U. S. ENVIRONMENTAL PROTECTION AGENCY
Washington, D.C. 20460

OFFICE OF
PREVENTION, PESTICIDES
AND TOXIC SUBSTANCES

Date:	April 14, 2005
Chemical:	Indoxacarb
PC Code:	067710
DP Barcodes:	D280192, D293793, D290131, D312430, D341705, D332867, D341715, D341676, D301657

MEMORANDUM

SUBJECT: Environmental Fate and Effects Division Risk Assessment for Proposed New Uses of Indoxacarb on grapes, fire ants, mole crickets, alfalfa, peanut, soybeans, Brassica leafy vegetables (Group 5), and turnip greens

TO: Meredith Laws, Branch Chief
Insecticide Branch
Registration Division (7507C)

4/14/05

FROM: James Hetrick, Ph D., Senior Physical Scientist James A. Hetrick 4/14/05
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Environmental Risk Branch I
Environmental Fate and Effects Division (7507C)

This memorandum summarizes the attached Environmental Fate and Effects Division's (EFED) Indoxacarb Environmental Risk Assessment for new uses, new formulations, and an IR4 proposal.

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Proposed Indoxacarb Usage

Indoxacarb is currently registered for use sites including apples, pears, broccoli, cabbage, cauliflower, sweet corn, head and leaf lettuce, tomatoes, bell and non-bell peppers, and cotton. Indoxacarb is intended for use in the major vegetable, fruit, and cotton growing areas in the United States such as California, Pacific Northwest, Arizona, Texas, Florida, Mid-South, Mid-Atlantic, Northeast and Upper Mid-West regions. Proposed new uses of indoxacarb include grapes, fire ants, mole crickets, alfalfa, peanut, soybeans, Brassica leafy vegetables (Group 5), and turnip greens.

The target pests are lepidopterans and include codling moth, oriental fruit moth, lesser appleworm, redbanded leafroller, tufted apple bud worm, cabbage looper, diamondback moth, imported cabbageworm, fall armyworm, beet armyworm, tomato fruitworm, loopers, Southern armyworm, cotton bollworm, tobacco budworm, soybean looper, lygus bugs and tomato pinworm. Proposed new uses target pests are alfalfa caterpillar, alfalfa weevil larvae, Egyptian alfalfa weevil larvae, granulated cutworm, potato leafhopper, western yellowstrip armyworm, cotton fleahopper, tarnish plant bug, rednecked peanutworm, corn earworm,velvetbean caterpillar, yellowstrip armyworm, grape berry moth, omnivorous leafroller, leafhoppers (Western grapeleaf skeletonizer), fire ant and mole cricket.

Currently, registered products of indoxacarb are developed from enriched indoxacarb technical using a 3:1 (S:R) enantiomeric ratio of indoxacarb. The registrant has requested registration of DuPont KN128 Technical and DuPont Claridox C Technical. These technical products have greater than 100%of the S enantiomer. The registerant is requesting to use the new technical products as follows:

DuPont KN128 Technical -proposed for formulation of indoxacarb products for agriculture crops including alfalfa, apple, broccoli, brussel sprouts, cabbage, cauliflower, chinese broccoli, chinese cabbage, chinese mustard cabbage, sweet corn, cotton, eggplant, grapes, kohlrabi, lettuce, peanut, pear, peppers, potato, soybean and tomato. EFED assumes the use rates are not higher than the recommended rate on Avaunt and Steward labels.

DuPont Claridox C Technical- proposed for formulation of indoxacarb products for terrestrial non-food (golf courses, ornamentals, noncrop/nongrazed areas), domestic outdoor (landscape turf and ornamentals) and indoor uses. Although the registrant does not indicate application rates for formulated products using DuPont KN128. EFED assumes the application rates are not higher than the recommended rate on the Indoxacarb fire ant bait.

Currently registered formulations of indoxacarb include Indoxacarb SC Soluble Concentrate, 15% a.i., and Indoxacarb WG Dispersible Granules 30% a.i. The proposed new formulations of indoxacarb are DuPont™ Indoxacarb 0.045%, 0.045% ai (granules) and DuPont™ Steward® EC, 15.84% ai

Rate and Method of Application

Indoxacarb can be applied aerially or with ground equipment. It cannot be applied through any type of irrigation system.

Table 1 below presents the rates of indoxacarb active ingredient application for each labeled crop.

Table 1: Label Application Rate, Number and Interval for Registered and Proposed Crops (shaded) (as KN-128 Isomer Only)

Crops	Single Application Rate (lb a.i./acre)	Maximum Applications per year	Minimum Interval (days)
cotton	0.065-0.11	4	5
apple/pear	0.065-0.11	4	7
corn/brassica/lettuce	0.025 - 0.065	4	3
tomato/peppers	0.025 - 0.065	4	5
Brassica leafy vegetables-Group 5)	0.045-0.065	4	3
fire ant	0.000675 - 0.0027	2	84
mole cricket bait	0.11 to 0.22	2	7
grapes	0.095 - 0.11	4	5
alfalfa	0.065 to 0.11	4	One application per
soybeans	0.055-0.11	4	5
peanuts	0.09-0.11	4	5

DuPont KN128 Technical- proposed for formulation of indoxacarb products for agriculture crops- alfalfa, apple, broccoli, brussel sprouts, cabbage, cauliflower, chinese broccoli, chinese cabbage, chinese mustard cabbage, sweet corn, cotton, eggplant, grapes, kohlrabi, lettuce, peanut, pear, peppers, potato, soybean, tomato. **EFED assumes application rates are not different than stipulated on Avaunt or Steward labels**.

DuPont Claridox C Technical- proposed for formulation of indoxacarb products for terrestrial non-food (golf courses, ornamentals, noncrop/nongrazed areas), domestic outdoor (landscape turf and ornamentals) and indoor uses. **EFED assumes application rates are not different than stipulated for control of mole crickets.**

Environmental Fate Summary

[(R,S)-methyl-7-chloro-2,5-dihydro-2-[(methoxycarbonyl)[4-(trifluoromethoxy) phenyl]amino]carbonyl]indeno[1,2-e][1,3,4]oxadiazine-4a(3aH)-carboxylate (Indoxacarb) is a mixture of two isomers - DPX-KN128 (75%) and DPX-KN127 (25%). KN128 has insecticidal activity, and is the only isomer identified on the label as an active ingredient. Originally, DPX-JW062 was produced with a 50:50 racemic mixture of the two isomers, and many studies were conducted with this 1:1 mixture. Subsequently, the product to be registered was enriched to 75:25 (DPX-MP062). Currently the registrant is seeking registration for 100% DPX-KN128.

Bridging data for the optical isomeric mixtures was determined using soil and aquatic metabolism studies because it is believed that different biological degradation pathways are likely for different optical isomers. The bridging studies addressed the rate of degradation of individual isomers. Optical isomers are expected to have similar abiotic environmental fate properties (including hydrolysis, photolysis, volatility, solubility, and leaching studies). The are sufficient bridging data to support the bridging of abiotic and biotic degradation for isomers of indoxacarb. Therefore, the assessment addresses the environmental fate of DPX-KN128 and DPX-KN127.

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Indoxacarb undergoes alkaline-catalyzed hydrolysis, photodegradation in water, and microbial mediated degradation. Indoxacarb degraded with half-lives ranging from 3 to 693 days in aerobic soil metabolism studies. In aerobic aquatic systems, indoxacarb degraded with half-lives ranging from 18 to 34 days in near-neutral aerobic aquatic environments. Under anaerobic conditions, indoxacarb is persistent. Major degradation products (≥ 10% of applied radioactivity) from degradation studies were identified as methyl 7-chloro-2,5-dihydro-2-[[[4-(trifluoro-methoxy)phenyl] amino] carbonyl]indeno[1,2-e][1,3,4]oxadiazine-4a(3H)-carboxylate (IN-JT333);7-Chloro-2,4-dihydro-4-[4-(trifluoromethoxy)phenyl]-3H-indeno[2,1-e]-1,2,4-triazin-3-one (IN-ML438); methyl 5-chloro-2,3-dihydro-2-hydroxy-1-[[[[4-(trifluoromethoxy)phenyl] amino]carbonyl]hydrazono]-1H-indene-2-carboxylate (IN-JU873). Minor degradation products (≤ 10% of applied radioactivity) were identified as methyl 5-chloro-2,3-dihydro-2-hydroxy-1-[[[(methoxycarbonyl)[4-(trifluoromethoxy)phenyl]amino] carbonyl]hydrazono]-1H-indene-2-carboxylate (IN-KG433); IN-ML437-OH (tentative identification, chemical name not provided); methyl [4-(trifluoromethoxy)phenyl]carbamate (IN-KB687); [4-(Trifluoromethoxy)phenyl]urea (IN-MK638); and 1,3-Dihydro-5-(trifluoromethoxy)-2H-benzimidazol-2-one (IN-MK643).

Degradation products of indoxacarb had different half-lives in aerobic soils: IN-KT413 and IN-MK638 were non-persistent ($t_{1/2}$ =1.3 to 16.2 days); IN-KG433 and IN-JU873 were non-persistent to moderately persistent ($t_{1/2}$ =10.5 to 58.7 days); and, IN-MK643 was persistent ($t_{1/2}$ =141.5 to 346.6 days).

Batch equilibrium studies suggest low mobility of DPX-JW062 (K_d= 29 to 99 ml/g) and JT333 (K_d=115 to 308 ml/g) in terrestrial and aquatic environments. Indoxacarb degradation products including IN-KT413, IN-KG433, IN-MK638, IN-MK643 had Kds ranging from 1.2 to 11.3 ml/g in five US and foreign mineral soils In contrast, IN-JU873 had Kds ranging from 52.1 to 406.4. With the exception of IN-JU873, the batch equilibrium data suggest indoxacarb degradation products may exhibit some mobility in soil. Aged soil column leaching studies, however, indicate aged residues of DPX-MP062 have low mobility in packed soil columns. DPX-JW062 had low volatility from plant and soil surfaces.

DPX-JW062 had reviewer calculated fish bioconcentration factors of 395 to 504X for edible tissues, 1568-2081X for nonedible tissues, and 1044-1351X for whole fish tissues, respectively. Minor degradation products (<10% recovered) were IN-ML811, IN-KT319, IN-KG433, and IN-JU873. The depuration half-life of bioaccumulated indoxacarb residues ranged from 6.55 to 7.88 days.

Field dissipation studies in Delaware, Texas, California, Florida indicate DPX-JW062 is moderately persistent ($t_{1/2}$= 29 to 119 days) in surface field soils. IN-JT333 was detected in all field studies. Some leaching of parent and degradation product occurred but were not detected below 45 cm (18 inches).

Five crops including alfalfa, fire ants on turf, Brassica leafy vegetables for Group 5, grapes, soybeans, peanuts, and turnips were chosen to represent the new indoxacarb (KN128) use patterns. Also, model simulations were conducted for indoxacarb (3:1 KN128:KN127) to represent new uses on cabbage and grapes. Standard scenarios for the selected crops were used to provide a range of estimated environmental concentrations for selected crops. Maximum application rates as well as application types (aerial or ground or no spray) were selected to model environmental concentrations for this screening-level deterministic (risk quotient-based) assessment. Application dates were based on the expected pest pressures within standard scenario regions.

The broadcast application for mole cricket bait yielded the highest EECs (Florida turf scenario) among the new uses of indoxacarb. The peak and 21 day average EECs were 8.5 and 7.8 µg/L, respectively, for the proposed mole cricket bait @ 2 applications of 0.22 lbs ai/A.

Ecological Risk Summary

The greatest potential risk to non-target organisms is to mammals and birds. Mammalian chronic risk LOCs are exceeded for multiple applications for the cotton scenario in three wildlife food items with RQs ranging from 1.29 to 2.82. Similar results are evident for the apple/pear scenario (RQs for three food items ranging from 1.20 to 2.6). RQs exceeding the level of concern are also evident for the corn/brassica/lettuce and tomato/pepper scenarios (RQ 1.02-1.8). In addition to chronic risk from reproductive effects, chronic risk resulting from hemolytic effects are also possible. The RQs from these effects range from 1.19 to 14.1 for three of the four wildlife food types for all application scenarios for both single and multiple applications.

The acute mammalian RQs of 0.14 exceeded the endangered species LOCs only for cotton and orchard crops for single applications for 15 g mammals consuming grass. Acute RQs for multiple applications was met or exceeded in two of three food items modeled for 15 and 35 g mammals in the cotton (RQs from 0.176 to 0.451), apple/pear (RQs from 0.176 to 0.417), corn/brassica/lettuce (RQs from 0.113 to 0.290), and tomato/pepper (RQs from 0.113 to 0.267) scenarios. No acute LOCs are exceeded for any use scenario or any weight class of mammal when risk to granivorous mammals or broadcast granular applications to control fire ants is considered.

No avian acute or chronic risk LOCs are exceeded by any application of indoxacarb. However, acute endangered species concerns (RQ = 0.1) are triggered for multiple applications of the pesticide to cotton, grape, soybean, peanut, apple, and pear for avian wildlife consuming vegetation in the short grass category (RQs of 0.14 and 0.129).

Risk to non-target and beneficial insects is also indicated. EFED classifies a $LD_{50} < 2$ µg/bee as highly toxic to non-target insects. The contact LD_{50} of 0.18 µg/bee performed with a mixture of 50% of each of the two isomers (KN128 and KN127) indicated that indoxacarb is highly toxic to honeybees. Additional field data show that DPX-MP062 sprayed at a rate of 133 g/ha caused significant mortality after a 24 hour exposure. Although EFED does not currently quantify risks for terrestrial non-target insects, precautionary labeling for protection of non-target insects is required.

Indoxacarb and its degradate are not expected to reach surface water concentrations high enough to trigger acute risk concerns (RQ 0.5) or chronic concerns (RQ 1) in fish or invertebrates in either freshwater or estuarine/marine systems. However, acute restricted use and endangered species levels of concern (RQ 0.1) are exceeded by estuarine/marine invertebrate acute risk quotients calculated for indoxacarb (RQ = 0.1) and degradate JT333 (RQ = 0.2) for the two highest exposure concentrations (peanut and alfalfa). Additionally, if estuarine/marine mollusc toxicity data is used as a surrogate species for freshwater molluscs the LC_{50} of 0.203 mg/L need be exceeded from exposures to JT333 for the the listed species LOC of 0.05.

No levels of concern are exceeded for aquatic plants.

Although DPX MP062 and its degradate JT333 are highly to very highly toxic to aquatic organisms and indoxacarb exhibits moderate persistence in the field, model predictions of surface water concentrations using a conservative application scenario to peanuts (maximum application rate, minimum application interval) do not trigger high concern for acute or chronic risks. This is due to the combination of low initial mass of pesticide used at each application and the low mobility of parent and JT333 in terrestrial and aquatic environments.

Uncertainties and Data Gaps

The following uncertainties have been identified on the environmental fate properties and exposure models for indoxacarb. These are discussed in greater detail in the risk assessment.

1. Enantioselectivity of soil and aquatic metabolism of chiral indoxacarb degradation products (e.g., IN-KG433, IN-JT333, KT413, JU873, and MH304) is not known at this time.

1. Indoxacarb degradation can be characterized as a "hockey stick" behavior with a rapid degradation rate followed by a slower degradation rate. Selection of a suitable soil degradation half-life is difficult due the large discrepancy of half-lives estimated using linearized first-order degradation model and 2 parameter exponential decay model.

2. Formulation effects on the dissipation of indoxacarb in the environment are not known at this time. For purposes of the risk assessment, it is assumed that formulation types do not alter dissipation rates and pathways when compared to the technical product.

3. Degradation products JT333 and IN-MP819 are expected to exhibit ecotoxic effects. JT333 is the active ingredient of indoxacarb. Additionally, IN-MP819 has been shown to exhibit greater toxicity to aquatic invertebrates than parent indoxacarb (6a-2). Soil metabolism half-lives and batch equilibrium coefficients are available for JT333. Environmental fate data for IN-MP819 were estimated using EPIWIN because there were no available environmental fate data. These data were used in aquatic exposure modeling to estimate environmental concentrations.

A number of areas of uncertainty have been identified in the ecological risk portion of the assessment, however, since the majority of the risk appears to be with mammals and birds, these risk uncertainties have been identified as important in the risk assessment. These uncertainties are discussed in greater detail in other sections of the risk assessment and summarized here.

1. Only dietary risk is included in the exposure assessment. These routes include ingestion of contaminated soils, ingestion of contaminated drinking water, preening, dermal contact, and inhalation.

2. The risk assessment only considers the most sensitive species tested.

3. The risk assessment assumes 100% of the avian diet is relegated to single food types foraged only from treated fields.

4. The exposure assessment used 95th percentile reside values. Values selected from points lower on the distribution would yield lower exposure estimates and lower RQs.

5. The exposure assessment modeled repeat application residues using a mean food item dissipation half life of 22.46 days. Even using the highest measured half-life value would not result in a trigger of the acute high risk level of concern.

In addition to the uncertainties described above, areas of uncertainty particular to mammals also merit mention. These include the following:

1. Only parent indoxacarb is included in the risk assessment. Since the degradate JT 333 is readily produced in non-target insects, it remains possible that, for insectivorous mammals, exposure to residues of JT333 in intoxicated insects could contribute to overall exposure and risk may be underestimated. Data on this degradate may reduce the uncertainty associated with this risk.

2 There is uncertainty as to the significance of the reproduction endpoint used for assessment purposes with respect to wild mammal populations. HED commonly uses a conversion factor of 20 to relate mg/kg-bw to a corresponding dietary concentration. Using this factor and the NOAEL of 10 mg/kg-bw yields a theoretical NOAEC of 200 mg/kg-diet, far above the maximum EECs calculated in this assessment and even above the observed NOAEC for frank developmental and reproductive effects from MRID 44477139.

3. The importance of hemolytic responses in wild mammal fitness is not certain. The degree to which wild mammals subjected to hemolytic losses can recover relative to compensatory ability in mammals in the laboratory is uncertain.

4 Consideration of the exposure duration in the field and in the laboratory is uncertain. It has been demonstrated that hemolytic responses in rats in as little as 45 days of exposure. From this it appears that the duration of exposure does not necessarily need to be protracted for these effects to be manifested.

Since risk to aquatic plants and animals appears to be below most levels of concerns, additional data for aquatic organisms will not be required at this time. Although EPA lacks specific data with regard whether the toxicity of indoxacarb is the product of the toxicity of the KN128 isomer alone or in combination with the isomer KN127, EFED elected to consider exposures on the basis of total KN128 and KN127 application. Although there are uncertainties associated with this analysis, additional data will not be required at this time.

Recommended Label Language

If indoxacarb is registered, the following statements should be included in the "ENVIRONMENTAL HAZARDS" labeling:

For Manufacturing-Use Products

"Do not discharge effluent containing this active ingredient into lakes, streams, ponds, estuaries, oceans, or other public waters unless this product is specifically identified and addressed in an NPDES permit. Do not discharge effluent containing this product into sewer systems without previously notifying the sewage treatment plant authority. For guidance, contact your State Water Board or Regional Office of EPA."

For End-Use Products

"Do not apply directly to water or to areas where surface water is present or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment washwater or rinsate."

"This product is highly toxic to bees exposed to direct treatment or residues on blooming crops or weeds. Do not apply this product or allow it to drift to blooming crops or weeds if bees are visiting the treatment area."

"This pesticide is toxic to birds and mammals."

Surface Water Advisory

"This product may contaminate water through drift of spray in wind. This product has a high potential for runoff for several months or more after application. Poorly draining soils and soils with shallow water tables are more prone to produce runoff that contains this product. A level, well-maintained vegetative buffer strip between areas to which this product is applied and surface water features such as ponds, streams, and springs will reduce the potential for contamination of water from runoff. Runoff of this product will be reduced by avoiding applications when rainfall is forecasted to occur within 48 hours. Sound erosion control practices will reduce this product's contribution to surface water contamination."

Groundwater Advisory

"This chemical has properties and characteristics associated with chemicals detected in ground water. Use of this chemical in areas where soils are permeable, particularly where the water table is shallow, may result in groundwater contamination."

Spray Drift Management

Drift is transport of pesticides through air away from the target site, and includes, for example, spray drift and volatilization. Spray drift, the movement of pesticide droplets off-target during or shortly after application, has been well studied, and is not dependent on the properties of the active ingredient. Short-range spray-drift and resulting exposures to non-target organisms is quantified in our risk assessments. Currently, when specific label instructions are not available, we account for spray drift in both drinking water and ecological exposure assessments by the use of default assumptions for the percentage of deposition based on application method. We have established default spray drift percentages for pesticides for aerial application, ground application, and orchard airblast.

Default values for drinking water exposure scenarios are 16%, 6.4%, and 6.3% of the application rate for aerial, ground boom and airblast applications, respectively. The default values for the drinking water exposure were generated using AgDRIFT version 1.03 which uses a semi-mechanistic model (AGDISP) for aerial applications and is based an empirical data set (Spray Drift Task Force data) for ground boom and airblast applications. The derivation of the spray drift loading values is described in Appendix B of the Guidance for Use of the Index Reservoir in Drinking Water Exposure Assessments and is based on the following application and wind speed assumptions:

For ground boom applications
- nozzle height no more than 4 feet above the ground or crop canopy
- wind speed is 10 mph or less at the application site and,
- medium or coarser spray according to ASAE 572 definition for standard nozzles.

For aerial applications
- boom width less than 75% of the wingspan or 90% of the rotary blade,
- use of upwind swath displacement,
- wind speed 3 - 10 mph, and
- use medium or coarser spray according to ASAE 572 definition for standard nozzles.

For orchard/vineyard airblast applications
- spray is not directed above trees/vines,
- outward pointing nozzles are shut off at row ends and outer rows, and
- wind speed is 3 -10 mph at the application site as measured by an anemometer outside of the orchard/vineyard on the upwind side.

Default values for ecological exposure scenarios are 5% for aerial applications and 1% for ground applications, with no set value for orchard airblast. For the ecological assessment, the default values of 5% for aerial applications and 1% for ground applications were established based on open literature and research prior to establishment of the Spray Drift Task Force, and were therefore not generated using AgDRIFT. Testing of the default spray drift values for ecological assessments using AgDRIFT provides context for the default assumptions. Analysis of the 1% ground application drift percentage using AgDRIFT (with the same assumptions as for drinking water outlined above) indicates that the default value likely underestimates drift from single events under relatively high drift conditions. A similar underestimation likely occurs for the 5% aerial drift value.

EECs predicted for drinking water and ecological assessments are based on the assumptions of drift outlined above for ground and aerial applications. Variance from these assumptions will result in differences in predicted concentrations. For the ecological assessment, as with the drinking water assessment, variance from the assumptions behind these default values could result in increased risk. In general, a decrease in droplet size or increase in wind speed at the time of application will result in higher predicted EECs and risk to non-target organisms. Alternatively, if droplet size is coarser or wind speeds are lower, exposures due to drift would be lower.

NEW USES, NEW FORMULATIONS, AND IR4

ENVIRONMENTAL FATE AND EFFECTS SCIENCE CHAPTER

Environmental Fate and Ecological Risk Assessment

For

INDOXACARB (PC 067710)

[(R,S)-methyl-7-chloro-2,5-dihydro-2-[(methoxycarbonyl)[4-(trifluoromethoxy)phenyl]amino] carbonyl]indeno[1,2-e][1,3,4]oxadiazine-4a(3aH)-carboxylate

and

End Use Products:

Avaunt (30% ai) EPA Reg No. 352-597
DuPont™ Indoxacarb (52.7% ai) EPA Reg No. 352-594
DuPont™ KN128 Technical (94% ai)
DuPont™ Claridox C Technical (94% ai)
DuPont™ Steward EC (17% ai)

Table of Contents

I. EXECUTIVE SUMMARY

A. Predicted Environmental Exposure

1. Nature of Chemical Stressor

Indoxacarb (enriched mixture) is an oxadiozine insecticide used to control various lepidopteran pests on apples, pears, broccoli, cabbage, cauliflower, sweet corn, head and leaf lettuce, tomatoes, bell and non-bell peppers, and cotton. The pesticide is intended for use in the major vegetable, fruit, and cotton growing areas in the United States such as California, Pacific Northwest, Arizona, Texas, Florida, Mid-South, Mid-Atlantic, Northeast and Upper Mid-West regions. The compound is a mixture of two isomers [DPX-KN128 (*S*-active enantiomer) and DPX-KN127 (*R*-inactive enantiomer)], with KN128 exhibiting insecticidal activity. Blockage of the neuronal sodium channel produces the insecticidal mode of action of indoxacarb. The insecticidal activity of the compound is believed to be attributed to the rapid and extensive conversion of indoxacarb (the isomer KN128) in insects to a more active metabolite (JT333). In insects, JT333 has greater affinity for the sodium channel complex compared to the parent compound (including the isomer KN128).

The chemical composition of indoxacarb has progressed from a racemic mixture of 50:50 to 75:25 mixture of KN128:KN127 to 100:0 mixture of the isomers. In order to address the effects of isomeric enrichment, the Agency employed a bridging strategy to link toxicity and environmental fate data for individual indoxacarb isomers among the various isomeric mixtures (EFED Interim Policy on Stereoisomeric Pesticides, 10/26/2000). Because indoxacarb is an optical stereoisomer, enantioselective biological-mediated toxicity and environment fate processes were considered in the bridging of ecotoxicity and environmental fate data. The ecological assessment was evaluated under the premise that DPX-KN128 (S-active enantiomer) and DPX-KN127 (*R*-inactive enantiomer)] have equivalent toxicity.

This assessment focused on characterizing potential risks resulting from the proposed new uses: 1.) Avaunt™ (EPA Reg. No 352-597) and DuPont™ Indoxacarb (EPA Reg. No. 352-594) use on grapes and raisins; 2.) use of a new granule bait formulation of indoxacarb (DuPont™ Indoxacarb 0.045%) on fire ant; 3.) Avaunt™ (EPA Reg. No 352-597) use on Brassica leafy vegetables (Group 5), and turnip greens; 4.) DuPont™ KN128 Technical use for formulation of agricultural use products of indoxacarb; 5.) use of indoxacarb bait for mole cricket control; 6.) DuPont™ Claridox Technical use for formulation of non-agricultural use products of indoxacarb;,7.) Steward EC for use on agricultural crops. The Claridox Technical and Steward EC are derived from DuPont™ KN128 Technical using different derivatation processes. DuPont™ KN128 Technical is 00% DPX-KN128 (S-active enantiomer).

The terrestrial risk assessment was based on the EFED's T-REX. Since indoxacarb is a new chemical and no monitoring data are available, water resource assessment was also based on modeling. To simulate the most conservative surface water exposures for ecological risk assessment (ERA) and human health drinking water assessment (DWA), PRZM-EXAMS and SCI-GROW2, respectively, were modeled on cotton in MS, turf in FL, apples in NC, cabbage in FL, sweet corn in FL, and potatoes in ME because these use represent highest application rates in areas with high runoff potential.

B. Potential Risks to Non-target Organisms

The greatest potential risk to non-target organisms is to mammals and birds. Mammalian chronic risk LOCs are exceeded for multiple applications for the cotton scenario in three wildlife food items with RQs ranging from 1.29 to 2.82. Similar results are evident for the apple/pear scenario (RQs for three food items ranging from 1.20 to 2.6). RQs exceeding the level of concern are also evident for the corn/brassica/lettuce and tomato/pepper scenarios (RQ 1.02-1.8). In addition to chronic risk from reproductive effects, chronic risk resulting from hemolytic effects are also possible. The RQs from these effects range from 1.19 to 14.1 for three of the four wildlife food types for all application scenarios for both single and multiple applications.

The acute mammalian RQs of 0.14 exceeded the endangered species LOCs only for cotton and orchard crops for single applications for 15 g mammals consuming grass. Acute RQs for multiple applications was met or exceeded in two of three food items modeled for 15 and 35 g mammals in the cotton (RQs from 0.176 to 0.451), apple/pear (RQs from 0.176 to 0.417), corn/brassica/lettuce (RQs from 0.113 to 0.290), and tomato/pepper (RQs from 0.113 to 0.267) scenarios. No acute LOCs are exceeded for any use scenario or any weight class of mammal when risk to granivorous mammals or broadcast granular applications to control fire ants is considered.

No avian acute or chronic risk LOCs are exceeded by any application of indoxacarb. However, acute endangered species concerns (RQ = 0.1) are triggered for multiple applications of the pesticide to cotton, grape, soybean, peanut, apple, and pear for avian wildlife consuming vegetation in the short grass category (RQs of 0.14 and 0.129).

Risk to non-target and beneficial insects is also indicated. EFED classifies a $LD_{50} < 2$ µg/bee as highly toxic to non-target insects. The contact LD_{50} of 0.18 µg/bee performed with a mixture of 50% of each of the two isomers (KN128 and KN127) indicated that indoxacarb is highly toxic to honeybees. Additional field data show that DPX-MP062 sprayed at a rate of 133 g/ha caused significant mortality after a 24 hour exposure. Although EFED does not currently quantify risks for terrestrial non-target insects, precautionary labeling for protection of non-target insects is required.

Indoxacarb and its degradate are not expected to reach surface water concentrations high enough to trigger acute risk concerns (RQ 0.5) or chronic concerns (RQ 1) in fish or invertebrates in either freshwater or estuarine/marine systems. However, acute restricted use and endangered species levels of concern (RQ 0.1) are exceeded by estuarine/marine invertebrate acute risk quotients calculated for indoxacarb (RQ = 0.1) and degradate JT333 (RQ = 0.2) for the two highest exposure concentrations (peanut and alfalfa). Additionally, if estuarine/marine mollusc toxicity data is used as a surrogate species for freshwater molluscs the LC_{50} of 0.203 mg/L need be exceeded from exposures to JT333 for the the listed species LOC of 0.05.

No levels of concern are exceeded for aquatic plants.

Although DPX MP062 and its degradate JT333 are highly to very highly toxic to aquatic organisms and indoxacarb exhibits moderate persistence in the field, model predictions of surface water concentrations using a conservative application scenario to peanuts (maximum application rate, minimum application interval) do not trigger high concern for acute or chronic risks. This is due to the combination of low initial mass of pesticide used at each application and the low mobility of parent and JT333 in terrestrial and aquatic environments.

C. Conclusions - Exposure Characterization

Because of the absence of monitoring data, the measure of exposure were estimated using standard exposure models. PRZM-EXAMS models were used to estimate environmental concentrations (EECs) of indoxacarb in aquatic environments. GENEEC modeling was used to estimate EECs for IN-JT333 and IN-MP819. TREX was used to estimate indoxacarb concentrations on terrestrial food items.

Five crops including alfalfa, fire ants on turf, Brassica leafy vegetables for Group 5, grapes, soybeans, peanuts, and turnips were chosen to represent the new indoxacarb (KN128) use patterns. Also, model simulations were conducted for indoxacarb (3:1 KN127:KN128) to represent new uses on cabbage and grapes. Standard scenarios for the selected crops were used to provide a range of estimated environmental concentrations for selected crops. Maximum application rates as well as application types (aerial or ground or no spray) were selected to model environmental concentrations for this screening-level deterministic (risk quotient-based) assessment. Application dates were based on the expected pest pressures within standard scenario regions.

The broadcast application for mole cricket bait yielded the highest EECs (Florida turf scenario) among the new uses of indoxacarb. The peak and 21 day average EECs were 8.5 and 7.8 µg/L for the proposed mole cricket bait @ 2 applications of 0.22 lbs ai/A.

D. Conclusions - Effects Characterization

There are insufficient data to demonstrate the role of either KN128 or KN127 in the overall toxicity of indoxacarb to aquatic organisms. Data were submitted as a mixture of both isomers for aquatic and terrestrial effect, with the exception of a freshwater fish study on the KN 127 isomer. As such, the risk assessment for aquatic organisms considers the applied mass of both isomers.

A compound of potential concern for aquatic organisms is the degradate JT333. The available acute toxicity data in fish and invertebrates suggest that this compound is at least an order of magnitude more toxic than the parent compound. However, there are limited data available to assess its toxic significance for chronic effects in all types of aquatic organisms and acute effects in estuarine organisms. For the purposes of this risk assessment, toxicity levels not directly supported by chemical-specific toxicity data were approximated for JT333 using the available data for the parent compound and demonstrated acute toxicity relationships between the degradate and parent. The significance of these estimated levels and the need for additional toxicity testing of JT333 are discussed in the Risk Characterization Section of this document.

The LC_{50}'s for fish fall in the range 0.024 to >1.3 mg/L, therefore indoxacarb and its metabolites are "moderately to very highly toxic" to fish on an acute basis. Aquatic invertebrate LC_{50}'s range from 0.0542 to 2.94 mg/L and are classified as moderately to very highly toxic on an acute basis. Conservative values obtained from actual data and risk ratios were used for aquatic invertebrates. Acute data were also submitted for aquatic plants and EC_{50}'s ranged from >0.11 to > 1.93 mg/L for alga and diatoms. Vascular plant data submitted for duckweed (*Lemna gibba*) indicated an EC_{50} >0.084 mg/L. The most conservative values obtained from the actual data and those obtained from risk ratios were used for this assessment.

Chronic data were submitted for fish and aquatic invertebrates for the KN 128 and KN 127 isomer mixture, and show that NOECs based on survival and growth was 0.15 mg/L for freshwater fish and 0.17 mg/L for estuarine/marine fish. Chronic data for aquatic invertebrates indicated a NOEC of 0.075 mg/L for freshwater invertebrates based on survival and a NOEC of 0.0184 mg/L based on survival of first generation, number of young per female, and growth and weight.

E. Uncertainties and Data Gaps

A following uncertainties have been identified on the environmental fate properties and exposure models for indoxacarb. These are discussed in greater detail in the risk assessment.

1. Enantioselectivity of soil and aquatic metabolism of chiral indoxacarb degradation products (e.g., IN-KG433, IN-JT333, KT413, JU873, and MH304) is not known at this time.

2. Indoxacarb degradation can be characterized as a "hockey stick" behavior with a rapid degradation rate followed by a slower degradation rate. Selection of a suitable soil degradation half-life is difficult due the large discrepancy of half-lives estimated using linearized first-order degradation model and 2 parameter exponential decay model.

3. Formulation effects on the dissipation of indoxacarb in the environment are not known at this time. For purposes of the risk assessment, it is assumed that formulation types do not alter dissipation rates and pathways when compared to the technical product.

4. Degradation products JT333 and IN-MP819 are expected to exhibit ecotoxic effects. JT333 is the active ingredient of indoxacarb. Additionally, IN-MP819 has been shown to exhibit greater toxicity to aquatic invertebrates than parent indoxacarb (6a-2). Soil metabolism half-lives and batch equilibrium coefficients are available for JT333. Environmental fate data for IN-MP819 were estimated using EPIWIN because there were no available environmental fate data. These data were used in aquatic exposure modeling to estimate environmental concentrations.

A number of areas of uncertainty have been identified in the ecological risk portion of the assessment, however, since the majority of the risk appears to be with mammals and birds, these risk uncertainties have been identified as important in the risk assessment. These uncertainties are discussed in greater detail in other sections of the risk assessment and summarized here.

1. Only dietary risk is included in the exposure assessment. These routes include ingestion of contaminated soils, ingestion of contaminated drinking water, preening, dermal contact, and inhalation.

2. The risk assessment only considers the most sensitive species tested.

3. The risk assessment assumes 100% of the avian diet is relegated to single food types foraged only from treated fields.

4. The exposure assessment used 95th percentile reside values. Values selected from points lower on the distribution would yield lower exposure estimates and lower RQs.

5. The exposure assessment modeled repeat application residues using a mean food item dissipation half life of 22.46 days. Even using the highest measured half-life value would not result in a trigger of the acute high risk level of concern.

In addition to the uncertainties described above, areas of uncertainty particular to mammals also merit mention. These include the following:

1. Only parent indoxacarb is included in the risk assessment. Since the degradate JT 333 is readily produced in non-target insects, it remains possible that, for insectivorous mammals, exposure to residues of JT333 in intoxicated insects could contribute to overall exposure and risk may be underestimated. Data on this degradate may reduce the uncertainty associated with this risk.

2 There is uncertainty as to the significance of the reproduction endpoint used for assessment purposes with respect to wild mammal populations. HED commonly uses a conversion factor of 20 to relate mg/kg-bw to a corresponding dietary concentration. Using this factor and the NOAEL of 10 mg/kg-bw yields a theoretical NOAEC of 200

mg/kg-diet, far above the maximum EECs calculated in this assessment and even above the observed NOAEC for frank developmental and reproductive effects from MRID 44477139.

3. The importance of hemolytic responses in wild mammal fitness is not certain. The degree to which wild mammals subjected to hemolytic losses can recover relative to compensatory ability in mammals in the laboratory is uncertain.

4 Consideration of the exposure duration in the field and in the laboratory is uncertain. It has been demonstrated that hemolytic responses in rats in as little as 45 days of exposure. From this it appears that the duration of exposure does not necessarily need to be protracted for these effects to be manifested.

Since risk to aquatic plants and animals appears to be below most levels of concerns, additional data for aquatic organisms will not be required at this time. Although EPA lacks specific data with regard whether the toxicity of indoxacarb is the product of the toxicity of the KN128 isomer alone or in combination with the isomer KN127, EFED elected to consider exposures on the basis of total KN128 and KN127 application. Although there are uncertainties associated with this analysis, additional data will not be required at this time.

II. PROBLEM FORMULATION

A. Stressor Source and Distribution

1. Chemical and Physical Properties

Physical/Chemical properties:	**KN128 (S-active enantiomer)**	**DPX-JW062 (racemic mixture)**
Molecular formula:	$C_{22}H_{17}ClF_3N_3O_7$.	$C_{22}H_{17}ClF_3N_3O_7$
Molecular weight:	527.8 g/mole	527.8 g/mole
Physical state:	solid	solid
Melting Point:	88.1 °C	140-141 °C
Vapor Pressure:	1.9×10^{-10} torr @ 25°C	-------
Henry's Law Constant:	6×10^{-10} atm m^3mol^{-1}	-------
Log K_{ow}:	4.65	4.60
Solubility @ 25^0C	0.20 mg/L in water	0.165 mg/L in water
CAS Number:	173584-44-6	

2. Pesticide Type, Class, and Mode of Action

Dupont report JW062/GEN 5 (no MRID) summarizes information on the toxic mode of action of indoxacarb. The compound is a mixture of two isomers (KN128 and KN127), with

DPX-KN128 indicated to be the insecticidal isomer. The insecticidal mode of action of DPX MP062 is produced by blockage of the sodium channel in the neuron. The insecticidal activity of the compound is believed to be attributed to the rapid and extensive conversion of indoxacarb (the isomer DKN128) in insects to a more active metabolite (JT333). In insects, JT333 has greater affinity for the sodium channel complex compared to the parent compound (including the isomer KN128).

Although sodium channel protein complexes are ubiquitous in nature, it is believed that the extent to which the parent compound's isomer (KN128) is converted to the active JT333 in the insect gut is responsible for the differential toxicity between insects and mammals. In insects (e.g., lepidopterans) the metabolism of parent to JT333 is very rapid. However, in mammals (e.g., rats) conversion of parent to JT333 is a minor pathway, and JT333 is extensively metabolized and eliminated in the urine. The extent to which metabolism of parent compound to JT333 occurs in wild birds, fish, and aquatic invertebrates is presently not quantified.

