic Metabolism	kbacs	30.52	days	Halfife
Aerobic Soil Metabolism	asm	241.28	days	Halfife
Hydrolysis:	pH 7	0	days	Half-life
Method:	CAM	1	integer	See PRZM manual
Incorporation Depth:	DEPI	4	cm	
Application Rate:	TAPP	0.0123	kg/ha	
Application Efficiency:	APPEFF	0.95	fraction	
Spray Drift	DRFT	0.05	fraction of application rate applied to pond	
Application Date	Date	16-03	dd/mm or dd/mmm or dd-mm or dd-mmm	
Interval 1	interval	7	days	Set to 0 or delete line for single app.
Record 17:	FILTRA			
	IPSCND			
	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 TXcorng.out
Chemical: Topramezone
PRZM environment: TXcornC.txt modified Satday, 12 October 2002 at 16:28:20
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 15:33:30
Metfile: w13958.dvf modified Wedday, 3 July 2002 at 09:06:24
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	0.1955	0.1952	0.1937	0.1921	0.1899	0.1037
1962	0.3197	0.3191	0.3179	0.3127	0.3084	0.2567
1963	0.7737	0.7718	0.7646	0.7507	0.7428	0.5792
1964	0.7781	0.7765	0.77	0.7554	0.7442	0.6743
1965	0.8034	0.8019	0.7966	0.7839	0.7734	0.6952
1966	0.8097	0.8088	0.8051	0.7947	0.785	0.7042

1967	0.7695	0.7681	0.765	0.7577	0.7514	0.684
1968	0.7317	0.7305	0.7269	0.7172	0.7083	0.6481
1969	0.8985	0.8969	0.8936	0.8887	0.8801	0.7585
1970	0.9823	0.9805	0.974	0.9605	0.9491	0.8256
1971	0.8256	0.8243	0.8191	0.8096	0.8091	0.786
1972	1	0.9985	0.9939	0.9801	0.9685	0.8377
1973	0.9174	0.916	0.9102	0.8972	0.8894	0.8247
1974	0.8608	0.8593	0.853	0.8384	0.8281	0.7668
1975	1.05	1.049	1.041	1.025	1.018	0.8701
1976	1.167	1.165	1.159	1.144	1.13	0.9952
1977	1.225	1.223	1.215	1.198	1.183	1.05
1978	1.178	1.176	1.171	1.162	1.152	1.044
1979	1.059	1.057	1.05	1.039	1.032	0.9694
1980	1.34	1.338	1.332	1.32	1.315	1.135
1981	1.236	1.235	1.231	1.216	1.2	1.099
1982	1.179	1.177	1.169	1.157	1.147	1.048
1983	1.282	1.28	1.273	1.26	1.245	1.123
1984	1.056	1.055	1.05	1.038	1.031	0.9599
1985	0.9003	0.8989	0.8942	0.8838	0.8791	0.8258
1986	1.074	1.072	1.065	1.049	1.036	0.8854
1987	0.9254	0.9238	0.9188	0.9052	0.8929	0.8459
1988	0.881	0.8798	0.8765	0.87	0.8657	0.8024
1989	0.8245	0.823	0.8189	0.8091	0.803	0.7409
1990	0.8682	0.8666	0.8603	0.8491	0.839	0.7432

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	1.34	1.338	1.332	1.32	1.315	1.135
0.0645161290322581	1.282	1.28	1.273	1.26	1.245	1.123
0.0967741935483871	1.236	1.235	1.231	1.216	1.2	1.099
0.129032258064516	1.225	1.223	1.215	1.198	1.183	1.05
0.161290322580645	1.179	1.177	1.171	1.162	1.152	1.048
0.193548387096774	1.178	1.176	1.169	1.157	1.147	1.044
0.225806451612903	1.167	1.165	1.159	1.144	1.13	0.9952
0.258064516129032	1.074	1.072	1.065	1.049	1.036	0.9694
0.290322580645161	1.059	1.057	1.05	1.039	1.032	0.9599
0.32258064516129	1.056	1.055	1.05	1.038	1.031	0.8854
0.354838709677419	1.05	1.049	1.041	1.025	1.018	0.8701
0.387096774193548	1	0.9985	0.9939	0.9801	0.9685	0.8459
0.419354838709677	0.9823	0.9805	0.974	0.9605	0.9491	0.8377
0.451612903225806	0.9254	0.9238	0.9188	0.9052	0.8929	0.8258
0.483870967741936	0.9174	0.916	0.9102	0.8972	0.8894	0.8256
0.516129032258065	0.9003	0.8989	0.8942	0.8887	0.8801	0.8247

0.548387096774194	0.8985	0.8969	0.8936	0.8838	0.8791	0.8024
0.580645161290323	0.881	0.8798	0.8765	0.87	0.8657	0.786
0.612903225806452	0.8682	0.8666	0.8603	0.8491	0.839	0.7668
0.645161290322581	0.8608	0.8593	0.853	0.8384	0.8281	0.7585
0.67741935483871	0.8256	0.8243	0.8191	0.8096	0.8091	0.7432
0.709677419354839	0.8245	0.823	0.8189	0.8091	0.803	0.7409
0.741935483870968	0.8097	0.8088	0.8051	0.7947	0.785	0.7042
0.774193548387097	0.8034	0.8019	0.7966	0.7839	0.7734	0.6952
0.806451612903226	0.7781	0.7765	0.77	0.7577	0.7514	0.684
0.838709677419355	0.7737	0.7718	0.765	0.7554	0.7442	0.6743
0.870967741935484	0.7695	0.7681	0.7646	0.7507	0.7428	0.6481
0.903225806451613	0.7317	0.7305	0.7269	0.7172	0.7083	0.5792
0.935483870967742	0.3197	0.3191	0.3179	0.3127	0.3084	0.2567
0.967741935483871	0.1955	0.1952	0.1937	0.1921	0.1899	0.1037

0.1 1.2349 1.2338 1.2294 1.2142 1.1983 1.0941
Average of yearly averages: 0.809396666666667

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

Data used for this run:
Output File: TXcorng
Metfile: w13958.dvf
PRZM scenario: TXcornC.txt
EXAMS environment file: pond298.exv
Chemical Name: Topramezone
Description Variable Name Value Units Comments
Molecular weight mwt 363.69 g/mol
Henry's Law Const. henry atm-m^3/mol
Vapor Pressure vapr 7.5e-13 torr
Solubility sol 15000 mg/L
Kd Kd 2.8 mg/L
Koc Koc mg/L
Photolysis half-life kdp 0 days Half-life
Aerobic Aquatic Metabolism kbacw 0 days Halfife
Anaerobic Aquatic Metabolism kbacs 30.52 days Halfife
Aerobic Soil Metabolism asm 241.28 days Halfife
Hydrolysis: pH 7 0 days Half-life
Method: CAM 1 integer See PRZM manual
Incorporation Depth: DEPI 4 cm
Application Rate: TAPP 0.0123 kg/ha
Application Efficiency: APPEFF 0.99 fraction
Spray Drift DRFT 0.01 fraction of application rate applied to pond

Application Date Date 16-03 dd/mm or dd/mmm or dd-mm or dd-mmm
Interval 1 interval 7 days Set to 0 or delete line for single app.
Record 17: FILTRA
IPSCND
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)

ECOLOGICAL MAXIMUM EXPOSURE SITE EXPOSURE 1 APPLICATION AQUATIC DEGRADATION

stored as FLSCORN0.out
Chemical: Topramezone
PRZM environment: FLsweetcornC.txt modified Satday, 12 October 2002 at 17:43:14
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 16:33:30
Metfile: w12844.dvf modified Wedday, 3 July 2002 at 10:04:30
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	0.2245	0.2232	0.2198	0.2118	0.1557	0.03838
1962	0.2521	0.2507	0.2458	0.2369	0.2085	0.1664
1963	0.3111	0.2917	0.281	0.2672	0.2271	0.1925
1964	0.5837	0.582	0.5721	0.5518	0.4445	0.2906
1965	1.16	1.154	1.136	1.095	0.886	0.5296
1966	1.037	1.033	1.015	0.9828	0.9583	0.821
1967	0.9111	0.9078	0.8943	0.8657	0.8438	0.6864
1968	0.6386	0.6364	0.6274	0.6088	0.5955	0.4844
1969	0.8049	0.8009	0.7893	0.7649	0.6354	0.4313
1970	0.722	0.7198	0.7106	0.6904	0.6743	0.522
1971	0.6036	0.6007	0.5893	0.564	0.4676	0.3442
1972	1.307	1.301	1.273	1.149	0.8638	0.5154
1973	1.157	1.152	1.134	1.097	1.068	0.8175
1974	0.6162	0.6143	0.6046	0.5905	0.5767	0.4636
1975	0.4694	0.4675	0.4597	0.4425	0.4299	0.3486
1976	0.5321	0.5296	0.5195	0.5028	0.4037	0.2973
1977	0.4892	0.4873	0.4843	0.4745	0.4635	0.3836
1978	0.657	0.655	0.6456	0.6186	0.5218	0.3984
1979	0.5894	0.5874	0.579	0.561	0.5476	0.4337

1980	0.3664	0.3651	0.36	0.3507	0.3429	0.2824
1981	0.7197	0.7163	0.703	0.6561	0.4966	0.2937
1982	1.032	1.029	1.012	0.9736	0.7836	0.5868
1983	1.045	1.041	1.03	1.001	0.8827	0.7544
1984	0.9856	0.9815	0.9649	0.8946	0.8721	0.7394
1985	0.9085	0.9055	0.8933	0.8658	0.8437	0.6495
1986	0.5947	0.5927	0.5843	0.5654	0.5511	0.4544
1987	0.8915	0.8872	0.8727	0.8356	0.6424	0.4174
1988	0.7984	0.7955	0.7836	0.7578	0.7387	0.5989
1989	0.5765	0.5742	0.5648	0.5445	0.53	0.4305
1990	0.4335	0.4311	0.4217	0.4056	0.3942	0.3339

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	1.307	1.301	1.273	1.149	1.068	0.821
0.0645161290322581	1.16	1.154	1.136	1.097	0.9583	0.8175
0.0967741935483871	1.157	1.152	1.134	1.095	0.886	0.7544
0.129032258064516	1.045	1.041	1.03	1.001	0.8827	0.7394
0.161290322580645	1.037	1.033	1.015	0.9828	0.8721	0.6864
0.193548387096774	1.032	1.029	1.012	0.9736	0.8638	0.6495
0.225806451612903	0.9856	0.9815	0.9649	0.8946	0.8438	0.5989
0.258064516129032	0.9111	0.9078	0.8943	0.8658	0.8437	0.5868
0.290322580645161	0.9085	0.9055	0.8933	0.8657	0.7836	0.5296
0.32258064516129	0.8915	0.8872	0.8727	0.8356	0.7387	0.522
0.354838709677419	0.8049	0.8009	0.7893	0.7649	0.6743	0.5154
0.387096774193548	0.7984	0.7955	0.7836	0.7578	0.6424	0.4844
0.419354838709677	0.722	0.7198	0.7106	0.6904	0.6354	0.4636
0.451612903225806	0.7197	0.7163	0.703	0.6561	0.5955	0.4544
0.483870967741936	0.657	0.655	0.6456	0.6186	0.5767	0.4337
0.516129032258065	0.6386	0.6364	0.6274	0.6088	0.5511	0.4313
0.548387096774194	0.6162	0.6143	0.6046	0.5905	0.5476	0.4305
0.580645161290323	0.6036	0.6007	0.5893	0.5654	0.53	0.4174
0.612903225806452	0.5947	0.5927	0.5843	0.564	0.5218	0.3984
0.645161290322581	0.5894	0.5874	0.579	0.561	0.4966	0.3836
0.67741935483871	0.5837	0.582	0.5721	0.5518	0.4676	0.3486
0.709677419354839	0.5765	0.5742	0.5648	0.5445	0.4635	0.3442
0.741935483870968	0.5321	0.5296	0.5195	0.5028	0.4445	0.3339
0.774193548387097	0.4892	0.4873	0.4843	0.4745	0.4299	0.2973
0.806451612903226	0.4694	0.4675	0.4597	0.4425	0.4037	0.2937
0.838709677419355	0.4335	0.4311	0.4217	0.4056	0.3942	0.2906
0.870967741935484	0.3664	0.3651	0.36	0.3507	0.3429	0.2824
0.903225806451613	0.3111	0.2917	0.281	0.2672	0.2271	0.1925
0.935483870967742	0.2521	0.2507	0.2458	0.2369	0.2085	0.1664

0.967741935483871 0.2245 0.2232 0.2198 0.2118 0.1557 0.03838

0.1 1.1458 1.1409 1.1236 1.0856 0.88567 0.7529

Average of yearly averages: 0.456872666666667

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

Data used for this run:
Output File: FLSCORN0
Metfile: w12844.dvf
PRZM scenario: FLsweetcornC.txt
EXAMS environment file: pond298.exv
Chemical Name: Topramezone

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	363.69	g/mol	
Henry's Law Const.	henry		atm-m^3/mol	
Vapor Pressure	vapr	7.5e-13	torr	
Solubility	sol	15000	mg/L	
Kd	Kd	2.8	mg/L	
Koc	Koc		mg/L	
Photolysis half-life	kdp	0	days	Half-life
Aerobic Aquatic Metabolism	kbacw	482.56	days	Halfife
Anaerobic Aquatic Metabolism	kbacs	30.52	days	Halfife
Aerobic Soil Metabolism	asm	241.28	days	Halfife
Hydrolysis:	pH 7	0	days	Half-life
Method:	CAM	1	integer	See PRZM manual
Incorporation Depth:	DEPI	4	cm	
Application Rate:	TAPP	0.0246	kg/ha	
Application Efficiency:	APPEFF	0.95	fraction	
Spray Drift	DRFT	0.05	fraction of application rate applied to pond	
Application Date	Date	21-10	dd/mm or dd/mmm or dd-mm or dd-mmm	
Record 17:	FILTRA			
	IPSCND			
	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 FLSCRN0g.out
Chemical: Topramezone

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PRZM environment: FLsweetcornC.txt modified Satday, 12 October 2002 at 17:43:14
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 16:33:30
Metfile: w12844.dvf modified Wedday, 3 July 2002 at 10:04:30
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	0.1834	0.1823	0.1799	0.1736	0.1243	0.03065
1962	0.1886	0.1876	0.184	0.1775	0.1575	0.1333
1963	0.2503	0.23	0.2178	0.2006	0.1671	0.146
1964	0.5248	0.5232	0.5144	0.4928	0.3889	0.2417
1965	1.119	1.114	1.097	1.057	0.8476	0.4887
1966	0.9949	0.9924	0.9806	0.9495	0.9258	0.7907
1967	0.8688	0.8657	0.8529	0.8256	0.8048	0.6493
1968	0.5845	0.5826	0.5743	0.5573	0.5453	0.4376
1969	0.7458	0.7421	0.7311	0.709	0.5825	0.3814
1970	0.6696	0.6675	0.659	0.6402	0.6253	0.4759
1971	0.538	0.5353	0.5249	0.5019	0.4088	0.2915
1972	1.274	1.267	1.24	1.114	0.8242	0.4726
1973	1.127	1.123	1.105	1.069	1.041	0.7883
1974	0.5658	0.564	0.5551	0.5413	0.5289	0.4196
1975	0.4103	0.4087	0.4019	0.3868	0.3758	0.2994
1976	0.4637	0.4615	0.4526	0.4384	0.3427	0.2444
1977	0.4294	0.4283	0.425	0.417	0.4075	0.3332
1978	0.5949	0.5929	0.5843	0.5589	0.4654	0.3485
1979	0.5336	0.5318	0.5242	0.5079	0.4957	0.3857
1980	0.3011	0.3001	0.2959	0.2886	0.2823	0.2279
1981	0.6596	0.6565	0.6441	0.598	0.4394	0.2397
1982	0.9872	0.9837	0.9681	0.9303	0.7398	0.5461
1983	0.9997	0.9953	0.9854	0.9564	0.8429	0.7213
1984	0.9402	0.9363	0.9202	0.8563	0.8347	0.7048
1985	0.8664	0.8636	0.8519	0.8256	0.8046	0.6112
1986	0.5412	0.5393	0.5315	0.5143	0.5013	0.4081
1987	0.8405	0.8364	0.823	0.7872	0.5934	0.3707
1988	0.7533	0.7506	0.7394	0.715	0.697	0.5597
1989	0.5219	0.5199	0.5114	0.493	0.4798	0.385
1990	0.3689	0.3674	0.3617	0.3483	0.3386	0.2848

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.0322580645161290	1.274	1.267	1.24	1.114	1.041	0.7907
0.0645161290322581	1.127	1.123	1.105	1.069	0.9258	0.7883
0.0967741935483871	1.119	1.114	1.097	1.057	0.8476	0.7213
0.129032258064516	0.9997	0.9953	0.9854	0.9564	0.8429	0.7048