Originally, environmental fate and toxicity studies were conducted using a racemic (50:50) mixture (DPX-JW062). However, process improvements have led to the production of a compound enriched to approximately 75:25 and 100% (indoxacarb) for the active insecticidal isomer (KN128). In addition, one metabolite was tested in some organisms (JT333), although additional metabolites exist. Available toxicity and environmental data consist of a mixture of studies of isomer mixtures (racemic and enriched), specific isomers, and selected degradates. To the extent possible, this risk assessment considers toxicity data specific to enriched formulations and specific degradates. Enantioselective environmental fate processes in soil and water environments were used to bridge environmental fate data. There is uncertainty regarding the enantioselectivity of environmental fate processes for the degradation products of KN128.

3. Overview of Pesticide Usage

Indoxacarb is currently registered for use sites including apples, pears, broccoli, cabbage, cauliflower, sweet corn, head and leaf lettuce, tomatoes, bell and non-bell peppers, and cotton. Indoxacarb is intended for use in the major vegetable, fruit, and cotton growing areas in the United States such as California, Pacific Northwest, Arizona, Texas, Florida, Mid-South, Mid-Atlantic, Northeast and Upper Mid-West regions. Proposed new uses of indoxacarb include grapes, fire ants, mole crickets, alfalfa, peanut, soybeans, Brassica leafy vegetables (Group 5), and turnip greens.

Target Pest

The target pests are lepidopterans and include codling moth, oriental fruit moth, lesser appleworm, redbanded leafroller, tufted apple bud worm, cabbage looper, diamondback moth, imported cabbageworm, fall armyworm, beet armyworm, tomato fruitworm, loopers, Southern armyworm, cotton bollworm, tobacco budworm, soybean looper, lygus bugs and tomato pinworm. Proposed new uses target pests are alfalfa caterpillar, alfalfa weevil larvae, Egyptian alfalfa weevil larvae, granulated cutworm, potato leafhopper, western yellowstrip armyworm, cotton fleahopper, tarnish plant bug, rednecked peanutworm, corn earworm,velvetbean caterpillar, yellowstrip armyworm, grape berry moth, omnivorous leafroller, leafhoppers (Western grapeleaf skeletonizer), fire ant and mole cricket.

Technical Products

Currently, registered products of indoxacarb are developed from enriched indoxacarb technical using a 3:1 (S:R) enantiomeric ratio of indoxacarb. The registrant has requested registration of DuPont KN128 Technical and DuPont Claridox C Technical. These technical products have greater than 100%of the S enantiomer. The registerant is requesting to use the new technical products as follows:

DuPont KN128 Technical -proposed for formulation of indoxacarb products for agriculture crops including alfalfa, apple, broccoli, brussel sprouts, cabbage, cauliflower, chinese broccoli, chinese cabbage, chinese mustard cabbage, sweet corn, cotton, eggplant, grapes, kohlrabi, lettuce, peanut, pear, peppers, potato, soybean and tomato. EFED assumes the use rates are not higher than the recommended rate on Avaunt and Steward labels.

DuPont Claridox C Technical- proposed for formulation of indoxacarb products for terrestrial non-food (golf courses, ornamentals, noncrop/nongrazed areas), domestic outdoor (landscape turf and ornamentals) and indoor uses. Although the registrant does not indicate application rates for formulated products using DuPont KN128. EFED assumes the application rates are not higher than the recommended rate on the Indoxacarb fire ant bait.

Formulation Types

Currently registered formulations of indoxacarb include:

Indoxacarb SC Soluble Concentrate, 15% a.i.
Indoxacarb WG Dispersible Granules 30% a.i.

Proposed new formulations of indoxacarb include:

DuPont™ Indoxacarb 0.045%, 0.045% ai (granules)
DuPont™ Steward® EC, 15.84% ai

Rate and Method of Application

Indoxacarb can be applied aerially or with ground equipment. It cannot be applied through any type of irrigation system.

The Table 1 below presents the rates of indoxacarb active ingredient application for each labeled crop.

Table 1: Label Application Rate, Number and Interval for Registered and Proposed Crops (shaded) (as KN-128 Isomer Only)

Crops	Single Application Rate (lb a.i./acre)	Maximum Applications per year	Minimum Interval (days)
cotton	0.065-0.11	4	5
apple/pear	0.065-0.11	4	7
corn/brassica/lettuce	0.025 - 0.065	4	3
tomato/peppers	0.025 - 0.065	4	5
Brassica leafy vegetables-Group 5)	0.045-0.065	4	3
fire ant	0.000675 - 0.0027	2	84
mole cricket bait	0.11 to 0.22	2	7
grapes	0.095 - 0.11	4	5
alfalfa	0.065 to 0.11	4	One application per
soybeans	0.055-0.11	4	5
peanuts	0.09-0.11	4	5

DuPont KN128 Technical- proposed for formulation of indoxacarb products for agriculture crops- alfalfa, apple, broccoli, brussel sprouts, cabbage, cauliflower, chinese broccoli, chinese cabbage, chinese mustard cabbage, sweet corn, cotton, eggplant, grapes, kohlrabi, lettuce, peanut, pear, peppers, potato, soybean, tomato. **EFED assumes application rates are not different than stipulated on Avaunt or Steward labels**.

DuPont Claridox C Technical- proposed for formulation of indoxacarb products for terrestrial non-food (golf courses, ornamentals, noncrop/nongrazed areas), domestic outdoor (landscape turf and ornamentals) and indoor uses. **EFED assumes application rates are not different than stipulated for control of mole crickets.**

B. Receptors

Each assessment endpoint requires one or more "measures of ecological effect," which are defined as changes in the attributes of an assessment endpoint itself or changes in a surrogate entity or attribute in response to exposure to a pesticide. Ecological measurement endpoints for the screening level risk assessment are based on a suite of registrant-submitted toxicity studies performed on a limited number of organisms.

1. Aquatic Effects

For aquatic effects in the following measurement endpoints were used from these broad groupings in this screening level assessment.

- Freshwater Fish (bluegill sunfish and rainbow trout) used as a surrogate for aquatic phase amphibians,
- Freshwater invertebrates (*Daphnia magna*),
- Estuarine/marine fish (sheepshead minnow),
- Estuarine/marine invertebrates (*Crassostrea virginica* and *Americamysis bahia*),
- Algae and aquatic plants (*Lemna gibba* and *Selenastrum capricornutum*).

Since indoxacarb is a new chemical, a large amount of additional data have not been developed at this time. In addition, aquatic risk appears to be low for indoxacarb.

2. Terrestrial Effects

For terrestrial effects in the following measurement endpoints were used from these broad groupings in this screening level assessment.

- Birds (mallard duck and bobwhite quail) used as surrogate species for terrestrial-phase amphibians and reptiles,
- Mammals (laboratory rat),
- Terrestrial plants (corn, onion, ryegrass, wheat, buckwheat, cucumber, soybean, sunflower, tomato, and turnip),

Within each of these very broad taxonomic groups, an acute and chronic endpoint is selected from the available test data, as the data sets allow. Additional ecological effects data were available for other taxa and have been incorporated into the risk characterization as other lines of evidence. These data include:

- Sub-chronic laboratory toxicity data on earthworms.
- Laboratory and field study on honeybee and beneficial insects

3. Ecosystems at Risk

Ecosystems potentially at risk are expressed in terms of the selected assessment endpoints. The typical assessment endpoints for screening-level pesticide ecological risks are reduced survival, and reproductive and growth impairment for both aquatic and terrestrial animal species. Aquatic animal species of potential concern include freshwater fish and invertebrates, estuarine/marine fish and invertebrates, and amphibians. Terrestrial animal species of potential concern include birds, mammals, beneficial insects, and earthworms. For both aquatic and terrestrial animal species, direct acute and direct chronic exposures are considered. In order to protect threatened and endangered species, all assessment endpoints are measured at the individual level. Although all endpoints are measured at the individual level, they provide insight about risks at higher levels of biological organization (e.g. populations and communities). For example, pesticide effects on individual survivorship have important implications for both population rates of increase and habitat carrying capacity.

For terrestrial and semi-aquatic plants, the screening assessment endpoint is the perpetuation of populations of non-target species (crops and non-crop plant species). Existing testing requirements have the capacity to evaluate emergence of seedlings and vegetative vigor. Although it is recognized that the endpoints of seedling emergence and vegetative vigor may not address all terrestrial and semi-aquatic plant life cycle components, it is assumed that impacts at emergence and in active growth have the potential to impact individual competitive ability and reproductive success.

For aquatic plants, the assessment endpoint is the maintenance and growth of standing crop or biomass. Measurement endpoints for this assessment endpoint focus on algal and vascular plant (i.e., duckweed) growth rates and biomass measurements.

The ecological relevance of selecting the above-mentioned assessment endpoints is as follows: 1) conclude that complete exposure pathways exist for these receptors; 2) the receptors may be potentially sensitive to pesticides in affected media and in residues on plants, seeds, and insects; and 3) the receptors could potentially inhabit areas where pesticides are applied, or areas where runoff and/or spray drift may impact the sites because suitable habitat is available.

C. Assessment Endpoints

Assessment endpoints are defined as "explicit expressions of the actual environmental value that is to be protected." Defining an assessment endpoint involves two steps: 1) identifying the valued attributes of the environment that are considered to be at risk, and 2) operationally defining the assessment endpoint in terms of an ecological entity (i.e., a community of fish and aquatic invertebrates) and its attributes (i.e., survival and reproduction). Therefore, selection of the assessment endpoints is based on valued entities (i.e., ecological receptors), the ecosystems potentially at risk, the migration pathways of pesticides, and the routes by which ecological receptors are exposed to pesticide-related contamination. The selection of clearly defined assessment endpoints is important because they provide direction and boundaries in the risk assessment for addressing risk management issues of concern.

The assessment endpoints typically used in a screening-level pesticide risk assessment are reduced survival and reproductive impairment from direct acute and chronic exposure for aquatic and terrestrial animals. Various analysis have indicated that these endpoints provide insights about risk at higher levels of biological organizations (e.g. populations).

The assessment endpoints used for terrestrial plants are seedling emergence and vegetative vigor and the concern is for the perpetuation of populations of both non-target crop and non-crop plant species. Although these endpoints may not address all the issues with regard to all aspects of the terrestrial plant life-cycles, it is assumed that impacts at these stages indicate a potential impact to individual competitive ability and reproductive success.

Aquatic plants use the measured endpoints of alga growth rates and measured plant biomass as well as similar measurements for vascular plants. These endpoints provide insights into the maintenance and growth of standing crop or biomass of aquatic plant life.

D. Conceptual Model

In order for a chemical to pose an ecological risk, it must reach ecological receptors in biologically significant concentrations. An exposure pathway is the means by which a substance moves in the environment from a source to an ecological receptor. For an ecological exposure pathway to be complete, it must have a source, a release mechanism, an environmental transport medium, a point of exposure for ecological receptors, and a feasible route of exposure. In addition, the potential mechanisms of transformation (i.e., which degradates may form in the environment, in which media, and how much) must be known, especially for a chemical whose metabolites/degradates are of greater toxicological concern. The assessment of ecological exposure pathways, therefore, includes an examination of the source and potential migration pathways for constituents, and the determination of potential exposure routes (e.g., ingestion, inhalation, dermal absorption).

Ecological receptors that may potentially be exposed and its degradates include terrestrial and semiaquatic wildlife (i.e., mammals, birds, and reptiles), terrestrial and semi-aquatic plants, and soil invertebrates. In addition to terrestrial ecological receptors, aquatic receptors (e.g., freshwater and estuarine/marine fish and invertebrates, amphibians) may also be exposed to potential migration of pesticides from the site of application to various watersheds and other aquatic environments via runoff and spray drift.

1. Risk Hypotheses

Estimated indoxacarb and toxic degradation products (IN-JT333 and IN-MP819) exposure on aquatic and terrestrial organisms directly by reducing individual's survival, growth, or reproduction.

Estimated indoxacarb and toxic degradation products (IN-JT333 and IN-MP819) exposure and their effect on aquatic and terrestrial organisms indirectly by adversely modifying food web function.

Estimated indoxacarb and toxic degradation products (IN-JT333 and IN-MP819) exposure and their effect on aquatic and terrestrial organisms indirectly by adversely modifying habitat.

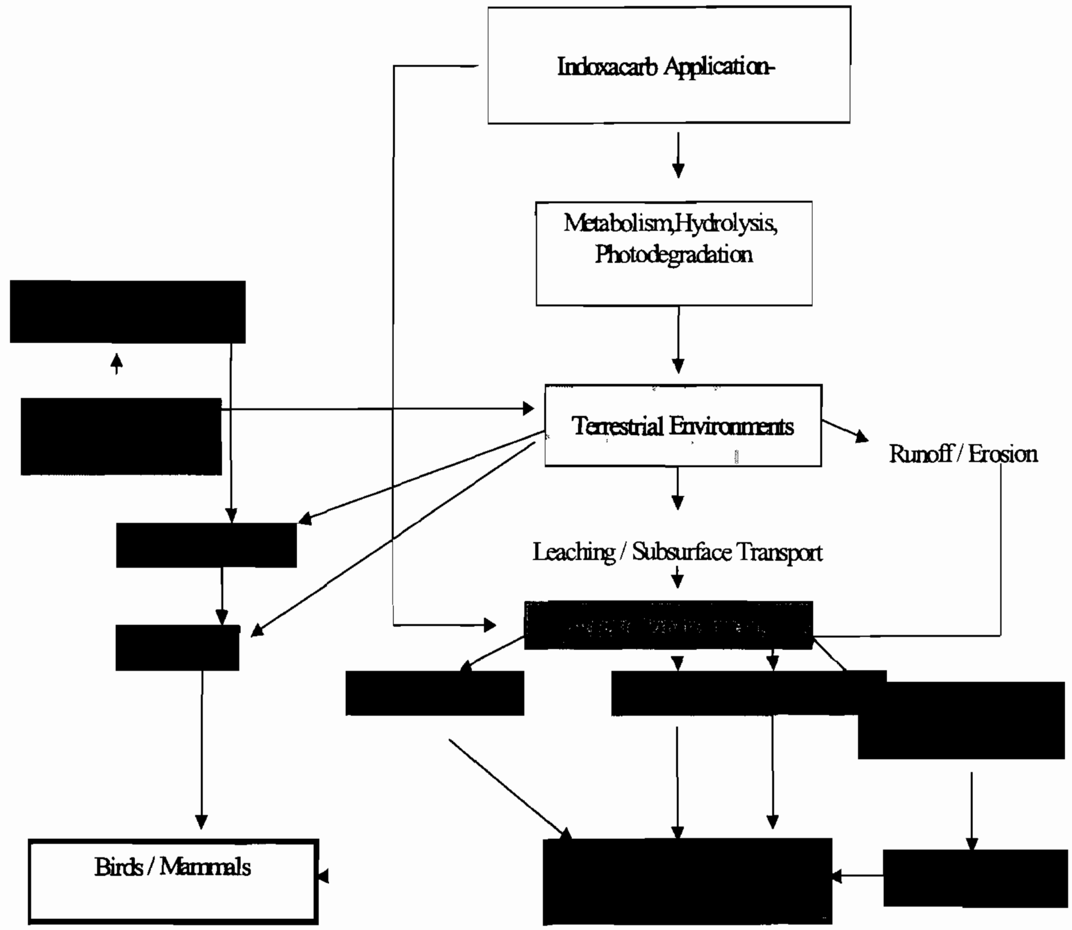
2. Diagram

Indoxacarb is released into the environment through ground and aerial foliar spray as well as broadcast granules for fire ants. Assessing the probable dissipation pathways from the application site requires understanding of indoxacarb chemistry and its degradation products. Indoxacarb has a chiral carbon forming two optical isomers (S:R) of indoxacarb. Indoxacarb consist of 50S:50R (racemic) mixture as well as manufactured mixtures of 75S:25R (enriched) and 100S. Because biologically-mediated environmental processes may impact the rate and degradation pathway of optical isomers, soil and aquatic metabolism fate data for racamic and enriched mixtures of indoxacarb isomers were compared to assess enantioselectivity of degradation rates and pathways for individual isomers of indoxacarb. These comparisons indicate the isomeric ratios of S and R isomers were constant, which suggests no enantioselectivity in microbial metabolism. An uncertainty in the assessment is the enantioselectivity of biological metabolism of chiral degradation products of indoxacarb (e.g., IN-KG433, IN-JT333, KT413, JU813, and MH304). For purposes of this assessment, the degradation pathways and rates for indoxacarb and its chiral degradation products are assumed to non-enantioselective.

Surface water runoff from areas of application is expected to be controlled by the application site conditions including foliar washoff, soil type, slope, agronomic practices. Additional site release mechanisms include spray drift, and possibly wind erosion, which may potentially move indoxacarb from the application site into the air and surrounding environments. Because indoxacarb has a high soil sorption coefficient, it is expected to move on entrained sediments in water or air and then deposited into aquatic sediments or soils. Volatilization and long-range atmospheric transport are not expected to be important release mechanism for indoxacarb due to low vapor pressure and Henry's Constant.

The conceptual models shown in Figure 1 and Figure 2 depict the potential routes of dissipation of indoxacarb, release mechanisms, abiotic receiving media, and biological receptor types. All potential routes of exposure are considered and are presented in the conceptual site model (Figures 1). The main difference in the conceptual model is dependent on the type of formulation of indoxacarb. Aerial and ground spray applied indoxacarb are expected to cause direct deposition of indoxacarb into aquatic environments through spray drift (Figure 1). In contrast, the granule fire bait is only expected to move into aquatic environments through runoff or erosion.

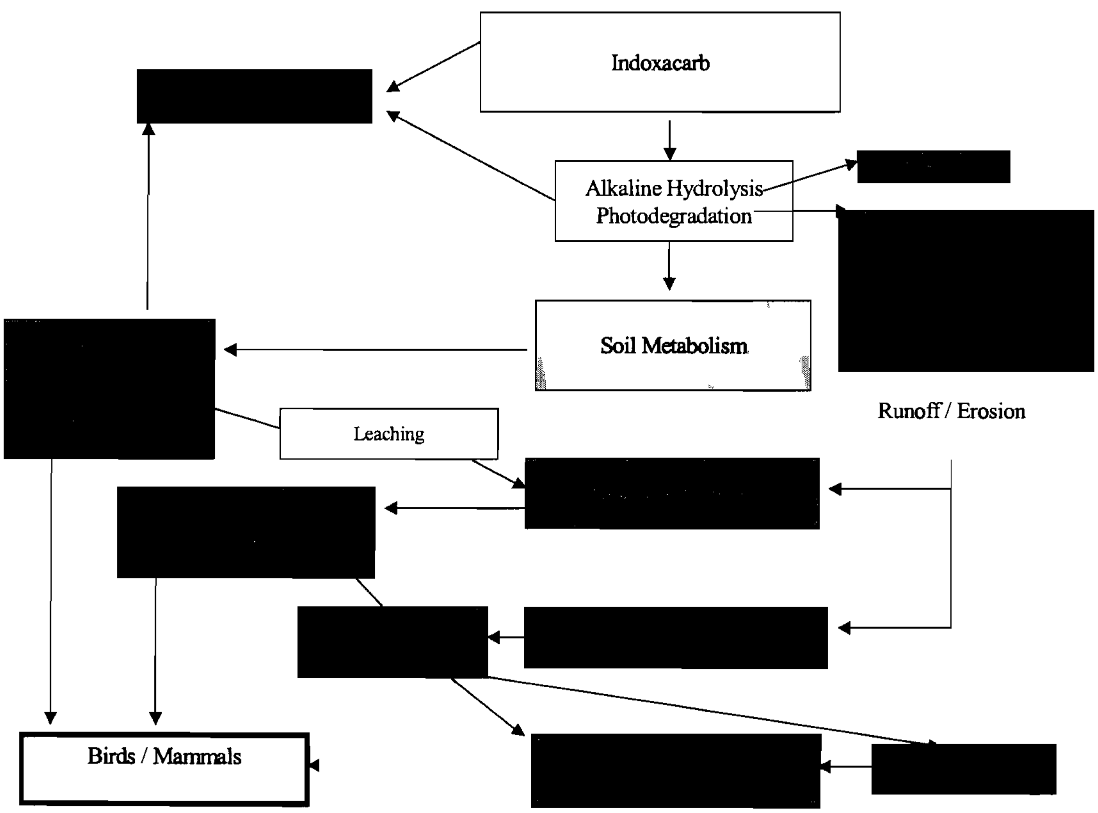
Figure 1 - Conceptual model depicting ecological risk based on the indoxacarb ground or aerial spray application to foliage



The environmental chemistry of indoxacarb is complex due to the formation of many degradation products from various environmental abiotic and biotic degradation processes.

(Figure 2). Additionally, the environmental chemistry is further complicated by the presence of a chiral center resulting in degradation products with an R (inactive) and S (active) isomer. The environmental data indicate R and S isomers of indoxacarb undergo similar biotic degradation rates and pathways in terrestrial and aquatic environments. With the exception of IN-JT333, there are no data to assess the selectivity of degradation pathways and rates for the chiral degradation products of indoxacarb (IN-KG433, IN-JT333, KT413, JU873, and MH304). Available data indicate isomers of IN-JT333 may undergo different aerobic soil degradation rates as well as bioaccumulation/depuration potential in fish by evidence of changes in isomeric ratios (**MRIDs 44477319 and 45805301**). As a first approximation, it is assumed the isomeric ratios of chiral degradation products will reflect the isomeric ratios of parent indoxacarb. The isomeric (S:R) ratios of indoxacarb have been progressively enriched from 50:50 to 75:25 to **94:1**. This enrichment process is expected to impact the isomeric ratios of the chiral degradation products of parent indoxacarb.

Figure 2 -Conceptual model depicting indoxacarb major degradation products



Another issue is that biotic environmental fate processes in soil and aquatic environments lead to the formation of JT333, the biologically active product of indoxacarb. These processes are expected to prolong the ecotoxicity of indoxacarb.

E. Analysis Plan

1. Preliminary Identification of Data Gaps and Methods

The following uncertainties and information gaps were identified as part of the problem formulation:

- Enantioselectivity of soil and aquatic metabolism of chiral indoxacarb degradation products (e.g., IN-KG433, IN-JT333, KT413, JU873, and MH304) is not known at this time.

- Indoxacarb degradation can be characterized as a "hockey stick" behavior with a rapid degradation rate followed by a slower degradation rate. Selection of a suitable soil degradation half-life is difficult due the large discrepancy of half-lives estimated using linearized first-order degradation model and 2 parameter exponential decay model.

- Formulation effects on the dissipation of indoxacarb in the environment are not known at this time. For purposes of the risk assessment, it is assumed that formulation types do not alter dissipation rates and pathways when compared to the technical product.

- Degradation products JT333 and IN-MP819 are expected to exhibit ecotoxic effects. JT333 is the active ingredient of indoxacarb. Additionally, IN-MP819 has been shown to exhibit greater toxicity to aquatic invertebrates than parent indoxacarb (6a-2). Soil metabolism half-lives and batch equilibrium coefficients are available for JT333. Environmental fate data for IN-MP819 were estimated using EPIWIN because there were no available environmental fate data. These data were used in aquatic exposure modeling to estimate environmental concentrations.

2. Measures to Evaluate Risk Hypotheses and Conceptual Model

a. Measures of Exposure

Because of the absence of monitoring data, the measure of exposure were estimated using standard exposure models. GENECC and PRZM-EXAMS models were used to estimate environmental concentrations (EECs) of indoxacarb and JT333 in aquatic environments. TREX was used to estimate indoxacarb concentrations on terrestrial food items.

b. Measures of Effect

Each assessment endpoint requires one or more "measures of ecological effect," which are defined as changes in the attributes of an assessment endpoint itself or changes in a surrogate entity or attribute in response to exposure to a pesticide. A complete discussion of all toxicity data available for this risk assessment and the resulting measurement endpoints selected for each taxonomic group are included in the Ecological Effects section of this document. A summary of the assessment and measurement endpoints selected to characterize potential ecological risks associated with exposure to indoxacarb and its degradates is provided in **Table 2**.

Table 2. Summary of Assessment and Measurement Endpoints

Assessment Endpoint	Measurement Endpoint
1. Abundance (i.e., survival, reproduction, and growth) of individuals and populations of birds	1a. Bobwhite quail acute oral LD_{50} for DPX-MP062 and IN-JT-333 1b. Bobwhite quail and mallard duck subacute dietary LD_{50} for DPX-MP062 1c. Bobwhite quail and mallard duck chronic reproduction NOAEC and LOAEC for DPX-MP062
2. Abundance (i.e., survival, reproduction, and growth) of individuals and populations of mammals	2a. Laboratory rat acute oral LD_{50} for DPX-MP062 and KG433 and IN-JT=333 degradates 2b. Laboratory rat developmental and chronic NOAEC and LOAEC for DPX-MP062
3. Survival and reproduction of individuals and communities of freshwater fish and invertebrates	3a. Rainbow trout, bluegill sunfish, carp, and channel catfish acute LC_{50} for DPX-MP062 3b. Rainbow trout LC_{50} for IN-JT-333 and IN-MP819 degradates 3c. Rainbow trout chronic (early-life) NOAEC and LOAEC for DPX-MP062 3d. Water flea acute EC_{50} for DPX-MP062 IN-MP819 degradate 3e. Water flea chronic (life-cycle) NOAEC and LOAEC for DPX-MP062
4. Survival and reproduction of individuals and communities of estuarine/marine fish and invertebrates	4a. Sheepshead minnow acute LC_{50} for DPX-MP062 4b. Sheephead minnow chronic (early-life) NOAEC and LOAEC for DPX-MP062 4c. Eastern oyster and mysid shrimp acute LC_{50} for DPX-MP062 4d. Mysid shrimp chronic (life-cycle) NOAEC and LOAEC for DPX-MP062 4e. Estimated NOAEC and LOAEC values for mollusks based on the acute-to-chronic ratio for mysids for DPX-MP062
6. Survival of beneficial insect populations	6a. Honeybee acute contact LD50 for DPX-MP062 6b Honeybee acute dietary LC50
7. Abundance (i.e., survival, reproduction, and growth) of earthworm populations	7a. Acute and subchronic earthworm LC_{50} values for IN-MK368 and IN-MK364
8. Maintenance and growth of individuals and populations of aquatic plants from standing crop or biomass	8a. Algal and vascular plant (i.e., duckweed) EC_{50} values for growth rate and biomass measurements for DPX-MP062

LD_{50} = Lethal dose to 50% of the test population.
NOAEC = No observed adverse effect level.
LOAEC = Lowest observed adverse effect level.
LC_{50} = Lethal concentration to 50% of the test population.

EC_{50}/EC_{25} = Effect concentration to 50%/25% of the test population.

III. Analysis

A. Exposure Characterization

1. Environmental Fate and Transport Characterization

[(R,S)-methyl-7-chloro-2,5-dihydro-2-[(methoxycarbonyl)[4-(trifluoromethoxy)phenyl]amino]carbonyl]indeno[1,2-e][1,3,4]oxadiazine-4a(3aH)-carboxylate (Indoxacarb) is a mixture of two isomers - DPX-KN128 (75%) and DPX-KN127 (25%). (Please refer to Appendix A for chemical structures.) Only DPX-KN128 has insecticidal activity, and is the only isomer identified on the label as an active ingredient. Originally, DPX-JW062 was produced with a 50:50 racemic mixture of the two isomers, and many studies were conducted with this 1:1 mixture. Subsequently, the product to be registered was enriched to 75:25 (DPX-MP062). Currently, the registrant is seeking registration for 100%S.

Bridging data for the optical isomeric mixtures was determined using soil and aquatic metabolism studies because it is believed that different biological degradation pathways are likely for different optical isomers. The bridging studies addressed the rate of degradation of individual isomers. Optical isomers are expected to have similar abiotic environmental fate properties (including hydrolysis, photolysis, volatility, solubility, and leaching studies)[1]. The are sufficient bridging data to support the bridging of abiotic and biotic degradation for isomers of indoxacarb.

The major routes of degradation for DPX-JW062 are alkaline-catalyzed hydrolysis, photodegradation in water, and microbial mediated degradation. DPX-JW062 had abiotic hydrolysis half-lives of 519 days in pH 5 buffer solution, 36 days in pH 7 buffer solution, and 1 day in pH 9 buffer solution **(MRID 44477301).** The major hydrolysis degradation product was sodium 7-chloro-2,5-dihydro-2-[[(methoxycarbonyl)[4-(trifluoromethoxy)phenyl] amino]indeno[1,2-e][1,3,4]oxadiazine-4a(3H)-carboxylic acid (IN-KT413)(48% of applied). Additional abiotic hydrolysis data indicate indanone and triflurormethoxyphenyl labeled DPX-MP062 (3S:1 R ratio) had hydrolysis half-lives of 577.62 days in pH 5 buffer solution, 21.80 days in pH 7 buffer solution, and 1.11 days in pH 9 buffer solution (**MRID 45795801**). The triflurormethoxyphenyl labeled DPX-MP062 hydrolyzed to form IN-MF014 (methyl 2-[[[4-(trifluoromethoxy)phenyl] amino]carbonyl] hydrazine carboxylate) as minor product (6.1% of applied) in pH 5 buffer solution and a major degradation product (14.7% of applied) in pH 7 buffer solution. IN-KT413 was identified as a major degradation in pH 7 buffer solution (47% of applied) and pH 9 buffer solution (88% of applied). A supplementary hydrolysis study showed

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[1] Morrison, R. T. and R.N. Boyd. 1973. Organic Chemistry. 3rd edition. Allyn and Bacon, Inc. Boston. Page 126

the enantiomeric ratio of the isomers of indoxacarb remained constant during the study.

The photodegradation half-life for DPX-JW062 was 3 days in pH 5 buffer solution (**MRID 44477302**). Methyl[4-(trifluoro methoxy)phenyl] carbamate (IN-KB687) and IN-MF014 were major degradates for phenyl labeled DPX-JW062. IN-MH304 and MW297 were major degradates for indanone ring labeled indoxacarb. DPX-MP062 had a photodegradation half-life of 3.44 days (6.88 days under a 12 hour day lengths) under continuous light conditions in pH 5 buffer solution (**MRID 45795802**). In dark controls, the half-life of DPX-MP062 was estimated at 1.6 years. Photodegradation products were identified as IN-MH304 (32% of applied), IN-CO639 (10.2% of applied) and IN-MA573 (10.6% of applied) for only indanone labeled indoxacarb; and IN-MF014 (37.6 % applied), IN-KB687 (15% of applied) for only phenyl labeled indoxacarb. Additionally, numerous unidentified non-polar and polar degradation products were found for both labels of indoxacarb. A supplementary photodegradation study showed the enantiomeric ratio of the isomers of indoxacarb remained constant during the study.

The extent of DPX-JW062 photodegradation on soil is questionable because there was extensive degradation in dark controls with similar degradation products (**MRID 44477303**). The dark control corrected half-life was 126 days. The main degradation products were methyl-7-chloro-2,5-dihydro-2-[[[4-(trifluoromethoxy) phenyl]amino] carbonyl]indeno[1,2-e][1,3,4] oxidiazine (IN-JT333) and IN-KB687.

DPX-JW062 , at 1 or 7 µg/g, degraded with half-lives ranging from 3 to 693 days in aerobic soil metabolism studies **(MRIDs 44477304, 45166303, 457950803, 45795812)**. Similar major degradation products were formed for the mixtures for indanone radiolabeled parent compound; common major degradates (>10% of applied) were identified as methy-5-chloro-2,3-dihydro-2-hydroxy-1[[[(methoxycarbonyl)[4-trifluoromethoxy) phenyl]amino] carbonyl]hydrazono]-1H-indene-2-carboxylate (INKG433), JT333, and CO_2. The degradate ML437-OH was formed only in the indanone labeled, 50:50 racemic mixture. Common minor degradates of the indanone and phenyl labeled rings in the racemic mixture were ML438 and methyl-5-chloro-2,3-dihydro-2-hydroxy-1-[[[[4-(trifluoromethoxy) phenyl]amino] carbonyl]hydrazono]-1H-indene-2-carboxylate (JU873). The degradates KG433 and JU873 were only detected in the phenyl labeled racemic mixture and the indanone labeled isomerically enriched mixture, respectively. Indanone and phenyl labeled indoxacarb formed common degradation products. DP-MP062, applied at 0.5 µg/g, had a first-order, linear half-life of 133.3 days (nonlinear half-life of 6.24 days) in a Speyer 2.2 loamy sand soil **(MRID 45906701).** Common degradation products from indanone and phenyl labeled indoxacarb were JT333, IN-KT413, IN-ML438, IN-JU873, IN-KG433 and IN-MP819. IN-MK638 was identified as a unique degradation product from the phenyl labeled indoxacarb.

DPX-JW062, applied at 10 ppm, degraded with half-lives ranging from 18 to 34 days in near-neutral aerobic aquatic environments (**MRID 44477306**). JT333 was a common degradate (≥10% of applied, half-life of 54 days under aerobic soil conditions.) for the racemic and isomerically (DPX-MP062) enriched formulations. Additionally, the common degradate

Unknown A was detected (17-25% of applied) in the studies. Also, a high percentage of radiolabeled residues (38%) were nonextractable from sediment. DP-MP062, applied at 0.484 mg/L, degraded with total system half-lives of 34.7 and 23.1 days in a pond water/sediment and lake water/sediment systems, respectively **(MRID 45793301).** Major degradation products (>10% of applied) were IN-KT413, IN-MP819 and IN-MS775. Minor degradation products (<10% of applied) were IN-JT333 and IN-KG433. In the lake water/ sediment system, the major degradation products were IN-JT333 and IN-KT413. Minor degradation products were identified as IN-KG433,IN-ML438 and IN-MS775. Three unidentified degradation products were also found in each water/sediment system.

DPX-JW062 degraded with half-lives of 147 and 231 days in anaerobic soil-water environments **(MRID 44477305)**. JT333 and KT413 were detected as common degradates between the indanone and phenyl labeled studies. JT333 was detected in both water and sediment samples. Additionally, a high percentage of nonextractable radiolabeled residues were detected (40-43%) in sediment samples. DPX-JW062 degraded with total system half-lives of 192 and 315 days for the indanone and phenyl label indoxacarb, respectively, in a flooded-silt loam sediment system **(MRID 456795804)**. Major degradation products were INJT333 and IN-KT413. Enantiomeric ratios of the R and S isomers remained constant during the study.

Degradation products of indoxacarb had different half-lives in aerobic soils. IN-KT413 and IN-MK638 were non-persistent ($t_{1/2}$ 1.3 to 16.2 days) in foreign and US mineral soils **(MRID 45906703, 45795816)** (Table 3). IN-KG433 and IN-JU873 were non-persistent to moderately persistent ($t_{1/2}$ 10.5 to 58.7 days) in aerobic soils **(MRIDs 45795814 and 45795815)**. In contrast, IN-MK643 was persistent (141.5 to 346.6 days) in aerobic soils **(MRID 45795817)**. Degradation products except for CO_2 were not identified. However, the degradation pathways were generally associated with oxidative mineralization to CO_2 and residue incorporation into non-extractable soil organic matter.

Table 3: Aerobic Soil Metabolism Half-lives for Selected Indoxacarb Degradation Products

Compound	Chiral	Linear Half-lives (days)	Non-Linear Half-lives (days)	Degradation Products	MRID
IN-KT413	Yes	1-7	NA	SOM	45906703
IN-KG433	Yes	11-39	~ 2 days	Unidentified ext, CO_2, SOM	45795815
IN-JU873	Yes	28-59	NA	CO_2, SOM	45795814
IN-MK638	No	9 -16	NA	CO_2	45795816
IN-MK643	No	142-315	128-327	SOM	45795817

The results of batch equilibrium studies suggest low mobility of DPX-JW062 and JT333 in terrestrial and aquatic environments. Reviewer calculated soil:water partition coefficients for DPX-JW062 are 29 ml/g in Myaka sand soil, 30 ml/g in Donna sandy clay loam soil, 99 ml/g in Chino loam soil, and 40 ml/g in a Tama silt loam soil **(MRIDs 44477308 and 45795809)**. Soil:water partition coefficients for JT333 are 251 ml/g in Myaka sand soil, 115 ml/g in Donna sandy clay loam soil, 308 ml/g in Chino loam soil, and 147 ml/g in a Tama silt loam soil. There was no correlation between soil organic matter content and indoxacarb soil:water partitioning coefficients. Indoxacarb degradation products (IN-KT413, IN-KG433, IN-MK638, IN-MK643) had reviewer calculated Kds ranging from 1.2 to 11.3 ml/g in five US and foreign mineral soils **(MRIDs 45795808, 45906702, 45795807, 45795806)**. In contrast, IN-JU873 has reviewer calculated Kds ranging from 52.1 to 406.4 **(MRID 45795805)**. With the exception of IN-JU873, the batch equilibrium data suggest indoxacarb degradation products may exhibit some mobility in soil. Aged soil column leaching studies, however, indicate aged residues of DPX-MP062 have low mobility in packed soil columns **(MRID 44477309)**.

Table 4: Batch Equilibrium Coefficients for Indoxacarb and Its Degradation Products

Compound	Soil Texture	Kf[1] registrant	1/n	K_{oc}	MRID
Indoxacarb	sand sandy clay loam silt loam	29,**29**[2] 23,28,**25,34** 113,77, **111, 86** 38, 31, **46, 32**	NA[3]	NA	45795809 44477308
IN-JT333	sand sandy clay loam silt loam	147, **251** 96, **115** 241, **309** 114, **147**	NA	NA	45795809 44477308
IN-KT413	sandy loam loam clay loam sandy clay loam	6.1 10.3 4.1 1.0	1.0 1.0 1.0 0.8	358 469 346 204	45906702
IN-KG433	sandy loam loam clay loam sandy clay loam	8.7 2.4 3.2-3.7 1.2	0.9 0.9 0.9 0.9	395 300 267-308 300	45795806
IN-JU873	sandy loam loam clay loam sandy clay loam	605 254 65-69 56	1.1 1.1 0.9 1.0	27500 31750 5417-5750 14000	45795805
IN-MK638	loamy sand loam silty clay loam clay loam sandy clay loam	2.6 1.0 1.3 1.8 0.9	0.9 0.8 0.8 0.8 0.9	130 67 93 164 300	45795808

IN-MK643	sand loam clay loam sandy clay loam	3.96 2.03 4.23 1.34	0.8 0.8 0.8 0.8	189 226 353 243	45795807

1-Freundlich adsorption coefficients were only calculated for studies using variable pesticide concentrations and constant soil mass for estimating the soil:water partitioning coefficients.
2. Bolded values indicate reviewer calculated Kd values. Non-bolded values were calculated by the registrant.
3. NA indicates the 1/n model exponent is not applicable because the Freundlich model is not appropriate.
4. NA indicates the K_{oc} model is not appropriate because of experimental method in determining soil:water adsorption coefficients.

Plant and soil volatility studies indicate that DPX-JW062 has low volatility from plant and soil surfaces, since after 168 hours of incubation, <3% of applied radioactivity had volatilized from lettuce plants and soil surface **(MRID 44491703)**.

DPX-JW062, at 10 and 100 ug/L, had reviewer calculated fish bioconcentration factors of 395 to 504X for edible tissues, 1568-2081X for nonedible tissues, and 1044-1351X for whole fish tissues, respectively (**MRIDs 44477319 and 45805301**). When based on residues of the active isomer, DPX-KN128, maximum BCFs were 24 in fillet, 153 in viscera, and 90 in whole fish for the 10 ppb exposure. The major degradation product in fish tissues (>10% recovered) was IN-JT333. Minor degradation products (<10% recovered) were IN-ML811, IN-KT319, IN-KG433, and IN-JU873. The depuration half-life of bioaccumulated indoxacarb ^{14}C residues ranged from 6.55 to 7.88 days.

DPX-JW062, applied at 0.6 lbs ai/A, had reviewer calculated field dissipation half-lives ranging from 72 to 79 days on bare sand soil in Florida and California, respectively **(MRIDs 44477312, 44477315 and 44477316)**. Radiolabeled DPX-JW062, applied at 0.88 lb a.i./A, had field dissipation half-lives ranging from 29 to 113 days on bareground soils in Delaware and Texas studies and 73 to 119 days on bareground soils in California and Florida studies, respectively (**MRIDs 44477311 and 45850002**). The degradate IN-JT333 was detected in all field studies. The degradate IN-KG433 was only detected in the radiolabeled field studies. Some leaching of parent and residues occurred but were not detected below 45 cm (18 inches).

2. Measures of Aquatic Exposure

a. Aquatic Exposure Modeling

General Approach

There are no monitoring data are available for indoxacarb. Exposure concentrations for drinking water and aquatic ecosystems assessments were estimated based on EFED's aquatic models listed below in **Table 5**. The input parameters used in this assessment were selected from the environmental fate data submitted by the registrant and in accordance with US EPA-OPP EFED water model parameter selection guidelines, *Guidance for Selecting Input Parameters in Modeling the Environmental Fate and Transport of Pesticides,* Version II, February 28, 2002. A detailed aquatic resource exposure assessment is attached in **Appendix A.**

Table 5. Models Used to Estimate Exposure Concentrations for Drinking Water and Aquatic Ecosystem Assessments

Exposure Estimates	Models
Ground water (Tier I)	SCIGROW (version 2.1; November 1, 2001)*
Aquatic ecosystems Surface water (Tier II)	PRZM 3.12 (dated May 7, 1998), named PRZM3.12.EXE EXAMS 2.98.04 (dated July 18, 2002), named EXAMS.EXE, Pond scenario PE4V01.pl, dated 8/8/03

*While use of this version is provisional, it is expected to produce more accurate estimated values for compounds with longer half-lives. In most cases, a majority of the use area will have groundwater that is less vulnerable to contamination than the areas used to drive the SCIGROW estimates.

Aquatic Organism Exposure Modeling:

Tier II surface water modeling was conducted to evaluate the impact of new indoxacarb uses on aquatic. Tier II Estimated Environmental Concentrations (EECs) for were estimated using EFED's aquatic models PRZM (Pesticide Root Zone Model) and EXAMS (EXposure Analysis Modeling System). **PRZM** is used to simulate pesticide transport as a result of runoff and erosion from an 10-ha agricultural field and **EXAMS** considers environmental fate and transport of pesticides in surface water and predicts EECs in a standard pond (10,000-m^2 pond, 2-m deep), with the assumption that the small field is cropped at 100%. Calculations are carried out with the linkage program shell - PE4V01.pl - which incorporates the standard scenarios developed by EFED. Additional information on these models can be found at: http://www.epa.gov/oppefed1/models/water/index.htm.

The five crops chosen to represent the agricultural uses of indoxacarb are alfalfa, fire ants on turf, Brassica leafy vegetables for Group 5, grapes, soybeans, peanuts, and turnips. To simulate these uses, standard scenarios associated with states of the highest US planted acreage (based on the data provided in USDA National Agriculture Statistics Service, "2002 Census of Agriculture, Volume 1 Chapter 2: U.S. State Level Data" at http://www.nass.usda.gov/census/census02/volume1/us/index2.htm and the highest exposure (driven in part by the vulnerability of the soils, the climate, and the agricultural practices) were chosen for the selected crops. Maximum application rates were selected to model environmental concentrations for this screening-level deterministic (risk quotient-based) assessment. Application dates were based on the expected pest pressures within standard scenario regions. Results are tabulated in **Table 6**.

Table 6 - Indoxacarb (KN128) EECs in Surface Water for Use in Ecological Risk Assessment							
Crop	Use Patterns	Upper 90th Percentile Values (ppb)					
		Peak	96 Hour	21 Day	60 Day	90 Day	Yearly
Alfalfa CA	4 x 0.11 lbs ai/A @ 30 day interval (aerial)	1.4	1.29	1.0	0.7	0.6	0.3
	4 x 0.11 lbs ai/A @ 30 day interval (ground)	0.13	0.12	0.1	0.07	0.06	0.03
Alfalfa MN	4 x 0.11 lbs ai/A @ 30 day interval (aerial)	2.5	2.4	1.7	1.2	1.0	0.5
	4 x 0.11 lbs ai/A @ 30 day interval (ground)	1.2	1.2	0.8	0.5	0.4	0.2
Alfalfa NC	4 x 0.11 lbs ai/A @ 30 day interval (aerial)	2.5	2.3	1.7	1.2	1.0	0.5
	4 x 0.11 lbs ai/A @ 30 day interval (ground)	2.3	2.2	1.6	1.1	0.9	0.4
Alfalfa PA	4 x 0.11 lbs ai/A @ 30 day interval (aerial)	2.8	2.5	1.9	1.2	1.0	0.5
	4 x 0.11 lbs ai/A @ 30 day interval (ground)	2.6	2.4	1.7	1.0	0.9	0.4
Alfalfa TX	4 x 0.11 lbs ai/A @ 30 day interval (aerial)	3.0	2.8	2.2	1.5	1.2	0.5
	4 x 0.11 lbs ai/A @ 30 day interval (ground)	3.0	2.8	2.1	1.4	1.1	0.4
Cabbage FL	4 x 0.065 lbs ai/A @ 3 day interval (aerial)	1.3	1.2	0.8	0.5	0.5	0.2
	4 x 0.065 lbs ai/A @ 3 day interval (ground)	1.1	1.0	0.7	0.5	0.4	0.2
Turf FL (Fire ants)	4 x 0.00066 lbs ai/A @ 84 day interval (granule/no drift)	0.15	0.14	0.10	0.05	0.05	0.03
Turf FL (Mole Crickets)	2 x 0.22 lbs ai/A@7day interval (granule/no drift)	8.5	7.8	5.7	3.6	2.6	0.7
Grapes CA	4 x 0.11 lbs ai/A @ 5 day interval (aerial)	0.9	0.8	0.6	0.4	0.3	0.1
	4 x 0.11 lbs ai/A @ 5 day interval (ground)	0.18	0.16	0.13	0.08	0.06	0.02
Peanuts NC	4 x 0.11 lbs ai/A @ 5 day interval (aerial)	4.9	4.6	3.5	2.3	1.8	0.7
	4 x 0.11 lbs ai/A @ 5 day interval (ground)	4.8	4.4	3.3	2.2	1.7	0.6
Soybeans MS	4 x 0.11 lbs ai/A @ 5 day interval (aerial)	2.6	2.3	1.7	1.0	0.9	0.4
	4 x 0.11 lbs ai/A @ 5 day interval (ground)	2.4	2.2	1.6	1.0	0.9	0.4

Because there are some uncertainties associated with the ecotoxicity for the R enantiomer of indoxacarb, EFED conducted ecological modeling for proposed new uses of DuPont Avaunt on grape and *Brassica* leafy vegetables-Group 5. These uses were selected because the technical product comprises a 3:1 (S:R) enantiomeric ratio of indoxacarb. Other formulations and technical end-use products of indoxacarb, DuPont Steward EC, DuPont Claridox C Technical, DuPont KN128 Technical, were not considered because they contain extremely low quantities of the R enantiomer. Table 7 shows the concentration of total indoxacarb (KN128 + KN127) for the proposed new uses of Avaunt.

Table 7 - Total Indoxacarb (KN128 + KN127) EECs in Surface Water for Use in Ecological Risk Assessment

Crop	Use Patterns	Upper 90th Percentile Values (ppb)					
		Peak	96 Hour	21 Day	60 Day	90 Day	Yearly
Cabbage FL	4 x 0.065 lbs ai/A @ 3 day interval (aerial)	1.4	1.3	0.9	0.6	0.5	0.3
	4 x 0.065 lbs ai/A @ 3 day interval (ground)	1.3	1.1	0.8	0.6	0.5	0.2
Grapes CA	4 x 0.11 lbs ai/A @ 5 day interval (aerial)	1.2	1.1	0.8	0.5	0.4	0.1
	4 x 0.11 lbs ai/A @ 5 day interval (ground)	0.24	0.21	0.17	0.11	0.08	0.02

Two degradation products, IN- JT333 and IN-MP819 exhibiting comparable or greater ecotoxicity than parent indoxacarb (Table 8). Estimated environmental concentrations were estimated to assess the exposure of IN-JT333 and IN-MP819.

Table 8 - GENEEC EECs for JT333 and MP819 in Surface Water for Use in Ecological Risk Assessment.

Compound	Use Patterns	Upper 90th Percentile Values (ppb)				
		Peak	96 Hour	21 Day	60 Day	90 Day
JT333	4 x 0.023 lbs ai/A @ 5 day interval	0.57	0.55	0.48	0.36	0.29
MP819	4 x 0.00197 lbs ai/A @ 5 day interval	0.016	0.008	0.002	0.001	0.001

Application rates were adjusted to account for maximum percentage of degradate in laboratory studies and molecule weight correction (527.84 g/mol-DPX/469.8 g/mol=1.12) for JT333 and IN-MP819

b. Aquatic Exposure Monitoring and Field Data

Because indoxacarb is a relatively new active ingredient in the U.S., no monitoring information on this chemical exists.

3. Measures of Terrestrial Exposure

a. Terrestrial Exposure Modeling

Birds and mammals in the field may be exposed to broadcast spray applications of pesticides by ingesting material directly with the diet. They also may be exposed by other routes, such as incidental ingestion of contaminated soil, dermal contact with treated plant surfaces and soil during activities in the treated areas, direct impingement of sprayed material on the body at the time of application, preening activities, inhalation of pesticide vapor and contaminated particulate, and ingestion of drinking water contaminated by the pesticide. Currently, EFED estimates terrestrial wildlife exposures via the dietary route alone.

For the purposes of this risk assessment, indoxacarb exposures were modeled using the data presented in Fletcher et al. (1994)[2]. These data establish concentrations of pesticides on wildlife food items, normalized for a unit application of 1 lb a.i./acre. For single applications of a pesticide, the Fletcher et al. (1994) residues are commonly adjusted for the labeled application rate. For multiple applications, not only are single application rates considered, but the number of the applications, the time interval between applications, and the potential for residue dissipation between applications must be considered. To incorporate these latter factors, EFED employs the T-REX model, an in-house computer model that uses a first-order dissipation relationship to account for residue dissipation of the pesticide between applications. The peak residue concentration from either the single or multiple application models is used for both acute and chronic risk assessments.

Tables 10 and 11 below summarize the estimated terrestrial wildlife food item residue concentrations. The first table is to be used for avian risk assessment and mammalian chronic risk assessment as it accounts for both isomers. As discussed in the Toxicity Characterization section of this assessment, either the lack of definitive toxicological information distinguishing the two isomers (avian effects and mammalian reproduction/developmental effects) or the mechanism of action potential for both isomers to contribute to an effect (mammalian hemolysis) suggests the need for accounting for both KN127 and KN128. The second table is used for mammalian acute risk assessment because it is based on KN128 residues, which can be related to observed lethality.

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[2]Fletcher, J.S., J.E. Nellsen, T.G. Pfleeger. 1994. Literature review and evaluation of the EPA food-chain (Kenaga) nomogram, an instrument for estimating pesticide residues on plants. Env. Toxicol. Chem. 13:1381-1391.

Table 9: Wildlife Estimated Exposure Concentrations (Acute and Chronic Birds, Chronic) based on KN127 and KN128

Application Rate (lb DPX/acre)	Avian Food Item	Maximum Avian Food Item Residue (mg/kg @1 lb a.i./acre)[1]	Maximum Wildlife Food Item Residue at Seasonal Maximum Application Rate Multiple Applications (mg/kg)[2]	Maximum Wildlife Food Item Residue at Seasonal Maximum Application Rate Single Application (mg/kg)
Cotton, grapes, soybeans, peanuts				
0.11 lb DPX/acre 4 applications 5 day interval	short grass	240	113	35
	tall grass	110	52	16
	broadleaf forage/ small insects	135	63	20
	fruit,pods,seeds, large insects	15	7	2
Apple and Pear				
0.11 lb DPX/acre 4 applications 7 day interval	short grass	240	104	35
	tall grass	110	48	16
	broadleaf forage/ small insects	135	59	20
	fruit,pods,seeds, large insects	15	7	2
Alfalfa				
0.11 lb DPX/acre 2 applications 60 day interval	short grass	240	41	35
	tall grass	110	19	16
	broadleaf forage/ small insects	135	23	20
	fruit,pods,seeds, large insects	15	3	2
Corn, Brassica, and Lettuce				
0.065 lb DPX/acre 4 applications 3 day interval	short grass	240	72	21
	tall grass	110	33	10
	broadleaf forage/ small insects	135	41	12
	fruit,pods,seeds, large insects	15	5	1
Tomato and Peppers				
0.065 lb DPX/acre 4 applications 5 day interval	short grass	240	66	21
	tall grass	110	30	10
	broadleaf forage/ small insects	135	37	12
	fruit,pods,seeds, large insects	15	4	1

[1] maximum residues as per Fletcher et al. 1994

[2] maximum residues using T-REX model:

a.i./acre X factor of 1.33 to adjust for total DPX-MP062
pseudo first order dissipation kinetics
dissipation half-life of 22.46 days

Table 10: Wildlife Estimated Exposure Concentrations (Acute Mammals) Based Solely on KN128 Isomer

Application Rate (lb DPX/acre)	Avian Food Item	Maximum Avian Food Item Residue (mg/kg @1 lb a.i./acre)[1]	Maximum Wildlife Food Item Residue at Seasonal Maximum Application Rate Multiple Applications (mg/kg)[2]	Maximum Wildlife Food Item Residue at Seasonal Maximum Application Rate Single Application (mg/kg)
Cotton, grapes, soybeans, peanuts				
0.11 lb DPX/acre 4 applications 5 day interval	short grass	240	85	26
	tall grass	110	39	12
	broadleaf forage/ small insects	135	48	15
	fruit,pods,seeds, large insects	15	5	2
Apple and pears				
0.11 lb DPX/acre 4 applications 7 day interval	short grass	240	79	26
	tall grass	110	36	12
	broadleaf forage/ small insects	135	44	15
	fruit,pods,seeds, large insects	15	5	2
Alfalfa				
0.11 lb DPX/acre 2 applications 60 day interval	short grass	240	31	26
	tall grass	110	14	12
	broadleaf forage/ small insects	135	17	15
	fruit,pods,seeds, large insects	15	2	2
Corn, brassica, and lettuce				
0.065 lb DPX/acre 4 applications 3 day interval	short grass	240	55	16
	tall grass	110	25	7
	broadleaf forage/ small insects	135	31	9
	fruit,pods,seeds, large insects	15	3	1
Tomato and peppers				
0.065 lb DPX/acre 4 applications 5 day interval	short grass	240	50	16
	tall grass	110	23	7
	broadleaf forage/ small insects	135	28	9
	fruit,pods,seeds, large insects	15	3	1

[1] maximum residues as per Fletcher et al. 1994

[2] maximum residues using T-REX model:

a.i./acre as KN 128

pseudo first order dissipation kinetics

dissipation half-life of 22.46 days

Terrestrial risk from granular formulations such as the broadcast granular bait used to control fire ants and mole crickets are evaluated by calculation of the number of lethal doses that are available to terrestrial species within one square feet immediately after application. This methodology is discussed under the risk characterization section.

Terrestrial plant testing (Guidelines 122-1 a and b) is required for pesticides other than herbicides if data from the literature indicate that a pesticide is phytotoxic. Given indoxacarb's recommended use on a variety of important crops, there is little to suggest that the compound is toxic to terrestrial plants, so terrestrial plant data for indoxacarb are not needed at this time.

b. Residue Studies

In order to employ the T-REX model, an estimate of the dissipation rate of the compound from food items must be determined. EFED currently assumes, in the absence of chemical-specific data, that the dissipation half-life is 35 days. However, data are available that can be used to develop residue decline trends for indoxacarb in a number of crops, including corn forage (MRID 44477405), bell peppers (MRID 44477412), tomatoes (MRID 44477414), lettuce (MRID 44477410), pears (MRID44477411), broccoli (MRID 44477402), and cabbage (MRID 44477404). All of these studies provide total (both isomer) measurements for multiple time steps (including day 0) after application. The half-lives for these residue decline curves ranged from 2.46 days to 1155 days. The 1155-day half-life value for corn was discarded because of extremely poor fit of the regression and what appear to be poor residue recoveries for days 1, 3 and 7. This leaves 7 day half-life estimates with a minimum of 2.46 days and a maximum of 72.2 days. Fit to a normal distribution, a mean of 22.46 days, and a standard deviation of 23.9 result. If these parameters were fit to a log normal distribution, the mean value would be 23.57 with a standard deviation of 32.30. EFED selected the mean value (22.46) days as the residue dissipation half-life for terrestrial wildlife exposure modeling. The implications of other dissipation half-lives other than the selected value are discussed in the risk characterization section(s) of this document.

B. Ecological Effects Characterization

In screening-level ecological risk assessments, effects characterization describes the types of effects a pesticide can 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 Ecological Incident Information System (EIIS), are conducted to further refine the characterization of potential ecological effects. As a relatively new active ingredient not registered in the USA, there are no data recorded in the EIIS

Appendix C summarizes the results of the registrant-submitted toxicity studies used to characterize effects for this risk assessment. Toxicity testing reported in this section does not represent all species of birds, mammals, or aquatic organisms. 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 usually limited to Norway rat or the house mouse. Estuarine/marine testing is usually limited to a crustacean, a mollusk, and a fish. Also, neither reptiles nor amphibians are tested. The risk assessment assumes that avian and reptilian toxicities are similar. The same assumption is used for fish and amphibians.

1. Aquatic Effects Characterization

a. Aquatic Animals

There are insufficient data to demonstrate the role of either KN128 or KN127 in the overall toxicity of indoxacarb to aquatic organisms. As such, the risk assessment for aquatic organisms considers the applied mass of both isomers.

A compound of potential concern is the degradate JT333. The available acute toxicity data in fish and invertebrates suggest that this compound is at least an order of magnitude more toxic than the parent compound. However, there are limited data available to assess its toxic significance for chronic effects in all types of aquatic organisms and acute effects in estuarine organisms. For the purposes of this risk assessment, toxicity levels not directly supported by chemical-specific toxicity data were approximated for JT333 using the available data for the parent compound and demonstrated acute toxicity relationships between the degradate and parent. The significance of these estimated levels and the need for additional toxicity testing of JT333 are discussed in the Risk Characterization Section of this document.

Table 12 below presents the aquatic organism toxicity levels used in the assessment of risks to aquatic organisms. The table also presents the procedures employed to estimate toxicity endpoints for JT333 in cases where no actual study information are available.

Table 12: Aquatic Organism Toxicity Levels Used in the DPX-MP062 Risk Assessment

Chemical	Acute Toxicity mg/L	Chronic Toxicity mg/L	Acute Origin	Chronic Origin
Freshwater Fish				
DPX MP062	0.2900	0.1500	1	2
IN-MP819	>0.368	0.0849	3	4
JT333	0.0240	0.0055	5	6
Freshwater Invertebrates				
DPX MP062	0.6000	0.0750	7	8
IN-MP819	0.0640	0.0080	9	10
JT333	>0.029	0.0036	11	12
Estuarine Fish				
DPX MP062	0.3700	0.0170	13	14
IN-MP819	> 0.2095	0.0055	15	16
JT333	0.0137	0.0006	17	18
Estuarine Invertebrates				
DPX MP062	0.0542	0.0184	19	20
IN-MP819	0.0058	0.0020	21	22
JT333	0.0026	0.0009	23	24

Origin

1 Channel catfish LC50
2 Rainbow trout NOEC from early life-stage test
3 Rainbow trout LC50
4 DPX chronic fish * (MP819 Rainbow trout / DPX Rainbow trout LC550)
5 Rainbow trout LC50
6 DPX chronic fish * (JT333 Rainbow trout LC50 / DPX Rainbow trout LC50)
7 Daphnia magna EC50
8 Daphnia magna NOEC from life cycle test
9 Daphnia magna EC50
10 DPX chronic freshwater invertebrate * (MP819 Daphnia EC50 / DPX Daphnia EC50) 8 Daphnia magna EC50
11 Daphnia magna EC50
12 DPX chronic freshwater invertebrate * (absolute JT333 Daphnia EC50 / DPX Daphnia EC50)
13 Sheepshead minnow LC50
14 Sheepshead minnow NOEC from early life-stage test
15 DPX acute estuarine fish * (MP819 Rainbow trout LC50 / DPX Rainbow trout LC50)
16 DPX chronic estuarine fish * (MP819 Rainbow trout LC50 / DPX Rainbow trout LC50)
17 DPX acute estuarine fish * (JT333 Rainbow trout LC50 / DPX Rainbow trout LC50)
18 DPX chronic estuarine fish * (JT333 Rainbow trout LC50 / DPX Rainbow trout LC50)
19 Mysidopsis bahia EC50
20 Mysidopsis bahia NOEC from life cycle test
21 DPX acute estuarine invert .* (MP819 Daphnia EC50 / DPX Daphnia EC50)
22 DPX chronic estuarine invert. * (MP819 Daphnia EC50 / DPX Daphnia EC50)
23 DPX acute estuarine invert. * (absolute JT333 Daphnia EC50 / DPX Daphnia EC50)
24 DPX chronic estuarine invert. * (absolute JT333 Daphnia EC50 / DPX Daphnia EC50)

(1). Acute Effects

Table C-1 presents the freshwater and estuarine/marine fish acute toxicity data for indoxacarb, individual isomers (KN127) and degradates. The LC_{50}'s fall in the range 0.024 to >1.3 mg/L, therefore indoxacarb and its metabolites are "moderately to very highly toxic" to fish on an acute basis. Sub-lethal effects observed included rapid respiration, erratic swimming, dark coloration, partial loss of equilibrium, surfacing, lying on the bottom, lethargy, and gasping for air. For the purposes of this risk assessment, LC_{50}s estimates of 0.24, 0,29, and >0.37 mg/L was used for the KN128 isomer, JT333 degradate, and IN-MP819 degradate, respectively.

Table C-3 presents acute toxicity data for freshwater and estuarine/marine invertebrates. The EC_{50} is >0.029 to 2.94 mg/L and is in the "moderately toxic" to "very highly toxic" range for aquatic invertebrates on an acute basis depending on the formulation of the TGAI and the metabolite. The metabolites (JT333) and IN-MP819 were "very highly toxic" as well as the TGAI (79:21 mixture). The sub-lethal effects observed during the studies included lethargy, pale coloration, loss of equilibrium, and erratic swimming.

(2). Chronic Effects

Table C-2 presents the chronic toxicity data for freshwater and estuarine/marine fish. The freshwater fish early life stage NOEC is 0.15 mg/L for survival and growth. This study was found to be supplemental because of highly variable measured concentrations (>30% of the time weighted average for >5% of the study duration) and limited number of replicates per dose to address variability. The results of this study are retained for the purposes of this risk assessment and repeat of a study to fulfill guideline requirement 72-4(a) is held in reserve. An acceptable early life stage study for sheepshead minnow (NOEC 0.017 mg/L) satisfies the guideline requirements (72-5) for indoxacarb. Sublethal effects including erratic swimming, loss of equilibrium, pale color, smaller gills, dark color, labored respiration, erratic swimming, loss of equilibrium, and scoliosis, and visually smaller fish were observed in the lower treatment levels.

Table C-4 presents the chronic toxicity data for indoxacarb for freshwater and estuarine/marine invertebrates. The chronic daphnid study (MRID 444772-25, NOEC 0.075 mg/L) satisfies the guideline requirement 72-4(b) for freshwater invertebrates for indoxacarb. The mysid study (MRID 444773-27, NOEC 0.0184 mg/L) satisfies the guideline requirement 72-4(b) for estuarine/marine invertebrates for indoxacarb. Sublethal signs of toxicity included daphnids floating at the surface, lethargy, pale daphnids, and daphnids that were smaller in size compared to controls. Floating daphnids were observed in the 0.0024, 0.0050, 0.036, and 0.19 ppm ai treatments, while lethargic daphnids were observed in the 0.036, 0.075, and 0.19 ppm ai treatments. Pale daphnids were observed in the 0.019, 0.036, and 0.19 ppm ai treatments, while small daphnids were observed in the 0.19 ppm ai treatment only.

(3). Field Studies

No aquatic field studies have been submitted for indoxacarb.

b. Aquatic Plants

Aquatic plant data were submitted for four species of alga studies and one vascular plant (*Lemna gibba*) as required by EPA guidelines. These studies tested mixtures of the isomers KN128 and KN127 ranging from 75% KN128 and 25% KN127 to 79%. KN128 and 21% KN127. Details of these studies are presented in Table C-5 of Appendix C. Guideline requirements for freshwater alga (*Anabean flos-aquae* and *Pseudokirchneriellam subcapitata*) and diatom (*Navicula pelliculosa*) as well as the marine diatom (*Skeletonema costatum*) are fulfilled by these core studies. The vascular plant study for *Lemna gibba* was classified as supplemental. For the purposes of this risk assessment, the most sensitive algae the marine diatom (*Navicula pelliculosa*) was used (LC_{50} = 1.22 mg/L) for calculations of risk quotients and the *Lemna gibba* LC_{50} of >0.084 mg/L was used to represent vascular plants.

2. Terrestrial Effects Characterization

a. Terrestrial Animals

(1). Acute Effects

Available acute and subacute toxicity data for birds are summarized in Appendix C, Tables C-7 and C-8. The lowest indoxacarb LD_{50} is 98.0 mg/kg (bobwhite quail), which is "moderately toxic" to avian species on an acute oral basis. Indoxacarb is "moderately toxic" to avian species on a subacute dietary basis, with the lowest LC_{50} of 808 mg/kg-diet reported for bobwhite quail.

The metabolite (JT333) is "slightly toxic" to avian species on an acute oral basis with an LD50 of 1618 mg/kg. A dietary study (71-2) with the main metabolite (JT333) has not been submitted.

For the purposes of this risk assessment, the bobwhite quail subacute dietary LC_{50} of 808 mg/kg indoxacarb will be used as the acute toxicity endpoint for birds. In addition, the indoxacarb bobwhite quail LD_{50} of 98 mg/kg will be used as the toxicity endpoint for the evaluation of the broadcast granular bait formulation which is proposed to control fire ants.

Avian chronic exposure reproduction effects studies were performed for parent indoxacarb in two species, mallard duck and bobwhite quail. The results of these studies are summarized in Appendix C, Table C-9. The lowest NOEC was for bobwhite quail (NOAEC 144 mg/kg-diet, which serves as the toxicological threshold for reproduction effects in this risk assessment. Of the two studies submitted for mallard ducks, is supplemental because the percentage of normal hatchlings of eggs laid, eggs set, and viable embryos in the control group was unacceptably low. This may have been due to inadequate conditions of the test, particularly the incubator and/or the hatcher. Therefore, it is impossible to determine in this study whether the reduction in the number of normal hatchlings is due to the test compound or due to adverse conditions of the test (i.e, faulty incubator, human error, etc.).

There is insufficient toxicological data for birds to determine whether the toxicity of indoxacarb is the product of toxicity of the KN128 isomer alone or in combination with the isomer KN127. This is important because the labeled rates of application are based on the insecticidal isomer KN128 alone. Because of the uncertainty in the toxicity data regarding isomeric activity in birds, EFED elected to consider avian exposures on the basis of total KN128 and KN127 application.

Table 13 below lists the toxicity levels and their origins used in this risk assessment.

Table 13: Avian Toxicity Levels Used in the DPX-MP062 Risk Assessment

Effect	Value	Origin
Acute dietary (mg/kg-diet)	808	Bobwhite quail LC50 [1]
Acute oral LD_{50} (mg/kg)	98	Bobwhite quail LC50 [1]
Chronic exposure/ Reproduction (mg/kg-diet)	144	Bobwhite quail NOEC [1]

[1] most sensitive species tested

The registrant has not conducted toxicity testing on wild mammal species. For the purposes of this risk assessment, EFED uses the available mammalian toxicity data on laboratory rodents as surrogates for mammalian wildlife. Tables C-10 through C-12 summarize the available toxicity data for Indoxacarb and degradates. The available acute toxicity data (Appendix C, Table C-10) demonstrate that the predominant toxic isomer is likely to be KN128 for acute effects. This is consistent with bridging requests for human health effects as well. MRID 444771-13 is a toxicity study of a mixture of KN128 (79%) and KN127 (21%), which reports an LD_{50} of 268 mg/kg in female rats. Converting this endpoint to KN128 yields an LD50 of 211.72 mg/kg. This is comparable to a study of the single isomer KN128 toxicity to rats alone, LD50 179 mg/kg (MRID 444771-15). Therefore, mammalian exposures for the acute risk assessment are based on the applied rate of KN128 and the acute toxicity endpoint is based on the 179 mg/kg LD_{50} in rats.

Other available acute toxicity data (Appendix C, Table C-10) on the degradates suggests that KG433 is of comparable toxicity to parent and JT333 is more toxic to mammals than parent by a factor greater than 5. However, neither of these compounds was identified as a major degradate in the hydrolysis or photolysis environmental fate studies, pathways EFED considers important to the degradation of pesticide residues on plant surfaces. Therefore, neither compound was included in the quantified risk assessment. The implications for additional residues of JT333 in intoxicated insects is discussed in the risk characterization section of this assessment.

Appendix C, Table C-13 presents data on the toxicity to beneficial insects. EFED classifies an $LD_{50} > 11$ µg/bee as practically non-toxic to non-target insects, and under these conditions no labeling for protection of non-target insects is required. Acute data for non-target insects was submitted for indoxacarb for various combinations of the isomers. The LD_{50} contact study performed with a mixture of 50% of each of the two isomers (KN128 and KN127) indicated that indoxacarb is highly toxic to honeybees ($LD_{50} = 0.18$ µg/bee). This toxicity warrants labeling to protect non-target and beneficial insects. EFED does not have toxicity data to directly establish the toxicity of the metabolite JT333. However, as the insecticidal properties are increased with the enriched formulation, it is expected that the toxicity to honey bees will also increase. In addition, the metabolite is supposed to be more toxic to insects than the other organisms. In addition, an acute dietary study indicated an LC_{50} > 1000 ppm and field study with DPX-MP062 (30% KN128 and 10% KN127) showed significant mortality after 3, 8, and 24 hours at field applications of 167 g/ha.

(2). Chronic Effects

Appendix C, Table C-11 presents the developmental and reproduction effects threshold data for rats chronically exposed to indoxacarb and the racemic mixture. These data indicate no gross malformations, no increases in fetal resorptions, and no adverse effects on reproduction parameters in dietary exposure studies. Fetus number reductions were observed in a rat gavage study, but only at doses consistent with frank maternal toxicity (ca. 100 mg/kg-bw) and approaching the LD50 for the compound. Fetal weight and maternal weight reductions were observed in all studies. For developmental and reproduction effects risk assessment purposes, EFED elected to use the NOEC (40 mg/kg-diet, reduced fetal weight) from the rat 15-day developmental study. There is uncertainty regarding the implications of this endpoint on the fitness and survival of offspring, which are discussed in the risk characterization section of this document. There are insufficient data to separate isomer-specific differences in these toxic endpoints. Therefore, exposure assessments for this endpoint should be based on application mass of both isomers.

Over the course of considering appropriate effects thresholds for the risk assessment, EFED observed a consistently occurring effect in all mammalian testing results. Hemolysis and associated effects on spleen weight were observed in a variety of subchronic and chronic studies and across a number of species other than laboratory rats. EFED has included data for these effects in rats (Appendix C, Table C-12) as part of the mammalian wildlife risk assessment. The registrant has proposed a toxic mechanism of action for these observed hemolytic effects. This mechanism suggests that the observed hematologic effects for indoxacarb are the product of oxidant effects on red blood cells and involve an aryl-amine metabolite of the parent compound. This metabolite is bio-transformed to the corresponding N-hydroxylamine. It follows that the hemolytic effect does not show stereospecificity such that the chiral portion of the KN128 and KN127 isomers have little influence on this mechanism. Therefore, exposure assessments for this endpoint should be based on application mass of both isomers together. The potential significance of risks for hemolytic effects in wild mammals is discussed in the terrestrial wildlife risk characterization of this document. The following table presents the toxicity levels (and their origins) used in the assessment of risks to mammalian wildlife.

Table 13: Mammalian Toxicity Levels Used in the DPX-MP062 Risk Assessment

Effect	Value	Origin
Acute (mg/kg-bw)	179	Laboratory rat toxicity test with KN128 isomer mixture
Subchronic/Chronic exposure (mg/kg-diet)	8	NOEC for 90-day rat subchronic dietary study showing hemolytic effects
Developmental/Reproduction (mg/kg-diet)	40	NOEC for 15-day dietary developmental study

(3). Sublethal Effects

The approach currently used by EFED for evaluating the hazard of pesticides to environmental receptors is generally based on an evaluation of acute lethality and chronic survival, growth, and reproduction. These endpoints, although not encompassing all potential effects and not all levels of ecological organization, are judged to be generally useful and applicable as "sentinels" of potential risk to ecological receptors. However, concerns have been raised regarding whether they adequately account for a variety of other types of sub-lethal effects.

A 90-day rat sub-chronic dietary study showing hemolytic and associated effects on spleen weight. In addition, these effects were observed in a variety of sub-chronic and chronic studies and across a number of species other than laboratory rats. The registrant has proposed a toxic mechanism of action for these observed hemolytic effects. This mechanism suggests that the observed hematologic effects for indoxacarb are the product of oxidant effects on red blood cells and involve an aryl-amine metabolite of the parent compound. This metabolite is bio-transformed to the corresponding N-hydroxylamine. It follows that the hemolytic effect does not show stereospecificity such that the chiral portion of the KN128 and KN127 isomers have little influence on this mechanism. Therefore, exposure assessments for this endpoint should be based on application mass of both isomers together. Such data could help to better characterize the other types of sub-lethal effects to small animals from the use of indoxacarb.

(4). Field Studies

No field studies have been submitted for indoxacarb.

b. Terrestrial Plants

Terrestrial plant testing (Guidelines 122-1 a and b) is required for pesticides other than herbicides if data from the literature indicate that a pesticide is phytotoxic. Given indoxacarb's recommended use on a variety of important crops, there is little to suggest that the compound is toxic to terrestrial plants, so terrestrial plant data for indoxacarb are not needed at this time.

IV. Risk Characterization

A. Risk Estimation - Integration of Exposure and Effects Data

Risk characterization integrates EEC's and toxicity estimates and evaluates the likelihood of adverse ecological effects to non-target species. In a 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. LOC's currently address the following risk presumption categories:

Risk presumptions for terrestrial animals

Risk Presumption	Risk Quotient (RQ)	Level of Concern (LOC)
	Birds	
Acute Risk	EEC[1]/LC_{50} or LD_{50}/sqft[2] or LD_{50}/day[3]	0.5
Acute Restricted Use	EEC/LC_{50} or LD_{50}/sqft or LD_{50}/day (or LD_{50} < 50 mg/kg)	0.2
Acute Endangered Species	EEC/LC_{50} or LD_{50}/sqft or LD_{50}/day	0.1
Chronic Risk	EEC/NOAEC	1
	Wild Mammals	
Acute Risk	EEC/LC_{50} or LD_{50}/sqft or LD_{50}/day	0.5
Acute Restricted Use	EEC/LC_{50} or LD_{50}/sqft or LD_{50}/day (or LD_{50} < 50 mg/kg)	0.2
Acute Endangered Species	EEC/LC_{50} or LD_{50}/sqft or LD_{50}/day	0.1
Chronic Risk	EEC/NOAEC	1

[1] abbreviation for Estimated Environmental Concentration (ppm) on avian/mammalian food items

[2] $\frac{mg/ft^2}{LD_{50} * \text{wt. of bird}}$ [3] $\frac{\text{mg of toxicant consumed/day}}{LD_{50} * \text{wt. of bird}}$

Risk presumptions for aquatic animals

Risk Presumption	RQ	LOC
Acute Risk	EEC[1]/LC_{50} or EC_{50}	0.5
Acute Restricted Use	EEC/LC_{50} or EC_{50}	0.1
Acute Endangered Species	EEC/LC_{50} or EC_{50}	0.05
Chronic Risk	EEC/NOAEC	1

[1] EEC = (ppm or ppb) in water

Risk presumptions for plants

Risk Presumption	RQ	LOC
Plant Inhabiting Terrestrial and Semi-Aquatic Areas		
Acute Risk	EEC[1]/EC_{25}	1
Acute Endangered Species	EEC/EC_{05} or NOAEC	1
Aquatic Plants		
Acute Risk	EEC[2]/EC_{50}	1
Acute Endangered Species	EEC/EC_{05} or NOAEC	1

[1] EEC = lbs a.i./A
[2] EEC = (ppb or ppm) in water

Results of the exposure and toxicity effects data are used to evaluate the likelihood of adverse ecological effects on non-target species. For the assessment of indoxacarb risks, the risk quotient (RQ) method is used to compare exposure and measured toxicity values. Estimated environmental concentrations (EECs) are divided by acute and chronic toxicity values. The RQs are compared to the Agency's levels of concern (LOCs). These LOCs are the Agency's interpretive policy and are used to analyze potential risk to non-target organisms and the need to consider regulatory action. These criteria are used to indicate when a pesticide's use as directed on the label has the potential to cause adverse effects on non-target organisms. Appendix D of this document summarizes the LOCs used in this risk assessment and provides detailed spreadsheets of all derived RQs for non-target species.

1. Non-target Aquatic Animals and Plants

Risk quotients are used to determine risks to aquatic animals. For acute toxicity, Tier-1 or Tier-2 estimated peak surface water concentrations are divided by the 96-hr LC_{50} for fish or 48-hr EC_{50} for invertebrates. A 96-hour EC_{50} is used for aquatic plant RQ calculations. For chronic RQs, Tier-1 or Tier-2 21-day average concentrations are divided by chronic (fish early life stage or invertebrate life cycle) NOEC values. Alternatively, the Tier-1 or Tier-2 60-day average surface water concentration is divided by the fish full life-cycle NOEC. Chronic risk quotients can not be calculated for aquatic plants because chronic plant data is not required for plants.