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0.161290322580645	0.9949	0.9924	0.9806	0.9495	0.8347	0.6493
0.193548387096774	0.9872	0.9837	0.9681	0.9303	0.8242	0.6112
0.225806451612903	0.9402	0.9363	0.9202	0.8563	0.8048	0.5597
0.258064516129032	0.8688	0.8657	0.8529	0.8256	0.8046	0.5461
0.290322580645161	0.8664	0.8636	0.8519	0.8256	0.7398	0.4887
0.32258064516129	0.8405	0.8364	0.823	0.7872	0.697	0.4759
0.354838709677419	0.7533	0.7506	0.7394	0.715	0.6253	0.4726
0.387096774193548	0.7458	0.7421	0.7311	0.709	0.5934	0.4376
0.419354838709677	0.6696	0.6675	0.659	0.6402	0.5825	0.4196
0.451612903225806	0.6596	0.6565	0.6441	0.598	0.5453	0.4081
0.483870967741936	0.5949	0.5929	0.5843	0.5589	0.5289	0.3857
0.516129032258065	0.5845	0.5826	0.5743	0.5573	0.5013	0.385
0.548387096774194	0.5658	0.564	0.5551	0.5413	0.4957	0.3814
0.580645161290323	0.5412	0.5393	0.5315	0.5143	0.4798	0.3707
0.612903225806452	0.538	0.5353	0.5249	0.5079	0.4654	0.3485
0.645161290322581	0.5336	0.5318	0.5242	0.5019	0.4394	0.3332
0.67741935483871	0.5248	0.5232	0.5144	0.493	0.4088	0.2994
0.709677419354839	0.5219	0.5199	0.5114	0.4928	0.4075	0.2915
0.741935483870968	0.4637	0.4615	0.4526	0.4384	0.3889	0.2848
0.774193548387097	0.4294	0.4283	0.425	0.417	0.3758	0.2444
0.806451612903226	0.4103	0.4087	0.4019	0.3868	0.3427	0.2417
0.838709677419355	0.3689	0.3674	0.3617	0.3483	0.3386	0.2397
0.870967741935484	0.3011	0.3001	0.2959	0.2886	0.2823	0.2279
0.903225806451613	0.2503	0.23	0.2178	0.2006	0.1671	0.146
0.935483870967742	0.1886	0.1876	0.184	0.1775	0.1575	0.1333
0.967741935483871	0.1834	0.1823	0.1799	0.1736	0.1243	0.03065

0.1	1.10707	1.10213	1.08584	1.04694	0.84713	0.71965
			Average of yearly averages:		0.413925	

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

Data used for this run:
Output File: FLSCRN0g
Metfile: w12844.dvf
PRZM scenario: FLsweetcornC.txt
EXAMS environment file: pond298.exv
Chemical Name: Topramezone

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	363.69	g/mol	
Henry's Law Const.	henry		atm-m^3/mol	
Vapor Pressure	vapr	7.5e-13	torr	
Solubility	sol	15000	mg/L	

Kd Kd 2.8 mg/L
Koc Koc mg/L
Photolysis half-life kdp 0 days Half-life
Aerobic Aquatic Metabolism kbacw 482.56 days Halfife
Anaerobic Aquatic Metabolism kbacs 30.52 days Halfife
Aerobic Soil Metabolism asm 241.28 days Halfife
Hydrolysis: pH 7 0 days Half-life
Method: CAM 1 integer See PRZM manual
Incorporation Depth: DEPI 4 cm
Application Rate: TAPP 0.0246 kg/ha
Application Efficiency: APPEFF 0.99 fraction
Spray Drift DRFT 0.01 fraction of application rate applied to pond
Application Date Date 21-10 dd/mm or dd/mmm or dd-mm or dd-mmm
Record 17: FILTRA
IPSCND
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)

ECOLOGICAL MAXIMUM EXPOSURE SITE EXPOSURE 2 APPLICATIONS AQUATIC DEGRADATION

stored as FLSCORN0.out
Chemical: Topramezone
PRZM environment: FLsweetcornC.txt modified Satday, 12 October 2002 at 17:43:14
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 16:33:30
Metfile: w12844.dvf modified Wedday, 3 July 2002 at 10:04:30
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	0.2268	0.2255	0.2219	0.2138	0.1547	0.03815
1962	0.2067	0.2056	0.2024	0.1964	0.1848	0.1595
1963	0.2993	0.2797	0.2687	0.2542	0.2109	0.1708
1964	0.5822	0.5805	0.5707	0.55	0.4391	0.2824
1965	1.188	1.182	1.166	1.126	0.8861	0.5288
1966	1.063	1.06	1.049	1.016	0.9907	0.8074

1967	0.753	0.7503	0.7402	0.7215	0.7048	0.5662
1968	0.4974	0.4957	0.4887	0.4752	0.466	0.3825
1969	0.9704	0.9655	0.9493	0.9259	0.7356	0.4231
1970	0.8787	0.8759	0.865	0.8409	0.8214	0.6329
1971	0.6847	0.6814	0.668	0.6386	0.523	0.401
1972	1.386	1.379	1.349	1.22	0.9205	0.57
1973	1.227	1.222	1.203	1.163	1.132	0.8655
1974	0.6493	0.6474	0.6371	0.6223	0.6077	0.4898
1975	0.5125	0.5105	0.5019	0.4831	0.4693	0.3824
1976	0.5614	0.5588	0.5482	0.5305	0.4287	0.3323
1977	0.534	0.5319	0.526	0.4998	0.4882	0.4053
1978	0.7776	0.7738	0.7619	0.7236	0.5886	0.4403
1979	0.698	0.6956	0.6856	0.6643	0.6483	0.5098
1980	0.4167	0.4153	0.4095	0.3988	0.3899	0.3194
1981	0.78	0.7764	0.7619	0.7113	0.538	0.3274
1982	1.231	1.227	1.208	1.16	0.9157	0.6527
1983	1.102	1.099	1.083	1.048	1.022	0.8568
1984	1.135	1.131	1.111	0.9915	0.8642	0.7491
1985	1.045	1.042	1.028	0.996	0.9706	0.7452
1986	0.6754	0.6731	0.6636	0.6421	0.6259	0.5136
1987	0.9275	0.923	0.9079	0.8695	0.6729	0.4589
1988	0.8305	0.8275	0.8151	0.7883	0.7685	0.6212
1989	0.5929	0.5906	0.5809	0.56	0.5451	0.4311
1990	0.4019	0.4003	0.3945	0.3802	0.3703	0.3025

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	1.386	1.379	1.349	1.22	1.132	0.8655
0.0645161290322581	1.231	1.227	1.208	1.163	1.022	0.8568
0.0967741935483871	1.227	1.222	1.203	1.16	0.9907	0.8074
0.129032258064516	1.188	1.182	1.166	1.126	0.9706	0.7491
0.161290322580645	1.135	1.131	1.111	1.048	0.9205	0.7452
0.193548387096774	1.102	1.099	1.083	1.016	0.9157	0.6527
0.225806451612903	1.063	1.06	1.049	0.996	0.8861	0.6329
0.258064516129032	1.045	1.042	1.028	0.9915	0.8642	0.6212
0.290322580645161	0.9704	0.9655	0.9493	0.9259	0.8214	0.57
0.32258064516129	0.9275	0.923	0.9079	0.8695	0.7685	0.5662
0.354838709677419	0.8787	0.8759	0.865	0.8409	0.7356	0.5288
0.387096774193548	0.8305	0.8275	0.8151	0.7883	0.7048	0.5136
0.419354838709677	0.78	0.7764	0.7619	0.7236	0.6729	0.5098
0.451612903225806	0.7776	0.7738	0.7619	0.7215	0.6483	0.4898
0.483870967741936	0.753	0.7503	0.7402	0.7113	0.6259	0.4589
0.516129032258065	0.698	0.6956	0.6856	0.6643	0.6077	0.4403

0.548387096774194	0.6847	0.6814	0.668	0.6421	0.5886	0.4311
0.580645161290323	0.6754	0.6731	0.6636	0.6386	0.5451	0.4231
0.612903225806452	0.6493	0.6474	0.6371	0.6223	0.538	0.4053
0.645161290322581	0.5929	0.5906	0.5809	0.56	0.523	0.401
0.67741935483871	0.5822	0.5805	0.5707	0.55	0.4882	0.3825
0.709677419354839	0.5614	0.5588	0.5482	0.5305	0.4693	0.3824
0.741935483870968	0.534	0.5319	0.526	0.4998	0.466	0.3323
0.774193548387097	0.5125	0.5105	0.5019	0.4831	0.4391	0.3274
0.806451612903226	0.4974	0.4957	0.4887	0.4752	0.4287	0.3194
0.838709677419355	0.4167	0.4153	0.4095	0.3988	0.3899	0.3025
0.870967741935484	0.4019	0.4003	0.3945	0.3802	0.3703	0.2824
0.903225806451613	0.2993	0.2797	0.2687	0.2542	0.2109	0.1708
0.935483870967742	0.2268	0.2255	0.2219	0.2138	0.1848	0.1595
0.967741935483871	0.2067	0.2056	0.2024	0.1964	0.1547	0.03815

0.1 1.2231 1.218 1.1993 1.1566 0.98869 0.80157

Average of yearly averages: 0.478868333333334

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

Data used for this run:
Output File: FLSCORN0
Metfile: w12844.dvf
PRZM scenario: FLsweetcornC.txt
EXAMS environment file: pond298.exv
Chemical Name: Topramezone

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	363.69	g/mol	
Henry's Law Const.	henry		atm-m^3/mol	
Vapor Pressure	vapr	7.5e-13	torr	
Solubility	sol	15000	mg/L	
Kd	Kd	2.8	mg/L	
Koc	Koc		mg/L	
Photolysis half-life	kdp	0	days	Half-life
Aerobic Aquatic Metabolism	kbacw	482.56	days	Halfife
Anaerobic Aquatic Metabolism	kbacs	30.52	days	Halfife
Aerobic Soil Metabolism	asm	241.28	days	Halfife
Hydrolysis:	pH 7	0	days	Half-life
Method:	CAM	1	integer	See PRZM manual
Incorporation Depth:	DEPI	4	cm	
Application Rate:	TAPP	0.0123	kg/ha	
Application Efficiency:	APPEFF	0.95	fraction	
Spray Drift	DRFT	0.05	fraction of application rate applied to pond	

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Application Date	Date	21-10	dd/mm or dd/mmm or dd-mm or dd-mmm	
Interval 1	interval	7	days	Set to 0 or delete line for single app.

Record 17: FILTRA
IPSCND
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 FLSCRN0g.out
Chemical: Topramezone
PRZM environment: FLsweetcornC.txt modified Satday, 12 October 2002 at 17:43:14
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 16:33:30
Metfile: w12844.dvf modified Wedday, 3 July 2002 at 10:04:30
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	0.1852	0.1837	0.1812	0.1749	0.1247	0.03076
1962	0.1638	0.1632	0.1608	0.1555	0.1515	0.1261
1963	0.2374	0.2169	0.2043	0.1864	0.1514	0.1233
1964	0.5226	0.5211	0.5123	0.4904	0.3847	0.2332
1965	1.149	1.143	1.127	1.09	0.8492	0.4879
1966	1.029	1.026	1.015	0.9836	0.9591	0.7766
1967	0.7036	0.701	0.6917	0.6749	0.6594	0.5241
1968	0.4368	0.4353	0.4292	0.4176	0.4097	0.3313
1969	0.9178	0.9131	0.8977	0.8763	0.6885	0.3728
1970	0.8324	0.8298	0.8195	0.7967	0.7782	0.5917
1971	0.6217	0.6186	0.6063	0.579	0.468	0.3507
1972	1.355	1.348	1.319	1.187	0.8847	0.5294
1973	1.199	1.195	1.176	1.137	1.107	0.8384
1974	0.5997	0.5978	0.5884	0.5739	0.5607	0.447
1975	0.4547	0.4529	0.4453	0.4286	0.4164	0.3346
1976	0.4936	0.4912	0.4818	0.4666	0.3702	0.2808
1977	0.4688	0.4667	0.4621	0.4428	0.4327	0.3559
1978	0.7199	0.7164	0.7049	0.6676	0.5365	0.3921
1979	0.6462	0.644	0.6348	0.615	0.6002	0.465
1980	0.353	0.3518	0.3468	0.3381	0.3306	0.2664
1981	0.722	0.7186	0.7051	0.655	0.4842	0.2748
1982	1.194	1.19	1.172	1.124	0.879	0.6149

1983	1.069	1.066	1.051	1.017	0.9917	0.8281
1984	1.096	1.091	1.072	0.9471	0.8261	0.7149
1985	1.009	1.005	0.9915	0.9607	0.9362	0.7108
1986	0.6247	0.6225	0.6135	0.5936	0.5787	0.4699
1987	0.877	0.8727	0.8587	0.8216	0.6263	0.4138
1988	0.7859	0.7831	0.7714	0.7459	0.7272	0.5828
1989	0.5383	0.5362	0.5274	0.5085	0.4949	0.3855
1990	0.3393	0.338	0.3332	0.3213	0.3132	0.2521

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	1.355	1.348	1.319	1.187	1.107	0.8384
0.0645161290322581	1.199	1.195	1.176	1.137	0.9917	0.8281
0.0967741935483871	1.194	1.19	1.172	1.124	0.9591	0.7766
0.129032258064516	1.149	1.143	1.127	1.09	0.9362	0.7149
0.161290322580645	1.096	1.091	1.072	1.017	0.8847	0.7108
0.193548387096774	1.069	1.066	1.051	0.9836	0.879	0.6149
0.225806451612903	1.029	1.026	1.015	0.9607	0.8492	0.5917
0.258064516129032	1.009	1.005	0.9915	0.9471	0.8261	0.5828
0.290322580645161	0.9178	0.9131	0.8977	0.8763	0.7782	0.5294
0.32258064516129	0.877	0.8727	0.8587	0.8216	0.7272	0.5241
0.354838709677419	0.8324	0.8298	0.8195	0.7967	0.6885	0.4879
0.387096774193548	0.7859	0.7831	0.7714	0.7459	0.6594	0.4699
0.419354838709677	0.722	0.7186	0.7051	0.6749	0.6263	0.465
0.451612903225806	0.7199	0.7164	0.7049	0.6676	0.6002	0.447
0.483870967741936	0.7036	0.701	0.6917	0.655	0.5787	0.4138
0.516129032258065	0.6462	0.644	0.6348	0.615	0.5607	0.3921
0.548387096774194	0.6247	0.6225	0.6135	0.5936	0.5365	0.3855
0.580645161290323	0.6217	0.6186	0.6063	0.579	0.4949	0.3728
0.612903225806452	0.5997	0.5978	0.5884	0.5739	0.4842	0.3559
0.645161290322581	0.5383	0.5362	0.5274	0.5085	0.468	0.3507
0.67741935483871	0.5226	0.5211	0.5123	0.4904	0.4327	0.3346
0.709677419354839	0.4936	0.4912	0.4818	0.4666	0.4164	0.3313
0.741935483870968	0.4688	0.4667	0.4621	0.4428	0.4097	0.2808
0.774193548387097	0.4547	0.4529	0.4453	0.4286	0.3847	0.2748
0.806451612903226	0.4368	0.4353	0.4292	0.4176	0.3702	0.2664
0.838709677419355	0.353	0.3518	0.3468	0.3381	0.3306	0.2521
0.870967741935484	0.3393	0.338	0.3332	0.3213	0.3132	0.2332
0.903225806451613	0.2374	0.2169	0.2043	0.1864	0.1515	0.1261
0.935483870967742	0.1852	0.1837	0.1812	0.1749	0.1514	0.1233
0.967741935483871	0.1638	0.1632	0.1608	0.1555	0.1247	0.03076
0.1	1.1895	1.1853	1.1675	1.1206	0.95681	0.77043

Average of yearly averages: 0.436855333333333

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

Data used for this run:
Output File: FLSCRN0g
Metfile: w12844.dvf
PRZM scenario: FLsweetcornC.txt
EXAMS environment file: pond298.exv
Chemical Name: Topramezone

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	363.69	g/mol	
Henry's Law Const.	henry		atm-m^3/mol	
Vapor Pressure	vapr	7.5e-13	torr	
Solubility	sol	15000	mg/L	
Kd	Kd	2.8	mg/L	
Koc	Koc		mg/L	
Photolysis half-life	kdp	0	days	Half-life
Aerobic Aquatic Metabolism	kbacw	482.56	days	Halfife
Anaerobic Aquatic Metabolism	kbacs	30.52	days	Halfife
Aerobic Soil Metabolism	asm	241.28	days	Halfife
Hydrolysis:	pH 7	0	days	Half-life
Method:	CAM	1	integer	See PRZM manual
Incorporation Depth:	DEPI	4	cm	
Application Rate:	TAPP	0.0123	kg/ha	
Application Efficiency:	APPEFF	0.99	fraction	
Spray Drift	DRFT	0.01	fraction of application rate applied to pond	
Application Date	Date	21-10	dd/mm or dd/mmm or dd-mm or dd-mmm	
Interval 1	interval	7	days	Set to 0 or delete line for single app.
Record 17:	FILTRA			
	IPSCND			
	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)	

Appendix E. Terrestrial Exposure Models

Three different models were used to estimate environmental concentrations of topramezone in a terrestrial environment and to assess downwind distances for potential drift to nontarget plants.. These estimates were used to assess the risk to terrestrial organisms. The models used (and their purpose) are summarized in Table E-1.

Table E-1 Terrestrial Exposure Models Used in the Tier I, Screening Risk Assessment of Topramezone Herbicide

Model	Exposed Species	Information Obtained from the Models
T-Rex	Exposure to birds and mammals via food	Acute dietary RQs Chronic dietary RQs
TerrPlant	Exposure to non-target terrestrial plants and those growing in semiaquatic environments	RQs to non-target plants (endangered and non-endangered) a. Seedling emergence b. Vegetative vigor (runoff and drift components)
AgDrift	Potential drift to non-target plants	Relative sensitivity of plants to spray drift as a function of distance from the edge of the field.

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Upper Bound Kenaga Residues For RQ Calculation

[illegible]	[illegible]

Acute and Chronic RQs are based on the Upper Bound Kenaga Residues.

The maximum single day residue estimation is used for both the acute and reproduction RQs.