2. Non-target Terrestrial Animals

T-REX, which replaces the ELL-Fate model, allows the user to calculate dose- and dietary-based risk quotients based on the Kenaga nomogram, LD_{50} ft^{-2} for liquid and granular pesticide applications, and seed treatment exposures to birds and mammals. (T-REX (v.1.1, December 7, 2004) replaces ELL-Fate (v.1.4a) for estimating terrestrial exposure and risk from pesticide applications.

The EEC values used for terrestrial exposure are derived from the Kenaga nomogram, modified by Fletcher et al. (1994), based on a large set of actual field residue data. The upper limit values from the nomogram represent the 95th percentile of residue values from actual field measurements (Hoerger, F. and E.E. Kenaga, 1972). The Fletcher et al. (1994) modifications to the Kenaga nomogram are based on measured field residues from 249 published research papers, including information on 118 species of plants, 121 pesticides, and 17 chemical classes (Fletcher et al., 1994). These modifications represent the 95^{th} percentile of the expanded data set. RQs are based on the most sensitive LC_{50} and NOAEC for birds (in this instance, bobwhite quail) and LD_{50} for mammals (based on lab rat studies).

Uncertainties in the terrestrial EECs are primarily associated with a lack of data on interception and subsequent dissipation from foliar surfaces. If total foliar residue dissipation data are not available, then a default value of 35 days should be used as the foliar dissipation half-life (Willis and McDowell, 1987). However, in the case of indoxacarb foliar dissipation half-life data was available to use a shorter day half-life. This is discussed under the Measures of Terrestrial Exposure section.

B. Risk Description

1. Risks to Aquatic Organisms

a. Animals

Appendix D discusses the general EFED approach for risk assessment, including discussion of risk quotients (RQs) and EFED levels of concern (LOCs). Table D-1 presents the RQ calculations for indoxacarb (KN128), and the JT333 and IN-MP819 degradates for the turf scenario for mole crickets (the senario with the highest exposure concentration). Table 14 below summarizes the RQ results.

Table 14: Aquatic Organism Risk Quotient Results

Chemical	Acute RQ	Chronic RQ
Freshwater Fish		
KN-128	0.029	0.02
JT333	0.024	0.08
IN-MP819	<0.00004	0.00001
Freshwater Invertebrates		
KN -128	0.014	0.08
JT333	0.020	0.13
IN-MP819	0.0003	0.0003
Estuarine Fish		
KN 128	0.023	0.20
JT333	0.042	0.67
IN-MP819	0.0002	0.0002
Estuarine Invertebrates		
KN 128	0.157	0.31
JT333	0.218	0.55
IN-MP819	0.0028	0.001

Risk Presumption	RQ
Acute Risk	0.5
Acute Restricted Use	0.1
Acute Endangered	0.05
Chronic Risk	1

Even under this conservative use scenario, indoxacarb and its degradate are not expected to reach surface water concentrations high enough to trigger acute risk concerns (RQ 0.5) or chronic concerns (RQ 1) in fish or invertebrates in either freshwater or estuarine/marine systems.

The acute restricted use level of concern (RQ 0.1) is exceeded by estuarine/marine invertebrate acute risk quotients calculated for Indoxacarb (RQ 0.157) and degradate JT333 (RQ 0.218). Likewise, the endangered species level of concern is exceeded for estuarine/marine invertebrates for parent compound and the degradate. Table D-2 presents the RQ calculations for aquatic plants. No levels of concern are exceeded for aquatic plants.

Although KN128 and its degradate JT333 are highly to very highly toxic to aquatic organisms and indoxacarb exhibits persistence in the field, model predictions of surface water concentrations using a conservative application scenario to mole crickets (maximum application rate, minimum application interval) do not trigger concern for acute toxic nor chronic risks. This is due to the combination of low initial mass of pesticide used at each application and the low mobility of parent and JT333 in terrestrial and aquatic environments.

Risk quotients calculated for estuarine/marine aquatic invertebrates exceed acute restricted use and endangered species levels of concern. Presumptions of risk for this situation are uncertain. The PRZM/EXAMS modeling approach is an uncertain predictor of water concentrations in estuarine/marine systems. It is expected, though not empirically demonstrated, that flushing and exchange rates within these systems may be greater, in some cases, than accounted for in the EXAMS model and actual estuarine/marine water concentrations may be lower. Concerns for JT333 risks to aquatic invertebrates are also uncertain because of the supplemental study toxicity endpoint used for this study (MRID 444772-21). The level of effect observed at the 0.029 mg/L concentration of JT333 (maximum concentration tested) was far below the usual EC_{50} endpoint used for risk assessment purposes. In this study sublethal effects were observed at all doses but only 5% mortality was observed at the highest dose tested (the effect endpoint used in the risk assessment). EFED is unaware of any federally listed endangered estuarine/marine invertebrates.

The Endangered Species Protection Program uses the toxicity data for the oyster to assess risks to endangered mussels. Although the latter are freshwater species, the effects on oysters more accurately reflect potential effects in mussels than do data from the daphnid studies. A RQ of 0.041 was calculated for the oyster. Therefore, the risks to endangered/threatened mussels from the proposed uses of indoxacarb are considered low.

With regard to a lack of chronic toxicity data for the degradate JT333, extrapolation procedures using available toxicity data for the parent compound and relationships between acute endpoints for parent and degradate do not lead to conclusions of chronic risks for aquatic organisms. There is considerable uncertainty regarding these chronic conclusions. Recall that the chronic thresholds for JT333 are approximated in this risk assessment by assuming a relationship between acute toxicity for parent and degradate is conserved for multiple effects endpoints. This relationship is then applied to the available chronic data for parent to approximate a JT333 chronic threshold. Because of the supplemental nature of the freshwater invertebrate acute toxicity study for JT333, the true EC_{50} for this study is unknown but is greater than predicted by the available data (as discussed in the preceding paragraph). Therefore, the difference between acute freshwater and acute estuarine/marine invertebrate sensitivity to the two compounds is likely to be less than that assumed for this risk assessment. It then follows that the extrapolated chronic thresholds for aquatic invertebrates for JT333 are uncertain and possibly conservative. Because of the already low RQs calculated in this risk assessment and the likelihood of a conservative extrapolation procedure, EFED does not believe that additional chronic toxicity testing with JT333 is warranted at this time.

b. Plants

Aquatic Plants

Aquatic plant risk to non-vascular plants was evaluated based on the freshwater agla *Pseudokirchneriella subcapitata* and *Anabaena flos-aquae* and the freshwater diatom *Navicula pelliculosa* toxicity studies. The marine diatom, *Skeletonema costatum*, was evaluated to assess the risk to marine/estuarine alge. Freshwater vascular plant data was evaluated based on the duckweed *Lemna gibba*. The test material was a mixture of the 75% KN 128 and 25% KN 127 isomers for the *Pseudokirchneriella subcapitata, Skeletonema costatum*, and *Lemna gibba* and a 79% KN 128 and 21% isomer mixture for the *Anabaena flos-aquae* and *Navicula pelliculosa*. No acute non-endangered or endangered species LOCs were exceeded for the species tested (Table D-2 of Appendix D).

2. Risks to Terrestrial Organisms

a. Animals

As was discussed in the toxicity profile for mammals, risks were assessed for acute lethal, reproduction/developmental, and hemolytic endpoints. Appendix D, Tables D-4 through D-7 present these calculations.

Appendix D, Table D-4 presents the RQ calculations for acute risks in herbivorous/insectivorous small mammals and Table 15 below summarizes the results.

Table 15: Herbivorous/Insectivorous Mammal Acute Risk Quotient results

Herbovore/ Insectivore Weight Class (g)	Single App. Short Grass RQ	Multiple App. Short Grass RQ	Single App. Forage/Small Insect RQ	Multiple app. Forage/Small Insect RQ	Single App. Large Insect RQ	Multiple App. Large Insect RQ
Cotton, grape, soybean, peanut Scenario						
15	0.140	0.451	0.079	0.254	0.009	0.028
35	0.097	0.314	0.055	0.176	0.006	0.020
1000	0.022	0.071	0.012	0.040	0.001	0.004
Apples and Pears Scenario						
15	0.140	0.417	0.079	0.254	0.009	0.028
35	0.097	0.290	0.055	0.176	0.006	0.020
1000	0.022	0.066	0.012	0.040	0.001	0.004
Alfalfa Scenario						
15	0.140	0.162	0.079	0.091	0.009	0.010
35	0.097	0.211	0.055	0.063	0.006	0.007
1000	0.022	0.026	0.012	0.014	0.001	0.002
Corn, Brassica, Lettuce Scenario						
15	0.083	0.290	0.047	0.163	0.005	0.018
35	0.058	0.201	0.032	0.113	0.004	0.013
1000	0.013	0.046	0.007	0.026	0.001	0.003
Tomato and Pepper Scenario						
15	0.083	0.267	0.047	0.163	0.005	0.018
35	0.058	0.185	0.032	0.113	0.004	0.013
1000	0.013	0.042	0.007	0.026	0.001	0.003

Risk Presumption	RQ
Acute Risk	0.5
Acute Restricted Use	0.2
Acute Endangered Species	0.1
Chronic Risk	1

On the basis of these RQ calculations the following can be concluded:

- No single application scenario triggered concern for acute risk (RQ 0.5) or restricted use (RQ 0.2). For all multiple application scenarios, all food items and all weight classes of mammals, the risk concern level was not exceeded.

- Under multiple use scenarios, the restricted use acute level of concern was exceeded for mammals consuming short grass under all crops for 15 g herbivorous mammals (RQs ranging from 0.267 to 0.451) and for and for 35 g mammals consuming forage and small insects (RQs ranging from 0.201 to 0.314) for the cotton, orchard, and corn/brassica/lettuce scenarios.

- Single applications only to cotton and orchard crops resulted in RQs (0.14) that exceed the endangered species concern level for acute effects (RQ 0.1) for 15 g mammals consuming grass.

- For multiple applications, the endangered species acute level of concern was met or exceeded in two of three food items modeled for 15 and 35 g mammals in the cotton (RQs from 0.176 to 0.451), apple/pear (RQs from 0.176 to 0.417), corn/brassica/lettuce (RQs from 0.113 to 0.290), and tomato/pepper (RQs from 0.113 to 0.267).

Appendix D, Table D-5 summarizes the RQ calculations for acute risks in granivorous small mammals and Table 16 below summarizes the results.

Table 16: Granivorous Mammal Acute Risk Quotient Results

Granivore Weight Class (g)	Single App. Seed RQ	Multiple App. Seed RQ
Cotton, grape, soybean, peqanut Scenario		
15	0.0019	0.006
35	0.0014	0.004
1000	0.0003	0.001
Apples and Pears Scenario		
15	0.0019	0.006
35	0.0014	0.004
1000	0.0003	0.001
Alfalfa Scenario		
15	0.0019	0.002
35	0.0014	0.002
1000	0.0003	0.0003
Corn, Brassica, Lettuce Scenario		
15	0.0011	0.004
35	0.0008	0.003
1000	0.0002	0.001
Tomato and Pepper Scenario		
15	0.0011	0.004
35	0.0008	0.003
1000	0.0002	0.001

Risk Presumption	RQ
Acute Risk	0.5
Acute Restricted Use	0.2
Acute Endangered Species	0.1
Chronic Risk	1

These RQ values indicate the no acute levels of concern are exceeded for any use scenario or any weight class of mammal.

To evaluate the acute risk from the broadcast granular bait formulation used to control fire ants EFED calculates the number of lethal doses (LD50s) that are available within one square foot immediately after application. RQs are calculated for 15, 35, 1000 g mammals. Table 17 below summarizes the risk quotients for a single application.

Table 17: Mammalian Acute Risk Quotient Calculations for Granular Broadcast Applications for the control of fire ants (0.0027 lb KN128/A) and mole cricket (0.44 lb KN128/A)		
Animal Body Weight (g)	**Acute Toxicity Threshold, LD_{50} (mg/kg)**	**Acute RQ (LD_{50} per ft^2) [a]**
Fire ant (0.0027 lb KN128/A; maximum single application)		
15	179	0.010
35	179	0.004
1000	179	0.00016
Mole Cricket (0.44 lb KN128/A; maximum single application)		
15	179	1.706
35	179	0.731
1000	179	0.02559

[a] $RQ = \frac{\text{App. Rate (lbs ae)}}{\text{Acre}} \times \frac{453{,}590 \text{ mg}}{\text{Lb}} \times \frac{\text{Acre}}{43{,}560 \text{ ft}^2} \times \frac{1}{\text{Animal weight (g)}} \times \frac{1000 \text{ g}}{1 \text{ kg}} \times \frac{\text{Kg}}{\text{LD50 mg}}$

Risk Presumption	RQ
Acute Risk	0.5
Acute Restricted Use	0.2
Acute Endangered Species	0.1

These RQ values indicate the acute, restricted use, and endangered species levels of concern are exceeded for 15 and 35 g mammals for the mole cricket at the maximum single application rate. However, the LOCs are not exceeded for any weight class of mammals for fire ants.

Appendix D, Table D-6 summarizes the reproduction RQ calculations and the results are summarized in Table 18 below.

Table 18: Mammal Reproduction Risk Quotient Results

Wildlife Food Item	Single Application Reproduction RQ	Multiple Application Reproduction RQ
Cotton grape, soybean, peanut Scenario		
short grass	0.88	2.82
tall grass	0.40	1.29
broadleaf forage/ small	0.49	1.59
fruit,pods,seeds, large insects	0.05	0.18
Apples and Pears Scenario		
short grass	0.88	2.61
tall grass	0.40	1.20
broadleaf forage/ small	0.49	1.47
fruit,pods,seeds, large insects	0.05	0.16
Alfalfa Scenario		
short grass	0.88	1.03
tall grass	0.40	0.48
broadleaf forage/ small	0.49	0.58
fruit,pods,seeds, large insects	0.05	0.08
Corn, Brassica, Lettuce Scenario		
short grass	0.52	1.81
tall grass	0.24	0.83
broadleaf forage/ small	0.29	1.02
fruit,pods,seeds, large insects	0.03	0.11
Tomato and Pepper Scenario		
short grass	0.52	1.66
tall grass	0.24	0.76
broadleaf forage/ small	0.29	0.93
fruit,pods,seeds, large insects	0.05	0.10

Risk Presumption	RQ
Chronic Risk	1

The results of RQ calculations for mammalian reproduction risks suggest:

- No single application residues are high enough to trigger the chronic effects level of concern (RQ 1.0).

- Multiple application residues are higher and chronic concerns are triggered. Quotients calculated for the cotton scenario exceed the chronic level of concern (RQ 1.0) in three wildlife food items with RQs ranging from 1.29 to 2.82. Similar results are evident for the apple/pear scenario (RQs for three food items ranging from 1.20 to 2.6). RQs exceeding the level of concern are also evident for the corn/brassica/lettuce and tomato/pepper scenarios (RQ 1.02-1.8). The significance of these excursions above the chronic level of concern are discussed in the risk characterization at the terminus of the Terrestrial Wildlife Risk Assessment section.

Risk Quotients calculated for hemolysis effects also raise concern. Appendix D, Table D-7 presents the risk quotient calculations for hemolytic risks and Table 19 below summarizes the results.

Table 19: Mammal Hemolytic Risk Quotient Results

Wildlife Food Item	Single Application Hemolytic RQ	Multiple Application Hemolytic RQ
Cotton, grape soybean, peanut Scenario		
short grass	4.39	14.11
tall grass	2.01	6.47
broadleaf forage/ small insects	2.47	7.94
fruit,pods,seeds, large insects	0.27	0.88
Apples and Pears Scenario		
short grass	4.39	13.04
tall grass	2.01	5.98
broadleaf forage/ small insects	2.47	7.34
fruit,pods,seeds, large insects	0.27	0.82
Alfalfa Scenario		
short grass	4.39	5.13
tall grass	2.01	2.38
broadleaf forage/ small insects	2.47	2.88
fruit,pods,seeds, large insects	0.27	0.38
Corn, Brassica, Lettuce Scenario		
short grass	2.59	9.03
tall grass	1.19	4.14
broadleaf forage/ small insects	1.46	5.08
fruit,pods,seeds, large insects	0.16	0.56
Tomato and Pepper Scenario		
short grass	2.59	8.31
tall grass	1.19	3.81
broadleaf forage/ small insects	1.46	4.67
fruit,pods,seeds, large insects	0.16	0.52

Risk Presumption	**RQ**
Chronic Risk	1

The hemolysis RQ results indicate that, under all application scenarios modeled (single and multiple applications), and for three of four wildlife food item types, the chronic level of concern is exceeded by RQs ranging from 1.19 to 14.1. The risk characterization section of this document will include a discussion of the implications of hemolytic risks to wildlife fitness.

Appendix D, Table D-3 presents the Avian Risk Quotient calculations and Table 20 below summarizes the results.

Table 20: Avian Risk Quotient Results

Wildlife Food Item	Single Application Acute RQ	Single Application Chronic RQ	Multiple Application Acute RQ	Multiple Application Chronic RQ
Cotton, grape, soybean, peanut Scenario				
short grass	0.043	0.244	0.140	0.784
tall grass	0.020	0.112	0.064	0.359
broadleaf forage/ small insects	0.024	0.137	0.079	0.441
fruit,pods,seeds, large insects	0.003	0.015	0.009	0.049
Apples and Pears Scenario				
short grass	0.043	0.244	0.129	0.725
tall grass	0.020	0.112	0.059	0.332
broadleaf forage/ small insects	0.024	0.137	0.073	0.408
fruit,pods,seeds, large insects	0.003	0.015	0.008	0.045
Alfalfa Scenario				
short grass	0.043	0.244	0.051	0.285
tall grass	0.020	0.112	0.024	0.132
broadleaf forage/ small insects	0.024	0.137	0.028	0.160
fruit,pods,seeds, large insects	0.003	0.015	0.004	0.210
Corn, Brassica, Lettuce Scenario				
short grass	0.026	0.144	0.089	0.502
tall grass	0.012	0.066	0.041	0.230
broadleaf forage/ small insects	0.014	0.081	0.050	0.282
fruit,pods,seeds, large insects	0.002	0.009	0.006	0.031
Tomato and Pepper Scenario				
short grass	0.026	0.144	0.082	0.462
tall grass	0.012	0.066	0.038	0.212
broadleaf forage/ small insects	0.014	0.081	0.046	0.260
fruit,pods,seeds, large insects	0.002	0.009	0.005	0.029

Risk Presumption	**RQ**
Acute Risk	0.5
Acute Restricted Use	0.2
Acute Endangered Species	0.1
Chronic Risk	1

No acute or chronic levels of concern were exceeded by any single application of indoxacarb. For all multiple application scenarios modeled (cotton, apples/pears, corn/brassica/lettuce, and tomatoes/ peppers), no acute risk nor chronic concerns were triggered (i.e., all RQs were less than the acute risk level of concern of 0.5 and the chronic level of concern of 1.0). Endangered species concerns for acute effects (RQ 0.1) are triggered for multiple applications of the pesticide to cotton, grape, soybean, peanut, pear, and apple for avian wildlife consuming vegetation in the short grass category (RQs of 0.14 and 0.129).

To evaluate risk from granular broadcast applications to birds EFED calculates the number of lethal doses (LD_{50} s) that are available within one square foot immediately after application. RQs are calculated for three separate weight class of birds: 1000 g (*e.g.*, waterfowl), 180 g (*e.g.*, upland gamebird), and 20 g (*e.g.*, songbird). The results of these risk quotients are presented in Table 21 below for fire ant and mole cricket control.

Table 21: Avian Acute Risk Quotient Calculations for Granular Broadcast Applications of Indoxacarb for fire ant (0.0027 lb KN128/A) and mole cricket (0.44 lb KN128/A)

Animal Body Weight (g)	Acute Toxicity Threshold, LD_{50} (mg/kg)	Acute RQ (LD_{50} per ft^2) [a]
Fire ant (0.0027 lb KN128/A; single application)		
20	98	0.0143
180	98	0.0016
1000	98	0.0003
Fire ant (0.44 lb KN128/A; single application)		
20	98	2.3371
180	98	0.2597
1000	98	0.0467

[a] $RQ = \frac{\text{App. Rate (lbs ae)}}{\text{Acre}} \times \frac{453{,}590\text{ mg}}{\text{Lb}} \times \frac{\text{Acre}}{43{,}560\text{ ft}^2} \times \frac{1}{\text{Animal weight (g)}} \times \frac{1000\text{ g}}{1\text{ kg}} \times \frac{\text{Kg}}{\text{LD50 mg}}$

Risk Presumption	RQ
Acute Risk	0.5
Acute Restricted Use	0.2
Acute Endangered Species	0.1

These RQ values indicate the acute, restricted use, and endangered species levels of concern are exceeded for 20 and 180 g birds for the mole cricket at the maximum single application rate. However, the LOCs are not exceeded for any weight class of birds for fire ants.

Although EFED does not currently quantify risks for terrestrial non-target insects, data submitted show that indoxacarb is highly toxic to honeybees (LD_{50} = 0.18 µg/bee). Additional field data show that DPX-MP062 sprayed at a rate of 133 g/ha caused significant mortality after a

24 hour exposure. Label statements to afford protection to non-target insects must be included for all uses of indoxacarb.

b. Plants

As discussed in the toxicity section there is no evidence from the literature that indicate that indoxacarb or its degradates are phytotoxic to terrestrial plants. Risk to terrestrial plants is expected to be low.

3. Review of Incident Data

FIFRA 6(a)(2) incident data add lines of evidence to provide evidence that the risk predictions from the screening level assessment are substantiated with actual effects in the field. Since indoxacarb is a relatively new chemical no incidents have as yet been entered into the system.

4. Federally Threatened and Endangered (Listed) Species Concerns

a. Action Area

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 Level I screening 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 organisms are assumed to be located in a surface water body adjacent to the treated site. The assessment also assumes that the listed species are located within an assumed area which has the relatively highest potential exposure to the pesticide, and that exposures are likely to decrease with distance from the treatment area. The Use Characterization section of this risk assessment presents the pesticide use sites that are used to establish initial co-location of species with treatment areas.

If the assumptions 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 affect" 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 organism and may potentially include areas of exposure that are downwind and downstream of the pesticide use site.

b. Taxonomic Groups Potentially at Risk

The Level I screening assessment process for listed species uses the generic taxonomic group-based process to make inferences on direct effect concerns for listed species. The first iteration of reporting the results of the Level I screen is a listing of pesticide use sites and taxonomic groups for which RQ calculations reveal values that meet or exceed the listed species LOCs. In the majority of cases, the screening-level risk assessment process reports RQ calculations for the following broad taxonomic groupings:

- Birds (also used as surrogate for terrestrial-phase amphibians and reptiles)
- Mammals
- Freshwater fish (also used as a surrogate for aquatic phase amphibians)
- Freshwater invertebrates
- Estuarine/marine fish
- Estuarine/marine invertebrates
- Terrestrial plants
- Algae and aquatic plants

There may also be taxonomic groups of listed species for which screening tools are not fully developed nor represented through surrogacy with existing tools. For example, there is no RQ calculation process for terrestrial invertebrates.

The available screening level information for indoxacarb suggests a potential concern for direct effects on listed mammals associated with cotton, orchard crops, corn, brassica, tomato, lettuce, and pepper and turf (mole crickets). Potential concern for direct effects on listed birds consuming vegetation in the short grass category is indicated when associated with multiple applications to cotton, grape, soybean, peanut, apple, and pear. There are also direct effects to 20 and 180 g birds for single applications to turf (mole crickets). In addition, there is potential concern for direct effects to listed estuarine/marine invertebrate species associated with application to peanuts and alfalfa (TX and PA).

1. Discussion of Risk Quotients

As summarized in the Risk Characterization section of this assessment, endangered species LOCs are exceeded for mammals and birds. The acute mammalian RQs of 0.14 exceeded the endangered species LOCs only for cotton and orchard crops for single applications for 15 g mammals consuming grass. Acute RQs for multiple applications was met or exceeded in two of three food items modeled for 15 and 35 g mammals in the cotton (RQs from 0.176 to

0.451), apple/pear (RQs from 0.176 to 0.417), corn/brassica/lettuce (RQs from 0.113 to 0.290), and tomato/pepper (RQs from 0.113 to 0.267) scenarios. Acute, restricted use, and endangered species mammalian LOCs are exceeded for 15 and 35 g mammals for the mole cricket at the maximum single application rate. However, the LOCs are not exceeded for any weight class of mammals for fire ants.

Mammalian chronic risk LOCs are exceeded for multiple applications for the cotton scenario in three wildlife food items with RQs ranging from 1.29 to 2.82. Similar results are evident for the apple/pear scenario (RQs for three food items ranging from 1.20 to 2.6). RQs exceeding the level of concern are also evident for the corn/brassica/lettuce and tomato/pepper scenarios (RQ 1.02-1.8). In addition to chronic risk from reproductive effects, chronic risk resulting from hemolytic effects are also possible. The RQs from these effects range from 1.19 to 14.1 for three of the four wildlife food types for all application scenarios for both single and multiple applications.

Avian acute, restricted use, and endangered species LOCs are exceeded for 20 and 180 g birds when applied to turf to control mole crickets, but no other avian acute or chronic risk LOCs are exceeded by any other applications of indoxacarb. However, acute endangered species concerns (RQ = 0.1) are triggered for multiple applications of the pesticide to cotton, grape, soybean, peanut, apple, and pear for avian wildlife consuming vegetation in the short grass category (RQs of 0.14 and 0.129).

Acute restricted use and endangered species risk quotients were exceeded for estuarine/marine invertebrates for the peanut and alfalfa scenarios (TX and PA).

2. Probit Dose Response Relationship

LOC values are based on the assumption of a probit dose-response relationship for acute toxicity endpoints. The listed species LOCs or the fraction (0.05 or 0.1) of the dose estimated to produce 50% mortality were used to interpolated from a probit dose response curve to estimate the associated ECx, LCx or LDx. These values were then used to estimate the chance of an individual event. The chance of an individual event is highly dependant on upon the shape and slope of the dose-response relationship.

With regard to birds and the calculation of the chance of an individual event occurrence associated with an LOC of 0.1 is based on an assumption of a probit dose response relationship with a mean estimated slope of 5.06. The corresponding estimated chance of individual mortality associated with the listed species LOC of 0.1 the acute toxic endpoint for birds is 1 in 4.76×10^6. It is recognized that extrapolation of very low probability events is associated with considerable uncertainty in the resulting estimates. To explore possible bounds to such estimates, the upper and lower values for the mean slope the estimated the 95% confidence intervals of 2.69 and 7.44 were used to calculate upper and lower estimates of the effects probability associated with the listed species LOC. These values are 1 in 280 and 1 in 1.97×10^{13}, respectively.

These same calculations from the mammalian LD_{50} of 179 mg/kg and a mean slope of 5.12 estimate the chance of individual mortality associated with the listed species LOC of 0.1 is 1 in 6.53 x 10^6. The 95% confidence intervals of 1.23 an 9.02 were used to calculate the upper and lower estimates of the effects probability. These values are 1 in 9.15 and 1 in 1 x 10^{16}, respectively.

Slope information is not provided in the DERs for freshwater fish (MRID 444772-11) and aquatic invertebrates (MRID 444772-19). For such situations, the raw data from the study is entered into and analyzed by the EFED current statistical package available from the EFED Statistical Workgroup, and the probit slope information will be used from these analyses. Although the assumptions from the probit dose responses were shown to be statistically unsupported, the slope estimates are still used in the listed species LOC interpretation. However, although the Agency has assumed a probit dose response relationship in establishing the listed species LOCs, the available data for the toxicity study generating RQs for this taxonomic group do not statistically support a probit dose response relationship (the p-values are $p>0.1$ and $p<0.0018$ for fish and freshwater invertebrates, respectively). Therefore the confidence in estimated event probabilities based on this dose response relationship and the listed species LOC is low.

The slope from the freshwater fish study is 40.343 with an LC_{50} of 0.29 mg/L and estimate the chance of individual mortality associated with the listed species LOC of 0.05 is 1 in 1 x 10^{16}. The chance of individual mortality for freshwater aquatic invertebrates where the LC_{50} = 0.6 mg/L and a mean slope of 10.2365 is also 1 in 1 x 10^{16}, the limit of Excel reporting.

The mean slope from the esturine/marine invertebrate study with an LC_{50} of 0.0542 is 3.7. The chance of individual mortality with this listed species is 1 in 1,350,000.

3. Data Related to Under-represented Taxa

Although the Level I screening assessment process relies on RQ calculations that use toxicity endpoints selected from the most sensitive species tested within broad taxonomic groups, there may be situations in which additional effects data from one or more sources may suggest that a given suite of listed taxa may be more or less sensitive than suggested by the effects data used for RQ calculations. In these circumstances, the screening level RQs are not changed, but effects data more specific to listed species may be used to evaluate the extent to which screening-level RQs adequately represent conclusions regarding effects on specific listed taxa.

An example of this is illustrated in the analysis for listed amphibians. Fish effects data are commonly used to evaluate impacts to aquatic phase amphibians at the screening level. But, if toxicity data were available on amphibians, and it is markedly different from the surrogate fish data used to estimate RQs, these effects data may be compared with estimated exposures for the following purposes:

- Determine our level of confidence in the ability of listed species conclusions based on the

fish-based RQs to provide appropriate protection for listed amphibians, and to
- More fully discuss any concerns for listed amphibians.

With regard to available toxicity data for indoxacarb, data are available for the estuarine/marine mollusc. The LC_{50} of 0.203 mg/L is highly toxic to molluscs and this value can be applied as a potential surrogate species for freshwater molluscs. Using this value the risk quotient for KN-128 isomer is below all levels of concerns (0.041). However, the RQ for the JT333 degradate triggers endangered species risk (RQ = 0.05) for the peanut scenario (the crop with the highest modeled concentration).

4. Implications of Sub-lethal Effects

The Level I screening assessment relies on the acute mortality endpoint as well as a suite of sublethal responses to the chemical stressor, as determined by the testing of species response to chronic exposure conditions and subsequent chronic risk assessment. When discussing the results of the chronic RQs for listed species, the nature of the sublethal effects encountered should be presented.

Examples of these sublethal endpoints include the following:

Aquatic Organisms	Test Type	Sublethal Measures of Effect
	Invertebrate Life-Cycle	Production of young by first generation
		Length of first generation
	Fish Early Life-Stage	Embryo hatch rate
		Time to hatch
		Time to swim-up
		Growth (length and weight)
		Pathological or histological effects
		Observations of other clinical signs
	Fish Life-Cycle	Embryo hatch rate
		Time to hatch
		Growth (length)
		Exposed adult egg production
		Second generation hatch rate
		Second generation growth
Birds	Reproduction	Maternal weight
		Eggs laid/hen
		Eggs cracked
		Eggshell thickness
		Viable embryos

		Hatchling number 14-day survivors Gross necropsy (organ lesions, fat and muscle deterioration) Observations of other clinical signs
Mammals	Two-Generation Reproduction	Total panel of reproduction parameters including: histopathology, parental and offspring growth, weight, mating, lactation, gonadal development milestones, sexual organ performance, and offspring production

As discussed above, only mammalian chronic risk LOCs are exceeded for multiple applications for the cotton scenario in three wildlife food items. The RQs for cotton range from 1.29 to 2.82. Similar results are evident for the apple/pear scenario (RQs for three food items range from 1.20 to 2.6). RQs exceeding the level of concern are also evident for the corn/brassica/lettuce and tomato/pepper scenarios (RQ 1.02-1.8). In addition to chronic risk from reproductive effects, chronic risk resulting from hemolytic effects are also possible. The RQs from these effects range from 1.19 to 14.1 for three of the four wildlife food types for all application scenarios for both single and multiple applications.

As discussed in the risk characterization section, concerns have been raised regarding the possible sub-lethal effects which may occur to small mammals. A 90-day rat sub-chronic dietary study showing hemolytic and associated effects on spleen weight. These effects were also observed in a variety of sub-chronic and chronic studies and across a number of species other than laboratory rats. The registrant has proposed a toxic mechanism of action for these observed hemolytic effects (MRID 44910813). As discussed, this mechanism suggests that the observed hematologic effects for indoxacarb are the product of oxidant effects on red blood cells and involve an aryl-amine metabolite of the parent compound. This metabolite is bio-transformed to the corresponding N-hydroxylamine. It follows that the hemolytic effect does not show stereospecificity such that the chiral portion of the KN128 and KN127 isomers have little influence on this mechanism. Therefore, exposure assessments for this endpoint should be based on application mass of both isomers together. The potential significance of risks for hemolytic effects in wild mammals indicate that even though this chronic toxicity endpoint has no direct numerical relationship to survival and fecundity, the overall resistance to disease, nutritional deficiencies and other stressors may impact the viability a small mammalian populations.

c. Indirect Effects Analysis

In conducting a screen for indirect effects, direct effect LOCs for each taxonomic group are used to make inferences concerning the potential for indirect effects upon listed species that rely upon non-listed organisms in these taxonomic groups as resources critical to their life cycle. Pesticide-use scenarios, resulting in RQs that are below all direct effect listed species LOCs for all taxonomic groups assessed are considered of no concern for risks to listed species either by direct or indirect effects. However, there may be situations where a taxonomic group is not quantitatively assessed (e.g., terrestrial insects), but other lines of evidence are sufficiently supportive of concerns for indirect effects on listed organisms that are dependant upon that taxonomic group.

The Level I screening indirect effects analysis documents those types of dependencies upon non-listed organisms that could be important sources of indirect effects to listed organisms should effective levels of the pesticide coincide with locations of listed species and the biologically based resources upon which they depend. Generally speaking, when a taxonomic group shows an RQ higher than the listed species LOC, **a potential concern** for indirect effects to **any** listed species in **any** taxonomic group that has a dependency on the taxa for which the RQ is in excess of the LOC **and** which is co-located with the pesticide use site is established.

For listed species LOCs for animals, the RQs vary with the slope of the dose response relationship. So, when an RQ for an animal taxonomic group exceeds the listed species LOC, one is concerned for a potential for indirect effects in **any** listed species in **any** taxonomic group which is co-located with the pesticide use site. This information serves as a guide to establish the need for and extent of additional analysis that may be performed using Services-provided "species profiles" as well as evaluations of the geographical and temporal nature of the exposure to ascertain if a not likely to adversely affect determination can be made. The degree to which additional analyses are performed is commensurate with the predicted probability of adverse effects from the comparison of dose response information with the EECs. The greater the probability that exposures will produce effects on a taxa, the greater the concern for potential indirect effects for listed species dependant upon that taxa, and therefore, the more intensive the analysis on the potential listed species of concern, their locations relative to the use site, and information regarding the use scenario (e.g., timing, frequency, and geographical extent of pesticide application). Greatest concerns would exist when exposure is associated with a risk higher than the effects probability associated with the non-endangered LOC for a pesticide with an average slope of 4.5.

The average slopes for mammals and birds are 5.12 and 5.06, respectively. As discussed above in the Probit Dose Response Relationship section, these slopes represent an estimated chance of individual listed species mortality of 1 in 6.53×10^6 for mammals and 1 in 4.76×10^6 for birds. Although this probability is less than the probability of a slope of 4.5, the lower bounds of these slopes are 1.23 for mammals and 1.69 for birds. These probabilities represent effects probabilities of 1 in 9.15 and 1 in 280, respectively.

Listed species LOCs for indoxacarb are exceeded for herbivore/insectivorous mammals, birds (for multiple applications to cotton, grape, soybean, peanut, apple, and pear for avian wildlife consuming vegetation in the short grass category), and estuarine/marine invertebrates (for the peanut and alfalfa scenarios). Although EFED does not currently quantify risks for terrestrial non-target insects, data submitted show that indoxacarb is highly toxic to honeybees (LD_{50} = 0.18 µg/bee). Additional field data show that DPX-MP062 sprayed at a rate of 133 g/ha caused significant mortality after a 24 hour exposure. This means that there are potential concerns for indirect effect on animals that eat birds, mammals, or estuarine/marine aquatic invertebrates; plants that require mammals, birds, or insects as pollinators or seed dispersers; and listed animals that use mammal or reptile burrows for shelter or breeding habitat.

d. 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 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 dependant upon mammals, birds, and esturine/marine invertebrates. 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: mammals, birds, and esturine/marine invertebrates. 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"

e. Co-occurrence Analysis

The goal of the analysis for co-location is to determine whether sites of pesticide use are geographically associated with known locations of listed species. At the screening level, this analysis is accomplished using the LOCATES database. The database uses location information for listed species at the county level and compares it to agricultural census data for crop production at the same county level of resolution. The product is a listing of federally listed species that are located within counties known to produce the crop upon which the pesticide will be used. Because the Level I screening assessment considers **both** direct and indirect effects across generic taxonomic groupings, it is not possible to exclude any taxonomic group from a LOCATES database run for a screening risk assessment. The complete results are listed in Appendix E

Although this list is repetitive because it lists the species within each county, this list could be refined by consideration of the biology of listed species, the locations of these species, fate and transport properties of the chemical, and the locations of use sites. In the case of indoxacarb risk, only the turf site for the control of mole crickets exceed the acute listed species sites for 20 and 180 g birds. Consideration of birds weighing more than 180 g could, therefore, shorten the list. In addition, since listed species RQs are only exceeded for birds foraging in short grass an additional number of birds could dropped from the list based on their diet.

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

The results of the risk assessment suggest a limited concern for avian acute or chronic risks to non-endangered species.

There are a number of areas of uncertainty in the avian risk assessment that merit discussion. These include the following:

1. **Only dietary exposure is included in the exposure assessment.** Other exposure routes are possible for birds in treated areas. These routes include ingestion of contaminated soils, ingestion of contaminated drinking water, preening, dermal contact, and inhalation. Given the low potential for indoxacarb volatilization (v.p. 1.9×10^{-10} torr) inhalation does not appear to be a significant contributor to overall exposure. Similarly, dermal exposure is likely to be of low importance given that HED has established a low dermal absorption factor (1%) from mammalian testing (HED Document No. 013528). Consumption of drinking water would appear to be inconsequential if water concentrations were equivalent to the low concentrations from PRZM/EXAMS. However, direct application to puddles or to dew on plant surfaces could be expected to be higher, and so the drinking water route remains an unquantified concern. Finally, preening exposures, involving the oral ingestion of material preened from the feathers remains an unquantified ,but potentially important, exposure route.

2. **The risk assessment only considers the most sensitive species <u>tested</u>**. Avian acute and chronic risks are based on toxicity data for the most sensitive bird species tested. Bird responses to a toxicant can be expected to be variable across species. In the case of indoxacarb, only two bird species have been tested. Sensitivity differences between species can be considerable (up to two orders of magnitude) for some chemicals. The

position of the two tested species relative to the distribution of all species' sensitivities to indoxacarb is unknown.

3. **The risk assessment assumes 100% of the avian diet is relegated to single food types foraged only from treated fields.** These assumptions are likely to be conservative for many species. 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.

4. **The exposure assessment used 95th percentile residue values.** The residue values used from Fletcher et al. (1994) represent values that ensure 5% or less of the residue measurements included in the study are greater (i.e. a 95th percentile). Values selected from points lower on the distribution would yield lower exposure estimates and lower resultant RQs.

5. **The exposure assessment modeled repeat application residues using a mean food item dissipation half life of 22.46 days.** As discussed in the exposure assessment section of this document, the mean of available studies of foliar dissipation was a half-life of 22.46 days, with a maximum of 72.2 days and a minimum of 2.46 days. Incorporation of minimum measured and maximum measured half-life values results in changes to the residues by factors of 0.5X and 2X, respectively. Even using the highest measured half-life value would not result in a trigger of the acute high risk level of concern.

The risk quotient calculations suggest limited concern for acute risks in populations of small mammals. In the case of small insectivorous/herbivorous mammals in treated areas, the predicted risk quotients suggest that restricted use provisions on the label could reduce these concerns.

There are additional concerns for reproduction/developmental and hemolytic effects. Reproduction/developmental risks are of concern in one or more food items for all labeled crops. However, the types of effects observed in dietary developmental/reproduction studies have uncertain implications for wild mammals. A more detailed discussion of this issue follows under Uncertainty Item 2 below.

The calculated RQs suggest that hemolytic risks are of concern, with the risk assessment suggesting such effects in exposed mammals for all but the lowest residue food category. These risks are evident even with one application of indoxacarb. A more detailed discussion of this issue follows under Uncertainty Item 3 below.

In <u>addition</u> to the uncertainty items discussed for birds, there are a number of areas of uncertainty in the mammalian risk assessment that merit discussion. These include the following:

1. **Only parent indoxacarb is included in the exposure assessment.** As discussed in the mammalian toxicological profile section , available acute toxicity data (Table C-8) on the

degradates suggests that KG433 is of comparable toxicity to parent and JT333 is more toxic to mammals than parent by a factor greater than 5. However, neither of these compounds were identified as a major degradate in the hydrolysis or photolysis environmental fate studies, pathways EFED considers important to the degradation of pesticide residues on plant surfaces. Nevertheless, there exists an unquantified potential for residues of JT333 in food items to be a contributor to overall toxic risks to mammals. In addition, no information on the concentration of JT333 in insects after treatment with indoxacarb are available. Because JT333 is readily produced in insects, it remains possible that, for insectivorous mammals, exposure to residues of JT333 in intoxicated insects could contribute to overall exposure and consequently this risk assessment may underestimate acute and possibly chronic risks.

2. **There is uncertainty as to the significance of the reproduction endpoint used for assessment purposes with respect to wild mammal populations.** The reproduction/ developmental endpoint selected for use in the risk assessment (NOAEC 40 mg/kg-diet) is associated with observations of reduced fetal weight (MRID 44477139). In this same study, no differences were observed between treatments as high as 120 mg/kg-diet and controls for the number of corpora lutea/dam, implantations/dam, pre- or post implantation loss, resorptions/dam, fetuses/litter, or fetal sex ratios. Additionally, no treatment-related external, visceral, or skeletal malformations or variations we observed. Reliance on reduced fetal weight as the endpoint of concern suggests that risks to wild mammals may be overestimated by this assessment. In fact, the only developmental or reproductive effects that have been observed in testing with mammals come from range-finding gavage studies with rats (MRID 44477140 and 44477143). These studies involved prenatally daily dosed rats at 0, 10, 100, 500, and 1000 mg/kg-bw. Adverse effects on the number of fetuses/litter were observed at 100 mg/kg-bw (LOAEL). These gavage data cannot be directly compared with the wildlife EECs calculated for the risk assessment. Instead, the mg/kg-bw endpoints must be converted to dietary concentrations, using assumptions of animal body weight and food intake. HED commonly uses a conversion factor of 20 to relate mg/kg-bw to a corresponding dietary concentration. Using this factor and the NOAEL of 10 mg/kg-bw yields a theoretical NOAEC of 200 mg/kg-diet, far above the maximum EECs calculated in this assessment and even above the observed NOAEC for frank developmental and reproductive effects from MRID 44477139.

3. **The importance of hemolytic responses in wild mammal fitness is not certain.** The Health Effects Division is currently considering the implications of observed hemolytic effects in test mammals with respect to human health. The registrant has proffered an opinion on the importance of observed hemolysis effects with respect to humans (DuPont report Number 3389 MRID 44910803). Essentially the registrant position is that observed hemolytic effects are largely within compensatory levels and are observed in mammals that are demonstrably more sensitive to such effects than humans. EFED will not comment on the merits of this position for human health effects, but questions its applicability to wild mammals in the field that are faced with a number of environmental

challenges not likely to be encountered in the lab nor by the majority of humans. The degree to which wild mammals subjected to hemolytic losses can recover relative to compensatory ability in mammals in the laboratory is uncertain.

In the 13-week study involving laboratory rats (MRID 44477132), the female NOAEC is 8 mg/kg-diet, which is the toxicity threshold for the risk assessment. This NOAEC is based on microscopic evidence of hematopoeisis (elevated red blood cell production). However, higher doses produced significant ($p \leq 0.05$) decreases (13-17%) in red blood cell count, hemoglobin, and hematocrit, with a NOAEC for these frank hemolytic indicators of 20 mg/kg-diet. If these effects are selected in place of the microscopic indicators of hemolysis, resulting RQs for hemolytic effects are reduced 2.5 fold. Such a reduction would still result in concerns for mammals under a single label application to all target crops (short grass food type only) as well for all multiple application scenarios modeled for three food types.

EFED is uncertain as to the quantitative impact of these hemolytic effects on individual wild mammal survival, the ability of individuals to resist other stressors, and the ability to maintain nutritive and energy status. However, the following discusses some qualitative aspects to concerns for hemolysis in wild mammals.

Anemia reduces the amount of red blood cells and consequently the amount of oxygen carried in the blood. This oxygen is needed for continued physical activity. Therefore, an anemic animal may have diminished ability to avoid predation (Jain 1993)[3]. In addition, if an anemic animal is injured when trying to escape a predator or when defending its territory resulting in blood loss, the ability of this animal to recover from such injury would be decreased.

Warm blooded animals can develop anemia when they are exposed to cold temperatures (Mihok and Schwartz 1989)[4]. If an animal is already facing hemolytic risks from indoxacarb exposure, cold tolerance could be reduced with a possible decreased survivability at what would normally be tolerable temperatures. Mammals exposed to indoxacarb in the spring or autumn, when temperatures fluctuate between extreme temperatures of warm and cold, may have reduced survivability. Along with decreased cold tolerance is the inability of the anemic animal to maintain normal body temperature at the same energetic costs[2]. Therefore, anemic animals may ultimately have higher requirements for assimilative sources of energy than normal animals in order to maintain the body temperature. It is uncertain how such increases in energy requirements may

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[3]Jain, N. C. 1993. Essentials of Veterinary Hematology. Lea & Febiger, Philadelphia.

[4]Mihok, S. and B. Schwartz. 1989. Anemia at the onset of winter in the meadow vole (*Microtus pennsylvanicus*). Comparative Biochemistry and Physiology, A Comparative Physiology, 94(2):289-304.

affect energy budgets, but it is possible that shifts to enable the acquisition of more food may come at the expense of other critical activities such as defending territories, pursuing potential mates, or reproducing.

Ecto- and endo-parasite load on an animal also contributes to anemia (Jellison 1938)[5]. The higher the parasite load, the more anemic an animal may become, decreasing survivability (Anderson and Gordon 1982[6]; Booth et al., 1993[7]). Wild animals, under hemolytic risk due to Indoxacarb exposure, may possibly exhibit reduced tolerance of normal parasite loads, though the extent to which such an indirect effect will impact populations is uncertain.

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[5]Jellison, W. L. 1938. Tick-host anemia: A secondary anemia induced by *Dermacentor andersoni* Stiles. Journal of Parasitology, 24(2):143-154.

[6]Anderson, R. M. and D. M. Gordon. 1982. Processes influencing the distribution of parasite numbers within host populations with special emphasis on parasite-induced host mortalities. Parasitology, 85:373-398.

[7]Booth, D. T., D. H. Clayton, and B.A. Block. 1993. Experimental demonstration of the energetic cost of parasitism in free-ranging hosts. Proceedings of the Royal Society of London B, 253:125-129.

APPENDIX A

ENVIRONMENTAL FATE DISCUSSION
and
STRUCTURES OF INDOXACARB AND DEGRADATES

Environmental Fate and Transport

Degradation

Hydrolysis (161-1)--Radiolabeled DPX-JW062, at a nominal concentration of 0.15 mg/L, was hydrolytically stable (mean half-life= 519 days) in pH 5 aqueous buffer solution (< 6% degradation after 30 days), and hydrolyzed with nonlinear first-order half-lives of 36 days (r^2 = 0.96, indanone label; r^2 = 0.97, phenyl label) and 1 day (r^2 = 0.96, indanone label; r^2 = 0.90, phenyl label) in pH 7 and pH 9 aqueous buffer solutions incubated in darkness at 25 °C for up to 30 days. Similar degradation patterns were observed for the indanone and phenyl labeled DPX-JW062. The major degradate for idanone and phenyl labeled DPX-JW062 in both pH 7 and 9 buffer solutions was IN-KT413. However, unidentified minor degradates were detected in the pH 7 and 9 buffer solutions. **(MRID 44477301)**

Radiolabeled DPX-MPO62, at nominal concentration of 0.1 mg/L, was stable (t1/2= 577.62 days) in pH aqueous buffer solution , and hydrolyzed with linear first-order half-lives of 21.80 days in pH 7 aqueous buffer solution and 1.11 days in pH 9 buffer solution. IN-MF014 (methyl 2-[[[4-(trifluoromethoxy)phenyl]carbonyl]hydrazine carboxylate) was identified as minor degradation product (maximum 6.1% of applied) in pH 5 buffer solution. IN-MF014 and INKT413 (sodium 7-chloro-2,5-dihydro-2-[[methoxycarbonyl)[4-(trifluoromethoxy)phenyl]-amino]-carbonyl]-indeno[1,2-e][1,3,4]oxadiazine-4a(3H)-carboxylic acid) were major degradation in pH 7 buffer solutions. At pH 9, INKT413 was a major degradation product. Unidentified degradation products ("0thers") accounted for < 8% of applied radioactivity. In a supplementary
study, the enantiomeric ratio of the isomers of indoxacarb remained constant during the study. A proposed degradation pathway is that indoxacarb degraded to IN-KT413 via methylester hydrolysis, and IN-KT413 further degraded to IN-MF014 via cleavage of the center of the molecule. **(MRID 45795801)**.

Photodegradation in water (161-2)--The registrant calculated that indanone ring-labeled [1-^{14}C]DPX-JW062 and uniformly phenyl ring-labeled [^{14}C]DPX-JW062, at a concentration of 0.15 mg/L, photolyzed with a half-life of 3.16 nominal days (r^2 = 0.99; 0 to 2 day data only) in 0.001 M pH 5 buffer solution. In contrast, the parent compound was stable in the pH 5 dark control solutions. In natural creek water (pH=8.3), radiolabeled DPX-JW062 photolyzed with a dark control corrected half-life of 3.80 nominal days. There was degradation in the dark control because of alkaline-catalyzed hydrolysis.

However, the registrant calculated half-lives using censored data; the data from the last two sampling regimes were not included in half-life analyses. EFED recalculated the photodegradation half-lives using the whole data set. Based on recalculated half-lives, using nonlinear first order regression analysis and correcting for the dark control, indanone ring-labeled [1-^{14}C]DPX-JW062 and uniformly phenyl ring-labeled [^{14}C]DPX-JW062, at a concentration of 0.15 mg/L, photolyzed with a mean half-life of 3.1 days in 0.001 M pH 5 buffer solution. In natural creek water (pH=8.3), radiolabeled DPX-JW062 photolyzed with a dark control corrected mean half-life of 3.1 days. The mean dark control half-life in the creek water was 4.3 days.

In the irradiated samples (indanone label), major photodegradates were IN-MH304 and MW 297. The degradates IN-C0639 and IN-MA573 were identified, but were not quantified other than as components of HPLC Peak 1 which accounted for a maximum of 57.9% of the applied at 15 days; three additional unidentified compounds also contributed to Peak 1. Unidentified radioactivity consisting of residual radioactivity plus unidentified minor degradates was a maximum of 25.3% (8 days). For the irradiated solutions, $^{14}CO_2$ accounted for 14.8% of the applied radioactivity at 15 days post-treatment; [^{14}C]organic volatiles were negligible.

In the irradiated samples (phenyl label), major photodegradates were IN-KB687 and IN-MF014. Numerous (8-10) unidentified, fluorinated degradates comprised HPLC Peak 1 which accounted for a maximum of 33% of the applied at 15 days. Unidentified radioactivity consisting of residual radioactivity plus unidentified minor degradates was a maximum of 15.9% at 8 days post-treatment. For the irradiated solutions, $^{14}CO_2$ accounted for 10.5% of the applied radioactivity at 15 days post-treatment; [^{14}C]organic volatiles were negligible. **(MRID 44477302)**

Radiolabeled indonone and phenyl indoxacarb (3:1 mixture of the S and R enantiomers), at approximately 0.1 µg/mL, had a half-life of-3.44 days based on continuous irradiation used in the study or 6.88 days based on 12-hour light/12-hour dark cycle in sterile aqueous pH 5 buffer solution (0.01 M acetate) continuously irradiated using a UV-filtered xenon arc lamp for 15 days at 25 ± 1°C. The quantum yield of indoxacarb in the pH 5 buffer was determined to be 0.00038. In the **irradiated samples** (both labels), major transformation products includeded IN-MH304 (32.2-37.6% of the applied at 15 days posttreatment), IN-KB687 (28.7% of the applied at 10 days posttreatment), and IN-C0639 (10.2% of the applied at 15 days posttreatment), and IN-MA573 (19.9% at 10 days). No minor transformation products were identified. Unidentified nonpolar and polar [^{14}C]components were each <7% of the applied. After 15 days of irradiation, $^{14}CO_2$ totaled 10.4-12.1% of the applied radioactivity. In the **dark controls**, there was no major degradation products due to the stability of indoxacarb ($t_{1/2}$= 578 days). IN-MF014 (methyl 2-[[[4-(trifluoromethoxy)phenyl]amino]carbonyl]-hydrazine carboxylate) was a minor transformation product at a maximum of 6.1% of the applied in the trifluoromethoxyphenyl-treated solution. In a supplementary experiment, it was determined that the enantiomeric ratio of the isomers of indoxacarb remained constant throughout the study. A transformation pathway was proposed by the study author. Indoxacarb degrades to IN-MF014, which in turn degraded to IN-KB687. IN-KB687 degrades to CO_2. Alternatively, indoxacarb degrades to IN-MH304, which in turn degrades to IN-MA573. IN-MA573 degrades to CO_2 and IN-C0639, and IN-C0639 degrades to CO_2. **(MRID 45795802)**

Photodegradation on soil (161-3)

Indanone ring-labeled [1-^{14}C]DPX-JW062, at a nominal application rate of 1.08 kg a.i./ha, degraded with a dark control corrected half-life of 143 days (r^2 = 0.81) on silt loam soil maintained at approximately 25 ± 1 °C and irradiated continuously for up to 360 hours with a xenon arc lamp. Indanone ring labeled DPX-JW062 had a half-life of 96 days in dark controls. The minor degradate IN-JT333 was detected (0.3%-5.8% of the applied radioactivity) in irradiated and dark control treatments. Radiolabeled $^{14}CO_2$ was detected at maximum concentration of 4.5% of the applied radioactivity in the irradiated samples; $^{14}CO_2$ was not detected at any sampling interval in the dark controls.

Uniformly phenyl ring-labeled [^{14}C]DPX-JW062, at a nominal application rate of 1.00 kg a.i./ha, degraded with a dark control corrected half-life of 109 days (r^2 = 0.86) on silt loam soil maintained at approximately 25 ± 1 °C and irradiated continuously for up to 360 hours with a xenon arc lamp. Phenyl-ring labeled DPX-JW062 had a half-life of 55 days in the dark controls. The degradates IN-KB687 and INJT333 were detected in both irradiated and dark control treatments. Maximum concentrations of IN-KB687 were 22.0% and 16% of the applied radioactivity in the irradiated and dark control treatments, respectively. Maximum concentrations of IN-JT333 were 2.5% and 5.7% of the applied radioactivity in the irradiated and dark controls, respectively. Radiolabeled $^{14}CO_2$ had a maximum concentration of 2.9% of the applied radioactivity in the irradiated samples, and was not detected at any sampling interval in the dark controls. **(MRID 44477303)**

Metabolism

Aerobic soil metabolism (162-1)--Racemic Mixture-- Radiolabeled indanone ring-labeled [1-^{14}C]DPX-JW062 and phenyl ring-labeled [^{14}C]DPX-JW062 degradation studies, at a nominal rate of 7 µg/g, yielded linear first-order half-lives of 36.9 days (r^2=0.497) and 78.6 days (r^2=0.354), respectively, in silt loam soil adjusted to 75% of 0.33 bar moisture content and incubated in darkness at 25° C for up to 12 months. Because the degradation pattern of [1-^{14}C]DPX-JW062 appears to be biphasic, the registrant conducted additional kinetic analysis. Using the integrated nonlinear first-order model with non-transformed data, the half-lives of radiolabeled phenyl and indanone DPX-JW062 were 2.5 days (r^2=0.975) and 2.8 days (r^2=0.979). Using a sequential first-order model with the combined phenyl and indanone data, the half-life of DPX-JW062 in the initial rapid phase and the sequential slower phase was 4.2 days and 47.8 days (r^2=0.862), respectively.

Major degradation products of the indanone ring-labeled [1-^{14}C]DPX-JW062 were (IN-JT333),(IN-KG433) and IN-ML437-OH .Minor degradation products were IN-ML438 and IN-JU873. Ten unidentified polar degradates were detected. Evolved $^{14}CO_2$ generally increased throughout the incubation and was a maximum of 35.7% of the applied radioactivity at 12 months post-treatment. Nonextractable [^{14}C]residues were a maximum of 52.1% of the applied radioactivity at 3 months post-treatment.

Major degradation products of the phenyl ring-labeled DPX-JW062 were N-JT333, IN-KB687, IN-ML437-OH, and IN-MK643. Minor degradates were IN-ML438, IN-JU873, and IN-KG433.

Evolved $^{14}CO_2$ was a maximum of 7.5% of the applied radioactivity at 12 months post-treatment. Nonextractable [^{14}C]residues were a maximum of 65.6% of the applied radioactivity at 3 months post-treatment.

EFED estimated the half-life of IN-JT333 using a nonlinear first-order degradation model. The n half-lives of IN-JT333 were 30 (r^2=0.767) and 33 (r^2=0.925) days. The modeling was conducted assuming that the maximum concentration of IN-JT333 observed in the study (14.6 % of applied Indoxacarb) is equivalent to the initial concentration of IN-JT333. Such an assumption eliminates consideration of IN-JT333 formation kinetics from Indoxacarb in the IN-JT333 degradation kinetic model. The estimated half-life should be used as the aerobic soil metabolism half-life for IN-JT333 in environmental fate and transport modeling. (**MRID 44477304**)

Radiolabeled [indanone-1-^{14}C]- and [trifluoromethoxyphenyl-indoxacarb; DPX-JW062), equivalent to approximately 7.9 kg a.i./ha, had first order half-lives of 64 to 65 days (R^2=0.28) and non-linear half lives of 3 days (R^2=0.92) in silt loam soil (pH 6.3; organic matter 2.7%) from Illinois for 120 days under aerobic conditions in darkness at 25°C with a soil moisture content of 75% of 1/3 bar. Transformation products for both radiolabeled positions include IN-JT333, IN-ML438, IN-JU873, IN-KG433 and IN-ML437-OH. Transformation products found only in the trifluoromethoxyphenyl-treatments include IN-KB687, IN-MK638, and IN-MK643.

Based on first-order linear regression analysis (Excel 2000) of data from both the original and repeat studies, the half-life for the combined labels was determined to be 73.74 days using all data points and 8.63 days using data only through 30 days. The observed DT50 was <3 days. A high degree of uncertainty is associated with the calculated half-life because there are relatively few sampling intervals during the first week of the experiments when majority of the indoxacarb degraded and because very little degradation occurs between 14-15 days (concentration *ca.* 8%) and the termination of the study. The correlation coefficients for the combined label data through study termination are <0.6. Using non-linear/non-transformed regression, 2-parameter exponential decay analysis (SigmaPlot, ver. 8.0.2) for the combined labels/combined experiments data, the reviewer calculated a half-life of 2.6 days ($r^2 = 0.9095$; $p < 0.0001$).

A transformation pathway was proposed by the study author. Indoxacarb degrades via two primary routes: demethylation followed by N-decarboxylation to form IN-JT333 and opening of the oxadiazine ring to form IN-KG433. Degradation of IN-JT333 continues via opening of the oxadiazine ring to form IN-JU873 which further degrades via bridge cleavage to form IN-MK643 and IN-MK638 or via de-esterification and decarboxylation and a ring closure to form IN-ML438. IN-KG433 degrades via cleavage if the urea bridge to form IN-KB687. The indanone portion degrades via microbial mineralization to CO_2. (**MRID 457950803**).

Radiolabeled DPW-JW062 , at 1 ug/g, was incubated in three mineral soils [Speyer sandy loam (Germany), Nambsheim silt loam (France), Chino loam (California, USA) in darkness at 20^{0}C and at 50% of the water holding capacity at 0.0 bars for 120 days. Additionally, the Nambsheim silt loam using a similar experimental conditions was incubated at 10^{0}C. Acetonitrile/water soil extracts were analyzed by HPLC; and radiolabeled residues were identified by co-chromatography. The DT_{50} for indoxacarb was determined for each soil.

Registrant calculated DT_{50} for indoxacarb was 9 days in the Speyer soil, 6 days in the Nambsheim soil at 20^{0}C, 23 days in the Nambsheim soil at 10^{0}C, and no reported half-life for the Chino soil. Reviewer calculated nonlinear half-lives for indoxacarb was 15 days in the Speyer soil, 10 days in the Nambsheim soil at 20^{0}C, 30 days in the Nambsheim soil at 10^{0}C, and 693 days for the Chino soil. The first-order linear half-live for IN-JT333 was 12 and 26 days, respectively, in the Speyer and Nambsheim (20^{0}C) soils. Degradation products were similar to degradation products in other soil metabolism studies (MRID 44477304, 457950803, 44477307). Maximum concentrations of degradation products were: IN-JT333-11.2%, IN-KG433-39.7%, IN-JU873-12.9%, IN-ML438-9.7%, IN-MK643-12%, and IN-MK638-28.1%. Bound residues were at maximum of 47% after 120 days incubation.**(MRID 45166303)**

The registrant submitted additional degradation kinetic analysis to supplement calculated DT_{50}s of indoxacarb as reported in MRID 45166303. Degradation rates were determined using Excel (first-order linear regression) and ModelManager v 1.0 (nonlinear first-order kinetics and first-order multicompartmental modeling).

For [^{14}C]indoxacarb (DPX-MP062), the registrant-calculated DT50 (half-life) values for the Speyer soil, Nambsheim soil (10oC), Nambsheim soil (20oC), and Chino soil calculated using first-order linear regression were, respectively, 67 days ($r^2 = 0.67$), 41 days ($r^2 = 0.73$), 43 days ($r^2 = 0.94$), >120 days ($r^2 = 0.32$), using first-order nonlinear regressions were 23 days ($r^2 = 0.73$), 10 days ($r^2 = 0.92$), 30 days ($r^2 = 0.95$), >120 days ($r^2 = 0.32$), and using first-order multicompartmental modeling were 11 days ($r^2 = 0.97$), 9 days ($r^2 = 0.96$), 23 days ($r^2 = 0.98$), and >120 days ($r^2 = 0.38$).

For [^{14}C] IN-JT333, the registrant-calculated DT50 (half-life) values for the Speyer soil, Nambsheim soil (10oC), Nambsheim soil (20oC), and Chino soil calculated using first-order nonlinear regression were, respectively, 5 days ($r^2 = 0.90$), 16 days ($r^2 = 0.95$), 21 days ($r^2 = 0.98$), and not determined. **(MRID 45795812)**

Isomeric enriched mixture--Indanone ring-labeled [1-^{14}C]Indoxacarb, at a nominal rate of 2 lbs ai/A, degraded with a linear first-order half-life (calculated from the linear regression of time vs ln concentration) of 46.5 days (r^2=0.681) in silt loam soil adjusted to 75% often 0.33 bar moisture content and incubated in darkness at 20 ± 2 °C for up to 12 months. Because the degradation pattern of [1-^{14}C]Indoxacarb appears to be biphasic, the registrant conducted kinetic analysis. Using a sequential first-order model (or two sequential first linear models), the half-life of [1-^{14}C] Indoxacarb in the rapid degradation phase and the sequential slower degradation phase was 6.1 days and 115.9 days (r^2=0.995), respectively. In contrast, the nonlinear first-order half-life of [1-^{14}C]Indoxacarb was 6 days (r^2= 0.994). IN-JT333, a biologically active compound, had an EFED calculated linear first-order half-life of 53.8 days (r^2=0.9511).

Major degradation products (>10% of applied) were IN-JT333 and IN-KG433. A minor degradation product (<10% of applied) was IN-JU873. One unidentified degradate was detected at a maximum of 3% (0.03 ppm) of the applied radioactivity at 3 months post-treatment. Unidentified polar degradate(s) had a maximum concentration of 17% (0.17 ppm) of the applied radioactivity at 3 and 12 months post-treatment.

Evolved $^{14}CO_2$ had a maximum concentration of 33% of the applied radioactivity at 12 months post-treatment. Nonextractable soil [^{14}C]residues had a maximum concentration of 41% (reviewer-calculated from humic acid-, fulvic acid-, and humin-bound residues) of the applied radioactivity at 3 months post-treatment.

Chiral chromatography confirmed the enantiomeric ratio of the parent in selected soil extracts to be 19.6:80.4 and 21.2:78.8 [IN-KN127 (inactive enantiomer): DPX-KN128 (active enantiomer)]. However, the enantiomeric ratio of IN-JT333 was reversed [92.6:7.4 and 91.7:8.3]. These data suggest that isomers of indoxacarb have similar degradation rates; while reversed enantiomeric ratios for IN-JT333 suggest that IN-JT333 isomers have different degradation rates. **(MRID 44477307)**

Degradation Products (IN-KT413, IN-MK638, IN-KG433, IN-JU873, and IN-MK643)

Radiolabeled IN-KT413, IN-MK638, IN-KG433, IN-JU873, and IN-MK643 were incubated in foreign soils [Speyer (Germany), Lleida clay loam (Spain), Pesaro clay loam (Italy)] and United States soils [Mattapex (Maryland) and Hildago sandy clay loam (Texas)] to assess aerobic soil degradation pathways and rates. Soils were incubated at 20^{0}C and at 50% of the soil water holding capacity. Experiments were conducted in accordance with European Commission, SETAC-Europe, and OECD guidelines, and in compliance with US EPA FIFRA GLP standards.

IN-KT413 and IN-MK638 were non-persistent ($t_{1/2}$ 1.3 to 16.2 days) in foreign and US mineral soils (MRID 45906703, 45795816) (Table XX). IN-KG433 and IN-JU873 were non-persistent to moderately persistent ($t_{1/2}$ 10.5 to 58.7 days) in aerobic soils (MRID 45795814, 45795815). In contrast, IN-MK643 was persistent ($t_{1/2}$ 141.5 to 346.6 days) in aerobic soils (MRID 45795817). Degradation products were not identified. However, the degradation pathways were associated with oxidative mineralization to CO_2 and residue incorporation into non-extractable soil organic matter.

Table A-1: Aerobic Soil Metabolism Half-lives for Indoxacarb Degradation Products.

Compound	Chiral	Linear Half-lives (days)	Non-Linear Half-lives (days)	Degradation Products	MRID
IN-KT413	Yes	1-7	NA	SOM	45906703
IN-KG433	Yes	11-39	~ 2 days	Unidentified ext, CO_2, SOM	45795815
IN-JU873	Yes	28-59	NA	CO_2, SOM	45795814
IN-MK638	No	9 -16	NA	CO_2	45795816
IN-MK643	No	142-315	128-327	SOM	45795817

Anaerobic aquatic metabolism (162-3)--Radiolabeled DPX-JW062, at a nominal concentration of 10 µg/g soil, degraded with registrant-calculated 50% dissipation time (DT50) of in anaerobic flooded silt loam soil incubated in darkness at 20 ± 2°C for up to 365 days. Using conventional 1st order linear regression analysis for the data in the water phase, the registrant-calculated mean half-life was 6.0 days. No parent was detected in the water phase after 21 days of incubation.

EFED calculated nonlinear first-order half-lives of total DPX-JW062 in the test systems (soil + water). The half-lives were 147 days (r^2=0.611) and 231 days (r^2= 0.483) for the indanone label and phenyl label, respectively.

Major aqueous degradation products (>10% of applied) from indanone labeled DPX-JW062 were IN-JT333 and IN-KT413; and three unidentified degradates (B1, B2 and B3). Major degradation products in soil were IN-JT333 and the unidentified degradate (A1). Nonextractable

[^{14}C]residues in the soil phase were a maximum of 42.5% of the applied radioactivity by 322 days post-treatment. Evolved $^{14}CO_2$ accounted for 6.0% of the applied radioactivity following 365 days of incubation; [^{14}C]organic volatiles were negligible.

Major aqueous degradation products (>10% of applied) from uniformly phenyl ring-labeled DPX-JW062 were IN-KT413 and the unidentified degradate (B1). A minor aqueous degradation product (<10% of applied) was IN-JT333. The major degradation product in soil was IN-JT333. Nonextractable [^{14}C]residues in the soil phase reached a maximum of 46.8% of the applied radioactivity by 365 days post-treatment. Evolved $^{14}CO_2$ accounted for 0.5% of the applied radioactivity following 365 days of incubation; [^{14}C]organic volatiles were negligible. The study is supplemental. **(MRID 44477305)**

Radiolabeled [indanone-]- and [trifluoromethoxyphenyl]-labeled indoxacarb (DPX-JW062; 1:1 mixture of S and R enantiomers), at 11.3 kg a.i., had half-lives of 192 days and 315days, respectively, in water-silt loam soil [purified water; soil pH 6.2, organic matter 2.4%; average redox potentials from -98.0 mV to +184.4 mV (water)] from Illinois for 365 days under anaerobic conditions in darkness at 20 ± 2°C.

The ratio of [^{14}C]residues in the soil and water was approximately 1:1 to 3:1 through 31 days, 10:1 and 22:1 in the indanone and trifluoromethoxyphenyl treatments, respectively, at 120 days, and 39:1 and 53:1, respectively, at 365 days.

[Indanone-1-^{14}C]indoxacarb: Major transformation product were identified as IN-KT413 in the water layer and IN-JT333in the soil layer; no other transformation products were identified. In the water layer, IN-KT413 was detected at only three intervals: at 10.7% of the applied at 6 days posttreatment, at 11.1% at 31 days, and at 2.8% at 59 days. Unidentified HPLC peaks B1, B2, and B3 were maximums of 11.3-16.5% of the applied at 9-21 days posttreatment and were ≤2.4% at and after 91 days; these were thought to be transformation products of IN-KT413. Up to 12.8% of the applied (21 days posttreatment) in the water was not identified. In the soil extract, IN-JT333 was a maximum of 28.2% of the applied at 282 days posttreatment, decreasing to 12.2% at 365 days (study termination). A1 was a maximum 11.9% of the applied at 21 days posttreatment. Up to 11.4% of the applied (59 days posttreatment) extracted from the soil was not identified.

[Trifluoromethoxyphenyl-^{14}C]indoxacarb: Major degradation products were IN-KT413 in the water layer. Additionally, unidentified degradation products, B1, B2, and B3l, had maximum concentrations of 35.3, 29.9, and 4.6% of the applied, respectively. IN-JT333 was a maximum of 10.1% of the applied in the soil. Also, an unidentified degradation product, A1, was a maximum 8.6% of the applied at 31 days posttreatment. No other transformation products were quantified, and no transformation products that were quantified were found in both the water and soil phases.
In both systems, the concentration of extractable [^{14}C]residues in the soil were variable, ranging from 43.2-71.1% of the applied between 0 and 322 days posttreatment, and were 38.3 and 45.1% at 365 days. Nonextractable [^{14}C]residues increased to 41.5-46.8% of the applied at 365 days.

At 365 days posttreatment, the distribution of the nonextractable residues was 10.8%-11.5% of the applied as humin, 17.5-21.9% as humic acid, and 11.5-14.3% as fulvic acid. At 365 days posttreatment, [^{14}C]residues trapped in the NaOH solutions (presumed to be CO_2) totaled 6.0% of the applied in the indanone treatment and 0.5% in the trifluoromethoxyphenyl treatment. No significant residues were trapped in the ethylene glycol. It was determined that the enantiomeric ratio of the isomers of indoxacarb remained constant throughout the study in both treatments.

The observed half-lives for the combined labels of indoxacarb in the water, soil and entire system were 9-15, 365, and 15-91 days, respectively; the calculated half-lives were 31.8, 385.1, and 247.6 days, respectively. However, the calculated half-lives are of limited value because the dissipation kinetics did not fit the first-order linear regression model.

A transformation pathway was proposed by the study author. DPX-JW062 degrades to IN-JT333 in the soil and to IN-KT413 in the water, with subsequent cleavage of the ring system resulting in polar transformation products and the ultimate mineralization to CO_2. **(MRID 45765804)**

Aerobic aquatic metabolism (162-4)--Radiolabeled indanone and phenyl radiolabeled DPX-JW062 , at a nominal application rate of 1 µg/mL, degraded in sediment + water with registrant calculated DT_{50}s of 10 and 17 days in aerobic flooded Brandywine River and Lums Pond systems, respectively, that were incubated in darkness at approximately 20°C for up to 101 days. In water the DT_{50}s were 2 days for the two systems; while in sediment the DT_{50}s were 28 and 39 days.

Because the study authors used a biphasic equation to determine the DT_{50} of the parent compound in the total system for each sediment/water source, EFED calculated nonlinear first-order degradation half-lives for DPX-JW062 in total test systems (sediments + water) and for water and sediment degradation individually . The first order half-life of DPX-JW062 was 18 days (r^2= 0.905) for indanone label DPX-JW062 and 22 days (r^2= 0.830) for phenyl label DPX-JW062 in the Brandywine water/sediment system, respectively. The first order half-life of DPX-JW062 was 33 days (r^2= 0.911 for indanone label DPX-JW062 and 34 days (r^2= 0.728) for phenyl label DPX-JW062 in the Lums Pond water/sediment system, respectively. In water and sediment individually, the mean half-lives were 7 and 40 days, respectively. Because the test waters were slightly alkaline (pH= 7.77 and 7.41), abiotic hydrolysis is a possible route of dissipation for DPX-JW062.

In Brandy River water and Lums Pond water, indanone and phenyl labeled DPX-JW062 degrades to form a major (>10% applied) unidentified degradate (Unknown A). IN-JT333 also was a degradation product in Brandy River and Lums Pond sediment.

Nonextractable [^{14}C]residues in the sediment phase reached a maximum of 21.3% to 38.1% of applied DPX-JW062. Evolved $^{14}CO_2$ accounted for 1.4% to 19% of the applied at 101 days post-treatment; [^{14}C]organic volatiles were negligible. **(MRID 44477306)**

Radiolabeled [indanone] and [trifluoromethoxyphenyl indoxacarb (DPX-MP062), at 0.484 mg a.i./L, had a total system half-lives of 30.7 and 38.1 days, respectively, in a Bury pond water-loam sediment (water pH 7.9, organic carbon 50.2 mg/L; sediment pH 8.1, organic carbon 1.7%, redox potentials +261 to + 417 mV (water) and -175 to +181 mV (sediments)] and a Chatsworth lake water-loamy sand sediment [water pH 6.9, organic carbon 27.8 mg/L; sediment pH 7.6, organic carbon 3.1%; redox potentials +327 to + 517 mV (water) and +62 to +493 mV (sediments)] from the UK for 102 days under aerobic conditions in darkness at 20 ± 2°C.

<u>For Bury Pond water-loam sediment</u>: Following application of [^{14}C]indoxacarb (both labels) to the water layer, [^{14}C]residues partitioned into the sediment with distribution ratios (sediment:water) of 0.8:1 at day 0, 1.3:1 at 1 day, 2.6:1 at 7 days, 9.8:1 at 56 days and 19.3:1 at 102 days. Three major transformation products were identified in each label including IN-KT413, IN-MP819 and IN-MS775.

In [indanone-^{14}C]-label treated systems, IN-KT413 was detected in the water layer, sediment and total system at maximums of 25.5%, 16.6% and 42.1% of the applied, respectively, at 14 days and was 2.3%, 4.7% and 7.0%, respectively, at study termination. IN-MP819 was detected in the sediment at a maximum of 10.3% of the applied at 84 days and was 6.6% at study termination. IN-MS775 was detected in the sediment at a maximum of 11.5% of the applied at 84 days and was 10.0% at study termination.

Two minor transformation products were identified in the sediment, IN-KG433 and IN-JT333. In the sediment, IN-KG433 and IN-JT333 were a maximum of 5.8% (28 days) and 6.0% (70 days) of the applied, respectively. Three unidentified transformation products were detected in the sediment and one was detected in the water layer. In the sediment, IS1, IS2 and IS4 were all ≤6.3% of the applied; in the water IW1 was ≤2.0% of the applied. Unidentified radioactivity and zones containing no discrete radioactivity were ≤11.3% of the applied.

In the [TFMP-^{14}C]-label treated systems, IN-KT413 was detected in the water layer, sediment and total system at maximums of 20.8%, 12.0%, and 32.8%, respectively, at 7 days, and was 4.3%, 10.0% and 14.3%, respectively, at 102 days. IN-MP819 was detected in the sediment at a maximum of 10.2% of the applied at 70 days and was 7.9% at study termination. IN-MS775 was detected in the sediment at a maximum of 14.7% of the applied at 70 days and was 2.8% at study termination. Two minor transformation products were identified in the sediment, IN-KG433 and IN-JT333. In the sediment, IN-KG433 and IN-JT333 were a maximum of 5.5% (42 days) and 5.0% (14 days) of the applied, respectively. Three unidentified transformation products were detected in the sediment and one was detected in the water layer. In the sediment, TS1, TS2 and TS4 were all ≤7.8% of the applied; in the water TW1 was ≤2.4% of the applied. Unidentified radioactivity and zones containing no discrete radioactivity were ≤5.8% of the applied.
At study termination, formation of volatilized of $^{14}CO_2$ totaled 9.6% of the applied in the [indanone-^{14}C]-label treated systems, but totaled only 1.5% of applied in the [TFMP-^{14}C]-label treated systems. The formation of volatile [^{14}C]organic compounds was significant totaling 8.8% and 17.7% of the applied at any sampling interval in the [indanone-^{14}C] and [TFMP-^{14}C]-label treated systems

For Chatsworth water-loamy sand sediment: Following application of [^{14}C]indoxacarb to the water layer, [^{14}C]residues partitioned into the sediment with distribution ratios (sediment:water) of 2:1 at day 0, 3.2:1 at 1 day, 17.8:1 at 42 days, 60.6:1 at 84 days and 29.4:1 at 102 days.