Endpoints

[illegible]	[illegible]

Note: To provide risk management with the maximum possible information, it is recommended that both the dose-based and concentration-based RQs be calculated when data are available

[illegible]	[illegible]

Note: To provide risk management with the maximum possible information, it is recommended that both the dose-based and concentration-based RQs be calculated when data are available

[illegible]	[illegible]
[illegible]	5.28
[illegible]	2.42
[illegible]	2.97
[illegible]	
[illegible]	0.33

[redacted]

[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	6 3 3 0	3 2 2 0	2 1 1 0

[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00

[redacted]	[redacted]	
	Acute	Chronic
[redacted]	0.00 0.00 0.00 0.00	0.02 0.01 0.01 0.00

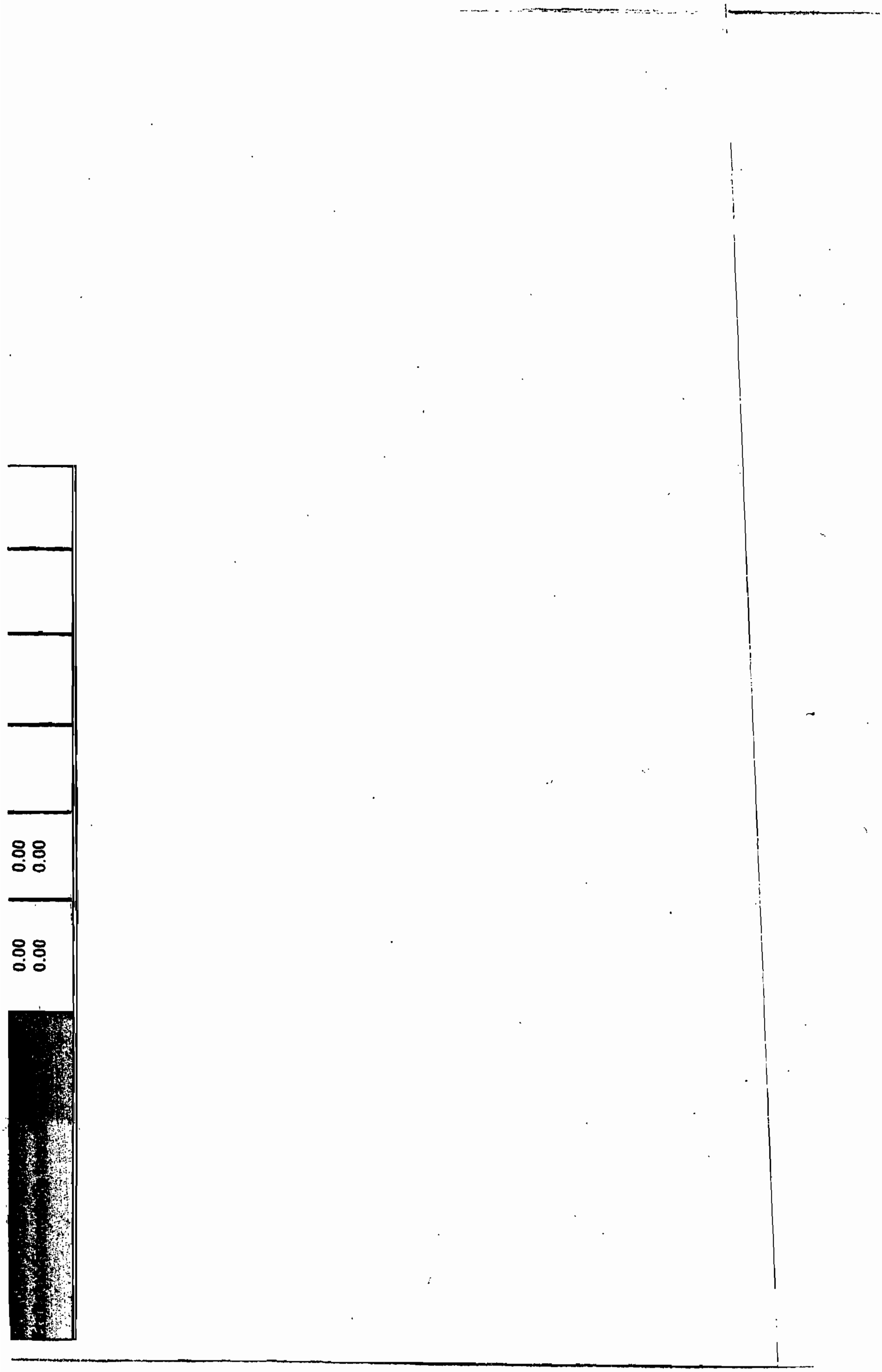
Mammalian Results

[redacted]

[redacted]	[redacted]					
[redacted]	5 2 3 0	3 2 2 0	1 0 0 0	[redacted] 0	[redacted] 0	[redacted] 0

[redacted]	[redacted]					
	Acute	Chronic	Acute	Chronic	Acute	Chronic
[redacted]	0.00	0.01	0.00	0.01	0.00	0.01
	0.00	0.01	0.00	0.00	0.00	0.00
	0.00	0.01	0.00	0.01	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00

[redacted]	[redacted]					
	Acute	Chronic				
[redacted]	0.00	0.00				
	0.00	0.00				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Appendix E.3 Terrestrial Plant EECs (TerrPlant Model)

Terrestrial Plant EECs and Acute Non Endangered RQs (8/8/01; version 1.0)) Chemical: Topramezone

Input Values

Application Rate (lb a.i./acre)	0.022
Runoff Value (0.01, 0.02, or 0.05 if chemical solubility <10, 10-100, or >100 ppm, respectively)	0.05
Seed Emerg Ryegrass EC25 (lb a.i./acre)	0.042
Seed Emerg Cabbage EC25 (lb a.i./acre)	0.0039
Veg Vigor Onion EC25 (lb a.i./acre)	0.0098
Veg Vigor Soybean EC25 (lb a.i./acre)	0.001

Estimated Environmental Concentrations (EECs) for NON-GRANULAR formulation applications (lbs a.i./acre)				Risk Quotients (RQs) for NON-GRANULAR formulation applications					
Application Method	Total Loading to Adjacent Areas (EEC = Sheet Runoff +Drift)	Total Loading to Semi-aquatic Areas (EEC = Channelized Runoff + Drift)	DRIFT EEC (for ground: application rate x 0.01) (for aerial: application rate x 0.05)	Emergence RQs, Adjacent Areas RQ = EEC/Seedling Emergence EC25		Emergence RQs, Semi-aquatic Areas RQ = EEC/Seedling Emergence EC25		Drift RQs RQ = Drift EEC/Vegetative Vigor EC25	
				Monocot	Dicot	Monocot	Dicot	Monocot	Dicot
Ground Unincorp.	0.0013	0.0112	0.0002	0.03	0.34	0.27		0.02	0.22
Aerial, Airblast, Spray Chemigation	0.0018	0.0077	0.0011	0.04	0.45	0.18		0.11	

Terrestrial Plant EECs and Acute Endangered RQs (8/8/01; version 1.0)

Chemical:Topramezone

Orange boxes indicate a LOC exceedance

Input Values

Application Rate (lb a.i./acre)	0.022
Runoff Value (0.01, 0.02, or 0.05 if chemical solubility <10, 10-100, or >100 ppm, respectively)	0.05
Seed Emerg Ryegrass NOAEC (lb a.i./acre)	0.015
Seed Emerg Cabbage NOAEC (lb a.i./acre)	0.0017
Veg Vigor Onion NOAEC (lbs a.i./acre)	0.005
Veg Vigor Soybean EC05 (lb a.i./acre)	0.000009

Estimated Environmental Concentrations (EECs) for NON-GRANULAR formulation applications (lbs a.i./acre)

Application Method	Total Loading to Adjacent Areas (EEC = Sheet Runoff + Drift)	Total Loading to Semi-aquatic Areas (EEC = (Channelized Runoff + Drift)	DRIFT EEC (for ground: application rate x 0.01) (for aerial: application rate x 0.05)
Ground Unincorp.	0.0013	0.0112	0.0002
Aerial, Airblast, Spray Chemigation	0.0018	0.0077	0.0011

Risk Quotients (RQs) for NON-GRANULAR formulation applications

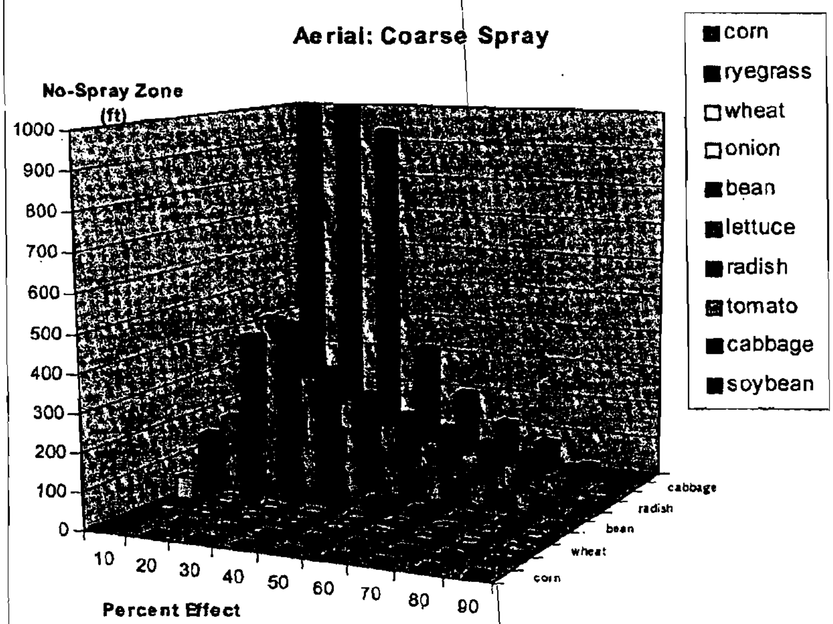
Emergence RQs: Adjacent Areas RQ = EEC/Seedling Emergence EC05 or NOAEC		Emergence RQs: Semi-aquatic areas RQ = EEC/Seedling Emergence EC05 or NOAEC		Drift RQs: RQ = EEC/Vegetative Vigor EC05 or NOAEC	
Monocot	Dicot	Monocot	Dicot	Monocot	Dicot
0.09	0.78	0.75	[illegible]	0.04	[illegible]
0.12	[illegible]	0.51	[illegible]	0.22	[illegible]

Appendix E.3- Spray Drift Estimates (AgDRIFT)

In order to assess distances downwind for potential drift to non-target or endangered plants in areas adjacent to the application site from aerial application areas, AgDRIFT Tier I Aerial Assessment, a mechanistic model was used to calculate the downwind distances at which a particular toxic effect level would be experienced by a particular plant species. The model generates downwind deposition values based on the input provided in tiers I that can be used with phytotoxicity data to produce drift assumptions. The inputs selected and the tiers are discussed below.

The Tier I model predicts relatively high end drift depositions values at varying distance (a maximum of 1000 feet downwind is observed). Several inputs such as wind speed (10 mph) and release height (10 ft) are preset in the model to represent 90[th] percentile values for agricultural application. The drift values (drift EECs) obtained from the Tier I model are then compared to the sensitivity of the plants based on EC_{25} values of 10 test plant species in the vegetative vigor study. The EC_{25} endpoints with its toxicity slope from each species are used to calculate EC_{10}, EC_{20}, to EC_{90} effect levels. These data are entered into an Excel spreadsheet with tier I deposition distance results and the maximum topramezone application rate for agricultural uses (0.022 lb ai/A) and then arranged into a bar chart. Figure 1 illustrates a three dimensional bar chart showing at what downwind distance a particular toxicity level for each species is expected to occur under the tier I AgDRIFT conditions when topramezone is applied by air.

Figure E-1: Percent effect by species and downwind distance: Upper-bound deposition values. The graph illustrates the potential effect to nontarget plants downwind from a single application of 0.022 lb ai/A of the BAS 670H herbicide. The effect levels (EC10 to EC90) for all 10 test terrestrial plant species are compared to estimated environmental concentrations resulting from spray drift to display the distances at which a particular effect level is expected to occur. The height of a bar associated with an effect of 10% is the downwind distance at which spray drift deposition is expected to be equal to the EC10 toxicity level. The height of a bar associated with an effect of 90% is the downwind distance at which spray drift deposition is expected to be equal to the EC90 toxicity level. The downwind distance from the application site is shown on the vertical axis. Plant species and percent effect values are shown on the horizontal axes. Variable AgDRIFT model conditions were 10 mph wind, 10 foot release height, coarse spray.



Droplet size is important in controlling spray drift. Using larger droplet sizes, such as coarse or extremely coarse spraying, reduces the downwind distances to adjacent areas compared to when medium or fine spraying is used. Thus this assessment suggests that by placing mandatory limits on labels specifying coarse or extremely coarse sprays (based on the ASAE standard), risks to nontaget plants are reduced. Information on the product label recommends drift management practices but because the language is not mandatory the practices are not requirements that must be followed to reduce off-target drift movement from aerial applications. For spray drift levels from topramezone applications to be consistent with levels and risks calculated in this assessment the parameters would be mandatory requirements on product labels: 1) the distance of the outermost nozzles on the boom must not exceed 3/4 the length of the wingspan or rotor, 2) applications should only occur in wind speeds between 3 and 10 mph, 3) ASAE droplet size consistent with those presented should be stated (coarser sprays reduce expected risks), 4) release height should be10 feet or less above the surface or tops of vegetation. The practicality and safety of flight release heights were not determined in this assessment.

Appendix E.4 Inadvertent Exposure to Residues of Topramezone: Irrigation water

The following method was used to calculate the risk quotients for non-target plants irrigated either from ground or surface water.

Assume that a field is irrigated with one inch of ground water containing 0.067 μgL^{-1} (ppb) of topramezone[3]

One acre has 6,272,640 cubic inches of water on the field. Th 1 acre field with one inch of water has 3,630 cubic feet of water (6,272,640 x 0.00058 cubic feet/cubic inch). The field has 27,156 gallons of water (3,630 cubic feet x 7.481 gallons/cubic feet). Therefore, 1 inch of water on the 1 acre field weights 226,625 lbs (27,156 gallons of water x 8.3453 lbs/gallon water)

EECs in Ground and Surface Water Used for Irrigation:

Ground Water
226,625 lbs water/acre x 0.067/(1.0 x 10^9) = 226,625 x (6.7 x 10^{-11})= 1.52 x 10^{-6} lb ai/acre
Surface Water
Surface water (maximum peak= 1.94 μgL^{-1} selected as the highest one and corresponds to PRZ-EXAMS for the sweet corn scenario in Florida) = 226,625 x (1.94/(1.0 x 10^{-9})= 4.4 x 10^{-4})

Risk Quotients

The RQ for sensitive crops within the field that is irrigated with ground water containing 0.067 μgL^{-1} of topramezone and 1.94 μgL^{-1} in surface water.

1. Non-endangered

Ground water Irrigation
Monocots (onions): EEC/EC25 for vegetative vigor= 1.52 x 10^{-6} /1 x 10^{-2} = 1.52 x 10^{-4}
Dicots (Soybeans): EEC/EC25 for vegetative vigor=1.52 x 10^{-6} /1 x 10^{-3} = 1.52 x 10^{-3}

Surface water Irrigation
Monocots (onions): EEC/EC25 for vegetative vigor= 4.4 x 10^{-4}/ 1 x 10^{-2} = 4.4 x 10^{-2}= 0.044
Dicots (Soybeans): EEC/EC25 for vegetative vigor= 4.4 x 10^{-4}/1 x 10^{-3}= 4.4 x 10^{-1}= 0.44

2. Endangered

Ground Water Irrigation
Monocots (onions): EEC/NOAEC for vegetative vigor= 1.52 x 10^{-6}/ 5 x 10^{-3}= 0.003
Dicots (Soybeans): EEC/EC05 for vegetative vigor= 1.52 x 10^{-6}/ 9 x 10^{-6} = **1.69**

Surface Water Irrigation
Monocots (onions): EEC/NOAEC for vegetative vigor= 4.4 x 10^{-4}/ 5 x 10^{-3} = 0.09
Dicots (Soybeans): EEC/EC05 for vegetative vigor= 4.4 x 10^{-4}/ 9 x 10^{-6}= **49**

[3] Concentrations in ground water were estimated by SCI-GROW (Drinking Water Assessment)

Appendix F: ECOLOGICAL EFFECTS TOXICITY ASSESSMENT

Toxicity test values (*i.e.*, measures of effects) for terrestrial biota used in the screening risk assessment were derived from the results of registrant-required animal toxicity studies. Toxicity results that were consistent with risk assessment practices and toxicity testing guidelines (FIFRA 40 CFR-Part 158 and Part 160) were used. After a critical review, a data evaluation record is created and the study is identified as "acceptable" (meets guideline requirements), "supplemental" (scientifically sound but does not meet guideline requirements) or "invalid" (scientifically unsound). In characterizing a chemical's toxic potential, acute oral toxicity results (14-day [except as noted] LD_{50}) for birds and mammals are classified, based on the magnitude of the chemical required to illicit a response, as practically nontoxic (>2000 mg/kg), slightly toxic (501 - 2000) mg/kg), moderately toxic (51 - 500 mg/kg), highly toxic (10 - 50 mg/kg), and very highly toxic (<10 mg/kg) and subacute dietary toxicity results (8-day LC_{50}) for birds are classified as practically nontoxic (>5000 ppm), slightly toxic (1001 - 5000 ppm), moderately toxic (501 - 1000 ppm), highly toxic (50 - 500 ppm), and very highly toxic (<50 ppm). This classification scheme for birds and mammals excluding plants is used in the sections below when discussing the results of toxicity studies using topramezone.