Two major transformation products were identified in each label; IN-KT413 and IN-JT333. In [indanone-^{14}C]-label treated systems, IN-KT413 was detected in the water layer, sediment and total system at maximums of 9.2%, 8.9% and 18.1% of the applied, respectively, at 14 days and was 1.1%, 2.3% and 3.4%, respectively, at study termination. IN-JT333 was detected in the sediment at a maximum of 25.7% of the applied at 14 days and was 3.9% at study termination. Three minor transformation products were identified in the sediment, IN-KG433, IN-ML438 and IN-MS775. In the sediment, IN-KG433, IN-ML438 and IN-MS775 were a maximum of 2.1% (84 days), 3.6% (28 days), and 2.5% (84 days) of the applied, respectively. Three unidentified transformation products were detected in the sediment and one was detected in the water layer. In the sediment, IS1, IS2 and IS4 were all ≤4.7% of the applied; in the water IW1 was ≤2.1% of the applied. Unidentified radioactivity and zones containing no discrete radioactivity were ≤3.1% of the applied.

In the [TFMP-^{14}C]-label treated systems, IN-KT413 was detected in the water layer, sediment and total system at maximums of 18.3%, 13.1% and 31.4% of the applied, respectively, at 14 days and was 1.2%, 2.2% and 3.4%, respectively, at study termination. IN-JT333 was detected in the sediment at a maximum of 21.4% of the applied at 7 days and was 3.1% at study termination. Three minor transformation products were identified in the sediment, IN-KG433, IN-ML438 and IN-MS775. In the sediment, IN-KG433, IN-ML438, and IN-MS775 were a maximum of 7.7% (14 days), 3.0% (42 and 84 days), and 5.2% (56 days) of the applied, respectively. Three unidentified transformation products were detected in the sediment and one was detected in the water layer. In the sediment, TS1, TS2 and TS4 were all ≤7.1% of the applied; in the water TW1 was ≤1.4% of the applied. Unidentified radioactivity and zones containing no discrete radioactivity were ≤9.1% of the applied. In the [indanone-^{14}C]-label treated Chatsworth systems, volatilized of $^{14}CO_2$ totaled 25.8% and was 6.8% of the applied in the [TFMP-^{14}C]-label treated systems. The formation of volatile [^{14}C]organic compounds totaled 3.0% and 3.8% of the applied at any sampling interval in the [indanone-^{14}C] and [TFMP-^{14}C]-label treated systems.

A transformation pathway was proposed by the study author. Indoxacarb degraded to In-JT333, IN-KT413 or IN-KG433 which further degraded to IN-MS775, IN-MP819 or IN-ML438 with eventual degradation to CO_2 and bound residues. **(MRID 45793301)**

Mobility

Leaching/adsorption/desorption (163-1)--Batch Equilibrium--Indanone ring-labeled [1-^{14}C]DPX-JW062 and uniformly phenyl ring-labeled [^{14}C]DPX-JW062, at a nominal concentration of 12 ppb, were determined to be immobile in sand, sandy clay loam, loam, and silt loam soil:solution slurries (1:25, 2:25, 3:25, 4:25, 1:5, w:v) that were equilibrated for 1 hour at 24-26 °C. Since the study design used variable soil:solution ratios, simple K_{ads} values are the only reliable data derived from such a study design. Simple uncorrected K_{ads} for DPX-JW062, at concentrations from 0.99 to 9.54 ppb, were 29±4 for Myaka sand soil, 26±3 ml/g for a Donna sandy clay loam soil, 95±23 ml/g for a Chino loam soil, and 35±10 ml/g for a Tama silt loam soil. Corresponding mean K_{oc} values were, respectively, 5100, 3300, 9600, and 2500 mL/g.

Since DPX-JW062 was unstable during the equilibration period, the registrant provided simple K_{ads} for the DPX-JW062 and its degradation products (total radioactivity). Simple K_{ads} for radiolabeled residues (including DPX-JW062 and JT333) were 22±1 ml/g for Myaka sand soil, 19±3 for a Donna sandy clay loam soil, 44±11 ml/g for a Chino loam soil, and 28±4 ml/g for a Tama silt loam.

Mean simple K_d values for the degradate [^{14}C]IN-JT333 in 1.0 and 5.0 g soil samples were 81 ml/g and 213 ml/g for the Myaka sand soil, 69 ml/g and 122 ml/g for the Donna sandy clay loam soil, 242 ml/g and 292 ml/g for the Chino loam soil, and 88 ml/g and 139 ml/g for the Tama silt loam soil, respectively. Corresponding mean K_{oc} values were, respectively, 25000, 12000, 24000, and 8200 mL/g. Desorption of the parent compound and the degradate were not studied due to the instability of the compounds under test conditions.

Because, there was no correlation between the soil organic matter content and simple soil:water partitioning coefficient for DPW-JW062 and IN-JT333, the K_{oc} model may not be appropriate for describing partitioning. **(MRID 44477308)**

Table A-2: Results of batch equilibrium study to estimate leaching of DPX and JT333 residues.

Soil Series and Texture	Soil Location	DPX		JT333	
		K_d-mL/g	K_{oc}-mL/g	K_d-mL/g	K_{oc}-mL/g
Myaka sand	Florida	29	5100	147	25000
Donna sandy clay loam	Texas	26	3300	96	12000
Chino loam	California	95	9600	241	24000
Tama silt loam	Illinois	35	2500	114	82000

Degradation Products (IN-KT413, IN-MK638, IN-KG433, IN-JU873, and IN-MK643)

Radiolabeled IN-KT413, IN-MK638, IN-KG433, IN-JU873, and IN-MK643 were incubated in foreign soils [Speyer (Germany), Lleida clay loam (Spain), Pesaro clay loam (Italy)] and United States soils [Mattapex (Maryland) and Hildago sandy clay loam (Texas)] to estimate soil: water batch equilibrium coefficients. Experiments were conducted in accordance with the USEPA Pesticide Assessment Guidelines, Subdivision N, Section 163-1, European Commission, SETAC-Europe, and in compliance with UK and OECD GLP Principles and EC Commission Directives.

Indoxacarb degradation products (IN-KT413, IN-MK638, IN-KG433, and IN-MK643) had reviewer calculated Kds ranging from 1.2 to 11.3 ml/g in five US and foreign mineral soils **(MRIDs 45795808, 45906702, 45795807, 45795806)**. In contrast, IN-JU873 has reviewer calculated Kds ranging from 52.1 to 406.4 **(MRID 45795805)**. With the exception of IN-JU873, the batch equilibrium data suggest indoxacarb degradation products may exhibit some mobility in soil.

Table A-3: Batch Equilibrium Coefficients for Indoxacarb and Its Degradation Products.

Compound	Soil Texture	K_f	1/n	K_{oc}	MRID
Indoxacarb	sand sandy clay loam loam silt loam	29* 23, 28 113, 77 38, 31	NA	5100** 3300 9600 2500	45795809
IN-JT333	sand sandy clay loam loam silt loam	147 96 241 114	NA	25000 12000 24000 8200	45795809
IN-KT413	sandy loam loam clay loam sandy clay loam	6.1 10.3 4.1 1.0	1.0 1.0 1.0 0.8	358 469 346 204	45906702
IN-KG433	sandy loam loam clay loam sandy clay loam	8.7 2.4 3.2-3.7 1.2	0.9 0.9 0.9 0.9	395 300 267-308 300	45795806
IN-JU873	sandy loam loam clay loam sandy clay loam	605 254 65-69 56	1.1 1.1 0.9 1.0	27500 31750 5417-5750 14000	45795805
IN-MK638	loamy sand loam silty clay loam clay loam sandy clay loam	2.6 1.0 1.3 1.8 0.9	0.9 0.8 0.8 0.8 0.9	130 67 93 164 300	45795808

IN-MK643	sand loam clay loam sandy clay loam	3.96 2.03 4.23 1.34	0.8 0.8 0.8 0.8	189 226 353 243	45795807

Aged soil column leaching--Based on column leaching studies, uniformly phenyl ring-labeled [^{14}C]Indoxacarb, applied at 500 g a.i./ha, and its degradation products in sandy clay loam, sand, loam and silt loam soils adjusted to approximately 75% of 0.33 bar soil moisture content and incubated at 20 ± 1 °C in darkness, appeared to have low mobility in the sandy clay loam, sand, loam and silt loam soil columns which were leached over a period of 48-65 hours with 0.01 M $CaCl_2$ solution. Although the soil columns were not sufficiently eluted with $CaCl_2$ solution as per Subdivision N guidelines, radiolabeled tracer (^{36}Cl) data indicate quantitative elution of the tracer. Total radioactivity in the leachate and [^{14}C]volatiles were negligible following column leaching. **(MRID 44477309)**

Volatility (163-2)--DPX-JW062 has a low volatility from bare soil and mature lettuce plants. After 168 hours (7 days) of incubation, 1.39 and 2.53% of applied radioactivity had volatilized, respectively, from lettuce plants and soil surface.

The reported vapor pressure and Henry's Law Constant of parent compound of 7.3 X 10^{-11} torr and 6 X 10^{-11} atm-m^3/mole, respectively, support the conclusion that there is very little volatility of DPX-JW062. The study is acceptable. (**MRID 44491703**)

Dissipation

Field dissipation (164-1)--Field dissipation studies were conducted on bareground plots in Florida and California with 1.) non-radiolabeled DPX-JW062 (60% ai, WP) and 2). non-radiolabeled DPX-JW062 (60% ai, WP) mixed with uniformly phenyl ring-labeled [^{14}C]DPX-JW062 (EC, 35% a.i.) and indanone ring-labeled [1-^{14}C]DPX-JW062 (EC, 35% a.i.) in cotton and fruit/vegetable label use patterns on bareground plots in Delaware, Texas, Florida and California.

Non-radiolabeled studies--The registrant calculated the half-lives (using linear regression) on a mass basis (which involves multiplying the measured concentration times the recovered soil mass in each soil core collected). The conventional approach is to use the concentration of pesticide. Based on the nonconventional method of calculating half-lives, in this study DPX-JW062 dissipated with half-lives of 73 and 77 days, respectively, in Florida and California. The half-lives (using the concentration of pesticide) were 72 and 79 days, respectively, in Florida and California. The small differences indicated that there was no significant differences in method of determining half-life in these particular field studies.

The registrant also calculated the half-lives using non-linear regression analysis on the untransformed data. The half-lives (using the concentration of pesticide) were 67 and 59 days, respectively, in Florida and California. The registrant recalculated DT50 (half-life) values for the Bradenton, Florida and Madera, California sites calculated using first-order linear regression were, respectively, 72 days ($r^2 = 0.87$) and 78 days ($r^2 = 0.91$), using first-order nonlinear regressions were 64 days ($r^2 = 0.73$) and 55 days ($r^2 = 0.93$), and using first-order multicompartmental modeling were 64 days ($r^2 = 0.73$) and 55 days ($r^2 = 0.94$) (MRID 45795811).

In Florida, the major degradate IN-JT333 (methyl 7-chloro-2,5-dihydro-2-[[[4-(trifluoromethoxy)phenyl]amino]carbonyl]= indeno[1,2-e][1,3,4]oxadiazine-4a(3*H*)-carboxylate) was detected in the 0- to 15-cm depth at 0.012 ppm at 14 days post-treatment and sporadically below the LOQ from 3 to 181 days post-treatment. The minor degradate IN-KG433 (methyl 5-chloro-2,3-dihydro-2-hydroxy-1-[[[(methoxycarbonyl[4-trifluoro-methoxy)phenyl] amino] carbonyl]hydrazono]-1*H*-indene-2-carboxylate) was detected only in the 0- to 15-cm depth (below the LOQ), in one of three replicates at 2 and 3 days post-treatment.

In California, the major degradate IN-JT333 (methyl 7-chloro-2,5-dihydro-2-[[[4-(trifluoromethoxy)phenyl]amino]carbonyl]= indeno[1,2-e][1,3,4]oxadiazine-4a(3*H*)-carboxylate) was detected sporadically in individual replicates from the 0- to 15-cm depth at 0.010-0.012 ppm from 9 to 100 days post-treatment and sporadically below the LOQ from 3 to 367 days post-treatment; the degradate was not detected at lower depths. The minor degradate IN-KG433 (methyl 5-chloro-2,3-dihydro-2-hydroxy-1-[[[(methoxycarb- onyl[4-trifluoromethoxy)= phenyl]amino]carbonyl]hydrazono]-1*H*-indene-2-carboxylate) was sporadically detected in the 0- to 15-cm depth below the LOQ from 9 to 180 days post-treatment. The study is supplemental. (MRID 44477312)

The registrant submitted additional information to address issues in the review of MRID 44477312. The application rate was verified for both test sites using dishes containing 10 g of sieved (2 mm) untreated soil. Six dishes were placed in the treated plots prior to each of the four applications. Mean recoveries of DPX-JW062 (sum of both enantiomers) from the Florida site ranged from 62 to 83% of the target application following each of the four applications, with an overall mean of 70% of the target application rate. Mean recoveries from the California site ranged from 77 to 83% of the target application rate following each of the four applications, with an overall mean of 80% of the target application rate. Mean recoveries from field-fortified application monitoring dishes were 86-119%, with an overall mean of 99% for the Florida site and were 90-111%, with an overall mean of 100% for the California site.

In concurrent recovery studies, control soil from both sites was fortified at 0.01-10 ppm with the parent compound and IN-JT333, and separate control soils were fortified with IN-KG433 at 0.01-1.0 ppm. Mean recoveries from the Florida sand soil were 92% (range of 74-130%), 84% (range of 64-120%), and 82% (range of 66-100%) for the parent compound, IN-JT333, and IN-KG433, respectively (reviewer-calculated). Mean recoveries from the California loam soil were 96% (range of 73-130%), 95% (range of 68-120%), and 83% (range of 69-120%) for the parent compound, IN-JT333, and IN-KG433, respectively.

The storage stability of DPX-JW062 and IN-JT333 in soil was reported in MRID 44477311. Subsamples of selected test samples from each site were periodically analyzed; data from samples stored for various intervals were compared over time and recoveries were reported as percentages of the initial recoveries. Recoveries of DPX-JW062 following frozen storage for up to 12.5 months were 81-107% and 94-138% for the Florida and California sites, respectively. Recoveries of IN-JT333 following frozen storage for up to 8 months were 63-80% and 120-140% for the Florida and California sites, respectively. Soil samples and monitoring dishes were stored frozen for up to 21 and 7 months, respectively, prior to analysis. The storage stability of IN-KG433 in soil was investigated in the current submission. Recoveries of IN-KG433 following frozen storage for up to 24 months were 86-114% and 95-115% for the Florida and California sites, respectively. Soil samples were stored frozen for up to 21 months prior to analysis for IN-KG433, and for up to 24 months prior to analysis for DPX-JW062 (DPX-KN128/IN-KN127) and IN-JT333.

At the Florida test site, the parent compound was detected in the 0- to 15-cm depth at 0.061 ppm immediately following the first pesticide application, showed a general increase to 0.24 ppm by 9 days posttreatment (immediately following the fourth application), was a maximum of 0.28 ppm at 14 days posttreatment, decreased to 0.14 ppm by 63 days and to 0.024 ppm by 181 days posttreatment, and was detected below the LOQ from 277 to 539 days posttreatment (DER of MRID 44477312). In the 15- to 30-cm depth, the parent compound was detected only once (below the LOQ), in one of three replicates at 91 days posttreatment. Parent compound was not detected in the 30- to 45-cm depth, and lower depth segments were not analyzed. The major transformation product IN-JT333 was detected in the 0- to 15-cm depth at 0.012 ppm at 14 days posttreatment and sporadically below the LOQ from 3 to 181 days posttreatment (DER of MRID 44477312). IN-JT333 was apparently not detected in the 15- to 30-cm depth, and was not detected at any sampling interval in the 30- to 45-cm depth. The minor transformation product IN-KG433 was detected only in the 0- to 15-cm depth (below the LOQ), in one of three replicates at 2 and 3 days posttreatment, and was not detected in the 15- to 30-cm depth at any sampling interval.

Under field conditions at the Florida site, DPX-JW062 had a registrant-calculated half-life value of 60 days ($r^2 = 0.87$, 9-181 days posttreatment data). The DT90 value was not determined. At the end of the 539-day study, the total carryover of DPX-JW062, IN-JT333, and IN-KG433 was 0%.

At the California test site, the parent compound was detected in the 0- to 15-cm depth at 0.081 ppm immediately following the first pesticide application, increased to a maximum concentration of 0.29 ppm by 9 days posttreatment (immediately following the fourth application), decreased to 0.16 ppm by 30 days posttreatment and to 0.045 ppm by 180 days posttreatment, and was detected below the LOQ from 367 to 540 days posttreatment (DER of MRID 44477312). In the 15- to 30-cm depth, the parent compound was only detected above the LOQ at 8 days posttreatment (0.019 ppm) and in one of three replicates at 15 days posttreatment (0.027 ppm), and was sporadically detected below the LOQ from 2 to 30 days posttreatment. In the 30- to 45-cm depth, the parent compound was detected below the LOQ in one of three replicates at 60 days posttreatment (0.006 ppm), in two of four replicates at 180 days posttreatment (0.006 ppm), and in one of three replicates at both 362/367 and 540 days posttreatment (0.005 ppm). Parent compound was not detected in the 45- to 60-cm depth at 15 days posttreatment, the only interval analyzed. Lower depth segments were not analyzed. IN-JT333 was detected sporadically in individual replicates from the 0- to 15-cm depth at 0.010-0.012 ppm from 9 to 100 days posttreatment and sporadically below the LOQ from 3 to 367 days posttreatment (DER of MRID 44477312). The transformation product was not detected in the 15- to 30-cm depth, and was not detected at any sampling interval in the 30- to 45-cm depth or at 8 days posttreatment in the 45- to 60-cm depth. IN-KG433 was sporadically detected in the 0- to 15-cm depth below the LOQ from 9 to 180 days posttreatment. IN-KG433 was not detected in the 15- to 30-cm depth at any sampling interval.

Under field conditions at the California site, DPX-JW062 had a registrant-calculated half-life value of 63 days (r^2 = 0.97, 9-270 days posttreatment data). The DT90 value was not determined. At the end of the 540-day study, the total carryover of DPX-JW062, IN-JT333, and IN-KG433 was 0%.

The major route of dissipation of DPX-JW062 under terrestrial field conditions at the Florida and California field sites could not be determined because soil samples were not analyzed for the major transformation products IN-ML437-OH, IN-KB687, and IN-MK643 (observed at >10% in aerobic soil metabolism studies at one sampling interval), and volatilization and runoff were not studied. MRID 45850002

Radiolabeled studies--The registrant calculated the half-lives (using linear regression) on a mass basis (which involves multiplying the measured concentration times the recovered soil mass in each soil core collected). The conventional approach is to use the concentration of pesticide. Based on the nonconventional method of calculating half-lives, the registrant calculated half-lives (erroneously call DT_{50}s in the report) were 34, 75, 80 and 117 days, respectively at the Texas, Delaware, Florida and California sites and are consistent with the reviewers calculated half-lives (using the conventional method) of 71 to 115 days. The small differences indicated that there was no significant differences in method of determining half-life in these particular field studies.

The registrant also calculated the half-lives using non-linear regression analysis on the untransformed data. The half-lives (using the concentration of pesticide) were 57, 17, 69, and 156 days, respectively, in Texas, Delaware, Florida and California. The study is supplemental. (MRID 44477311)

At the Delaware site, parent compound (indanone label) was detected once in the 15- to 30-cm depth at 0.017 mg/kg (day 0 day). At the Delaware and Texas sites, parent compound (phenyl label) was only detected in the 15- to 30-cm depth at 0.032 mg/kg (10 days) and 0.062 mg/kg (14 days), respectively.

At the Texas site, parent compound (phenyl label) was detected once in the 30- to 45-cm depth at

0.011 mg/kg (day 14). Parent compound was not detected below the 30-cm depth at the Delaware site and the 45-cm depth at the Texas site. At the Texas site, IN-JT The major degradate IN-JT333 was detected in the 0- to 15-cm depth at both sites at maximums of 0.012-0.016 mg/kg at 14-122 days post-treatment. 333 (phenyl label) was detected in the 15- to 30-cm depth once at 0.009 mg/kg at 14 days post-treatment. IN-JT333 was not detected below the 15-cm depth at the Delaware site and the 30-cm depth at the Texas site. At the Delaware site, the major degradate IN-KG433 was detected in the 0- to 15-cm depth at a maximum of 0.007 mg/kg at 122 days post-treatment; IN-KG433 was not detected below the 15-cm depth.

At the Florida site, parent compound was initially present in the 0- to 15-cm depth at 0.35 mg/kg, increased to 0.43 mg/kg by 3 days post-treatment, decreased to 0.42 mg/kg by 7-9 days, was a maximum of 0.57 mg/kg at 14 days, decreased to 0.25 mg/kg by 61 days post-treatment and was 0.013 mg/kg at 464 days.

At the California site, parent compound was initially present in the 0- to 15-cm depth at 0.35-0.36 mg/kg at 0-3 days, decreased to 0.21 mg/kg by 10 days, then increased to 0.32 mg/kg by 30 days post-treatment, decreased to 0.20 mg/kg by 179 days and was 0.016 mg/kg at 542 days. At the Florida site, parent compound (indanone label) was detected once in the 15- to 30-cm depth at 0.009 mg/kg (250 days). At the Florida site, parent compound (phenyl label) was detected once in the 15- to 30-cm depth at 0.012 mg/kg (9 days). Parent compound was not detected below the 15-cm depth at the California site and the 30-cm depth at the Florida site. The major degradate IN-JT333 was detected in the 0- to 15-cm depth at both sites at a maximum (excluding outliers) of 0.015 mg/kg at 120 (FL) and 240 (CA) days post-treatment. IN-JT333 was not detected below the 15-cm depth at either site. At the California site, the major degradate IN-KG433 was detected sporadically in the 0- to 15-cm depth at ≤0.005 mg/kg; IN-KG433 was not detected below the 15-cm depth. (MRID 44477311).

Non-guideline field dissipation study--One non-guideline field dissipation study was submitted to 1) obtain information on the amount of DPX-JW062 intercepted by cabbage and lettuce leaf plant canopies, and 2) assess the transport of residues from plant surfaces to soil.

In this study approximately 36.5 ± 22.4% (determined from the concentration in soil in μg/g) to 51.4 ± 17.3% (determined from the total mass in soil in μg) of the applied DPX-JW062 was intercepted by the lettuce or cabbage plant canopy. The percent interception was determined by comparing the amount of DPX-JW062 detected in this study and a similar study performed on bare-ground (DER for Study 11, MRID 44477312).

At Site 1 (lettuce in Florida), DPX-JW062 may have washed off the plant surfaces during rain or aerial irrigation events. The total amount[8] of residues in lettuce plants declined from 26000 μg to 8800 μg between day 28 and 63. This decrease was attributed to six precipitation events that occurred between Days 30 and 42, which averaged 0.76 inches/day (range = 0.30 - 1.23

[8] Calculated by multiplying the fresh weight of plants times the concentration in ug/g.

inches/day). This is supported by the fact that between 28 and 63 days, the concentration of residues in the soil remained the same. However, because there were no plants or soil analyzed between Day 28 and 63, it can not definitely be concluded that significant wash off occurred. Furthermore, degradation on the leaf surfaces can not be ruled out as a possible reason for the decrease.

At site 2 (cabbage in California), it does not appear that wash off of residues from the plants occurred, since there was no apparent decrease in residues. From Day 30 to 45 there was a decrease in plant residues from 76000 to 63000 μg total residues; however, this decrease was not related to any precipitation since the last rain occurred on the 17th day of the study. The decrease also was probably not related to the dilution effect since the total weight of the plants were the same. Also the concentration of residues in the soil decreased from 0.19 to 0.10 ppm from Day 30 to 45. The degradation may have been due to degradation on the leaf surfaces. However, since no plant or soil samples were collected between 30 and 45 days it can not be definitely concluded that this occurred. The study period (45 and/or 63 days) was too short to obtain enough data to calculate plant or soil half-lives. The study is supplemental. (MRID 44477310)

Accumulation

Bioconcentration in fish (165-4)--When based on total radioactivity, maximum BCFs for the indanone and uniformly phenyl ring-labeled [^{14}C] DPX-JW062 were, respectively, 592 and 633x for fillet, 2388 and 3193x for viscera, and 1612 and 2087x for whole fish tissues for the 10 ppb exposure. For the 100 ppb exposure, the maximum BCFs were 395x and 493x for fillet, 1584 and 1568x for viscera, and 1053 and 1044x for whole fish tissues.

When based on residues of the active isomer, DPX-KN128, maximum BCFs were 24x in fillet, 153x in viscera, and 90x in whole fish for the 10 ppb exposure. After 21 days, approximately 70 to 80% pf the total radioactive residues depurated. (MRID 44477319)

The registrant submitted additional information on the identification of residues in the fish bioaccumulation study (MRID 44477319). In fish exposed to [indanone-1-^{14}C]indoxacarb at 10 μg/L, the maximum concentration of total radioactive residues (TRR) was 4.439 mg/kg in the edible tissue at 14 days, 18.795 mg/kg in the nonedible tissue at 21 days, and 12.257 mg/kg in the whole fish tissue at 21 days. The reviewer-calculated maximum bioconcentration factor (BCF) for TRR was 504 for the edible tissues, 2081 for the nonedible tissues, and 1357 for the whole fish.

In the edible fish tissues from 21 and 28 days of exposure, 98.4 and 86.3% of the TRR were extractable (3.806-3.822 mg/kg), respectively. [^{14}C]Indoxacarb comprised 53.6-62.7% (2.374-2.425 mg/kg) of the recovered; the ratio of the R to S enantiomer was approximately 26:1 (60.3% and 2.3% of the recovered, respectively, 21 day data only). Five transformation products were identified:(IN-JT333 (R:S ratio 94:4) was 22.2-23.7% of the recovered (0.917-0.983 mg/kg); IN-ML811 was 1.6-1.8% (0.070-0.071 mg/kg); IN-KG433 was 0.6-0.8% (0.027-0.031 mg/kg); IN-KT319 was 4.0% (0.155-0.177 mg/kg); and IN-JU873) was 1.8-2.0% (0.070-0.089 mg/kg).

In the nonedible fish tissues from 21 and 28 days of exposure, 95.1-96.5% of the TRR were extractable (17.367-17.874 mg/kg). [^{14}C]Indoxacarb comprised 58.0-62.2% (10.438-11.690 mg/kg) of the recovered. The five transformation products identified were the same as those found in the edible tissues: IN-JT333 was 23.6-30.2% of the recovered; IN-ML811 was 4.8%; IN-KG433 was 0.3%; IN-KT319 was 1.9-2.1%; and IN-JU873 was 1.0-1.4%.

After 1 day of depuration, total [^{14}C]residues in edible, nonedible and whole fish tissues had decreased by 30.5%, 6.9% and 10.7%, respectively, compared to the 28-day exposure values. After 21 days of depuration, total [^{14}C]residues in edible, nonedible and whole fish tissues had decreased by 66.1-69.4%. Using a BIOFAC modeling program, the study author calculated that the $t_{1/2}$ for clearance was 7.88 days for whole fish tissues. In the edible tissue (TRR 1.501 mg/kg), the only identified [^{14}C]residues were indoxacarb and IN-JT333 at 15.8% and 61.8% of the recovered, respectively. In the nonedible tissue (TRR 5.512 mg/kg), the only identified [^{14}C]residues were indoxacarb and IN-JT333 at 18.5% and 72.5% of the recovéred, respectively.

The concentration of indoxacarb in the water was 79.5 and 84.5% of the recovered at 21 and 28 days, respectively. The ratio of the R to S enantiomer was approximately 1:1 (39.4-41.9% and 38.5-40.9% of the recovered, respectively).

In fish exposed to [indanone-1-^{14}C]indoxacarb at 100 µg/L, the maximum concentration of TRR was 33.287 mg/kg in the edible tissue at 28 days, 133.350 mg/kg in the nonedible tissue at 21 days, and 89.137 mg/kg in the whole fish tissue at 21 days. The reviewer-calculated maximum bioconcentration factor (BCF) for TRR was 395 for the edible tissues, 1584 for the nonedible tissues, and 1059 for the whole fish. [^{14}C]Residues in the fish were not characterized.

After 1 day of depuration, total [^{14}C]residues in edible, non-edible and whole fish tissues had decreased by 27.2%, 26.9% and 27.0%, respectively from the 28-day exposure values. After 21 days of depuration, total [^{14}C]residues in edible, non-edible and whole fish tissues had decreased by 70.2%, 71.7% and 71.4%, respectively from the 28-day exposure values. Using a BIOFAC modeling program, the study author calculated that the $t_{1/2}$ for clearance was 6.70 days for whole fish tissues. [^{14}C]Residues in the fish and water were not characterized.

In fish exposed to [trifluoromethoxyphenyl-U-^{14}C]indoxacarb at 10 µg/L, the maximum concentration of total [^{14}C]residues was 4.747 mg/kg in the edible tissue at 14 days, 19.924 mg/kg in the nonedible tissue at 21 days, and 12.808 mg/kg in the whole fish tissue at 21 days. The reviewer-calculated maximum bioconcentration factor (BCF) for TRR was 440 for the edible tissues, 1845 for the nonedible tissues, and 1186 for the whole fish.

In the edible fish tissues from 21 and 28 days of exposure, 92.6 and 99.2% of the TRR were extractable (3.197-3.684 mg/kg), respectively. [^{14}C]Indoxacarb comprised 58.5-61.6% (2.019-2.288 mg/kg) of the recovered; the ratio of the R to S enantiomer was approximately 30:1 (56.4% and 1.9% of the recovered, respectively, 21 day data only). Five transformation products were identified: IN-JT333 was 24.4-27.8% of the recovered (0.842-1.032 mg/kg); IN-ML811 was 0.3% (0.011 mg/kg); IN-KG433 was 0.7% (0.024-0.026 mg/kg); IN-KT319 was 4.5% (0.155-

0.167 mg/kg); and IN-JU873 was 1.9-2.3% (0.066-0.085 mg/kg).

In the nonedible fish tissues from 21 and 28 days of exposure, 90.7-102.1% of the TRR were extractable (16.506-20.342 mg/kg). [^{14}C]Indoxacarb comprised 56.1-65.4% (10.210-13.030 mg/kg) of the recovered. The five transformation products identified were the same as those found in the edible tissues: IN-JT333 was 29.0-29.2% of the recovered; IN-ML811 was 1.0-1.5%; IN-KG433 was 0.4%; IN-KT319 was 2.0-2.4%; and IN-JU873 was 1.2%.

After 1 day of depuration, total [^{14}C]residues in edible, non-edible and whole fish tissues had decreased by 27.4%, 0.6% and 4.2%, respectively, from the 28-day exposure values. After 21 days of depuration, total [^{14}C]residues in edible, non-edible and whole fish tissues had decreased by 67.5%, 73.4% and 72.6%, respectively, from the 28-day exposure values. Using a BIOFAC modeling program, the study author calculated that the $t_{1/2}$ for clearance was 6.91 days for whole fish tissues. In the edible tissue (TRR 1.208 mg/kg), the only identified [^{14}C] residues were indoxacarb and IN-JT333 at 9.4% and 70.2% of the recovered, respectively. In the nonedible tissue (TRR 4.849 mg/kg), the only identified [^{14}C] residues were indoxacarb and IN-JT333 at 9.9% and 85.5% of the recovered, respectively.

The concentration of indoxacarb in the water was 78.5-84.3% of the recovered at 21 and 28 days, respectively. The ratio of the R to S enantiomer was approximately 1:1 (35.6-39.2% and 33.8-37.1% of the recovered, respectively). (MRID 45805301)

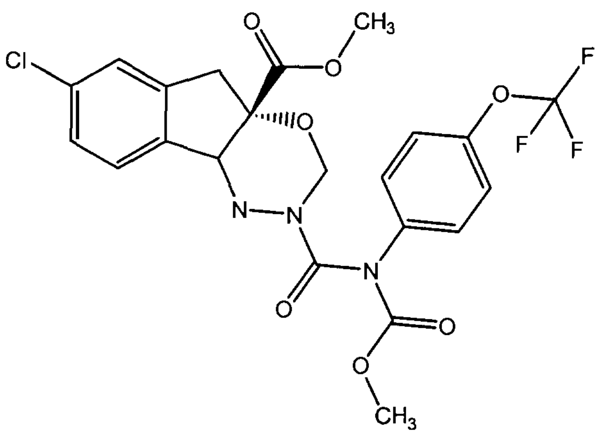
In fish exposed to [trifluoromethoxyphenyl-U-^{14}C]indoxacarb at 100 μg/L, the maximum concentration of total [^{14}C]residues was 42.280 mg/kg in the edible tissue at 14 days, 135.460 mg/kg in the nonedible tissue at 21 days, and 90.191 mg/kg in the whole fish tissue at 21 days. The reviewer-calculated maximum bioconcentration factor (BCF) for TRR was 493 for the edible tissues, 1568 for the nonedible tissues, and 1044 for the whole fish.

After 1 day of depuration, total [^{14}C]residues in edible, non-edible and whole fish tissues had decreased by 21.6%, 0.3% and 3.6%, respectively, from the 28-day exposure values. After 21 days of depuration, total [^{14}C]residues in edible, non-edible and whole fish tissues had decreased by 76.8%, 80.2% and 79.7%, respectively, from the 28-day exposure values. Using a BIOFAC modeling program, the study author calculated that the $t_{1/2}$ for clearance was 6.55 days for whole fish tissues. [^{14}C]Residues in fish and water were not characterized.

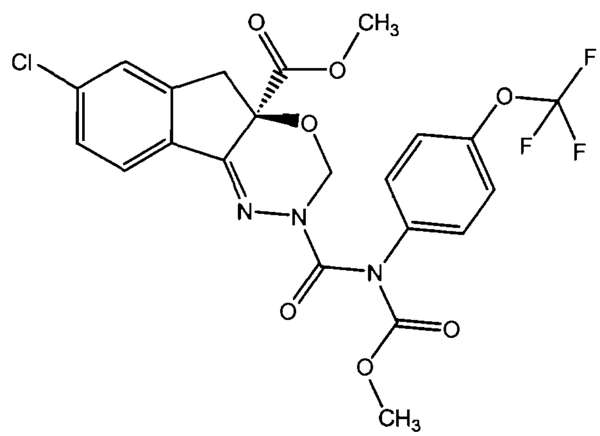
Spray Drift (201-1 and 202-1):

No spray drift-specific studies were reviewed for this pesticide. Droplet size spectrum (201-1) and drift field evaluation (202-1) studies are required since the product may be applied by aerial and ground spray equipment and due to the concern for potential risk to nontarget plants. However, to satisfy these requirements the registrant, in conjunction with other registrants of other pesticide active ingredients, formed the Spray Drift Task Force (SDTF). The SDTF has completed and submitted to the Agency its series of studies which are intended to characterize spray droplet drift potential due to various factors, including application methods, application equipment, meteorological conditions, crop geometry, and droplet characteristics. In the interim and for this assessment, the Agency is relying on previously submitted spray drift data and the open literature for off-target drift rates. The standard assumption used by EFED for ground and aerial application is that 1 and 5% of the application rate is deposited 100 ft down wind, respectively. After peer review of the SDTF data is completed, the Agency will determine whether a reassessment is warranted of the potential risks from the application of this chemical.

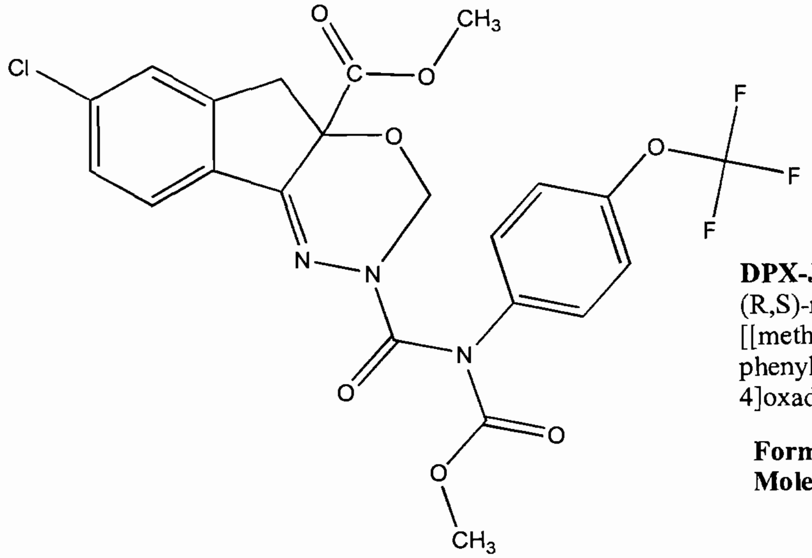
Indoxacarb



(Indoxacarb - pesticidal active enantiomer)

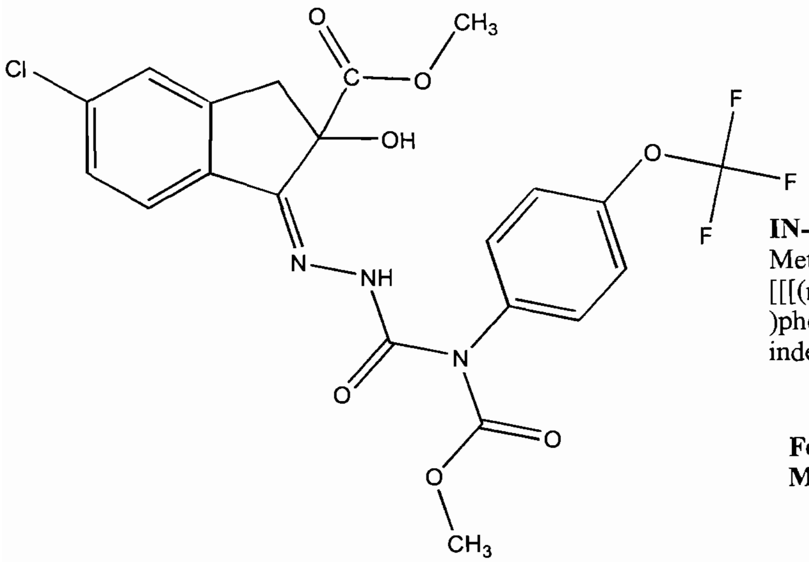


(R-pesticidal inactive enantiomer)



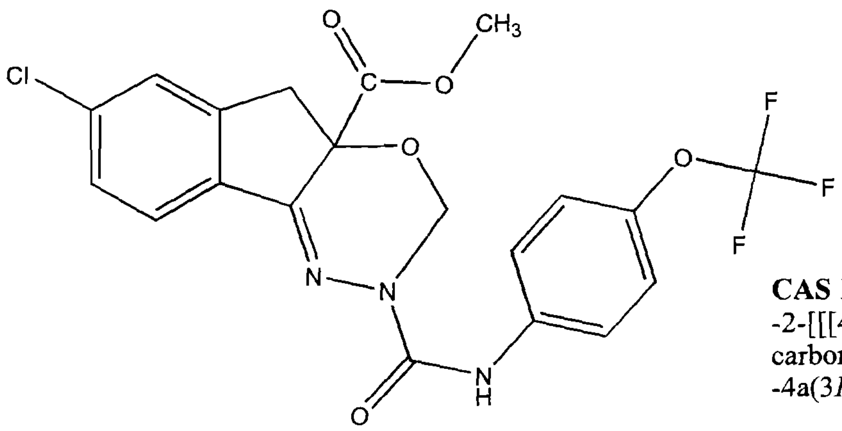
DPX-JW062
(R,S)-methyl-7-chloro- 2,5-dihydro-2-[[methoxycarbonyl)[4-(trifluoromethoxy) phenyl]amino]carbonyl]indeno[1,2-*e*][1,3,4]oxadiazine-4a(3*H*)-carboxylate

Formula: $C_{22}H_{17}ClF_3N_3O_7$
Molecular Weight: 527.84



IN-KG433
Methyl-5-chloro-2,3-dihydro-2-hydroxy-1[[[(methoxycarbonyl)[4-(trifluoromethoxy)phenyl]amino]carbonyl]hydrazono]-1*H*-indene-*2*-carboxylate

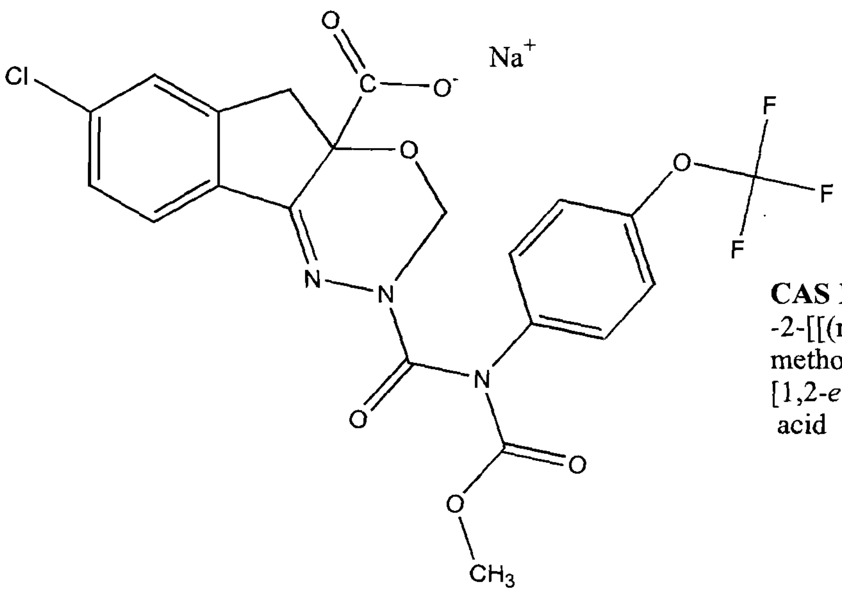
Formula: $C_{21}H_{17}ClF_3N_3O_7$
Molecular Weight: 515.8



IN-JT333

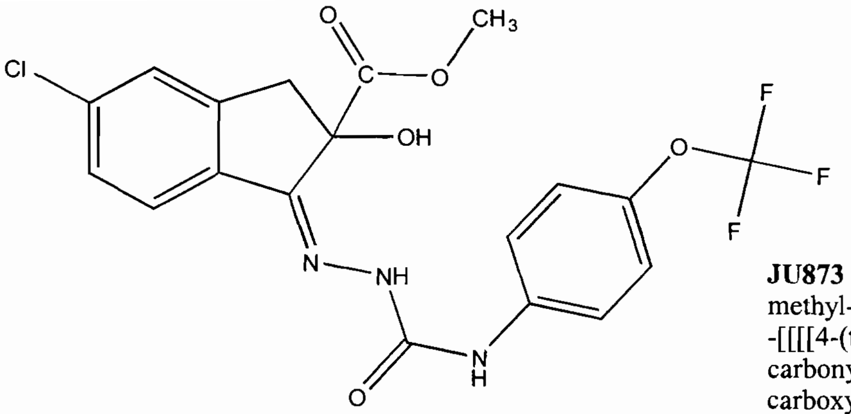
CAS Name:methyl-7-chloro-2,5-dihydro -2-[[[4-(trifluoromethoxy)phenyl]amino] carbonyl]indeno[1,2-*e*][1,3,4]oxadiazine -4a(3*H*)-carboxylate

Formula: $C_{20}H_{15}ClF_3N_3O5$
Molecular Weight: 469.8

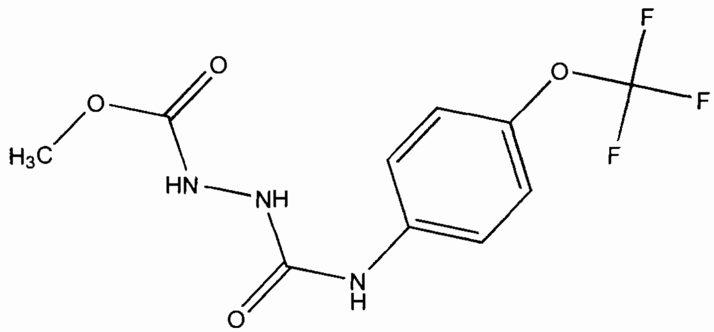


KT413

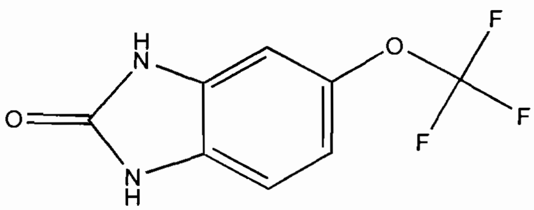
CAS Name: Sodium 7-chloro-2,5-dihydro -2-[[(methoxycarbonyl) [4-(trifluoro methoxy)phenyl]amino]carbonyl]indeno [1,2-*e*][1,3,4]oxadiazine-4a(3*H*)-carboxyli acid



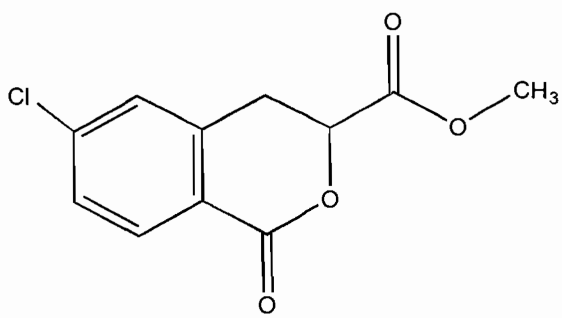
JU873
methyl-5-chloro-2,3-dihydro-2-hydroxy-1 -[[[[4-(trifluoromethoxy)phenyl] amino] carbonyl]hydrazono]-1*H*-indene-2-carboxylate



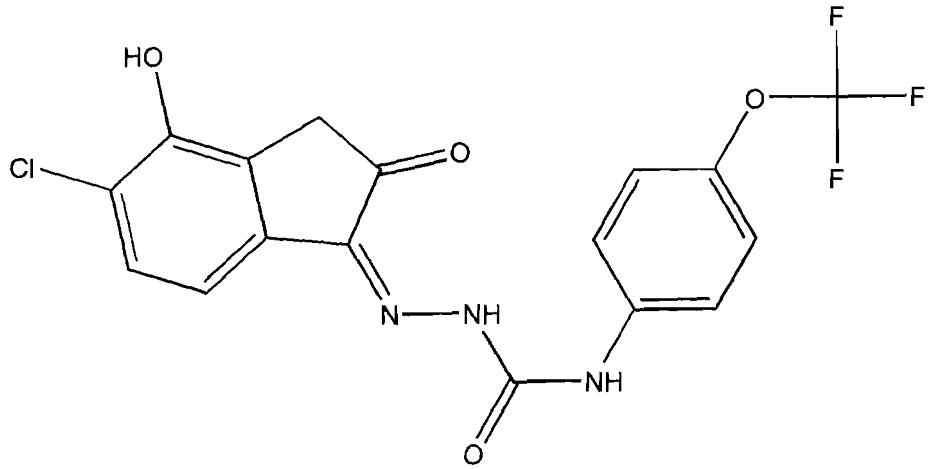
MF014
Structure given in MRID 44477302; chemical name not reported



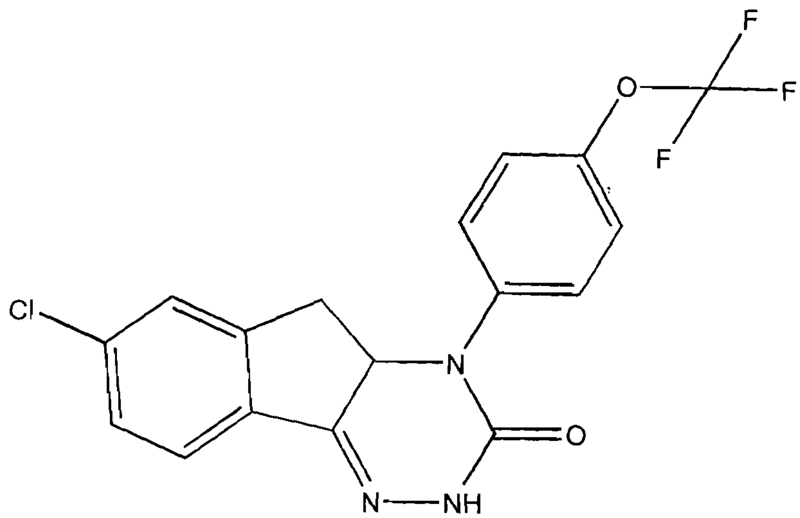
MK643
1,2-dihydro-5-(trifluoromethoxy)-2H-benz imidazol-2-one



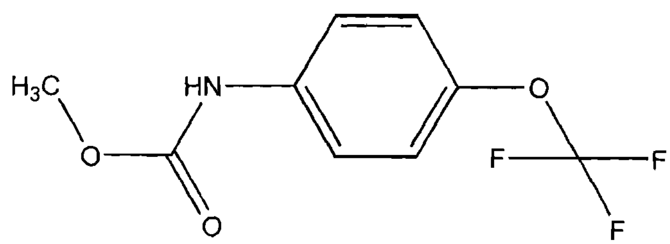
MH304
Structure given in MRID 44477302; chemical name not reported



ML437-OH
Structure given in MRID 44477304; chemical name not reported



ML438
7-chloro-2,4-dihydro-4-[4-4 -(trifluoromethoxy)phenyl]-3 H-indeno[2,1-*e*]-1,2,4-triazin -3-one



KB687
methyl[4-(trifluoromethoxy) phenyl]carbamate

APPENDIX B

MODELING DISCUSSION

AQUATIC EXPOSURE ASSESSMENT

Uncertainties in the Assessment

The major uncertainty in the water assessment is the treatment of enantiomers of parent and its major, chiral degradation products (for example, JT333). Other uncertainties in the modeling are associated with the selection of aerobic soil metabolism half-lives and the batch equilibrium data. EFED only modeled IN-JT333 and IN-MP819 in the ecological exposure assessment because they are the more toxic than indoxacarb.

Uncertainties in the assessment are associated with the selection of the most representative model for describing indoxacarb residue degradation. Linear fitting techniques using the first order degradation model (ln(y/a)=-bt) provided a poor description of the aerobic soil metabolism data as shown by non-significant F tests and low coefficients of determination (R^2). Therefore, nonlinear fitting techniques (as employed through Sigmaplot-Regression Wizard) with the first order decay model ($y=ae^{-bx}$) were used to estimate rate constants for indoxacarb residue degradation. This fitting procedure was used to estimate the degradation rate constants for hydrolysis, aerobic soil metabolism, aerobic aquatic metabolism, and anaerobic aquatic metabolism.

Uncertainty in batch equilibrium data are associated with the experimental techniques used in estimating coefficients because the experimental techniques were not conducted according to Subdivision N Guidelines. Additionally, there was no correlation between the soil organic carbon content and the soil:water partitioning coefficients. As recommended in current input parameter guidance, the lowest non-sand K_{oc} was selected because there is no apparent correlation between batch equilibrium constants and soil organic carbon content.

Since the registrant is seeking registration of the enantiomerically enriched mixture of Indoxacarb (75:25, DPX-KN128:DPXKN127), the water assessment was conducted to assess the impact of active ingredient (DPX-KN128) and the combination of active and inactive ingredients (DPX-KN128 and DPX-KN127). In order to account for enantiomeer enrichment, estimated environmental concentrations (EECs) of DPX-JW062 were determined by multiplying the application rate by a factor of 1.33 for an isomeric enrichment ratio of 75:25. as found in Indoxacarb. Such an approach was used to provide conservative EECs. Additionally, EECs for JT333 were estimated for the active JT333. Hence, the environmental concentration of JT333 was not corrected for enantiomeric enrichment.

Surface Water Assessment

Tier I Modeling--Input parameters for GENEEC (Table B-1) were selected according to current EFED guidance which changes quite frequently. GENEEC modeling estimates that the residues of aerially and ground-applied Indoxacarb (KN128 only) are not expected to exceed, respectively, 4.7 and 4.1 μg/L for the annual peak concentration (acute) and 1.8 and 1.6 μg/L for the 56 day average concentration (chronic) (Table B-2). Estimated environmental concentrations of aerially and ground-applied Indoxacarb (KN128+ KN127) concentrations in surface water used as drinking water and in aquatic environments are not likely to exceed, respectively, 6.3 and 5.4 µg/L for the annual peak concentration (acute) and 2.4 and 2.1 µg/L for the 56 day average concentration (chronic) (Table B-3).

Estimated environmental concentrations of aerially and ground-applied JT333 are not expected to exceed, respectively, 0.4and 0.2 µg/L for the annual peak concentration (acute) and 0.1 µg/L for the 56 day average concentration (chronic)(Tables B-2 and 3).

Table B-1a: Input Parameters for Indoxacarb for GENEEC Version 2.2 used in the Aquatic Exposure Assessment

Parameter (units)	**Input Value**	**Source of Information/ Reference**
Application rate (pounds a.i. $acre^{-1}$)	0.11	Product label
Number of applications	4	Product label
Interval between applications (days)	5	Product label
Partition Coefficient K_d or K_{oc} (mL $g_{o.c}^{-1}$ or L $kg_{o.c}^{-1}$)	1497 L/kg (lowest non-sand K_d of 25/0.0167)	MRID 44477308 MRID 45795809
Aerobic Soil Metabolism ($t_{1/2}$ in days)	156 days (UB 90th % of 3, 3, 6, 10,15, 30, 693, 3, 3, 7, 6 days)	MRID 44477304 MRID 44477307 MRID 45850001 MRID 45795803 MRID 45906701
Wetted in?	No	Product label
Depth of incorporation (inches)	0	Product label
Method of application	aerial	Product label
Solubility in water (mg/L)	0.8	MRID 44477229
Aerobic Aquatic Metabolism ($t_{1/2}$ in days)	34 days (UB 90th % of 18, 22, 33, 34, 40, 21, 38 days)	MRID 44477306 MRID 45793301
Hydrolysis (pH 7) ($t_{1/2}$ in days)	36, 21 days (Used 36 days as input value	MRID 44477301 MRID 45795801
Aquatic Photolysis (pH 7) ($t_{1/2}$ in days)	3 days	MRID 44477302 MRID 45795802

Table B-1b: Input Parameters for JT333 for GENEEC Version 1.2 used in the Aquatic Exposure Assessment

Parameter (units)	Input Value	Source of Information/ Reference
Maximum application rate[1] (pounds a.i. $acre^{-1}$)	0.023 lbs JT333/A	Derived by using 0.11 ai/A*0.186*1.12 (MW DPX (527.84 g/mol)/MW JT333 (469.8 g/mol)
Number of applications	4	Product label
Interval between applications (days)	5	Product label
Partition Coefficient K_d or K_{oc} (mL $g_{o.c}^{-1}$ or L $kg_{o\,c}^{-1}$)	5749 L/kg (lowest non-sand K_d of 96/0.0167)	MRID 44477308
Aerobic Soil Metabolism ($t_{1/2}$ in days)	96 days (UB 90[th] % of 12, 26, 56, 171, 91, 60, 56 days)	MRID 44477304 MRID 44477307 MRID 45906701 MRID 45795803
Wetted in?	No	Product label
Depth of incorporation (inches)	0 (not incorporated)	Product label
Method of application	Aerial	Product label
Solubility in water (mg/L)	0.8	MRID 44477229
Aerobic Aquatic Metabolism ($t_{1/2}$ in days)	33 days (X3)= 99 days	MRID 44477306 MRID 45793301
Hydrolysis (pH 7) ($t_{1/2}$ in days)	Stable	MRID 44477301
Aquatic Photolysis (pH 7) ($t_{1/2}$ in days)	Stable	MRID 44477302

[1]The maximum application rate of JT333 was based on 18.6% conversion efficiency from the aerobic soil metabolism studies (MRID 45906701). The application rate was derived using the following equation: 0.11 ai/A*0.186*1.12 (MW DPX (527.84 g/mol)/MW JT333 (469.8 g/mol).

Table B-1c: Input Parameters for IN-MP819 for GENEEC Version 1.2 used in the Aquatic Exposure Assessment

Parameter (units)	Input Value	Source of Information/ Reference
Maximum application rate[1] (pounds a.i. $acre^{-1}$)	0.00197 lbs ai/A	Assumes 1.6% conversion rate from parent (0.11*0.016*1.12)
Number of applications	4	Product label
Interval between applications (days)	5	Product label
Partition Coefficient K_d or K_{oc} (mL $g_{o.c.}^{-1}$ or L $kg_{o.c.}^{-1}$)	6356 L/kg	EPI (v 3.12) estimation
Aerobic Soil Metabolism ($t_{1/2}$ in days)	Stable	No data available to estimate half-life
Wetted in?	No	Product label
Depth of incorporation (inches)	0 (not incorporated)	Product label
Method of application	Aerial	Product label
Solubility in water (mg/L)	1.37	EPI (v 3.12) estimation
Aerobic Aquatic Metabolism ($t_{1/2}$ in days)	Stable	No data available to estimate half-life
Hydrolysis (pH 7) ($t_{1/2}$ in days)	Stable	EPI (v 3.12) estimation
Aquatic Photolysis (pH 7) ($t_{1/2}$ in days)	Stable	No data available to estimate half-life

Table B-2. Estimated Environmental Concentrations (ppb) of DPX-KN128 and JT333 in Surface Water (GENEEC Tier 1 modeling) used for Aquatic Exposure Assessment.

Application Regime	Peak		4 day		21 day		56 day	
	KN128	JT333	KN128	JT333	KN128	JT333	KN128	JT333
Multiple Aerial Applications	4.7	0.4	4.4	0.3	3.1	0.2	1.8	0.1
Multiple Ground Applications	4.1	0.2	3.8	0.2	2.7	0.1	1.6	0.1

Table B-3. Estimated Environmental Concentrations (ppb) of DPX-KN128+DPX-KN127, and JT333 in Surface Water (GENEEC Tier 1 modeling used for Aquatic Exposure Assessment).

Application Regime	Peak		4 day		21 day		56 day	
	DPX	JT333	DPX	JT333	DPX	JT333	DPX	JT333
Multiple Aerial Applications	6.3	0.4	5.9	0.3	4.1	0.2	2.4	0.1
Multiple Ground Applications	5.4	0.2	5	0.2	3.5	0.1	2.1	0.1

TIER I GENECC MODELING

```
RUN No.   1 FOR JT333          ON   GRAPES       * INPUT VALUES *
--------------------------------------------------------------------
 RATE (#/AC)  No.APPS &   SOIL  SOLUBIL   APPL TYPE NO-SPRAY INCORP
  ONE(MULT)   INTERVAL   Koc   (PPB )   (%DRIFT)   (FT)    (IN)
--------------------------------------------------------------------
.023(  .087)  4  5   5749.0  800.0  GRANUL(  .0)    .0   .0

FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)
--------------------------------------------------------------------
METABOLIC  DAYS UNTIL  HYDROLYSIS  PHOTOLYSIS  METABOLIC  COMBINED
 (FIELD)  RAIN/RUNOFF  (POND)    (POND-EFF)   (POND)    (POND)
--------------------------------------------------------------------
  96.00       2        N/A      .00-    .00   99.00     99.00

GENERIC EECs (IN NANOGRAMS/LITER (PPTr))     Version 2.0 Aug 1, 2001
--------------------------------------------------------------------
   PEAK      MAX 4 DAY     MAX 21 DAY    MAX 60 DAY    MAX 90 DAY
   GEEC      AVG GEEC      AVG GEEC      AVG GEEC      AVG GEEC
--------------------------------------------------------------------
  568.07     553.56       480.45       358.07       293.63

RUN No.   2 FOR MP819          ON              * INPUT VALUES *
--------------------------------------------------------------------
 RATE (#/AC)  No.APPS &   SOIL  SOLUBIL   APPL TYPE NO-SPRAY INCORP
  ONE(MULT)   INTERVAL   Koc   (PPM )   (%DRIFT)   (FT)    (IN)
--------------------------------------------------------------------
.002(  .008)  4  5   6356.0   1.4  GRANUL(  .0)    .0   .0

FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)
--------------------------------------------------------------------
METABOLIC  DAYS UNTIL  HYDROLYSIS  PHOTOLYSIS  METABOLIC  COMBINED
```

(FIELD) RAIN/RUNOFF (POND) (POND-EFF) (POND) (POND)

Tier II Modeling

Standard pond scenario modeling for EECs--Tier II (PRZM/EXAMS) was performed for DPX . In performing the Tier II assessment, several factors were considered in choosing the modeling scenario to yield the most conservative result. These factors included maximum application rate, number of applications, interval between applications, irrigation system, and the vulnerability of the soil in the use area.

Table B-4a: Factors for Standard Pond Scenario Modeling for EECs

Variable Description	Variable (Units)	Input Value	Source of Info/Reference
Application date(s) (day/mo/yr)	APD, APM, IAPYR (day/mo/yr)		Product label or location-specific
Incorporation depth	DEPI (cm)	0	Product label
Application rate	TAPP (kg a.i. ha^{-1})	0.12	Product label
Application efficiency	APPEFF (decimal)	0.95	Spray Drift Task Force Data
Spray drift fraction: For aquatic ecological exposure assessment, use 0.05 for aerial spray; 0.01 for ground spray. For drinking water assessment, use 0.16 for aerial 0.064 for ground spray.	DRFT (decimal)	0.05 or 0.01 for Eco 0.16 or 0.064 for DW	Spray Drift Task Force Data
Foliar extraction	FEXTRA (frac./cm rain)	0.5 is the default unless field data is available	Default or field data
Decay rate on foliage	PLDKRT (day^{-1})	$T_{1/2}$=22.46 days Rate constant = 0.03/day	Derived as median foliar wash-off half-life from log-normal distribution MRID 44477412 MRID 44477414 MRID 44477410 MRID 44477411 MRID 44477402 MRID 44477404
Volatilization rate from foliage	PLVKRT (day^{-1})	0.0 is the default unless field data is available	Default or field data
Plant uptake factor	UPTKF (frac. of evap)	0.0 is the default unless field data is available	Default or field data
Dissolved phase pesticide decay rate in surface horizon **(aerobic soil metabolism)**	DWRATE (surface) (day^{-1})	$T_{1/2}$ =156 days Rate constant = 0.00444/day (UB90th% 3,3,6,10,15,30, 693,3,3,7,6),	MRID 44477304 MRID 44477307 MRID 45850001 MRID 45795803 MRID 45906701

Adsorbed phase pesticide decay rate in surface horizon **(aerobic soil metabolism)**	DSRATE (surface) (day^{-1})	$T_{1/2}$ =156 days Rate constant = 0.00444/day (UB90th% 3,3,6,10,15,30, 693,3,3,7,6),	MRID 44477304 MRID 44477307 MRID 45850001 MRID 45795803 MRID 45906701
Dissolved phase pesticide decay rate in subsequent subsurface horizons **(aerobic or anaerobic soil metabolism)**	DWRATE (subsurface horizons) (day^{-1})	$T_{1/2}$ =156 days Rate constant = 0.00444/day (UB90th% 3,3,6,10,15,30, 693,3,3,7,6),	MRID 44477304 MRID 44477307 MRID 45850001 MRID 45795803 MRID 45906701
Adsorbed phase pesticide decay rate in subsequent subsurface horizons **(aerobic or anaerobic soil metabolism)**	DSRATE (subsurface horizons) (day^{-1})	$T_{1/2}$ =156 days Rate constant = 0.00444/day (UB90th% 3,3,6,10,15,30, 693,3,3,7,6),	MRID 44477304 MRID 44477307 MRID 45850001 MRID 45795803 MRID 45906701
Pesticide partition or distribution coefficients for each horizon **(Leaching/Adsorption/Desorption)**	KD (cm^3 gm^{-1} or mL g^{-1} or L kg^{-1})	25 (lowest non-sand Kd)	MRID 44477308 MRID 45795809

Table B-4b: Input Parameters for IN-JT333 for PRZM Version 3.12 for Aquatic Exposure Assessment.

Variable Description	**Variable (Units)**	**Input Value**	**Source of Info/Reference**
Application date(s) (day/mo/yr)	APD, APM, IAPYR (day/mo/yr)		Product label or location-specific
Incorporation depth	DEPI (cm)	0	Product label
Application rate	TAPP (kg a.i. ha^{-1})	0.018	Product label
Application efficiency	APPEFF (decimal)	0.95	Spray Drift Task Force Data
Spray drift fraction. For aquatic ecological exposure assessment, use 0.05 for aerial spray; 0.01 for ground spray. For drinking water assessment, use 0.16 for aerial 0 064 for ground spray.	DRFT (decimal)	0.05 or 0.01 for Eco 0.16 or 0.064 for DW	Spray Drift Task Force Data
Foliar extraction	FEXTRA (frac./cm rain)	0.5 is the default unless field data is available	Default or field data
Decay rate on foliage	PLDKRT (day^{-1})	0.0 is the default unless field data is available	Default or field data
Volatilization rate from foliage	PLVKRT (day^{-1})	0.0 is the default unless field data is available	Default or field data
Plant uptake factor	UPTKF (frac. of evap)	0.0 is the default unless field data is available	Default or field data
Dissolved phase pesticide decay rate in surface horizon **(aerobic soil metabolism)**	DWRATE (surface) [5] (day^{-1})	$T_{1/2}$ = 42 days Rate constant = 0.017/day	MRID 44477304 MRID 44477307
Adsorbed phase pesticide decay rate in surface horizon **(aerobic soil metabolism)**	DSRATE (surface) [5] (day^{-1})	$T_{1/2}$ = 42 days Rate constant = 0.017/day	MRID 44477304 MRID 44477307
Dissolved phase pesticide decay rate in subsequent subsurface horizons **(aerobic or anaerobic soil metabolism)**	DWRATE (subsurface horizons) [5] (day^{-1})	$T_{1/2}$ = 42 days Rate constant = 0.017/day	MRID 44477304 MRID 44477307
Adsorbed phase pesticide decay rate in subsequent subsurface horizons **(aerobic or anaerobic soil metabolism)**	DSRATE (subsurface horizons) [5] (day^{-1})	$T_{1/2}$ = 42 days Rate constant = 0.017/day	MRID 44477304 MRID 44477307

Pesticide partition or distribution coefficients for each horizon **(Leaching/Adsorption/Desorption)**	KD [5] (cm^3 gm^{-1} or mL g^{-1} or L kg^{-1})	96	MRID 44477308

Table B-4c: Input Parameters for Indoxcarb Files Used in EXAMS for Aquatic Exposure Assessment.

Variable Description	**Variable (Units)**	**Input Value**	**Source of Info/Reference**
Henry's law constant	HENRY (atm-$m^3$$mole^{-1}$)	6 x 10-10	From registrant or product chemistry
Bacterial biolysis in water column **(aerobic aquatic metabolism)**	KBACW $(cfu/mL)^{-1}$ $hour^{-1}$	8.494E-4/hr ($t_{1/2}$=34 days)	MRID 44477306 MRID 45793301
Bacterial biolysis in benthic sediment **(anaerobic aquatic or aerobic aquatic metabolism)**	KBACS[1] $(cfu/mL)^{-1}$ $hour^{-1}$	1.164E-4/hr ($t_{1/2}$= 248 days)	MRID 45795804
Direct photolysis **(aqueous photolysis)**	KDP ($hour^{-1}$)	9.63E-3/hr ($t_{1/2}$= 3 days)	MRID 44477302 MRID 45795802
Hydrolysis	pH 7	8.022E-4/hr ($t_{1/2}$= 36 days0	MRID 44477301 MRID 45795801
Partition coefficient for sediments **(Leaching/Adsorption/Desorption)**	KPS (mL g^{-1} or L kg^{-1})	26 mL g^{-1}	MRID 44477308 MRID 44477309
Molecular weight	MWT (g $mole^{-1}$)	527.8	Calculated
Aqueous solubility **(Multiply water solubility by 10)**	SOL (mg L^{-1}) = 0.800	8	MRID
Vapor pressure	VAPR (torr)	1.9 x 10^{-10} torr @ 25°C	MRID
Sediment bacteria temperature coefficient	QTBAS	2	Standard value
Water bacteria temperature coefficient	QTBAW	2	Standard value

Table B-4d: Input Parameters for IN-JT333 Used in EXAMS for Aquatic Exposure Assessment.

Variable Description	**Variable (Units)**	**Input Value**	**Source of Info/Reference**
Henry's law constant	HENRY (atm-$m^3$$mole^{-1}$)		From registrant or product chemistry
Bacterial biolysis in water column **(aerobic aquatic metabolism)**	KBACW $(cfu/mL)^{-1}$ $hour^{-1}$	Stable	MRID 44477306
Bacterial biolysis in benthic sediment **(anaerobic aquatic or aerobic aquatic metabolism)**	KBACS[1] $(cfu/mL)^{-1}$ $hour^{-1}$	Stable	MRID 44477305

Table B-4d: Input Parameters for IN-JT333 Used in EXAMS for Aquatic Exposure Assessment.

Variable Description	**Variable (Units)**	**Input Value**	**Source of Info/Reference**
Direct photolysis **(aqueous photolysis)**	KDP ($hour^{-1}$)	Stable	MRID 44477302
Base hydrolysis	KBH ($mole^{-1}$ $hour^{-1}$)	NA	
Neutral hydrolysis	KNH ($mole^{-1}$ $hour^{-1}$)	NA	
Acid hydrolysis	KAH ($mole^{-1}$ $hour^{-1}$)	NA	
Partition coefficient for sediments **(Leaching/Adsorption/Desorption)** need Kd from soil closest to crop scenario	KPS (mL g^{-1} or L kg^{-1})	114 mL g^{-1}	MRID 44477308 MRID 44477309
Molecular weight	MWT (g $mole^{-1}$)	469.8	Calculated
Aqueous solubility **(Multiply water solubility by 10)**	SOL (mg L^{-1})		
Vapor pressure	VAPR (torr)		
Sediment bacteria temperature coefficient	QTBAS	2	Standard value
Water bacteria temperature coefficient	QTBAW	2	Standard value

Ground Water Assessment

SCI-GROW modeling estimates the acute and chronic concentration of indoxacarb residues in shallow groundwater is not likely to exceed 0.02 µg/L.

Table B-6: Input Parameters for Radioactivity Summary for SCI-GROW

Variable Description	**Input Value**	**Source of Info/Reference**
Application rate	0.146 # ai/A	Product label
Number of Applications	4	Product label
Aerobic Soil Metabolism	$T_{1/2}$ =136 days	MRID 44477304 MRID 44477307
Pesticide partition or distribution coefficients **(Koc)**	2514 mL g^{-1}	MRID 44477308

Modeling Output

PRZM-EXAMS AERIAL SPRAY

ALFALFA

CA-Alfalfa-Aerial

stored as CAAlfalfa.out
Chemical: Indoxacarb
PRZM environment: CAalfalfaC.txt modified Satday, 12 October 2002 at 15:27:56
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 15:33:30
Metfile: w93193.dvf modified Wedday, 3 July 2002 at 08:04:24
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	0.4114	0.3759	0.271	0.2204	0.2082	0.07813
1962	0.4123	0.3758	0.2697	0.2226	0.2121	0.09011
1963	0.4122	0.3751	0.2685	0.2236	0.2146	0.08966
1964	0.4165	0.3812	0.2745	0.2246	0.2134	0.08974
1965	0.4206	0.3862	0.2811	0.2294	0.2176	0.09026
1966	0.4117	0.376	0.2706	0.2208	0.2111	0.08915
1967	0.4037	0.3668	0.2607	0.2122	0.2024	0.08626
1968	0.4154	0.3791	0.2732	0.2313	0.2174	0.09384
1969	0.4125	0.3757	0.2705	0.2235	0.2136	0.1048
1970	0.4124	0.3766	0.2716	0.222	0.2099	0.0902
1971	0.4119	0.3762	0.272	0.222	0.2105	0.08858
1972	0.414	0.3786	0.2742	0.2237	0.2119	0.09087
1973	0.4156	0.3799	0.2797	0.2292	0.2165	0.09233
1974	0.407	0.3693	0.2617	0.2165	0.2076	0.09024
1975	0.4142	0.3769	0.2704	0.2255	0.216	0.09047
1976	0.5233	0.4825	0.3881	0.2909	0.2602	0.1082
1977	0.4099	0.3736	0.267	0.2184	0.2078	0.0889
1978	0.4332	0.3955	0.2827	0.2351	0.2185	0.09029
1979	0.4024	0.3639	0.2552	0.2116	0.2034	0.08392
1980	0.408	0.3713	0.264	0.2162	0.2057	0.08464
1981	0.4032	0.3662	0.2613	0.2127	0.2015	0.08299
1982	0.4499	0.4113	0.3243	0.246	0.2275	0.09829
1983	0.4034	0.3654	0.2643	0.2154	0.2076	0.09162
1984	0.3948	0.3558	0.2492	0.2044	0.1947	0.08086
1985	0.4116	0.376	0.2706	0.22	0.2063	0.08612
1986	0.4088	0.3739	0.2692	0.216	0.2049	0.08538
1987	0.4097	0.3728	0.2644	0.2179	0.2103	0.08616
1988	0.4049	0.3679	0.2603	0.2127	0.2017	0.08266
1989	0.4217	0.3843	0.2751	0.2237	0.2112	0.08685
1990	0.4067	0.3698	0.2625	0.2149	0.2043	0.08396

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	0.5233	0.4825	0.3881	0.2909	0.2602	0.1082
0.0645161290322581	0.4499	0.4113	0.3243	0.246	0.2275	0.1048
0.0967741935483871	0.4332	0.3955	0.2827	0.2351	0.2185	0.09829
0.129032258064516	0.4217	0.3862	0.2811	0.2313	0.2176	0.09384
0.161290322580645	0.4206	0.3843	0.2797	0.2294	0.2174	0.09233
0.193548387096774	0.4165	0.3812	0.2751	0.2292	0.2165	0.09162
0.225806451612903	0.4156	0.3799	0.2745	0.2255	0.216	0.09087
0.258064516129032	0.4154	0.3791	0.2742	0.2246	0.2146	0.09047
0.290322580645161	0.4142	0.3786	0.2732	0.2237	0.2136	0.09029
0.32258064516129	0.414	0.3769	0.272	0.2237	0.2134	0.09026
0.354838709677419	0.4125	0.3766	0.2716	0.2236	0.2121	0.09024
0.387096774193548	0.4124	0.3762	0.271	0.2235	0.2119	0.0902

0.419354838709677	0.4123	0.376	0.2706	0.2226	0.2112	0.09011
0.451612903225806	0.4122	0.376	0.2706	0.222	0.2111	0.08974
0.483870967741936	0.4119	0.3759	0.2705	0.222	0.2105	0.08966
0.516129032258065	0.4117	0.3758	0.2704	0.2208	0.2103	0.08915
0.548387096774194	0.4116	0.3757	0.2697	0.2204	0.2099	0.0889
0.580645161290323	0.4114	0.3751	0.2692	0.22	0.2082	0.08858
0.612903225806452	0.4099	0.3739	0.2685	0.2184	0.2078	0.08685
0.645161290322581	0.4097	0.3736	0.267	0.2179	0.2076	0.08626
0.67741935483871	0.4088	0.3728	0.2644	0.2165	0.2076	0.08616
0.709677419354839	0.408	0.3713	0.2643	0.2162	0.2063	0.08612
0.741935483870968	0.407	0.3698	0.264	0.216	0.2057	0.08538
0.774193548387097	0.4067	0.3693	0.2625	0.2154	0.2049	0.08464
0.806451612903226	0.4049	0.3679	0.2617	0.2149	0.2043	0.08396
0.838709677419355	0.4037	0.3668	0.2613	0.2127	0.2034	0.08392
0.870967741935484	0.4034	0.3662	0.2607	0.2127	0.2024	0.08299
0.903225806451613	0.4032	0.3654	0.2603	0.2122	0.2017	0.08266
0.935483870967742	0.4024	0.3639	0.2552	0.2116	0.2015	0.08086
0.967741935483871	0.3948	0.3558	0.2492	0.2044	0.1947	0.07813

0.1 0.43205 0.39457 0.28254 0.23472 0.21841 0.097845

Average of yearly averages: 0.0891826666666667

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

Data used for this run:
Output File: CAAlfalfa
Metfile: w93193.dvf
PRZM scenario: CAalfalfaC.txt
EXAMS environment file: pond298.exv
Chemical Name: Indoxacarb

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	527 g/mol		
Henry's Law Const.	henry	6E-10	atm-m^3/mol	
Vapor Pressure	vapr	1.9E-9	torr	
Solubility	sol	8	mg/L	
Kd	Kd	25	mg/L	
Koc	Koc		mg/L	
Photolysis half-life	kdp	3 days	Half-life	
Aerobic Aquatic Metabolism	kbacw	34	days	Halfife
Anaerobic Aquatic Metabolism	kbacs	248	days	Halfife
Aerobic Soil Metabolism	asm	156 days	Halfife	
Hydrolysis:	pH 7	36	days	Half-life
Method:	CAM	2	integer	See PRZM manual
Incorporation Depth:	DEPI	0.0 cm		
Application Rate:	TAPP	0.1232	kg/ha	
Application Efficiency:	APPEFF	0.95	fraction	
Spray Drift	DRFT	0.05	fraction of application rate applied to pond	
Application Date	Date	24-6	dd/mm or dd/mmm or dd-mm or dd-mmm	
Interval 1	interval	30	days	Set to 0 or delete line for single app.
Interval 2	interval	30	days	Set to 0 or delete line for single app.
Interval 3	interval	30	days	Set to 0 or delete line for single app.
Record 17:	FILTRA			
	IPSCND	1		

UPTKF			
Record 18:	PLVKRT		
PLDKRT	0.03086		
FEXTRC	0.5		
Flag for Index Res. Run	IR	Pond	
Flag for runoff calc.	RUNOFF	none	none, monthly or total(average of entire run)