Toxicity to Terrestrial Animals

I. Birds, Acute and Subacute dietary

One acute oral toxicity study using the technical grade of the active ingredient (TGAI) is required to establish the toxicity of topramezone to birds. The preferred test species are the mallard duck (*Anas platyrhynchos*) and/or bobwhite quail (*Colinus virginianus*). Since the LD_{50} is greater than 2000 mg/kg (**Table 1**), topramezone is categorized as practically nontoxic to avian species on an acute oral exposure basis. The guideline (71-1) is fulfilled (MRID 45902309).

Table 1. Acute Toxicity of Topramezone to Northern bobwhite and Mallard ducks.

Avian Acute Oral Toxicity

Species	% ai	Toxicity value	Toxicity category	MRID # (author)	Study classification[1]
Northern bobwhite quail *(Colinus virginianus)*	97.7	LD_{50} >2000[2] mg ai/kg bw	practically nontoxic	45902309 (Zok, S. 2000).	acceptable

[1] acceptable (study satisfies guideline). supplemental (study is scientifically sound, but does not satisfy guideline). Invalid (study is not scientifically sound and does not satisfy guideline).
[2] no mortality reported.

Two subacute dietary toxicity studies using the TGAI are required to establish the toxicity of topramezone to birds. The preferred test species are the mallard duck (*Anas platyrhynchos*) and bobwhite quail (*Colinus virginianus*). Since the LC_{50}s are greater than 5000 mg a.i/kg dw (ppm ai) (**Table 2**), topramezone is categorized as practically nontoxic to avian species on a subacute dietary exposure basis. The guideline (71-2a,b) is fulfilled (MRIDs 45902310 and -11).

Table 2. Subacute Dietary Toxicity of Topramezone to Northern bobwhite and Mallard ducks.

Avian Subacute Dietary Toxicity

Species	% ai	Toxicity value	Toxicity category	MRID # (author)	Study Classification
Northern bobwhite quail *(Colinus virginianus)*	95.8	LC_{50} >5000 mg a.i/kg dw	practically nontoxic	45902310 (Zok, S. 2001)	supplemental[1]

Mallard duck *(Anas platyrhynchos)*	LC_{50} >5000 mg a.i/kg dw	practically nontoxic	45902311 (Zok, S. 2000)	acceptable

[1] data verifying the stability of the test substance in treated feed were not provided.

II. Birds, Reproductive

Avian reproduction studies using the TGAI are required for topramezone because multiple applications may subject birds to repeated or continuous exposure during or preceding the breeding season. The preferred test species are the mallard duck and Northern bobwhite.
There were adverse reproductive effects of hatchling and body weight (**Table 3**) in the diet for 22 weeks. The guideline (71-4) is fulfilled (MRIDs 45902312 and -13).

Table 3. Chronic Toxicity of Topramezone to Northern bobwhite and Mallard ducks.

Avian Reproduction

Species	% ai	NOAEC (ppm)	LOAEC (ppm)	Affected endpoints	MRID no. (author)	Study classification
Northern bobwhite	95.8	294	1012	hatchling [3]	45902312 (Zok, D. 2002)	supplemental[1]
Mallard		<100	100	body weight [4]	45902313 (Zok, D. 2002)	supplemental[2]

[1] stability of topramezone in the treated feed was not assessed at concentration levels.
[2] the stability of topramezone in the treated feed was not assessed at concentration levels and a NOAEC could not be determined
[3] the ratio of number hatched to live embryos
[4] Hatchling body weight and adult female weight gain

III. Mammals, Acute and Reproductive

Wild mammal testing is required on a case-by-case basis, depending on the results of lower tier laboratory mammalian studies, intended use pattern and pertinent environmental fate characteristics. In most cases, rat or mouse toxicity values obtained from the Agency's Health Effects Division (HED) substitute for wild mammal testing. Since the LD_{50} value exceeded 2000 mg/kg bw(**Table 4**), topramezone is categorized as practically non-toxic to small mammals on an acute oral basis. Results from the 2-generation reproduction study indicate no adverse reproductive effects as high as 4000 ppm (**Table 5**) to small mammals on a chronic exposure basis.

Table 4. Acute Toxicity of Topramezone to Mammals.

Mammalian Acute Oral Toxicity

Species	% ai	Test type	Toxicity value	MRID#
Laboratory rat	97.7	acute oral	>2000 mg/kg bw	45902118
Laboratory rat	95.8	acute oral	>2000 mg/kg bw	45902119
Laboratory rat	99	acute oral	>2000 mg/kg bw	45902120

Table 5. Chronic Toxicity of Topramezone to Mammals.

Mammalian Reproduction

Species	% ai	Test type	Toxicity value	MRID#
Laboratory rat	95.8	2-generation	NOAEC 4000 ppm; LOAEC >4000 ppm	45902214

IV. Beneficial Insects

A honey bee (*Apis mellifera*) acute contact study using the TGAI is required for topramezone, because its use may result in honey bee exposure. Since the LD_{50} is >100 µg ai/bee (**Table 6**), topramezone is practically non-toxic to bees on an acute contact basis. The guideline (141-1) is fulfilled (MRID 45902325).

Table 6. Acute Contact Toxicity of Topramezone to Honeybees.

Nontarget Insect Acute Contact Toxicity

Species	% ai	LD_{50}	Toxicity category	MRID no. (author)	Study classification
Honey bee	95.8	>100 µg ai/bee	practically nontoxic	45902325 (Palmer, S.J., Krueger, H.O. and Holmes, C.M. 2001)	acceptable

Additional honeybee acute contact and oral toxicity studies with the end use product was also submitted by the registrant. Results indicate LD_{50}s of >100 µg EP/bee (**Table 7**) for both studies, BAS 670 00 H is categorized as practically non-toxic to honeybees on an acute contact and oral exposure basis (MRID 45901814).

Table 7. Acute Contact and Oral Toxicity of BAS 670 00H to Honeybees.

Nontarget Insect Acute Contact and Oral Toxicity

Species	% ai	LD_{50}s	Toxicity category	MRID no. (author)	Study classification
Honey bee	31	>100 ug EP/bee	practically nontoxic	45901814 (Schmitzer, S. 2000)	supplemental[1]

[1] not an EPA guideline

V. Terrestrial Invertebrates

Additional supplemental terrestrial invertebrate acute toxicity study (MRID 45902326) with the technical grade was also submitted by the registrant. Results indicate an LC_{50} of >1000 mg/kg dw (**Table 8**) for earthworm exposed to topramezone.

Table 8. Toxicity of Topramezone to Earthworms.

Nontarget Insect Toxicity

Species	% ai	LD_{50}	Toxicity category	MRID no.	Study classification
earthworm (*Eisenia fetida*)	95.8	>1000 mg ai/kg dw soil	practically nontoxic	45902326	supplmental[1]

[1] not an EPA guideline

Additional supplemental terrestrial invertebrate acute toxicity studies (**Table 9**) were also submitted by the registrant on the topramezone's end use product, BAS 670 00H. Results indicate the end use product is categorized as practically nontoxic to earthworm, beetles, lacewings, parasitoid and mites on an acute exposure basis (MRIDs 45901815, -16, -17, -18, and -19).

Table 9. Toxicity of BAS 670 00H to Earthworms.

Nontarget Insect Toxicity

Species	% ai	LC_{50}	Toxicity category	MRID no.	Study classification
earthworm (*Eisenia fetida*)	31	>1000 mg/kg dw soil	practically nontoxic	45901819	supplmental[1]
carabid beetle (*Poecilus cupreus*)	31	>223 mL/ha (0.07 lb ai/A)	practically nontoxic	45901818	supplmental[1]
lacewing (*Chrysoperia carnea*)	31	>225 mL/ha (0.07 lb ai/A)	practically nontoxic	45901817	supplmental[1]
predatory mite (*typhlodromus pyri*)	31	>675 mL/ha	practically nontoxic	45901816	supplmental[1]
parasitoid (*Aphidius rhopalosiphi*)	31	>675 mL/ha (0.24 lb ai/A)	practically nontoxic	45901815	supplmental[1]

[1] Not an EPA guideline

Toxicity to Aquatic Organisms

Toxicity test values (*i.e.*, measures of effects) for aquatic biota used in the screening risk assessment were derived from the results of registrant-required aquatic plant and animal toxicity studies. Toxicity results that were consistent with risk assessment practices and toxicity testing guidelines (FIFRA 40 CFR-Part 158 and Part 160) were used. In characterizing a chemical's toxic potential, acute toxicity results (96-hr [except as noted] LC_{50} or EC_{50}) for fish and invertebrates excluding plants are classified, based on the magnitude of the chemical required to illicit a response, as practically nontoxic (>100 mg/L), slightly toxic (100 to 10 mg/L), moderately toxic (10 to 1 mg/L), highly toxic (1 to 0.1 mg/L), and very highly toxic (<0.1 mg/L). This classification scheme is used in the sections below when discussing the results of toxicity studies using topramezone.

VI. Freshwater Fish, Acute

Two freshwater fish toxicity studies using the TGAI are required to establish the toxicity of topramezone to fish. The preferred test species are rainbow trout (a coldwater fish) and bluegill sunfish (a warmwater fish). Since the LC_{50}s are greater than 97.4 mg ai/L (**Table 10**), topramezone is categorized as practically nontoxic to freshwater fish on an acute exposure basis. The guideline (72-1) is fulfilled (MRIDs 45902314 and -15).

Table 9. Acute Toxicity of Topramezone to Freshwater Fish.

Freshwater Fish Acute Toxicity Under Static Conditions					
Species	% ai	LC_{50}	Toxicity category	MRID # (author)	Study classification
Rainbow trout	95.8	>97.4 mg ai/L	practically nontoxic	45902314 (Zok, S. 2000)	acceptable
Bluegill sunfish	95.8	>100 mg ai/L	practically nontoxic	45902315 (Zok, S. 2000)	acceptable

Additional acceptable freshwater fish toxicity study was also submitted by the registrant on the topramezone's primary degradate, M670H05, (3-(4,5-dihydro-isoxazol-3-yl)-4-methylsulfonyl-2-methyl-benzoic acid). Results indicate an LC_{50} greater than 100 mg M670H05/L (**Table 10**), the primary degradate is categorized as practically non-toxic to freshwater fish on an acute exposure basis (MRID 46242706).

Table 10. Acute Toxicity of Topramezone Primary Degradate (M670H05) to Freshwater Fish.

Freshwater Fish Acute Toxicity Under Static Conditions					
Species	% ai	Toxicity value	Toxicity category	MRID # (author)	Study Classification
Rainbow trout	99.3	>100 mg M670H05/L	practically nontoxic	46242706 (Bögi, C. 2003)	acceptable

Additional acceptable freshwater invertebrate toxicity study was also submitted by the registrant on the BAS 670H's end use product, BAS 670 00H. Results indicate an LC_{50} greater than 100 mg EP/L (**Table 11**), the end use product is categorized as practically nontoxic to freshwater fish on an acute exposure basis (MRID 45901813).

Table 11. Acute Toxicity of Topramezone End Use Product (BAS 670 00H) to Freshwater Fish.

Freshwater Fish Acute Toxicity Under Static Conditions					
Species	% ai	Toxicity value	Toxicity category	MRID # (author)	Study Classification
Rainbow trout	30	>100 mg EP/L	practically nontoxic	45901813 (Zok, S. 2001)	acceptable

VII. Freshwater Fish, Chronic

A freshwater fish early life-stage test using the TGAI is required for topramezone because the end-use product may be applied directly to water or is expected to be transported to water from the intended use site, and the following conditions are met: (1) the pesticide is intended for use such that its presence in water is likely to be continuous or recurrent regardless of toxicity, (2) any aquatic acute LC_{50} or EC_{50} is less than 1 mg/L, (3) the EEC in water is equal to or greater than 0.01 of any acute LC_{50} or EC_{50} value, or, (4) the actual or estimated environmental concentration in water resulting from use is less than 0.01 of any acute LC_{50} or EC_{50} value and any one of the following conditions exist: studies of other organisms indicate the reproductive physiology of fish may be affected, physicochemical properties indicate cumulative effects, or the pesticide is persistent in water (*i.e.*, half-life greater than 4 days). The preferred test species is rainbow trout. Results indicate topramezone affected survival and growth (**Table 12**) at concentrations of 2.93 to 9.01 mg ai/L. The guideline (72-4) is fulfilled (MRID 45902321).

Table 12. Early Life-Stage Toxicity of Topramezone to Freshwater Fish.

Freshwater Fish Chronic Toxicity Under Flow-Through Conditions						
Species	% ai	NOAEC	LOAEC	Endpoints Affected	MRID No. (Author)	Study Classification
Rainbow trout *(Oncorhynchus mykiss)*	95.8	2.93 mg ai/L	9.01 mg ai/L	wet weight, length, juvenile survival; abnormalities included decreased growth (reduction of body length) in juveniles.	45902321 (Zok, S. 2000)	acceptable

VIII. Freshwater Invertebrate, Acute

A freshwater invertebrate toxicity test using the TGAI is required to establish the toxicity of topramezone to aquatic invertebrates. The preferred test species is *Daphnia magna*. Since the EC_{50} is >100 mg ai/L (**Table 13**), topramezone is categorized as practically nontoxic to freshwater invertebrates on an acute exposure basis. The guideline (72-2) is fulfilled (MRID 45902316).

Table 13. Acute Toxicity of Topramezone to Freshwater Invertebrates.

Freshwater Invertebrate Acute Toxicity Under Static Conditions					
Species	% ai	EC_{50}	Toxicity category	MRID # (author)	Study Classification
Water flea	95.8	>100 mg ai/L	practically nontoxic	45902316 (Jatzek, 2002)	acceptable

Additional acceptable freshwater invertebrate toxicity study was also submitted by the registrant on the topramezone's primary degradate, M670H05, (3-(4,5-dihydro-isoxazol-3-yl)-4-methylsulfonyl-2-methyl-benzoic acid). Results indicate an EC_{50} greater than 100 mg M670H05/L (**Table 14**), the primary degradate is categorized as practically non-toxic to freshwater invertebrates on an acute exposure basis (MRID 46242705).

Table 14. Acute Toxicity of Topramezone Primary Degradate (M670H05) to Freshwater Invertebrates.

Freshwater Invertebrate Acute Toxicity Under Static Conditions					
Species	% ai	EC_{50}	Toxicity category	MRID No. (author)	Study Classification
Water flea	99.3	>100 mg M670H05/L	practically nontoxic	46242705 (Jatzek, 2003)	acceptable

Additional acceptable freshwater invertebrate toxicity study was also submitted by the registrant on the topramezone's end use product, BAS 670 00H. Results indicate an EC_{50} greater than 100 mg EP/L (**Table 15**), the end use product is categorized as practically nontoxic to freshwater invertebrates on an acute exposure basis (MRID 45901820).

Table 15. Acute Toxicity of Topramezone End Use Product (BAS670 00H) to Freshwater Invertebrates.

Freshwater Invertebrate Acute Toxicity Under Static Conditions					
Species	% ai	EC_{50}	Toxicity category	MRID # (author)	Study Classification
Water flea	30	>100 mg EP/L	practically nontoxic	45901820 (Funk, 2002)	acceptable

IX. Freshwater Invertebrate, Chronic

A freshwater aquatic invertebrate life-cycle test using the TGAI is required for topramezone since the end-use product may be applied directly to water or is expected to be transported to water from the intended use site, and the following conditions are met: (1) the pesticide is intended for use such that its presence in water is likely to be continuous or recurrent regardless of toxicity, (2) any aquatic acute LC_{50} or EC_{50} is less than 1 mg/L, (3) the EEC in water is equal to or greater than 0.01 of any acute LC_{50} or EC_{50} value, or, (4) the actual or estimated environmental concentration in water resulting from use is less than 0.01 of any acute LC_{50} or EC_{50} value and any of the following conditions exist: studies of other organisms indicate the reproductive physiology of invertebrates may be affected, physicochemical properties indicate cumulative effects, or the pesticide is persistent in water (*i.e.*, half-life greater than 4 days). The preferred test species is *Daphnia magna*. Results indicate topramezone affected reproduction (**Table 16**) at concentrations of 48.6 to 97.5 mg a.i./L. The guideline (72-4) is not fulfilled.

Table 16. Chronic Toxicity of Topramezone to Freshwater Invertebrates.

Freshwater Invertebrate Life-Cycle Toxicity Under Semi-Static Conditions.

Species	% ai	21-day NOAEC (ppm)	LOAEC (ppm)	Endpoints Affected	MRID No. Author/Year	Study Classification
Waterflea *(Daphnia magna)*	95.8	48.6	97.5	mean number of live offspring produced per female daphnid	45902320 (Jatzek 2002.)	Supplemental[1]

[1] Dry weight of surviving daphnids were not measured.

Toxicity to Estuarine and Marine Organisms

X. Estuarine and Marine Fish, Acute

Acute toxicity testing with estuarine and marine fish is required for the TGAI because topramezone can be used in coastal counties and may contaminate the estuarine and marine environment. The preferred test species is sheepshead minnow (*Cyprinodon variegatus*). Since the LC_{50} is greater than 100 mg ai/L (**Table 17**), topramezone is categorized as practically nontoxic to estuarine and marine fish on an acute exposure basis. The guideline (72-3a) is fulfilled (MRID 45902319).

Table 17. Acute Toxicity of Topramezone to Estuarine and Marine Fish

Estuarine and Marine Fish Acute Toxicity Under Static Condition					
Species	% ai	LC_{50}	Toxicity category	MRID # (author)	Study classification
Sheepshead minnow	95.8	>119 mg ai/L	practically nontoxic	45902319 (Palmer, S.J., T.Z. Kendall, H.O. Krueger, and C.M. Holmes. 2001)	acceptable

XI. Estuarine and Marine Invertebrates, Acute

Acute toxicity testing with estuarine and marine invertebrates using the TGAI is required because topramezone can be used in coastal counties and may contaminate the estuarine and marine environment. The preferred test species are the mysid shrimp (*Americamysis bahia*) and Eastern oyster (*Crassostrea virginica*). Results indicate a shrimp EC_{50} of 2.7 mg ai/L (**Table 18**); topramezone is categorized as moderately toxic to estuarine and marine invertebrate on an acute exposure basis. The guideline (72-3b and c) are fulfilled (MRIDs 45902317 and -18).

Table 18. Acute Toxicity of Topramezone to Estuarine and Marine Invertebrates

Estuarine and Marine Invertebrate Acute Toxicity Under Static and Semi-Renewal Conditions					
Species	% ai	EC_{50}	Toxicity category	MRID no. (author)	Study Classification
Mysid shrimp	95.8	2.7 mg ai/L	moderately toxic	45902318 (Palmer, S.J., Kendall, T.Z., Krueger, H.O., and C.M. Holmes, 2001)	acceptable
Eastern oyster (shell deposition)	95.8	>123 mg ai/L	practically nontoxic	45902317 (Palmer, S.J., Kendall, T.Z., Krueger, H.O., and C.M. Holmes, 2001)	acceptable[1]

[1] semi-renewal conditions.

Toxicity to Plants

XII. Toxicity to Terrestrial Plants

Terrestrial plant testing (seedling emergence and vegetative vigor) is a standard requirement only for herbicides that have terrestrial non-residential outdoor use patterns and that may move off the application site through drift (aerial) and/or that may have endangered or threatened plant species associated with the application site. For seedling emergence and vegetative vigor testing the following plant species and groups should be tested: (1) six species of at least four dicotyledonous families, one species of which is soybean (*Glycine max*) and the second is a root crop, and (2) four species of at least two monocotyledonous families, one of which is corn (*Zea mays*).

Normally, tier I testing with the herbicide is conducted at the highest use rate on the label. Then, Tier II testing is required if any species in tier I is inhibited 25% or more. In this case, the registrant conceded a 25% inhibition and proceeded directly to tier II seedling emergence and vegetative vigor studies instead of tier I studies.

Seedling Emergence

The tier II seedling emergence toxicity test measures the response of plants, relative to a control, and five or more test concentrations of a pesticide. This simulates the response of non-target plants subjected to runoff from adjacent treated areas. Based on an application rate of 0.022 lb ai/A, cabbage (0.0039 lb/A) is the most sensitive dicot while ryegrass (0.042 lb/A) is the most sensitive monocot (**Table 19**) in the seedling emergence tier II toxicity test. The most sensitive endpoint was dry weight. The guideline (123-1a) is fulfilled (MRID 45902327) for the seedling emergence test. Results of tier II toxicity testing on the TEP material are tabulated below.

Table 19. Toxicity of BAS 670 00H To Terrestrial Plants using Tier II Seedling Emergence.[1]

Species	**NOAEC, EC_{25} and Slope (lbs/A) at 21 Days**								
	Seedling Emergence			**Dry Weight**			**Height**		
	Slope	NOAEC	EC_{25}	Slope	NOAEC	EC_{25}	Slope	NOAEC	EC_{25}
Cabbage	n/a	0.045	>0.045	1.44	**0.002**	**0.0039**	1.35	0.0017	0.007
Lettuce	n/a	0.045	>0.045	1.72	0.005	0.007	1.49	0.005	0.012
Radish	n/a	0.045	>0.045	2.82	0.005	0.009	2.52	0.005	0.012
Soybean	n/a	0.045	>0.045	n/a	0.045	>0.045	n/a	0.045	>0.045
Tomato	n/a	0.045	>0.045	1.21	0.015	0.044	0.996	0.042	>0.045
Onion	n/a	0.045	>0.045	n/a	0.045	>0.045	n/a	0.045	>0.045
Ryegrass	n/a	0.045	>0.045	2.68	**0.015**	**0.042**	1.53	0.042	>0.045
Bean	n/a	0.045	>0.045	n/a	0.045	>0.045	n/a	0.045	>0.045
Corn	n/a	0.045	>0.045	n/a	0.045	>0.045	n/a	0.045	>0.045
Wheat	n/a	0.045	>0.045	n/a	0.045	>0.045	n/a	0.045	>0.045

[1] MRID no. 459023-27; proposed label application rate is 0.022 lb ai/A, however, test was conducted at 0.045 lb ai/A (2x max. appl. rate).
n/a - No effects seen.

Visual analysis was used to determine the effects of phytotoxicity at 17 g ai/ha or 0.015 lb ai/A to observe potential effect to plants (**Table 19a**) when applying at the proposed label rate of 25 g ai/ha or 0.022 lb ai/A The test was conducted at 50 g/ha or 0.045 lb ai/A, however, the analysis for phytotoxicity at 17 g/ha instead of 50 g/ha is more appropriate to observe actual phytotoxicity effects when treatment is occurring on agricultural sites. Analysis shows the conditions of surviving seedlings at the proposed application of 25 g ai/ha show bean, corn, and wheat were generally normal and not effected. Soybean, ryegrass, onion, and lettuce were moderately effected with an increase in phytotoxicity of chlorosis, leaf curl and necrosis observed but appears to recover back to normal levels. Radish, tomato and cabbage were detrimentally effected with a pronounce increase in phytotoxicity of chlorosis, leaf curl and necrosis.

Table 19a. Phytotoxicity of BAS670 00H to Terrestrial Plants using Tier II Seedling Emergence.

Plant Injury Index at 17 g ai/ha or 0.015 lb ai/A*									
Soybean	Lettuce	Radish	Tomato	Bean	Cabbage	Wheat	Ryegrass	Corn	Onion
4-12% LC, CL	13-49% CL, N	33-63% LC, CL, N	22-65% N	n/a	20-65% LC, CL, N	n/a	2-13% CL, N	n/a	0-6% N

* 0% = No effect; 10% = Effect barely noticeable; 20% = Some effect, not apparently detrimental; 30% = Effect more pronounced, not obviously detrimental; 40% = Effect moderate, plants appear able to recover; 50% = More lasting effect, recovery doubtful; 60% = Lasting effect, recovery doubtful; 70% = Heavy injury, loss of individual leaves; 80% = Plant nearly destroyed, a few surviving leaves; 90% = Occasional surviving leaves; 100% = plant death. CL = Chlorosis; LC = Leaf Curl; N = Necrosis; S = Stunting; D = mildew

Vegetative Vigor

The vegetative vigor toxicity test measures the response of plants, relative to a control, and five or more test concentrations that simulate the effects of drift to non-target plants in adjacent areas. Tier II vegetative vigor studies indicate that at the application rate of 0.022 lb ai/A, soybean (0.0001 lb/A) is the most sensitive dicot while onion (0.0098 lb/A) is the most sensitive monocot (**Table 20**). The most sensitive endpoint was dry weight. The guideline (123-1b) is fulfilled (MRID 45902328) for the vegetative vigor test. Results of Tier II toxicity testing on the TEP material are tabulated below.

Table 19. Toxicity of BAS 670 00H To Terrestrial Plants using Tier II Vegetative Vigor.[1]

Species	NOAEC, EC_{25} and Slope (lbs/A) at 21D								
	Survival			Dry weight			Height		
	slope	NOAEC	EC_{25}	slope	NOAEC	EC_{25}	slope	NOAEC	EC_{25}
Soybean	n/a	0.045	>0.045	0.893	[0.000009][A]	0.0001	0.688	[0.00004]	0.001
Lettuce	NP[1]	0.002	0.005	3.64	0.0002	0.001	4.35	0.0017	0.003
Radish	2.11	0.002	0.004	1.17	0.0006	0.0002	1.9	0.001	0.003
Tomato	2.97	0.005	0.01	1.73	0.0002	0.0005	1.04	0.001	0.002
Bean	1.75	0.015	>0.045	1.5	[0.0004]	0.002	1.09	0.0017	0.009
Cabbage	2.8	0.002	0.005	1.92	[0.00015]	0.0005	1.21	0.001	0.002
Wheat	n/a	0.034	>0.034	2.56	0.015	0.029	n/a	0.034	>0.034
Ryegrass	NO DATA			n/a	0.034	>0.034	n/a	0.034	>0.034
Corn	n/a	0.045	>0.045	n/a	0.045	>0.045	n/a	0.045	>0.045
Onion	3.17	0.015	>0.045	1.02	**0.005**	**0.01**	2.14	0.015	0.041

[1] MRID no. 459023-28; proposed label application rate is 25 g ai/A, however, test was conducted at 50 g ai/A (2x max. appl. rate).
[A] [EC_{05}]

Visual analysis was used to determine the effects of phytotoxicity at 17 g ai/ha or 0.015 lb ai/A to observe potential effect to plants (**Table 20a**) when applying at the proposed label rate of 25 g ai/ha or 0.022 lb ai/A The test was conducted at 50 g/ha or 0.045 lb ai/A, however, the analysis for phytotoxicity at 17 g/ha instead of 50 g/ha is more appropriate to observe actual phytotoxicity effects when treatment is occurring on agricultural sites. Analysis shows the conditions of growing plants at the proposed application of 25 g ai/ha show corn, onion and ryegrass were generally normal and not effected. Wheat appears to be normal with a slight increase of chlorosis, leaf curl, necrosis and mildew. Bean was detrimentally effected with a pronounce increase in phytotoxicity of necrosis. Soybean, lettuce, radish, tomato and cabbage were nearly destroyed with some approaching death and a pronounce increase in phytotoxicity of leaf curl, chlorosis, necrosis and stunting.

Table 20a. Phytotoxicity of BAS670 00H to Terrestrial Plants using Tier II Vegetative Vigor.

Plant Injury Index at 17 g ai/ha or 0.015 lb ai/A*									
Soybean	Lettuce	Radish	Tomato	Bean	Cabbage	Wheat	Ryegrass	Corn	Onion
82-90% LC, N	100% S, N	90-100% CL, LC, N	90-94% CL, LC, N, S	28-64% N	96-100% LC, N	4-14% CL, LC, N, D	0-3% N	0%	0-6% N

* 0% = No effect; 10% = Effect barely noticeable; 20% = Some effect, not apparently detrimental; 30% = Effect more pronounced, not obviously detrimental; 40% = Effect moderate, plants appear able to recover; 50% = More lasting effect, recovery doubtful; 60% = Lasting effect, recovery doubtful; 70% = Heavy injury, loss of individual leaves; 80% = Plant nearly destroyed, a few surviving leaves; 90% = Occasional surviving leaves; 100% = plant death. CL = Chlorosis; LC = Leaf Curl; N = Necrosis; S = Stunting; D = mildew

XII. Field Study

A vegetative vigor field study was submitted (MRID 46460702) to observe the effect of topramezone's formulated product BAS670 00H including an adjuvant (DASH HC) to pea under field conditions. Results indicate that the response of pea plants from treatment conditions did not differ from control plants with the exception of the two highest treatment levels (0.5 + 0.2233 and 0.1005 lb BAS 670 00H/A + 0.4465 lb DASH HC/A). The phytotoxic effects in the 0.5 + 0.2233 and 0.1005 lb BAS 670 00H/A + 0.4465 lb DASH HC/A were 33 and 85%, respectively. The EC_{25} was determined to be 0.048 lb BAS 670 00H/A + 0.22 lb DASH HC/A. The NOAEC was 0.025 lb BAS 670 00H./A + 0.1116 lb DASH HC/A. The study is classified as supplemental because it is unknown whether the effects were caused by the adjuvant or the end use product. A solvent control for the adjuvant DASH HC was not tested. In addition, there was no indication whether the control plots were separated from treated plot to prevent cross-contamination between plots.

XIII. Toxicity to Aquatic Plants

Aquatic plant testing is required for any herbicide that has outdoor non-residential terrestrial uses and that may move off-site by runoff (solubility >10 ppm in water), and/or by drift (aerial) or that is applied directly to aquatic use sites (except residential). Normally, tier I testing with the TGAI is conducted on duckweed (*Lemna gibba*), a vascular species, and a green algae (*Skeletonema costatum*), a nonvascular species. Then, tier II testing is required if either species in Tier I is inhibited 50% or more, and also includes *Selenastrum capricornutum*, *Anabaena flos-aquae,* and a freshwater diatom. In this case, the registrant chose to conduct Tier II testing even though it may not have been triggered. Tier II toxicity testing with the vascular aquatic plant, duckweed, and the most sensitive non-vascular aquatic plant, the EC_{50}s were 0.008 and 4 mg ai/L respectively (**Table 21**). The most sensitive endpoint was frond counts. The guideline (123-2) is fulfilled for the duckweed, *A. flos-aquae, S. costatum* and *P. subcapitata* (MRIDs 45902329, -30, -

31, -33) but not fulfilled for *N. pelliculosa* (MRID 45902332). Results of tier II toxicity testing on topramezone are tabulated below.

Table 21. Toxicity of Topramezone to Aquatic Plants using Tier II.

Nontarget Aquatic Plant Toxicity (Tier II)

Species	% ai	EC_{50}	NOAEC	MRID # (author)	Study classification
Vascular species:					
Duckweed	95.8	0.008 mg ai/L	0.001 mg ai/L	45902329 (Dohmen, G.P. 2002)	acceptable
Nonvascular species:					
Anabaena flos-aquae	95.8	>100 mg ai/L	100 mg ai/L	45902330 (Kubitza, J. 2001)	acceptable
Skeletonema costatum	95.8	49 mg ai/L	3 mg ai/L	45902331 (Palmer, S.J., T.Z. Kendall, H.O. Krueger, C.M. Holmes. 2002)	acceptable
Pseudokirchneriella subcapitata.	95.8	17 mg ai/L	3 mg ai/L	45902333 (Kubitza, J. 2001)	acceptable
Navicula pelliculosa	95.8	47 mg ai/L	30 mg ai/L	45902332 (Palmer, S.J., T.Z. Kendall, H.O. Krueger, C.M. Holmes. 2002)	invalid[1]

[1] Significant inhibition occurred in the two highest treatments which also had pH values substantially lower than the recommended 7.5 ± 0.1, throughout the duration of the test. As a result, it was not possible to differentiate between pH or active ingredient effects on toxicity to the diatoms.

Additional acceptable aquatic plant toxicity study was also submitted by the registrant on the topramezone primary degradate, M670H05, (3-(4,5-dihydro-isoxazol-3-yl)-4-methylsulfonyl-2-methyl-benzoic acid). The most sensitive endpoint was frond counts with an EC_{50} at 0.36 mg M670H05/L (**Table 22**). The guideline (123-2) is fulfilled (MRID 46242704).

Table 22. Toxicity of Topramezone Primary Degradate (M670H05) to Aquatic Plants using Tier II.

Nontarget Aquatic Plant Toxicity (Tier II)

Species	% ai	EC_{50}	NOAEC	MRID # (author)	Study classification
Vascular species:					
Duckweed	99.3	0.36 mg ai/L	0.0067 mg ai/L	46242704 (Junker, M. 2003)	acceptable

Additional acceptable aquatic plant toxicity study was also submitted by the registrant on the topramezone end use product, BAS 670 00H. The most sensitive endpoint was frond counts with an EC_{50} at 0.0296 mg EP/L (**Table 23**). The guideline (123-2) is fulfilled (MRID 45901821).

Table 23. Toxicity of BAS 670 00H (end use product) to Aquatic Plants using Tier II.

Nontarget Aquatic Plant Toxicity (Tier II)					
Species	% ai	EC_{50}	NOAEC	MRID # (author)	Study classification
Vascular species:					
Duckweed	30	0.0296 mg ai/L	0.0023 mg ai/L	45901821 (Junker, M. 2002)	acceptable

Appendix G: Risk Quotient Estimates for Nontarget Terrestrial Animals and Aquatic Organisms

Risk characterization integrates the results of the exposure and ecotoxicity data to evaluate the likelihood of adverse ecological effects. The means of this integration is called the quotient method. Risk quotients (RQs) are calculated by dividing exposure estimates by acute and chronic ecotoxicity values.

RQ = EXPOSURE/TOXICITY

RQs are then compared to OPP's levels of concern (LOCs). These LOCs are used by OPP to analyze potential risk to nontarget organisms and the need to consider regulatory action. The criteria indicate that a pesticide used as directed has the potential to cause adverse effects on nontarget organisms. LOCs currently address the following risk presumption categories: (1) **acute** -- potential for acute risk; regulatory action may be warranted in addition to restricted use classification, (2) **acute restricted use** -- the potential for acute risk, but may be mitigated through restricted use classification, (3) **acute endangered species** - endangered species may be adversely affected, and (4) **chronic risk** - the potential for chronic risk; regulatory action may be warranted. Currently, EFED does not perform assessments for chronic risk to plants, acute or chronic risks to nontarget insects, or chronic risk from granular/bait formulations to birds or mammals.

The ecotoxicity test values (measurement endpoints) used in the acute and chronic risk quotients are derived from required studies. Examples of ecotoxicity values derived from short-term laboratory studies that assess acute effects are: (1) LC_{50} (fish and birds), (2) LD_{50} (birds and mammals), (3) EC_{50} (aquatic plants and aquatic invertebrates) and (4) EC25 (terrestrial plants). Examples of toxicity test effect levels derived from the results of long-term laboratory studies that assess chronic effects are: (1) LOAEC (birds, fish, and aquatic invertebrates), and (2) NOAEC (birds, fish and aquatic invertebrates). For birds and mammals, the NOAEC generally is used as the ecotoxicity test value in assessing chronic effects, although other values may be used when justified. However, the NOAEC is used if the measurement end point is production of offspring or survival.

Risk presumptions and the corresponding RQs and LOCs, are tabulated below.

Table 1. Risk Presumption Categories

Risk Presumption for Terrestrial Animals	**LOC**
Acute: Potential for acute risk for all non-target organisms	>0.5
Acute Restricted Use: Potential for acute risk for all non-target organisms, but may be mitigated through restricted use classification	>0.2
Acute Endangered Species: endangered species may be adversely affected by use	>0.1
Chronic Risk: potential for chronic risk may warrant regulatory action	>1
Risk Presumption for Aquatic Organisms	**LOC**
Acute: Potential for acute risk for all non-target organisms	>0.5
Acute Restricted Use: Potential for acute risk for all non-target organisms, but may be mitigated through restricted use classification	>0.1
Acute Endangered Species: endangered species may be adversely affected by use	>0.05
Chronic Risk: potential for chronic risk may warrant regulatory action	>1
Risk Presumption for Terrestrial and Aquatic Plants	**LOC**
Potential for risk for all non-endangered and endangered plants	>1

For assessment of exposure to terrestrial animals, EFED used the first-order regression models to calculate the maximum Estimated Environmental Concentrations (EECs) on potential bird and mammal food items (grasses, other green vegetation, seeds, insects). EECs are based on one application of topramezone at an application rate of 0.022 lb a.i./acre/season. Since no foliar dissipation half life was available for topramezone, EFED also assumed a default half-life value of 35 days. This 35-day default half-life is based on foliar dissipation data for pesticides for which such data are available, and is designed to be conservative (Willis and McDowell, 1987).

For acute exposures to aquatic organisms and aquatic plants, EFED relied on the peak Estimated Environmental Concentration (EEC) generated through PRZM-EXAM, a tier II aquatic exposure assessment. For chronic exposure to fish and invertebrates, the 60-day and 21-day EECs were used, respectively. Five scenarios for corn uses were developed by OPP for specific sites, using uses site-specific data for soils, precipitation, and agronomic practices. These estimates were based on either ground or aerial application of the maximum annual rate and two split applications made at seven day intervals, as listed on the proposed label for the five corn scenarios deemed representative of the proposed new uses: Florida sweet corn, Illinois corn, Mississippi corn, North Carolina East corn, and Texas corn. Estimated environmental concentrations are not adjusted for regional percent cropped area.

To characterize ecological effects, EFED evaluates the acute and chronic toxicity values (i.e., point estimates and no-effect levels) derived from required guideline studies with terrestrial and aquatic test species. Additional information on effects determinations and available toxicity data for topramezone are provided in **Appendix F.** However, formulation product BAS670 00H and degradate M670H05 were also tested for ecological effects, therefore, toxicity values are solely based on parent topramezone, its degradate M670H05 and the formulation product. Other degradates identified in submitted FATE studies were not tested for effects.

For pesticides applied as a nongranular product (e.g., liquid and dust), the estimated environmental concentrations (EECs) on food items following product application are compared to LC_{50} values to assess risk. The TREX model predicted maximum residues of a pesticide that may be expected to occur on selected avian or mammalian food items from one instantaneous application for corn is presented in **Table 1.**

Table 1. Estimated environmental concentrations on avian and mammalian food items (ppm) following multiple broadcast applications of nongranular topramezone products.

Site / App. Method	App. Rate(lb ai/A) / No. of Apps / Intervals	Food Items	EEC (ppm) Predicted Maximum Residue[1]
Corn	0.022 / 1 appl. / No intervals	Short grass	5
		Tall grass	2
		Broadleaf plants and small insects	3
		Fruits, pods, seeds, and large insects	0.3

[1] TREX model

I. Birds

Acute

Since topramezone is classified as practically nontoxic to birds (LD_{50} >2000 mg/kg (northern bobwhite) LC_{50}s are >5000 ppm and >5000 ppm). Acute risks to bird are presumed to be negligible (**Table 2**) from any of the proposed new uses. The acute risk quotients for one (Table 2) broadcast application of topramezone are tabulated below.

Table 2. Avian Acute Risk Quotients for One Application of Topramezone (Broadcast) Based on a Northern Bobwhite LC50 of >4874 ppm.

Site/App. Method	App.Rate (lbs ai/A)	Food Items	Maximum EEC (ppm)	LC50 (ppm)	Acute RQ (EEC/LC50)
Corn	0.022 / 1 appl. / No intervals	Short grass	5	>5000	0.00
		Tall grass	2	>5000	0.00
		Broadleaf plants and small insects	3	>5000	0.00
		Fruits, pods, seeds, and large insects	0.3	>5000	0.00

[a] exceeds acute high, acute restricted and acute endangered species LOCs.
[b] exceeds acute restricted and acute endangered species LOCs.
[c] exceeds acute endangered species LOCs

No acute LOCs are exceeded, because one instantaneous application of topramezone on food items would not be expected to exceed the LOC for birds when applied to corn.

Chronic

Risk quotients for chronic risk to birds during reproduction periods were not calculated because the mallard duck study revealed statistically significant reductions in hatchling body weight and female weight gain at all three treatment levels, resulting in the inability to define a NOAEC in this study (<100 mg a.i./kg dw (ppm a.i.) diet). Instead, reproductive effects to birds were qualitatively evaluated using a Mallard duck LOAEC of 100 ppm (**Table 3**). Even though a defined NOAEC of 294 ppm was established in the quail study, the toxicity to duck exhibits more sensitivity to topramezone than the quail and will be evaluated. The qualitative assessment (Table 3) for one application of topramezone to birds are tabulated below.

Table 3. Chronic Risk for One Application of Topramezone (Broadcast) Based on a Mallard Duck LOAEC of 100 ppm.

Site/App. Method	App. Rate (lbs ai/A)	Food Items	Maximum EEC (ppm)	LOAEC (ppm)
Corn	0.022	Short grass	5	100

The evaluation for birds feeding short grass after a broadcast application of topramezone on corn shows the maximum EEC to be 20-times lower than the duck LOAEC. Therefore, reproductive risk to birds feeding in corn use sites is probably minimal, however, it is uncertain until a reliable NOAEC is established.

II. Mammals

Acute

Estimating the potential for adverse effects to wild mammals is based upon EFED's draft 1995 SOP of mammalian risk assessments and methods used by Herger and Kenaga (1972) as modified by Fletcher *et al.* (1994). The concentration of topramezone in the diet that is expected to be acutely lethal to 50% of the test population (LC_{50}) is determined by dividing the LD_{50} value (usually rat LD_{50}) by the percent body weight consumed. A risk quotient is then determined by dividing the EEC by the derived LC_{50} value. Risk quotients are calculated for three separate weight classes of mammals (15, 35, and 1000 g), each presumed to consume four different kinds of food (grass, forage, insects, and seeds). The acute risk quotients (**Table 4**) for broadcast application of non-granular products are tabulated below.

Table 4: Mammalian Acute Risk Quotients for One Broadcast Application of Topramezone (Broadcast) Based on a Rat LD_{50} of >2000 mg/kg.

Site/ App. Meth./ Rate in lbs ai/A (No. of Apps.)	Body Weight (g)	% Body Weight Consumed	Rat LD_{50} (mg/kg)	Maximum EEC (ppm) Short Grass	Acute RQ
Corn (1 application @ 0.022 lb ai/A)	15	95	>2000	5	0.01
	35	66	>2000	5	0.00
	1000	15	>2000	5	0.00

Since topramezone is classified as practically nontoxic to mammals (LD_{50} >2000 mg/kg), acute risk to mammals is believed to be negligible.

Chronic

The chronic risk quotients for one (**Table 5**) broadcast application of topramezone to mammals are tabulated below.

Table 5. Mammalian Chronic Risk Quotients for Single Application of Topramezone (Broadcast) Based on a Laboratory Rat NOAEC of 4000 in a 2-Generation Study.

Site/Application Method	Application Rate in lbs ai/A	Food Items	Maximum EEC[1] (ppm)	NOAEC (ppm)	Chronic RQ (EEC/NOAEC)
Corn	0.022	Short grass	5	4000	0.01
		Tall grass	2	4000	0.00
		Broadleaf plants/Insects	3	4000	0.00
		Seeds	0.3	4000	0.00

[1]Based on Fletcher without degradation.

The results indicate that for one application of topramezone at the proposed label rate, the chronic LOC is not exceeded for mammals feeding short grass, tall grass, broadleaf plants and seeds in the vicinity.

III. Insects

Currently, EFED does not assess risk to nontarget insects. However, toxicity results for the honeybee are used only for recommending appropriate label precautions. Topramezone and its formulated product are practically non toxic to honeybees (LD_{50} >100 µg a.i./bee and >100 µg EP/bee) on an acute basis, precautionary labeling is not required.

IV. Earthworm and Other Terrestrial Invertebrates

Currently, EFED does not assess risk to terrestrial invertebrates. However, toxicity results for the terrestrial invertebrates (earthworms, *Eisenia foetida*; parasitic wasp, *Aphidius rhopalosiphi*; predator lacewing, *Chrysoperla carnea*; carabid beetle, *Poecilus cupreus*; predatory mite, *typhlodromus pyri*) are used only for recommending appropriate label precautions. Topramezone and its formulated product are practically nontoxic to terrestrial invertebrates (LC_{50} >1000 mg/kg dw soil for earthworm; >223 mL/ha for beetle; >225 mL/ha for lacewing; >675 mL/ha for mite and parasitoid) on an acute basis, precautionary labeling is not required.

IV. Terrestrial Plants

Terrestrial plant EECs of topramezone from one application were determined using the TerrPlant model (V.1.0). Details of the TerrPlant model and EECs are presented in Table 6 and Appendix E.2. The EECs from the model are based on the application rate and solubility of the pesticide in water and drift characteristics which depend on ground or aerial applications. The amount of imazapyr that runs off is a proportion of the application rate and is assumed to be

1%, 2%, or 5% for water solubility values of <10 ppm, 10-100 ppm, and >100 ppm, respectively. For imazapyr, a runoff value of 5% is assumed, based on its solubility of >100 ppm in water. Drift from ground and aerial applications are assumed to be 1% and 5%, respectively, of the application rate. An application efficiency of 60% is assumed for aerial application. For dry areas, "sheet runoff" is characterized as a combination of runoff and drift of one treated acre to an adjacent acre (1:1 ratio). For semi-aquatic areas, "channelized runoff" is characterized as a combination of runoff and drift of 10 acres to a distant low-lying acre (10:1 ratio).

Table 6. Estimated Environmental Concentrations For Dry and Semi- Aquatic Areas (lb ai/A) Following Ground or Aerial Applications.

Application Method/ Rate of Application in lbs ai/A	Runoff Value	Sheet Run-off (lbs ai/A)	Channelized Runoff (lbs ai/A)	Drift (lbs ai/A)	Total Loading to Adjacent Area (Sheet Run-off +Drift)	Total Loading to Semi-aquatic Area (Channel Run-off + Drift)
Unincorporated Ground (0.022 lb ai/A)	0.05	0.0011	0.011	0.00022	0.0013	0.0112
Aerial, Airblast, Forced-Air, Chemigation (0.022 lb ai/A)	0.05	0.0007	0.0066	0.0011	0.0018	0.0077

Exposure is then compared with ecological toxicity EC_{25}s for the most sensitive species tested in a seedling emergence and a vegetative vigor study (see Appendix F for details of the study). Results of that comparison are presented in Table 7 for a combination of runoff and drift conditions to non-endangered species inhabiting dry and semi-aquatic areas; Table 8 for drift conditions only to non-endangered species inhabiting both areas.

Table 7. Risk Quotients from a Single Application for Non-Endangered Terrestrial Plants in Dry and Semi-Aquatic Areas Based On a Cabbage Emergence EC_{25} of 0.0039.

Method	Seedling Emergence EC_{25} (lbs ai/A)	Total Loading to Adjacent Area[4]	Total Loading to Semi-Aquatic Area[5]	Emergence RQ Dry Area	Emergence RQ Semi-Aquatic Area
Unincorporated Ground	0.0039	0.0013	0.0112	0.33	**2.88***
Aerial, Airblast, Forced-Air Chemigation	0.0039	0.0018	0.0077	0.46	**1.98***

Table 8. Risk Quotients from a Single Application for Non-Endangered Terrestrial Plants in Dry and Semi-Aquatic Areas Based On a Soybean Vegetative Vigor EC_{25} of 0.0001.

4 (Sheet Runoff + Drift)

5 (Channelized Runoff+ Drift)

* exceeds the LOC (RQ≥1) for non-endangered terrestrial plants

Method	Vegetative Vigor EC_{25} (lbs ai/A)	Drift EEC	Vegetative Vigor RQ Both Areas
Unincorporated Ground	0.0001	0.0002	2*
Aerial, Airblast, Forced-Air Chemigation	0.0001	0.0011	11*

Based on results of the risks to non-endangered plants, there is the potential for risk to non-endangered terrestrial plants growing in semi-aquatic areas from a combination of runoff and drift following a single application of topramezone at a maximum rate of 0.022 lb ai per acre. For ground and aerial application, the non-endangered species LOCs are exceeded with RQs of 3 and 2, respectively. On the other hand, the RQ does not exceed the LOC for risk to non-endangered terrestrial plants growing in dry areas from a combination of runoff and drift. No method is currently available for estimating chronic exposures to terrestrial plants.

Drift risk quotients (Table 8) for non-endangered terrestrial plants inhabiting dry and semi-aquatic areas exceed the LOC from drift only following a single application of topramezone. LOCs are exceeded with RQs of 2 and 11 from ground and aerial applications, respectively.

Exposure is then compared with ecological toxicity NOAECs or EC_{05}s for the most sensitive species tested in a seedling emergence and a vegetative vigor study (see Appendix F for details of the study). Results of that comparison are presented in Table 9 for a combination of runoff and drift conditions to endangered species inhabiting dry and semi-aquatic areas; Table 10 for drift conditions only to endangered species inhabiting both areas.

Table 9. Risk Quotients from a Single Application for Endangered Terrestrial Plants in Dry and Semi-Aquatic Areas Based On a Cabbage Emergence NOAEC of 0.0017.

Method	Seedling Emergence NOAEC (lbs ai/A)	Total Loading to Adjacent Area	Total Loading to Semi-Aquatic Area	Emergence RQ Dry Area	Emergence RQ Semi-Aquatic Area
Unincorporated Ground	0.0017	0.0013	0.0112	0.78	**6.6****
Aerial, Airblast, Forced-Air Chemigation	0.0017	0.0018	0.0077	**1.04****	**4.5****

Table 10. Risk Quotients from a Single Application for Endangered Terrestrial Plants in Dry and Semi-Aquatic Areas Based On a Soybean Vegetative Vigor EC_{05} of 0.000009.

Method	Vegetative Vigor EC_{25} (lbs ai/A)	Drift EEC	Vegetative Vigor RQ Both Areas
Unincorporated Ground	0.000009	0.0002	22**

** exceeds the LOC (RQ ≥ 1) for endangered terrestrial plants

** Exceeds the LOC (RQ≥ 1) for endangered terrestrial plants

Aerial, Airblast, Forced-Air . Chemigation	0.000009	0.0011	122**

Based on results of the risks to endangered plants, there is the potential for risk to endangered terrestrial plants growing in dry and semi-aquatic areas from a combination of runoff and drift following a single application of topramezone at a maximum rate of 0.022 lb ai per acre. For ground and aerial application in semi-aquatic areas, the endangered species LOCs are exceeded with RQs of 7 and 5, respectively. For aerial application in dry areas, the endangered species LOC is exceeded with a RQ of 1; however, for ground applications in dry areas, the endangered species LOC is not exceeded with a RQ of 0.8.

Drift risk quotients (Table 10) for endangered terrestrial plants inhabiting dry and semi-aquatic areas exceeds the LOC from drift only following a single application of topramezone. LOCs are exceeded with RQs of 2 and 11 from ground and aerial applications, respectively.

Exposure and Risk to Nontarget Aquatic Organisms

The Tier II EEC values for estimating acute risk are the maximum (peak) values calculated for topramezone applied to corn uses at 0.011 lb ai/A at 7-day intervals using PRZM-EXAM (discussed in Appendix C). These estimates were based on application of the maximum rate as listed on the label for the proposed corn uses.

For chronic risk, 60-day EECs are used for fish and 21-day EECs are used for invertebrates. EFED believes that the proposed use and method of application (aerial or ground), because of their proximity to aquatic environments, may result in the direct application of topramezone from runoff or drift to aquatic environments. For this use pattern, EFED assumes either ground, airblast or aerial application of the maximum rate, applied once or two times at seven day intervals, as listed on the label for the five scenarios representative of the proposed corn uses.

V. Freshwater Fish

Acute

Acute risk quotients for a broadcast or two broadcast application of topramezone to freshwater fish **(Table 11)** are tabulated below.

Table 11. Acute Risk Quotients for Freshwater Fish Based on a Rainbow Trout LC_{50} of >97.4 mg/L.

Scenario	Appl. rate (lb ai/A)	No. appl.	EEC model	LC_{50} (mg/L)	Peak EEC (mg/L)	Acute RQ (EEC/LC_{50})
Florida Sweet Corn	0.022	1	PRZMEXAM (aerial)	>97.4	0.002	<0.1
	0.011	2	PRZMEXAM (aerial)	>97.4	0.002	<0.1

*** exceeds the LOCs for acute risk (RQ ≥0.5), restricted use (RQ ≥0.1) and endangered species (RQ ≥0.05)
** exceeds the LOCs for restricted use (RQ ≥0.1) and endangered species (RQ ≥0.05)
* exceeds the LOC for endangered species (RQ ≥0.05)

Acute risk to freshwater fish are presumed to be negligible for all uses. There are no LOC exceedances for freshwater fish.

Acute risk quotients for one and two application of the degradate, M670H05, to freshwater fish (**Table 12**) are tabulated below.

Table 12. Acute Risk Quotients for Freshwater Fish Based on a Rainbow Trout LC_{50} of >100 mg M670H05/L.

Scenario	Appl. rate (lb ai/A)	No. appl.	EEC model	LC_{50} (mg/L)	Peak EEC (mg/L)	Acute RQ (EEC/LC_{50})
Florida Sweet Corn	0.022	1	PRZMEXAM (aerial)	>100	0.002	<0.1
	0.011	2	PRZMEXAM (aerial)	>100	0.002	<0.1

The degradate, M670H05, which is practically nontoxic (LC_{50} >100 mg/L) to freshwater fish, the risks to freshwater fish is believed to be negligible.

Acute risk quotients for one and two application of the formulated end use product, BAS 670 00H, to freshwater fish (**Table 13**) are tabulated below.

Table 13. Acute Risk Quotients for Freshwater Fish Based on a Rainbow Trout LC_{50} of >100 mg EP/L.

Scenario	Appl. rate (lb ai/A)	No. appl.	EEC model	LC_{50} (mg/L)	Peak EEC (mg/L)	Acute RQ (EEC/LC_{50})
Florida Sweet Corn	0.022	1	PRZMEXAM (aerial)	>100	0.002	<0.1
	0.011	2	PRZMEXAM (aerial)	>100	0.002	<0.1

The formulation, BAS670 00H, which is practically nontoxic (LC_{50} >100 mg/L) to freshwater fish, the risks to freshwater fish is believed to be negligible.

<u>Chronic</u>

Chronic risks were evaluated using 60-day estimated environmental concentrations of topramezone residues (**Table 14**) to freshwater fish. Based on an fish early life-stage toxicity test with topramezone; the rainbow trout NOAEC is 2.93 mg/L. Chronic risk quotients for one and two applications to freshwater fish by air are tabulated below.

Table 14. Chronic Risk Quotients for Freshwater Fish Based on a Rainbow Trout NOAEC of 2.93 mg/L.

Scenario	Appl. rate (lb ai/A)	No. appl	EEC model	Toxicity value (mg/L)	Appl. method	60-day-avg EEC (mg/L)	60-day-avg RQ (EEC/NOAEC)
Florida Sweet Corn	0.022	1	PRZM EXAM	2.93	aerial	0.002	**<0.1**
	0.011	2	PRZM EXAM	2.93	aerial	0.002	<0.1

Based on the early life-stage toxicity test, the topramezone residue does not exceeds the chronic LOC for risk to freshwater fish at 60-day average estimated concentrations for corn uses. In addition, the LOC is not exceeded for freshwater fish from applications of topramezone using Illinois, Mississippi, North Carolina and Texas scenarios because aquatic EECs resulting from maximum applications to those scenarios are lower than those for Florida sweet corn.

VI. Freshwater Invertebrates

Acute

Acute risk quotients for one and two broadcast applications of topramezone to freshwater invertebrates **(Table 15)** are tabulated below.

Table 15. Acute Risk Quotients for Freshwater Invertebrates Based on a Daphnid EC_{50} of >100 mg/L for Topramezone.

Scenario	Appl. rate (lb ai/A)	No. appl.	EEC model	EC_{50} (mg/L)	Peak EEC (mg/L)	RQ (EEC/EC_{50})
Florida sweet corn	0.022	1	PRZM EXAM	>100	0.002	<0.1
	0.011	2	PRZM EXAM	>100	0.002	<0.1

*** exceeds the LOCs for acute risk (RQ ≥0.5), restricted use (RQ ≥0.1) and endangered species (RQ ≥0.05)
** exceeds the LOCs for restricted use (RQ ≥0.1) and endangered species (RQ ≥0.05)
* exceeds the LOC for endangered species (RQ ≥0.05)

Acute risk to freshwater invertebrates is presumed to be negligible for all uses. There are no LOC exceedances since the toxicity of topramezone is practically nontoxic to freshwater invertebrates. Therefore, minimal risk also is expected from maximum applications with other scenarios, because aquatic EECs resulting from maximum applications to those scenarios are lower than those for Florida sweet corn.

Acute risk quotients for one and two application of the degradate, M670H05, to freshwater invertebrates **(Table 16)** are tabulated below.

Table 16. Acute Risk Quotients for Freshwater Invertebrate Based on a Daphnid EC_{50} of >100 mg M670H05/L.

Scenario	Appl. rate (lb ai/A)	No. appl.	EEC model	EC_{50} (mg/L)	Peak EEC (mg/L)	Acute RQ (EEC/EC_{50})
Florida Sweet Corn	0.022	1	PRZMEXAM (aerial)	>100	0.002	<0.1
	0.011	2	PRZMEXAM (aerial)	>100	0.002	<0.1

The degradate, M670H05, which is practically nontoxic (EC_{50} >100 mg M670H05/L) to freshwater invertebrate, the risks to freshwater invertebrates is believed to be negligible.

Acute risk quotients for one and two application of the formulated end use product, BAS 670 00H, to freshwater invertebrates **(Table 17)** are tabulated below.

Table 17. Acute Risk Quotients for Freshwater Invertebrate Based on a Daphnid EC_{50} of >100 mg EP/L.

Scenario	Appl. rate (lb ai/A)	No. appl.	EEC model	EC_{50} (mg/L)	Peak EEC (mg/L)	Acute RQ (EEC/EC_{50})
Florida Sweet Corn	0.022	1	PRZMEXAM (aerial)	>100	0.002	<0.1
	0.011	2	PRZMEXAM (aerial)	>100	0.002	<0.1

The formulation, BAS670 00H, which is practically nontoxic (LC_{50} >100 mg EP/L) to freshwater invertebrates, the risks to freshwater invertebrates is believed to be negligible.

Chronic

Chronic risks were evaluated using 21-day (average) estimated environmental concentrations of topramezone residues **(Table 18)** to freshwater invertebrates. Based on an invertebrate life cycle toxicity test with topramezone; the daphnid NOAEC is 48.6 mg/L. Chronic risk quotients for one or two broadcast applications to freshwater invertebrates by air are tabulated below to examine long-term exposures.

Table 18. Chronic Risk Quotients for Freshwater Invertebrates Based on a Daphnid NOAEC of 48.6 mg/L for Topramezone.

Scenario	Appl. rate (lb ai/A)	No. appl	EEC model	Toxicity NOAEC (mg/L)	application method	21-Day EEC (mg/L)	21-Day RQ (EEC/NOAEC)
Florida sweet corn	0.022	1	PRZM EXAM	48.6	aerial	0.002	<0.1
	0.011	2	PRZMEXAM	48.6	aerial	0.002	<0.1

Minimal risk is presumed for freshwater invertebrates from long-term exposures. Therefore, minimal risk also is expected from maximum applications at other scenarios, because aquatic EECs resulting from maximum applications to those scenarios are lower than those for Florida sweet corn.

VII. Estuarine/Marine Fish

Acute risk quotients for one and two broadcast applications to estuarine/marine fish **(Table 19)** are tabulated below for corn use sites from which runoff and drift might contaminate the estuarine/marine environment.

Table 19. Acute Risk Quotients for Estuarine/marine Fish Based on a Sheepshead Minnow LC_{50} of >100mg/L.

Scenario	Appl. rate (lb ai/A)	Number of applications	EEC model	Toxicity LC_{50} (mg/L)	application method	Peak EEC (mg/L)	Fish RQ (EEC/LC_{50})
Florida sweet corn	0.022	1	PRZM EXAM	>100	aerial	0.002	<0.1
	0.011	2	PRZM EXAM	>100	aerial	0.002	<0.1

Acute risk to estuarine/marine fish is presumed to be negligible for all uses. There are no LOC exceedances since the toxicity of topramezone is practically nontoxic to estuarine/marine fish. Therefore, minimal risk also is expected from maximum applications at other scenarios, because aquatic EECs resulting from maximum applications to those scenarios are lower than those for Florida sweet corn.

VIII. Estuarine/Marine Invertebrates

Acute risk quotients for one or two broadcast applications to estuarine/marine invertebrates **(Table 20)** are tabulated below for corn use sites from which runoff and drift might contaminate the estuarine/marine environment.

Table 20. Acute Risk Quotients for Estuarine/marine Invertebrates Based on a Shrimp EC_{50} of 2.7 mg/L.

Site	Appl. rate (lb ai/A)	No. appl.	EEC model	Toxicity EC_{50} (mg/L)	Application Method	Peak EEC (mg/L)	Shrimp RQ (EEC/EC_{50})
Florida Sweet Corn	0.022	1	PRZM EXAM	2.7	aerial	0.002	<0.1
	0.011	2	PRZM EXAM	2.7	aerial	0.002	<0.1

Acute risk to estuarine/marine invertebrates is presumed to be negligible for all uses. There are no LOC exceedances since the toxicity of topramezone is moderate to estuarine/marine invertebrates. Therefore, minimal risk also is expected from maximum applications at other scenario, because aquatic EECs resulting from maximum applications to those scenarios are lower than those for Florida sweet corn.

IX. Aquatic Plants

Risk quotients for aquatic plants **(Table 21)** are addressed below. The assessment for non-endangered and endangered vascular aquatic plants is based on the toxicity of topramezone to duckweed. The assessment for nonvascular, non-endangered plants uses the toxicity to the most sensitive algal or diatom species. Currently, there are no Federally listed endangered nonvascular aquatic plants.

Table 21. Acute Risk Quotients for Aquatic Plants. A Duckweed (*Lemna gibba*) EC_{50} of 0.008 ppm and a Nonvascular Plant (*Psuedokirchneria subcapitata*) EC_{50} of 17 ppm of Technical Topramezone. For Endangered Species, the L. gibba NOAEC of 0.001 ppm of Techincal Topramezone.

Scenarios	Taxa	No of Appls.	EEC (µg/L)	Toxicity (µg/L)		RQ	
			Peak	EC_{50}	NOAEC	Acute[2]	Endangered Species[3]
Corn, aerial Florida	Vascular (*Lemna gibba*)	2	1.94	8	1	0.24	1.94*
		1	1.79	8	1	0.22	1.79*
	Non-Vascular (*Pseudokirchneriella subcapitata*)	2	1.94	17000	3000	<0.01	<0.01
		1	1.79	17000	3000	<0.01	<0.01
Corn, ground Florida	Vascular (*Lemna gibba*)	2	1.85	8	1	0.23	1.85*
		1	1.69	8	1	0.21	1.69*

Table 21. Acute Risk Quotients for Aquatic Plants. A Duckweed (*Lemna gibba*) EC_{50} of 0.008 ppm and a Nonvascular Plant (*Psuedokirchneria subcapitata*) EC_{50} of 17 ppm of Technical Topramezone. For Endangered Species, the L. gibba NOAEC of 0.001 ppm of Techincal Topramezone.

Scenarios	Taxa	No of Appls.	EEC (µg/L)	Toxicity (µg/L)		RQ	
	Non-Vascular (*Pseudokirchneriella subcapitata*)	2	1.85	17000	3000	<0.01	<0.01
		1	1.69	17000	3000	<0.01	<0.01
Corn, aerial Illinois	Vascular (*Lemna gibba*)	2	1.32	8	1	0.17	**1.32***
		1	1.17	8	1	0.15	**1.17***
	Non-Vascular (*Pseudokirchneriella subcapitata*)	2	1.32	17000	3000	<0.01	<0.01
		1	1.17	17000	3000	<0.01	<0.01
Corn, ground Illinois	Vascular (*Lemna gibba*)	2	1.15	8	1	0.14	**1.15***
		1	0.99	8	1	0.12	0.99
	Non-Vascular (*Pseudokirchneriella subcapitata*)	2	1.15	17000	3000	<0.01	<0.01
		1	0.99	17000	3000	<0.01	<0.01
Corn, aerial Mississippi	Vascular (*Lemna gibba*)	2	1.46	8	1	0.18	**1.46***
		1	1.49	8	1	0.19	**1.49***
	Non-Vascular (*Pseudokirchneriella subcapitata*)	2	1.46	17000	3000	<0.01	<0.01
		1	1.49	17000	3000	<0.01	<0.01
Corn, ground Mississippi	Vascular (*Lemna gibba*)	2	1.31	8	1	0.16	**1.31***
		1	1.34	8	1	0.17	**1.34***
	Non-Vascular (*Pseudokirchneriella subcapitata*)	2	1.31	17000	3000	<0.01	<0.01
		1	1.34	17000	3000	<0.01	<0.01
Corn, aerial N. Carolina, East	Vascular (*Lemna gibba*)	2	0.82	8	1	0.1	0.82
		1	0.78	8	1	0.1	0.78
	Non-Vascular (*Pseudokirchneriella subcapitata*)	2	0.82	17000	3000	<0.01	<0.01
		1	0.78	17000	3000	<0.01	<0.01
Corn, ground N. Carolina, East	Vascular (*Lemna gibba*)	2	0.64	8	1	0.08	0.64
		1	0.58	8	1	0.07	0.58
	Non-Vascular (*Pseudokirchneriella subcapitata*)	2	0.64	17000	3000	<0.01	<0.01
		1	0.58	17000	3000	<0.01	<0.01
Corn, aerial Texas	Vascular (*Lemna gibba*)	2	1.37	8	1	0.17	**1.37***
		1	1.34	8	1	0.17	**1.34***
	Non-Vascular (*Pseudokirchneriella subcapitata*)	2	1.37	17000	3000	<0.01	<0.01
		1	1.34	17000	3000	<0.01	<0.01

Table 21. Acute Risk Quotients for Aquatic Plants. A Duckweed (*Lemna gibba*) EC_{50} of 0.008 ppm and a Nonvascular Plant (*Psuedokirchneria subcapitata*) EC_{50} of 17 ppm of Technical Topramezone. For Endangered Species, the L. gibba NOAEC of 0.001 ppm of Techincal Topramezone.

Scenarios	Taxa	No of Appls.	EEC (µg/L)	Toxicity (µg/L)		RQ	
Corn, ground Texas	Vascular (*Lemna gibba*)	2	1.24	8	1	0.16	1.24*
		1	1.2	8	1	0.15	1.2*
	Non-Vascular (*Pseudokirchneriella subcapitata*)	2	1.24	17000	3000	<0.01	<0.01
		1	1.2	17000	3000	<0.01	<0.01

[1] The EC_{50} is used for the RQ for nonendangered species, the NOAEC is used for the endangered species
[2] LOC >1 for non-endangered species
[3] LOC >1 for acute risk to endangered species.
* exceeds the plant LOC for non-target or endangered plants (RQ ≥1)

Risk quotients for aquatic vascular plants exposure to topramezone exceed LOCs for endangered species for the following crop scenarios: Florida sweet corn (aerial and ground application(s)), Illinois corn (one or two aerial application(s); two ground applications only), Mississippi corn (aerial and ground application(s) and Texas corn (aerial and ground application(s)). Corresponding RQ values for these scenarios are 1.15 to 1.94. However, the RQs for vascular plants exposure to topramezone did not exceed LOCs for endangered vasculars from the North Carolina corn scenario. LOCs were not exceeded for non-endangered vascular plants.

The endangered and non-endangered aquatic plants LOCs are not exceeded for non-vascular plants and risk to aquatic nonvascular plants is presumed to be negligible for all corn uses.

Appendix H- Endangered Species

Appendix H-1. Identification of Listed Plant Species Located in Corn-Producing Counties in the United States

Species	Monocot or Dicot Designation
Achyranthes Mutica (Ncn)	Dicot
A'e (Zanthoxylum Dipetalum Var. Tomentosum)	Dicot
A'e (Zanthoxylum Hawaiiense)	Dicot
'Aiea (Nothocestrum Breviflorum)	Dicot
'Aiea (Nothocestrum Peltatum)	Dicot
'Akoko	Dicot
Alabama Canebrake Pitcher-plant	Dicot
Alabama Leather-flower	Dicot
Alabama Streak-sorus Fern	Neither
Alani (Melicope Haupuensis)	Dicot
Alani (Melicope Knudsenii)	Dicot
Alani (Melicope Pallida)	Dicot
Alani (Melicope Quadrangularis)	Dicot
Alani (Melicope Zahlbruckneri)	Dicot
Alsinidendron Viscosum (Ncn)	Dicot
American Chaffseed	Dicot
American Hart''S Tongue Fern	Neither
Antioch Dunes Evening-primrose	Dicot
'Anunu	Dicot
Arizona Agave	Monocot
Arizona Cliffrose	Dicot
Arizona Hedgehog Cactus	Dicot
Ash-grey Indian Paintbrush	Dicot
Ashy Dogweed	Dicot
Asplenium Fragile Var. Insulare (Ncn)	Dicot
Aupaka (Isodendrion Hosakae)	Dicot
Aupaka (Isodendrion Laurifolium)	Dicot
Aupaka (Isodendrion Longifolium)	Dicot
Avon Park Harebells	Dicot
'Awiwi (Centaurium Sebaeoides)	Dicot
'Awiwi (Hedyotis Cookiana)	Dicot
Baker''S Stickyseed	Dicot
Bakersfield Cactus	Dicot
Barneby Reed-mustard	Dicot
Barneby Ridge-cress	Dicot
Beach Jacquemontia	Dicot
Beach Layia	Dicot
Bear Valley Sandwort	Dicot
Beautiful Pawpaw	Dicot
Ben Lomond Spineflower	Dicot

Species	Monocot or Dicot Designation
Ben Lomond Wallflower	Dicot
Big-leaved Crown-bearded	Dicot
Bitterweed	Dicot
Blacklace Cactus	Dicot
Black-spored Quillwort	Dicot
Blowout Penstemon	Dicot
Blue Ridge Goldenrod	Dicot
Bonamia Menziesii (Ncn)	Dicot
Bradshaw''S Lomatium	Dicot
Brady Pincushion Cactus	Dicot
Braunton''S Milk-vetch	Dicot
Britton's Beargrass	Monocot
Bunched Arrowhead	Monocot
Burke''S Goldfields	Dicot
Butte County Meadowfoam	Dicot
California Jewelflower	Dicot
California Orcutt Grass	Monocot
California Sea-blite	Dicot
California Taraxacum	Dicot
Calistoga Allocarya	Dicot
Camatta Canyon Amole	Monocot
Canby''S Dropwort	Dicot
Carter's Mustard	Dicot
Catalina Island Mountain-mahogany	Dicot
Chamaesyce Halemanui	Dicot
Chapman Rhododendron	Dicot
Chorro Creek Bog Thistle	Dicot
Clara Hunt''S Milk-vetch	Dicot
Clay Phacelia	Dicot
Clay Reed-mustard	Dicot
Clay-loving Wild-buckwheat	Dicot
Clay's Hibiscus	Dicot
Clover Lupine	Dicot
Coachella Valley Milk-vetch	Dicot
Cochise Pincushion Cactus	Dicot
Colorado Butterfly Plant	Dicot
Colusa Grass	Monocot
Conejo Dudleya	Dicot
Contra Costa Goldfields	Dicot
Contra Costa Wallflower	Dicot

Species	Monocot or Dicot Designation
Cook's Lomatium	Dicot
Cooley''S Meadowrue	Dicot
Coyote Ceanothus	Dicot
Crenulate Lead-plant	Dicot
Cumberland Rosemary	Dicot
Cumberland Sandwort	Dicot
Cushenberry Milk-vetch	Dicot
Cushenbury Buckwheat	Dicot
Cushenbury Oxytheca	Dicot
Cyanea Undulata (Ncn)	Dicot
Decurrent False Aster	Dicot
Del Mar Manzanita	Dicot
Delissea Rhytodisperma (Ncn)	Dicot
Deltoid Spurge	Dicot
Deseret Milk-vetch	Dicot
Desert Yellowhead	Dicot
Diellia Erecta (Ncn)	Neither
Diellia Pallida (Ncn)	Neither
Dubautia Latifolia	Dicot
Dubautia Pauciflorula	Dicot
Dwarf Lake Iris	Monocot
Dwarf-flowered Heartleaf	Dicot
Eastern Prairie Fringed Orchid	Monocot
Eggert''S Sunflower	Dicot
El Dorado Bedstraw	Dicot
Encinitas Baccharis	Dicot
Fassett''S Locoweed	Dicot
Few-flowered Navarretia	Dicot
Fleshy Owl's-clover	Dicot
Florida Bonamia	Dicot
Florida Golden Aster	Dicot
Florida Perforate Cladonia	Neither
Florida Torreya	Neither
Florida Ziziphus	Dicot
Fountain Thistle	Dicot
Four-petal Pawpaw	Dicot
Fringed Campion	Dicot
Furbish Lousewort	Dicot
Gambel''S Watercress	Dicot
Garber''S Spurge	Dicot

Species	Monocot or Dicot Designation
Gaviota Tarplant	Dicot
Gentian Pinkroot	Dicot
Gentner's Fritillary	Monocot
Geocarpon Minimum	Dicot
Godfrey''S Butterwort	Dicot
Golden Paintbrush	Dicot
Golden Sedge	Monocot
Gouania Meyenii (Ncn)	Dicot
Green Pitcher-plant	Dicot
Green''S Tuctoria	Dicot
Guthrie''S Ground-plum	Dicot
Gypsum Wild-buckwheat	Dicot
Haha (Cyanea Asarifolia)	Dicot
Haha (Cyanea Copelandii Ssp. Copelandii)	Dicot
Haha (Cyanea Hamatiflora Ssp. Carlsonii)	Dicot
Haha (Cyanea Platyphylla)	Dicot
Haha (Cyanea Recta)	Dicot
Haha (Cyanea Remyi)	Dicot
Haha (Cyanea Shipmanii)	Dicot
Haha (Cyanea Stictophylla)	Dicot
Hairy Orcutt Grass	Monocot
Hairy Rattleweed	Dicot
Ha'iwale (Cyrtandra Giffardii)	Dicot
Ha'iwale (Cyrtandra Limahuliensis)	Dicot
Hala Pepe	Monocot
Haplostachys Haplostachya (Ncn)	Dicot
Harperella	Dicot
Hartweg''S Golden Sunburst	Dicot
Hau Kauhiwi (Hibiscadelphus Woodi)	Dicot
Hau Kuahiwi (Hibiscadelphus Distans)	Dicot
Hawaiian Bluegrass	Monocot
Hawaiian Vetch	Dicot
Heau	Dicot
Hedyotis St.-johnii (Ncn)	Dicot
Heliotrope Milk-vetch	Dicot
Heller''S Blazing Star	Dicot
Hesperomannia Lydgatei (Ncn)	Dicot
Hidden Lake Bluecurls	Dicot
Highlands Scrub Hypericum	Dicot
Hilo Ischaemum	Monocot

Species	Monocot or Dicot Designation
Hoffmann's Rock-cress	Dicot
Hoffmann's Slender-flowered Gilia	Dicot
Holei	Dicot
Holy Ghost Ipomopsis	Dicot
Hoover''S Spurge	Dicot
Houghton''S Goldenrod	Dicot
Howell''S Spineflower	Dicot
Howell's Spectacular Thelypody	Dicot
Huachuca Water Umbel	Not Determined
Iliau	Dicot
Indian Knob Mountainbalm	Dicot
Ione (Irish Hill) Buckwheat	Dicot
Ione Manzanita	Dicot
Island Rush-rose	Dicot
Island Barberry	Dicot
Island Bedstraw	Dicot
Island Malacothrix	Dicot
Island Phacelia	Dicot
Island Rush-rose	Dicot
Jesup''S Milk-vetch	Dicot
Johnson''S Sedge	Dicot
Johnson's Seagrass	Monocot
Jones Cycladenia	Dicot
Kamakahala (Labordia Lydgatei)	Dicot
Kamakahala (Labordia Tinifolia Var. Wahiawaen	Dicot
Ka'u Silversword	Dicot
Kauila	Dicot
Kaulu (Pteralyxia Kauaiensis)	Dicot
Keck''S Checker-mallow	Dicot
Kenwood Marsh Checker-mallow	Dicot
Kern Mallow	Dicot
Kio'ele	Dicot
Kiponapona	Dicot
Kneeland Prairie Penny-cress	Dicot
Knieskern''S Beaked-rush	Monocot
Knowlton Cactus	Dicot
Koki'o (Kokia Drynarioides)	Dicot
Koki'o (Kokia Kauaiensis)	Dicot
Koki'o Ke'oke'o (Hibiscus Waimeae Ssp.	Dicot

Species	Monocot or Dicot Designation
Hanner)	
Kolea (Myrsine Linearifolia)	Dicot
Ko'oloa'ula	Dicot
Kral''S Water-plantain	Dicot
Kuawawaenohu (Alsinidendron Lychnoides)	Dicot
Kuenzler Hedgehog Cactus	Dicot
La Graciosa Thistle	Dicot
Laguna Beach Liveforever	Dicot
Lake County Stonecrop	Dicot
Lakeside Daisy	Dicot
Lane Mountain Milk-vetch	Dicot
Large (=braun''S) Rock-cress	Dicot
Large-flowered Fiddleneck	Dicot
Large-flowered Skullcap	Dicot
Large-flowered Wooly Meadowfoam	Dicot
Large-fruited Sand-verbena	Dicot
Last Chance Townsendia	Dicot
Lau'ehu (Panicum Niihauense)	Monocot
Laukahi Kuahiwi (Plantago Hawaiensis)	Dicot
Laukahi Kuahiwi (Plantago Princeps)	Dicot
Laulihilihi (Schiedea Stellarioides)	Dicot
Layne''S Butterweed	Dicot
Leafy Prairie-clover	Dicot
Lee Pincushion Cactus	Dicot
Leedy's Roseroot	Dicot
Lewton's Polygala	Dicot
Lipochaeta Venosa	Dicot
Little Amphianthus	Dicot
Lobelia Niihauensis (Ncn)	Dicot
Loch Lomond Coyote-thistle	Dicot
Lompoc Yerba Santa	Dicot
Longspurred Mint	Dicot
Louisiana Quillwort	Dicot
Loulu (Pritchardia Affinis)	Monocot
Loulu (Pritchardia Napaliensis)	Monocot
Loulu (Pritchardia Schattaueri)	Monocot
Loulu (Pritchardia Viscosa)	Monocot
Lyrate Bladderpod	Dicot
Lysimachia Filifolia (Ncn)	Dicot
Macfarlane's Four-o'clock	Dicot

Species	Monocot or Dicot Designation
Maguire Daisy	Dicot
Maguire Primrose	Dicot
Mahoe (Alectryon Macrococcus)	Dicot
Makou (Peucedanum Sandwicense)	Dicot
Mancos Milk-vetch	Dicot
Mann's Bluegrass	Monocot
Many-flowered Navarretia	Dicot
Ma'o Hau Hele	Dicot
Ma'oli'oli (Schiedea Apokremnos)	Dicot
Mapele (Cyrtandra Cyaneoides)	Dicot
Marcescent Dudleya	Dicot
Mariposa Pussypaws	Dicot
Mariscus Fauriei (Ncn)	Monocot
Mariscus Pennatiformis (Ncn)	Monocot
Marsh Sandwort	Dicot
Mat-forming Quillwort	Neither
Mauna Kea Silversword	Dicot
Mcdonald's Rock-cress	Dicot
Mead''S Milkweed	Dicot
Mehamehame	Dicot
Menzie's Wallflower	Dicot
Mesa Verde Cactus	Dicot
Mexican Flannelbrush	Dicot
Miccosukee (Florida) Gooseberry	Dicot
Michaux''S Sumac	Dicot
Michigan Monkey-flower	Dicot
Minnesota Trout Lily	Dicot
Missouri Bladderpod	Dicot
Mohr''S Barbara''S Button	Dicot
Monterey Spineflower	Dicot
Morefield's Leather-flower	Dicot
Morro Manzanita	Dicot
Mountain Golden Heather	Dicot
Mountain Sweet Pitcher-plant	Dicot
Munroidendron Racemosum (Ncn)	Dicot
Munz's Onion	Monocot
Nani Wai'ale'ale (Viola Kauaensis Var. Wahiaw	Dicot
Napa Bluegrass	Monocot
Navajo Sedge	Monocot
Navasota Ladies'-tresses	Monocot

Species	Monocot or Dicot Designation
Nehe (Lipochaeta Fauriei)	Dicot
Nehe (Lipochaeta Micrantha)	Dicot
Nehe (Lipochaeta Waimeaensis)	Dicot
Nelson''S Checker-mallow	Dicot
Neraudia Ovata (Ncn)	Dicot
Neraudia Sericea (Ncn)	Dicot
Nevin''S Barberry	Dicot
Nichol's Turk's Head Cactus	Dicot
Nipomo Mesa Lupine	Dicot
Nohoanu	Dicot
Northeastern (=barbed Bristle) Bulrush	Monocot
Northern Wild Monkshood	Dicot
Oha (Delissea Rivularis)	Dicot
'Oha (Delissea Undulata)	Dicot
Oha Wai (Clermontia Drepanomorpha)	Dicot
'Oha Wai (Clermontia Lindseyana)	Dicot
'Oha Wai (Clermontia Peleana)	Dicot
'Oha Wai (Clermontia Pyrularia)	Dicot
'Ohai (Sesbania Tomentosa)	Dicot
Okeechobee Gourd	Dicot
Olulu (Brighamia Insignis)	Dicot
Orcutt''S Spineflower	Dicot
Otay Mesa Mint	Dicot
Otay Tarplant	Dicot
Pallid Manzanita	Dicot
Palmate-bracted Bird''S-beak	Dicot
Papery Wawae'iole (Phlegmariurus (=lycopodium)nutan Whitlow-wort	Neither
Papery Whitlow-wort	Dicot
Parish's Daisy	Dicot
Pecos Sunflower	Dicot
Pedate Checker-mallow	Dicot
Peebles Navajo Cactus	Dicot
Pendant Kihi Fern	Neither
Pennell's Bird's-beak	Dicot
Persistent Trillium	Dicot
Peter's Mountain Mallow	Dicot
Phyllostegia Knudsenii (Ncn)	Dicot
Phyllostegia Velutina (Ncn)	Dicot
Phyllostegia Waimeae (Ncn)	Dicot

Species	Monocot or Dicot Designation
Phyllostegia Warshaueri (Ncn)	Dicot
Phyllostegia Wawrana (Ncn)	Dicot
Pierson's Milk-vetch	Dicot
Pigeon Wings	Dicot
Pine Hill Ceanothus	Dicot
Pine Hill Flannelbrush	Dicot
Pismo Clarkia	Dicot
Pitcher's Thistle	Dicot
Pitkin Marsh Lily	Dicot
Platanthera Holochila (Ncn)	Monocot
Poa Siphonoglossa (Ncn)	Monocot
Po'e	Dicot
Pondberry	Dicot
Popolo 'Aiakeakua (Solanum Sandwicense)	Dicot
Popolo Ku Mai	Dicot
Prairie Bush-clover	Dicot
Presidio Clarkia	Dicot
Price's Potato-bean	Dicot
Purple Amole	Monocot
Pu'uka'a (Cyperus Trachysanthos)	Monocot
Pygmy Fringe Tree	Dicot
Relict Trillium	Dicot
Remya Kauaiensis (Ncn)	Dicot
Remya Montgomeryi (Ncn)	Dicot
Roan Mountain Bluet	Dicot
Robust Spineflower	Dicot
Rock Gnome Lichen	Neither
Rough Popcornflower	Dicot
Rough-leaved Loosestrife	Dicot
Rugel's Pawpaw	Dicot
Running Buffalo Clover	Dicot
Ruth's Golden Aster	Dicot
Sacramento Mountains Thistle	Dicot
Sacramento Orcutt Grass	Monocot
Sacramento Prickly Poppy	Dicot
Salt Marsh Bird's-beak	Dicot
San Bernardino Bluegrass	Monocot
San Bernardino Mountains Bladderpod	Dicot
San Clemente Island Broom	Dicot
San Clemente Island Bush-mallow	Dicot

Species	Monocot or Dicot Designation
San Clemente Island Indian Paintbrush	Dicot
San Clemente Island Larkspur	Dicot
San Clemente Island Woodland-star	Dicot
San Diego Ambrosia	Dicot
San Diego Button-celery	Dicot
San Diego Mesa Mint	Dicot
San Diego Thornmint	Dicot
San Francisco Peaks Groundsel	Dicot
San Jacinto Valley Crownscale	Dicot
San Joaquin Adobe Sunburst	Dicot
San Joaquin Valley Orcutt Grass	Monocot
San Joaquin Woolly-threads	Dicot
San Rafael Cactus	Dicot
Sandlace	Dicot
Sandplain Gerardia	Dicot
Santa Ana River Woolly-star	Dicot
Santa Barbara Island Liveforever	Dicot
Santa Clara Valley Dudleya	Dicot
Santa Cruz Cypress	Neither
Santa Cruz Island Fringepod	Dicot
Santa Cruz Island Bushmallow	Dicot
Santa Cruz Island Dudleya	Dicot
Santa Cruz Island Malacothrix	Dicot
Santa Cruz Island Rock-cress	Dicot
Santa Cruz Tarplant	Dicot
Santa Monica Mountains Dudleya	Dicot
Santa Rosa Island Manzanita	Dicot
Schiedea Helleri (Ncn)	Dicot
Schiedea Kauaiensis (Ncn)	Dicot
Schiedea Membranacea (Ncn)	Dicot
Schiedea Nuttallii (Ncn)	Dicot
Schweinitz's Sunflower	Dicot
Scott's Valley Polygonum	Dicot
Scotts Valley Spineflower	Dicot
Scrub Lupine	Dicot
Scrub Blazing Star	Dicot
Scrub Buckwheat	Dicot
Scrub Lupine	Dicot
Scrub Plum	Dicot
Seabeach Amaranth	Dicot

Species	Monocot or Dicot Designation
Sebastopol Meadowfoam	Dicot
Sensitive Joint-vetch	Dicot
Sentry Milk-vetch	Dicot
Shale Barren Rock-cress	Dicot
Short''S Goldenrod	Dicot
Short-leaved Rosemary	Dicot
Short's Goldenrod	Dicot
Showy Indian Clover	Dicot
Shrubby Reed-mustard	Dicot
Silene Hawaiiensis (Ncn)	Dicot
Silene Lanceolata (Ncn)	Dicot
Siler Pincushion Cactus	Dicot
Slender Orcutt Grass	Monocot
Slender Rush-pea	Dicot
Slender-horned Spineflower	Dicot
Slender-petaled Mustard	Dicot
Small Rock-cress	Dicot
Small Whorled Pogonia	Monocot
Small''S Milkpea	Dicot
Small-anthered Bittercress	Dicot
Small's Milkpea	Dicot
Smooth Coneflower	Dicot
Sneed Pincushion Cactus	Dicot
Soft Bird's-beak	Dicot
Soft-leaved Paintbrush	Dicot
Solano Grass	Monocot
Sonoma Alopecurus	Monocot
Sonoma Spineflower	Dicot
South Texas Ambrosia	Dicot
Southern Mountain Wild Buckwheat	Dicot
Spalding's Catchfly	Dicot
Spermolepis Hawaiiensis (Ncn)	Dicot
Spreading Avens	Dicot
Spreading Navarretia	Dicot
Spring Creek Bladderpod	Dicot
Springville Clarkia	Dicot
Star Cactus	Dicot
Stebbins Morning-glory	Dicot
Stenogyne Angustifolia (Ncn)	Dicot
Suisun Thistle	Dicot