MN Alfalfa- Aerial

stored as MNAlfalfa.out
Chemical: Indoxacarb
PRZM environment: MNalfalfaC.txt modified Satday, 12 October 2002 at 16:04:22
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 15:33:30
Metfile: w14914.dvf modified Wedday, 3 July 2002 at 08:05:52
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	0.6599	0.6312	0.4958	0.3677	0.3362	0.1402
1962	0.6069	0.5573	0.4541	0.4208	0.3947	0.1668
1963	0.7692	0.7051	0.6067	0.4246	0.3644	0.1562
1964	0.8001	0.7333	0.5676	0.4034	0.4085	0.1692
1965	0.5112	0.4855	0.3993	0.3476	0.3197	0.1577
1966	0.703	0.6478	0.4933	0.4211	0.359	0.157
1967	0.4489	0.4136	0.3058	0.2619	0.2573	0.1202
1968	0.4463	0.4108	0.3033	0.2599	0.2558	0.1166
1969	1.109	1.016	0.7823	0.5599	0.4788	0.1918
1970	1.167	1.077	0.8	0.4983	0.4228	0.2069
1971	0.9608	0.8886	0.66	0.5206	0.4585	0.2221
1972	0.5061	0.465	0.3447	0.3069	0.2874	0.15
1973	1.063	0.9872	0.7565	0.6005	0.5084	0.2177
1974	1.421	1.308	1.062	0.7997	0.6462	0.2771
1975	1.459	1.367	0.9787	0.6933	0.6126	0.2493
1976	0.4308	0.3937	0.2853	0.2437	0.2391	0.115
1977	1.115	1.017	0.7477	0.5634	0.4995	0.2512
1978	1.072	0.9816	0.7084	0.4703	0.431	0.1959
1979	0.9043	0.8256	0.5957	0.4335	0.3958	0.2131
1980	0.7726	0.7177	0.5553	0.4764	0.4027	0.1921
1981	0.5465	0.5049	0.37	0.3133	0.3108	0.1443
1982	1.718	1.598	1.21	0.772	0.6038	0.2499
1983	0.6162	0.563	0.423	0.372	0.3606	0.1834
1984	0.9709	0.9236	0.7664	0.5071	0.3962	0.2202
1985	0.6014	0.5521	0.427	0.3647	0.3426	0.1737
1986	0.6925	0.6443	0.5011	0.4269	0.3933	0.1851
1987	0.5892	0.5367	0.3862	0.3284	0.2983	0.1325
1988	0.7973	0.7552	0.5723	0.4051	0.3551	0.1615
1989	1.214	1.122	0.9062	0.5881	0.4884	0.2252
1990	0.5624	0.5168	0.3774	0.3131	0.2986	0.1428

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	1.718	1.598	1.21	0.7997	0.6462	0.2771
0.0645161290322581	1.459	1.367	1.062	0.772	0.6126	0.2512
0.0967741935483871	1.421	1.308	0.9787	0.6933	0.6038	0.2499

0.129032258064516	1.214	1.122	0.9062	0.6005	0.5084	0.2493
0.161290322580645	1.167	1.077	0.8	0.5881	0.4995	0.2252
0.193548387096774	1.115	1.017	0.7823	0.5634	0.4884	0.2221
0.225806451612903	1.109	1.016	0.7664	0.5599	0.4788	0.2202
0.258064516129032	1.072	0.9872	0.7565	0.5206	0.4585	0.2177
0.290322580645161	1.063	0.9816	0.7477	0.5071	0.431	0.2131
0.32258064516129	0.9709	0.9236	0.7084	0.4983	0.4228	0.2069
0.354838709677419	0.9608	0.8886	0.66	0.4764	0.4085	0.1959
0.387096774193548	0.9043	0.8256	0.6067	0.4703	0.4027	0.1921
0.419354838709677	0.8001	0.7552	0.5957	0.4335	0.3962	0.1918
0.451612903225806	0.7973	0.7333	0.5723	0.4269	0.3958	0.1851
0.483870967741936	0.7726	0.7177	0.5676	0.4246	0.3947	0.1834
0.516129032258065	0.7692	0.7051	0.5553	0.4211	0.3933	0.1737
0.548387096774194	0.703	0.6478	0.5011	0.4208	0.3644	0.1692
0.580645161290323	0.6925	0.6443	0.4958	0.4051	0.3606	0.1668
0.612903225806452	0.6599	0.6312	0.4933	0.4034	0.359	0.1615
0.645161290322581	0.6162	0.563	0.4541	0.372	0.3551	0.1577
0.67741935483871	0.6069	0.5573	0.427	0.3677	0.3426	0.157
0.709677419354839	0.6014	0.5521	0.423	0.3647	0.3362	0.1562
0.741935483870968	0.5892	0.5367	0.3993	0.3476	0.3197	0.15
0.774193548387097	0.5624	0.5168	0.3862	0.3284	0.3108	0.1443
0.806451612903226	0.5465	0.5049	0.3774	0.3133	0.2986	0.1428
0.838709677419355	0.5112	0.4855	0.37	0.3131	0.2983	0.1402
0.870967741935484	0.5061	0.465	0.3447	0.3069	0.2874	0.1325
0.903225806451613	0.4489	0.4136	0.3058	0.2619	0.2573	0.1202
0.935483870967742	0.4463	0.4108	0.3033	0.2599	0.2558	0.1166
0.967741935483871	0.4308	0.3937	0.2853	0.2437	0.2391	0.115

0.1 1.4003 1.2894 0.97145 0.68402 0.59426 0.24984

Average of yearly averages: 0.182823333333333

MN-Alfalfa-Aerial

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

Data used for this run:
Output File: MNAlfalfa
Metfile: w14914.dvf
PRZM scenario: MNalfalfaC.txt
EXAMS environment file: pond298.exv
Chemical Name: Indoxacarb

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	527 g/mol		
Henry's Law Const.	henry	6E-10	atm-m^3/mol	
Vapor Pressure	vapr	1.9E-9	torr	
Solubility	sol	8	mg/L	
Kd	Kd	25	mg/L	
Koc	Koc	mg/L		
Photolysis half-life	kdp	3 days	Half-life	
Aerobic Aquatic Metabolism	kbacw	34	days	Halfife
Anaerobic Aquatic Metabolism	kbacs	248	days	Halfife
Aerobic Soil Metabolism	asm	156 days	Halfife	
Hydrolysis:	pH 7	36	days	Half-life

Method:	CAM	2	integer	See PRZM manual
Incorporation Depth:		DEPI	0.0 cm	
Application Rate:		TAPP	0.1232	kg/ha
Application Efficiency:		APPEFF	0.95	fraction
Spray Drift	DRFT	0.05	fraction of application rate applied to pond	
Application Date	Date	24-5	dd/mm or dd/mmm or dd-mm or dd-mmm	
Interval 1	interval	30	days	Set to 0 or delete line for single app.
Interval 2	interval	30	days	Set to 0 or delete line for single app.
Interval 3	interval	30	days	Set to 0 or delete line for single app.
Record 17:	FILTRA			
IPSCND		1		
UPTKF				
Record 18:	PLVKRT			
PLDKRT		0.03086		
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 NCAlfalfa.out
Chemical: Indoxacarb
PRZM environment: NCalfalfaC.txt modified Satday, 12 October 2002 at 16:08:44
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 15:33:30
Metfile: w03812.dvf modified Wedday, 3 July 2002 at 08:05:50
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1965	0.6932	0.646	0.5191	0.4014	0.382	0.2061
1966	1.519	1.394	1.142	0.8444	0.7234	0.4125
1967	2.742	2.594	2	1.268	1.142	0.5206
1968	1.839	1.713	1.362	0.8961	0.7456	0.388
1969	2.748	2.493	1.782	1.166	0.9153	0.3858
1970	0.8651	0.7889	0.6299	0.4216	0.3715	0.2239
1971	0.78	0.7302	0.5932	0.4956	0.4383	0.2633
1972	1.303	1.197	0.9376	0.7065	0.6013	0.3208
1973	2.442	2.305	1.666	1.157	1.24	0.5534
1974	1.289	1.187	0.948	0.6348	0.5708	0.3202
1975	1.238	1.14	0.8619	0.6147	0.5114	0.3244
1976	1.538	1.423	1.073	0.8513	0.745	0.376
1977	1.557	1.429	1.115	0.8244	0.7621	0.3891
1978	1.36	1.254	0.9542	0.6493	0.5413	0.3353
1979	0.7673	0.7047	0.5614	0.4504	0.4401	0.3347
1980	1.008	0.9286	0.6632	0.4804	0.4514	0.2428
1981	1.658	1.539	1.225	0.8159	0.6658	0.2658
1982	1.635	1.495	1.25	0.8226	0.6854	0.3701
1983	0.5841	0.5502	0.4875	0.382	0.367	0.262
1984	1.053	0.9828	0.8408	0.6735	0.6082	0.3429
1985	1.789	1.636	1.225	0.7632	0.6261	0.302
1986	1.258	1.155	0.8949	0.6228	0.5277	0.2962
1987	1.766	1.616	1.196	0.8662	0.697	0.3838
1988	0.563	0.5153	0.3714	0.2935	0.2834	0.1959
1989	1.465	1.342	1.044	0.8761	0.8272	0.4199

1990	1.661	1.566	1.2	0.8065	0.7198	0.3972

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.037037037037037	2.748	2.594	2	1.268	1.24	0.5534
0.0740740740740741	2.742	2.493	1.782	1.166	1.142	0.5206
0.111111111111111	2.442	2.305	1.666	1.157	0.9153	0.4199
0.148148148148148	1.839	1.713	1.362	0.8961	0.8272	0.4125
0.185185185185185	1.789	1.636	1.25	0.8761	0.7621	0.3972
0.222222222222222	1.766	1.616	1.225	0.8662	0.7456	0.3891
0.259259259259259	1.661	1.566	1.225	0.8513	0.745	0.388
0.296296296296296	1.658	1.539	1.2	0.8444	0.7234	0.3858
0.333333333333333	1.635	1.495	1.196	0.8244	0.7198	0.3838
0.37037037037037	1.557	1.429	1.142	0.8226	0.697	0.376
0.407407407407407	1.538	1.423	1.115	0.8159	0.6854	0.3701
0.444444444444444	1.519	1.394	1.073	0.8065	0.6658	0.3429
0.481481481481481	1.465	1.342	1.044	0.7632	0.6261	0.3353
0.518518518518518	1.36	1.254	0.9542	0.7065	0.6082	0.3347
0.555555555555556	1.303	1.197	0.948	0.6735	0.6013	0.3244
0.592592592592593	1.289	1.187	0.9376	0.6493	0.5708	0.3208
0.62962962962963	1.258	1.155	0.8949	0.6348	0.5413	0.3202
0.666666666666667	1.238	1.14	0.8619	0.6228	0.5277	0.302
0.703703703703704	1.053	0.9828	0.8408	0.6147	0.5114	0.2962
0.740740740740741	1.008	0.9286	0.6632	0.4956	0.4514	0.2658
0.777777777777778	0.8651	0.7889	0.6299	0.4804	0.4401	0.2633
0.814814814814815	0.78	0.7302	0.5932	0.4504	0.4383	0.262
0.851851851851852	0.7673	0.7047	0.5614	0.4216	0.382	0.2428
0.888888888888889	0.6932	0.646	0.5191	0.4014	0.3715	0.2239
0.925925925925926	0.5841	0.5502	0.4875	0.382	0.367	0.2061
0.962962962962963	0.563	0.5153	0.3714	0.2935	0.2834	0.1959
0.1	2.532	2.3614	1.7008	1.1597	0.98331	0.45011

Average of yearly averages: 0.339719230769231

NC-Alfalfa-Aerial

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

Data used for this run:
Output File: NCAlfalfa
Metfile: w03812.dvf
PRZM scenario: NCalfalfaC.txt
EXAMS environment file: pond298.exv
Chemical Name: Indoxacarb

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	527 g/mol		
Henry's Law Const.	henry	6E-10	atm-m^3/mol	
Vapor Pressure	vapr	1.9E-9	torr	
Solubility	sol	8	mg/L	
Kd	Kd	25	mg/L	
Koc	Koc		mg/L	
Photolysis half-life	kdp	3	days	Half-life
Aerobic Aquatic Metabolism	kbacw	34	days	Halfife

Anaerobic Aquatic Metabolism		kbacs	248 days	Halfife
Aerobic Soil Metabolism	asm	156 days	Halfife	
Hydrolysis: pH 7	36	days	Half-life	
Method: CAM	2	integer	See PRZM manual	
Incorporation Depth:	DEPI	0.0 cm		
Application Rate:	TAPP	0.1232	kg/ha	
Application Efficiency:	APPEFF	0.95	fraction	
Spray Drift DRFT	0.05	fraction of application rate applied to pond		
Application Date Date	24-4	dd/mm or dd/mmm or dd-mm or dd-mmm		
Interval 1 interval	30	days	Set to 0 or delete line for single app.	
Interval 2 interval	30	days	Set to 0 or delete line for single app.	
Interval 3 interval	30	days	Set to 0 or delete line for single app.	
Record 17: FILTRA				
IPSCND	1			
UPTKF				
Record 18: PLVKRT				
PLDKRT	0.03086			
FEXTRC	0.5			
Flag for Index Res. Run	IR	Pond		
Flag for runoff calc.	RUNOFF	none	none, monthly or total(average of entire run)	

PA-Alfalfa-Aerial

stored as PAAlfalfa.out
Chemical: Indoxacarb
PRZM environment: PAalfalfaC.txt modified Satday, 12 October 2002 at 16:24:04
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 15:33:30
Metfile: w14737.dvf modified Wedday, 3 July 2002 at 08:06:12
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	1.403	1.276	0.9139	0.6489	0.5195	0.1956
1962	0.8017	0.7365	0.6402	0.5262	0.467	0.3079
1963	1.183	1.092	0.9373	0.6828	0.6414	0.314
1964	0.4985	0.4566	0.3912	0.3203	0.2899	0.2361
1965	0.8548	0.7827	0.6619	0.5335	0.4599	0.2646
1966	0.9505	0.8789	0.7518	0.5889	0.5258	0.2892
1967	0.8065	0.7464	0.6093	0.5189	0.5191	0.3031
1968	0.7805	0.7227	0.5412	0.4263	0.3836	0.2535
1969	2.806	2.556	1.871	1.189	0.919	0.349
1970	0.8598	0.8338	0.7112	0.5962	0.5009	0.3032
1971	2.013	1.841	1.448	1.126	0.975	0.466
1972	1.591	1.488	1.267	0.9204	0.6986	0.4325
1973	1.428	1.303	0.9355	0.6537	0.6505	0.4094
1974	1.298	1.223	1.074	0.8924	0.7819	0.3951
1975	1.385	1.28	0.9664	0.7642	0.6517	0.3724
1976	1.306	1.223	0.97	0.7482	0.6978	0.3536
1977	0.822	0.7516	0.541	0.4299	0.4093	0.2966
1978	1.568	1.429	1.163	0.7865	0.6403	0.3101
1979	1.527	1.406	1.12	0.8508	0.7196	0.3809
1980	0.4388	0.4036	0.292	0.2468	0.2445	0.1795
1981	0.5173	0.4776	0.3463	0.2916	0.2903	0.178
1982	2.376	2.174	1.695	1.059	0.8611	0.3857

1983	0.7205	0.6794	0.5792	0.4508	0.3733	0.2582
1984	1.104	1.012	0.8129	0.6965	0.6561	0.334
1985	2.971	2.724	2.025	1.32	1.119	0.4957
1986	0.6698	0.6158	0.4892	0.4429	0.3911	0.2898
1987	2.832	2.603	1.982	1.302	1.105	0.4549
1988	0.9974	0.9222	0.7079	0.6228	0.5409	0.3159
1989	1.139	1.059	0.8191	0.5955	0.5189	0.2973
1990	1.375	1.256	0.9747	0.685	0.5863	0.3347

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	2.971	2.724	2.025	1.32	1.119	0.4957
0.0645161290322581	2.832	2.603	1.982	1.302	1.105	0.466
0.0967741935483871	2.806	2.556	1.871	1.189	0.975	0.4549
0.129032258064516	2.376	2.174	1.695	1.126	0.919	0.4325
0.161290322580645	2.013	1.841	1.448	1.059	0.8611	0.4094
0.193548387096774	1.591	1.488	1.267	0.9204	0.7819	0.3951
0.225806451612903	1.568	1.429	1.163	0.8924	0.7196	0.3857
0.258064516129032	1.527	1.406	1.12	0.8508	0.6986	0.3809
0.290322580645161	1.428	1.303	1.074	0.7865	0.6978	0.3724
0.32258064516129	1.403	1.28	0.9747	0.7642	0.6561	0.3536
0.354838709677419	1.385	1.276	0.97	0.7482	0.6517	0.349
0.387096774193548	1.375	1.256	0.9664	0.6965	0.6505	0.3347
0.419354838709677	1.306	1.223	0.9373	0.685	0.6414	0.334
0.451612903225806	1.298	1.223	0.9355	0.6828	0.6403	0.3159
0.483870967741936	1.183	1.092	0.9139	0.6537	0.5863	0.314
0.516129032258065	1.139	1.059	0.8191	0.6489	0.5409	0.3101
0.548387096774194	1.104	1.012	0.8129	0.6228	0.5258	0.3079
0.580645161290323	0.9974	0.9222	0.7518	0.5962	0.5195	0.3032
0.612903225806452	0.9505	0.8789	0.7112	0.5955	0.5191	0.3031
0.645161290322581	0.8598	0.8338	0.7079	0.5889	0.5189	0.2973
0.67741935483871	0.8548	0.7827	0.6619	0.5335	0.5009	0.2966
0.709677419354839	0.822	0.7516	0.6402	0.5262	0.467	0.2898
0.741935483870968	0.8065	0.7464	0.6093	0.5189	0.4599	0.2892
0.774193548387097	0.8017	0.7365	0.5792	0.4508	0.4093	0.2646
0.806451612903226	0.7805	0.7227	0.5412	0.4429	0.3911	0.2582
0.838709677419355	0.7205	0.6794	0.541	0.4299	0.3836	0.2535
0.870967741935484	0.6698	0.6158	0.4892	0.4263	0.3733	0.2361
0.903225806451613	0.5173	0.4776	0.3912	0.3203	0.2903	0.1956
0.935483870967742	0.4985	0.4566	0.3463	0.2916	0.2899	0.1795
0.967741935483871	0.4388	0.4036	0.292	0.2468	0.2445	0.178
0.1	2.763	2.5178	1.8534	1.1827	0.9694	0.45266

Average of yearly averages: 0.325216666666667

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

Data used for this run:
Output File: PAAlfalfa
Metfile: w14737.dvf
PRZM scenario: PAalfalfaC.txt
EXAMS environment file: pond298.exv
Chemical Name: Indoxacarb

Description	Variable	Name	Value	Units	Comments	
Molecular weight		mwt	527 g/mol			
Henry's Law Const.		henry	6E-10	atm-m^3/mol		
Vapor Pressure	vapr	1.9E-9	torr			
Solubility	sol	8	mg/L			
Kd Kd	25	mg/L				
Koc Koc		mg/L				
Photolysis half-life		kdp	3 days	Half-life		
Aerobic Aquatic Metabolism			kbacw	34	days	Halfife
Anaerobic Aquatic Metabolism			kbacs	248	days	Halfife
Aerobic Soil Metabolism		asm	156 days	Halfife		
Hydrolysis:	pH 7	36	days	Half-life		
Method:	CAM	2	integer	See PRZM manual		
Incorporation Depth:		DEPI	0.0 cm			
Application Rate:		TAPP	0.1232	kg/ha		
Application Efficiency:		APPEFF	0.95	fraction		
Spray Drift	DRFT	0.05	fraction of application rate applied to pond			
Application Date	Date	24-5	dd/mm or dd/mmm or dd-mm or dd-mmm			
Interval 1	interval	30	days	Set to 0 or delete line for single app.		
Interval 2	interval	30	days	Set to 0 or delete line for single app.		
Interval 3	interval	30	days	Set to 0 or delete line for single app.		
Record 17:	FILTRA					
IPSCND		1				
UPTKF						
Record 18:	PLVKRT					
PLDKRT		0.03086				
FEXTRC		0.5				
Flag for Index Res. Run		IR	Pond			
Flag for runoff calc.		RUNOFF	none	none, monthly or total(average of entire run)		

TX-Alfalfa-Aerial

stored as TXAlfalfa.out
Chemical: Indoxacarb
PRZM environment: TXalfalfaC.txt modified Satday, 12 October 2002 at 16:27:40
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 15:33:30
Metfile: w13958.dvf modified Wedday, 3 July 2002 at 08:06:24
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	3.005	2.815	2.222	1.733	1.329	0.4732
1962	2.209	1.964	1.396	0.9215	0.7532	0.4255
1963	0.4631	0.4265	0.2958	0.2512	0.2487	0.1524
1964	2.904	2.607	1.879	1.052	0.7952	0.412
1965	1.749	1.576	1.185	0.7925	0.6779	0.4533
1966	2.137	1.975	1.373	0.8944	0.6935	0.3423
1967	0.8656	0.8084	0.6219	0.5588	0.5467	0.2989
1968	1.366	1.233	0.9247	0.686	0.6797	0.347
1969	1.405	1.286	1.031	0.6448	0.5827	0.3318
1970	1.476	1.38	1.04	0.7315	0.5879	0.3049
1971	1.813	1.688	1.182	0.6811	0.5523	0.2536
1972	1.229	1.117	0.9435	0.7 0.5976	0.2654	
1973	2.35	2.214	1.752	1.28	0.9754	0.4278

1974	1.951	1.757	1.204	0.8269	0.6471	0.3949
1975	1.965	1.811	1.412	1.154	0.9881	0.4679
1976	1.533	1.388	1.209	0.8505	0.7829	0.4002
1977	0.4536	0.4175	0.3004	0.2547	0.248	0.1578
1978	1.166	1.049	0.8927	0.6274	0.572	0.2946
1979	3.832	3.442	2.485	1.458	1.227	0.5096
1980	0.7799	0.7121	0.6243	0.4896	0.4122	0.2424
1981	4.487	4.196	3.241	2.261	1.739	0.6197
1982	1.087	0.9867	0.8498	0.6303	0.5284	0.2225
1983	0.7328	0.6616	0.5447	0.4611	0.4601	0.2417
1984	1.078	0,9901	0.8167	0.5522	0.4457	0.2077
1985	1.178	1.062	0.7831	0.572	0.4702	0.2899
1986	1.21	1.11	0.8911	0.6206	0.5196	0.3309
1987	2.342	2.111	1.925	1.412	1.124	0.4683
1988	0.7631	0.6969	0.551	0.4295	0.398	0.1841
1989	0.9706	0.8796	0.7535	0.5979	0.5046	0.2228
1990	1.063	0.9607	0.7354	0.5895	0.5295	0.2918

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	4.487	4.196	3.241	2.261	1.739	0.6197
0.0645161290322581	3.832	3.442	2.485	1.733	1.329	0.5096
0.0967741935483871	3.005	2.815	2.222	1.458	1.227	0.4732
0.129032258064516	2.904	2.607	1.925	1.412	1.124	0.4683
0.161290322580645	2.35	2.214	1.879	1.28	0.9881	0.4679
0.193548387096774	2.342	2.111	1.752	1.154	0.9754	0.4533
0.225806451612903	2.209	1.975	1.412	1.052	0.7952	0.4278
0.258064516129032	2.137	1.964	1.396	0.9215	0.7829	0.4255
0.290322580645161	1.965	1.811	1.373	0.8944	0.7532	0.412
0.32258064516129	1.951	1.757	1.209	0.8505	0.6935	0.4002
0.354838709677419	1.813	1.688	1.204	0.8269	0.6797	0.3949
0.387096774193548	1.749	1.576	1.185	0.7925	0.6779	0.347
0.419354838709677	1.533	1.388	1.182	0.7315	0.6471	0.3423
0.451612903225806	1.476	1.38	1.04	0.7	0.5976	0.3318
0.483870967741936	1.405	1.286	1.031	0.686	0.5879	0.3309
0.516129032258065	1.366	1.233	0.9435	0.6811	0.5827	0.3049
0.548387096774194	1.229	1.117	0.9247	0.6448	0.572	0.2989
0.580645161290323	1.21	1.11	0.8927	0.6303	0.5523	0.2946
0.612903225806452	1.178	1.062	0.8911	0.6274	0.5467	0.2918
0.645161290322581	1.166	1.049	0.8498	0.6206	0.5295	0.2899
0.67741935483871	1.087	0.9901	0.8167	0.5979	0.5284	0.2654
0.709677419354839	1.078	0.9867	0.7831	0.5895	0.5196	0.2536
0.741935483870968	1.063	0.9607	0.7535	0.572	0.5046	0.2424
0.774193548387097	0.9706	0.8796	0.7354	0.5588	0.4702	0.2417
0.806451612903226	0.8656	0.8084	0.6243	0.5522	0.4601	0.2228
0.838709677419355	0.7799	0.7121	0.6219	0.4896	0.4457	0.2225
0.870967741935484	0.7631	0.6969	0.551	0.4611	0.4122	0.2077
0.903225806451613	0.7328	0.6616	0.5447	0.4295	0.398	0.1841
0.935483870967742	0.4631	0.4265	0.3004	0.2547	0.2487	0.1578
0.967741935483871	0.4536	0.4175	0.2958	0.2512	0.248	0.1524
0.1	2.9949	2.7942	2.1923	1.4534	1.2167	0.47271

Average of yearly averages: 0.334496666666667

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

Data used for this run:
Output File: TXAlfalfa
Metfile: w13958.dvf
PRZM scenario: TXalfalfaC.txt
EXAMS environment file: pond298.exv
Chemical Name: Indoxacarb

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	527 g/mol		
Henry's Law Const.	henry	6E-10	atm-m^3/mol	
Vapor Pressure	vapr	1.9E-9	torr	
Solubility	sol	8	mg/L	
Kd	Kd	25	mg/L	
Koc	Koc		mg/L	
Photolysis half-life	kdp	3 days	Half-life	
Aerobic Aquatic Metabolism	kbacw	34 days	Halfife	
Anaerobic Aquatic Metabolism	kbacs	248 days	Halfife	
Aerobic Soil Metabolism	asm	156 days	Halfife	
Hydrolysis: pH 7		36	days	Half-life
Method:	CAM	2	integer	See PRZM manual
Incorporation Depth:	DEPI	0.0 cm		
Application Rate:	TAPP	0.1232	kg/ha	
Application Efficiency:	APPEFF	0.95	fraction	
Spray Drift	DRFT	0.05	fraction of application rate applied to pond	
Application Date	Date	24-4	dd/mm or dd/mmm or dd-mm or dd-mmm	
Interval 1	interval	30	days	Set to 0 or delete line for single app.
Interval 2	interval	30	days	Set to 0 or delete line for single app.
Interval 3	interval	30	days	Set to 0 or delete line for single app.
Record 17:	FILTRA			
IPSCND		1		
UPTKF				
Record 18:	PLVKRT			
PLDKRT		0.03086		
FEXTRC		0.5		
Flag for Index Res. Run	IR	Pond		
Flag for runoff calc.	RUNOFF	none	none, monthly or total(average of entire run)	

FL-Cabbage-Aerial

stored as FLCabba.out
Chemical: Indoxacarb
PRZM environment: FLcabbageC.txt modified Satday, 12 October 2002 at 15:39:00
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 15:33:30
Metfile: w12842.dvf modified Wedday, 3 July 2002 at 08:04:28
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	0.9637	0.8846	0.5443	0.1905	0.127	0.03132
1962	0.7247	0.6694	0.4951	0.2994	0.2649	0.1393
1963	0.7142	0.6607	0.5435	0.4019	0.3624	0.1632
1964	1.281	1.183	0.8767	0.6894	0.578	0.2651
1965	0.7427	0.6842	0.4176	0.2234	0.1965	0.1325

1966	0.6212	0.5728	0.4425	0.3702	0.3032	0.1515
1967	0.6201	0.5696	0.3464	0.2633	0.229	0.1363
1968	0.6309	0.5828	0.356	0.2145	0.1776	0.127
1969	0.6384	0.6072	0.4975	0.3516	0.3399	0.2015
1970	0.7121	0.6612	0.5441	0.4536	0.4131	0.1747
1971	0.8107	0.7472	0.5634	0.3655	0.3176	0.1975
1972	0.8141	0.7469	0.4363	0.2802	0.2482	0.1437
1973	0.892	0.8219	0.4258	0.3065	0.2659	0.1458
1974	1.084	0.9763	0.6614	0.3696	0.2803	0.173
1975	0.6224	0.5734	0.3477	0.2274	0.1843	0.1268
1976	0.7821	0.7207	0.5263	0.3645	0.2847	0.1527
1977	0.6352	0.5902	0.4576	0.3052	0.2383	0.1077
1978	0.7848	0.7206	0.5476	0.4033	0.3701	0.1583
1979	2.183	2.011	1.434	0.8007	0.6355	0.3649
1980	0.6195	0.5718	0.344	0.2279	0.1976	0.1266
1981	1.4	1.327	0.7553	0.4626	0.397	0.1987
1982	1.14	1.053	0.8304	0.5447	0.4562	0.2285
1983	0.7256	0.6405	0.4378	0.3866	0.3427	0.1728
1984	0.6418	0.5939	0.4466	0.2984	0.254	0.1281
1985	0.6283	0.5798	0.3527	0.1985	0.1691	0.128
1986	0.8081	0.7425	0.5527	0.325	0.2821	0.1474
1987	1.171	1.077	0.7965	0.5456	0.4471	0.2176
1988	0.6244	0.5743	0.3507	0.2624	0.2607	0.144
1989	0.8083	0.7466	0.4414	0.2188	0.1735	0.1121
1990	0.6093	0.5581	0.3945	0.3289	0.3	0.1476

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	2.183	2.011	1.434	0.8007	0.6355	0.3649
0.0645161290322581	1.4	1.327	0.8767	0.6894	0.578	0.2651
0.0967741935483871	1.281	1.183	0.8304	0.5456	0.4562	0.2285
0.129032258064516	1.171	1.077	0.7965	0.5447	0.4471	0.2176
0.161290322580645	1.14	1.053	0.7553	0.4626	0.4131	0.2015
0.193548387096774	1.084	0.9763	0.6614	0.4536	0.397	0.1987
0.225806451612903	0.9637	0.8846	0.5634	0.4033	0.3701	0.1975
0.258064516129032	0.892	0.8219	0.5527	0.4019	0.3624	0.1747
0.290322580645161	0.8141	0.7472	0.5476	0.3866	0.3427	0.173
0.32258064516129	0.8107	0.7469	0.5443	0.3702	0.3399	0.1728
0.354838709677419	0.8083	0.7466	0.5441	0.3696	0.3176	0.1632
0.387096774193548	0.8081	0.7425	0.5435	0.3655	0.3032	0.1583
0.419354838709677	0.7848	0.7207	0.5263	0.3645	0.3	0.1527
0.451612903225806	0.7821	0.7206	0.4975	0.3516	0.2847	0.1515
0.483870967741936	0.7427	0.6842	0.4951	0.3289	0.2821	0.1476
0.516129032258065	0.7256	0.6694	0.4576	0.325	0.2803	0.1474
0.548387096774194	0.7247	0.6612	0.4466	0.3065	0.2659	0.1458
0.580645161290323	0.7142	0.6607	0.4425	0.3052	0.2649	0.144
0.612903225806452	0.7121	0.6405	0.4414	0.2994	0.2607	0.1437
0.645161290322581	0.6418	0.6072	0.4378	0.2984	0.254	0.1393
0.67741935483871	0.6384	0.5939	0.4363	0.2802	0.2482	0.1363
0.709677419354839	0.6352	0.5902	0.4258	0.2633	0.2383	0.1325
0.741935483870968	0.6309	0.5828	0.4176	0.2624	0.229	0.1281
0.774193548387097	0.6283	0.5798	0.3945	0.2279	0.1976	0.128
0.806451612903226	0.6244	0.5743	0.356	0.2274	0.1965	0.127

0.838709677419355	0.6224	0.5734	0.3527	0.2234	0.1843	0.1268
0.870967741935484	0.6212	0.5728	0.3507	0.2188	0.1776	0.1266
0.903225806451613	0.6201	0.5718	0.3477	0.2145	0.1735	0.1121
0.935483870967742	0.6195	0.5696	0.3464	0.1985	0.1691	0.1077
0.967741935483871	0.6093	0.5581	0.344	0.1905	0.127	0.03132

0.1 1.27 1.1724 0.82701 0.54551 0.45529 0.22741

Average of yearly averages: 0.161474

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

Data used for this run:
Output File: FLCabba
Metfile: w12842.dvf
PRZM scenario: FLcabbageC.txt
EXAMS environment file: pond298.exv
Chemical Name: Indoxacarb

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	527 g/mol		
Henry's Law Const.	henry	6E-10	atm-m^3/mol	
Vapor Pressure	vapr	1.9E-9	torr	
Solubility	sol	8	mg/L	
Kd	Kd	25	mg/L	
Koc	Koc	mg/L		
Photolysis half-life	kdp	3 days	Half-life	
Aerobic Aquatic Metabolism	kbacw	34	days	Halfife
Anaerobic Aquatic Metabolism	kbacs	248	days	Halfife
Aerobic Soil Metabolism	asm	156 days	Halfife	
Hydrolysis:	pH 7	36	days	Half-life
Method:	CAM	2	integer	See PRZM manual
Incorporation Depth:	DEPI		cm	
Application Rate:	TAPP	0.0728	kg/ha	
Application Efficiency:	APPEFF	0.95	fraction	
Spray Drift	DRFT	0.05	fraction of application rate applied to pond	
Application Date	Date	15-12	dd/mm or dd/mmm or dd-mm or dd-mmm	
Interval 1	interval	3	days	Set to 0 or delete line for single app.
Interval 2	interval	3	days	Set to 0 or delete line for single app.
Interval 3	interval	3	days	Set to 0 or delete line for single app.
Record 17:	FILTRA			
	IPSCND	1		
	UPTKF			
Record 18:	PLVKRT			
	PLDKRT	0.03086		
	FEXTRC	0.5		
Flag for Index Res. Run	IR	Pond		
Flag for runoff calc.	RUNOFF	none	none, monthly or total(average of entire run)	

CA-GRAPES-Aerial

stored as CAGRAPES.out
Chemical: Indoxacarb
PRZM environment: CAgrapesC.txt modified Satday, 12 October 2002 at 15:36:14
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 15:33:30

Metfile: w93193.dvf modified Wedday, 3 July 2002 at 08:04:24
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	0.8581	0.7729	0.6036	0.3658	0.2653	0.07327
1962	0.8735	0.7903	0.6195	0.3805	0.2772	0.08038
1963	0.8858	0.8049	0.6321	0.3945	0.289	0.08405
1964	0.8821	0.8006	0.6284	0.3882	0.2829	0.0816
1965	0.8902	0.8104	0.6368	0.3975	0.2906	0.08389
1966	0.8702	0.7863	0.616	0.3796	0.2768	0.08018
1967	0.8817	0.8001	0.628	0.3846	0.2783	0.07989
1968	0.8647	0.7798	0.6103	0.3712	0.2701	0.07795
1969	0.8887	0.8082	0.6351	0.3942	0.2875	0.08684
1970	0.8719	0.7883	0.6178	0.3763	0.2729	0.08016
1971	0.878	0.7957	0.6241	0.3832	0.2784	0.0802
1972	0.8708	0.7859	0.6163	0.3758	0.2732	0.07901
1973	0.8626	0.7773	0.6082	0.3709	0.2701	0.07815
1974	0.8663	0.7817	0.612	0.3737	0.2719	0.07824
1975	0.8761	0.7935	0.6222	0.3854	0.2823	0.08123
1976	0.8837	0.8025	0.63	0.3914	0.2872	0.08474
1977	0.8577	0.7714	0.6032	0.3648	0.2645	0.0763
1978	0.8703	0.7864	0.6161	0.3755	0.2723	0.07919
1979	0.8633	0.7781	0.6089	0.37	0.2685	0.07639
1980	0.8826	0.8012	0.6289	0.3856	0.2796	0.07999
1981	0.8429	0.7538	0.588	0.3496	0.2519	0.07219
1982	0.8858	0.805	0.6321	0.3918	0.2855	0.08262
1983	0.8719	0.7883	0.6178	0.3809	0.2776	0.08108
1984	0.8658	0.7812	0.6115	0.3667	0.2636	0.07432
1985	0.8454	0.7568	0.5905	0.3504	0.2524	0.0719
1986	0.8568	0.7703	0.6022	0.3642	0.2633	0.07574
1987	0.8622	0.7767	0.6077	0.3741	0.2735	0.07936
1988	0.8748	0.7918	0.6207	0.376	0.2714	0.07677
1989	0.8683	0.7841	0.6141	0.3735	0.271	0.07747
1990	0.8691	0.785	0.6149	0.3729	0.2698	0.0774

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	0.8902	0.8104	0.6368	0.3975	0.2906	0.08684
0.0645161290322581	0.8887	0.8082	0.6351	0.3945	0.289	0.08474
0.0967741935483871	0.8858	0.805	0.6321	0.3942	0.2875	0.08405
0.129032258064516	0.8858	0.8049	0.6321	0.3918	0.2872	0.08389
0.161290322580645	0.8837	0.8025	0.63	0.3914	0.2855	0.08262
0.193548387096774	0.8826	0.8012	0.6289	0.3882	0.2829	0.0816
0.225806451612903	0.8821	0.8006	0.6284	0.3856	0.2823	0.08123
0.258064516129032	0.8817	0.8001	0.628	0.3854	0.2796	0.08108
0.290322580645161	0.878	0.7957	0.6241	0.3846	0.2784	0.08038
0.32258064516129	0.8761	0.7935	0.6222	0.3832	0.2783	0.0802
0.354838709677419	0.8748	0.7918	0.6207	0.3809	0.2776	0.08018
0.387096774193548	0.8735	0.7903	0.6195	0.3805	0.2772	0.08016
0.419354838709677	0.8719	0.7883	0.6178	0.3796	0.2768	0.07999
0.451612903225806	0.8719	0.7883	0.6178	0.3763	0.2735	0.07989
0.483870967741936	0.8708	0.7864	0.6163	0.376	0.2732	0.07936
0.516129032258065	0.8703	0.7863	0.6161	0.3758	0.2729	0.07919

0.548387096774194	0.8702	0.7859	0.616	0.3755	0.2723	0.07901
0.580645161290323	0.8691	0.785	0.6149	0.3741	0.2719	0.07824
0.612903225806452	0.8683	0.7841	0.6141	0.3737	0.2714	0.07815
0.645161290322581	0.8663	0.7817	0.612	0.3735	0.271	0.07795
0.67741935483871	0.8658	0.7812	0.6115	0.3729	0.2701	0.07747
0.709677419354839	0.8647	0.7798	0.6103	0.3712	0.2701	0.0774
0.741935483870968	0.8633	0.7781	0.6089	0.3709	0.2698	0.07677
0.774193548387097	0.8626	0.7773	0.6082	0.37	0.2685	0.07639
0.806451612903226	0.8622	0.7767	0.6077	0.3667	0.2653	0.0763
0.838709677419355	0.8581	0.7729	0.6036	0.3658	0.2645	0.07574
0.870967741935484	0.8577	0.7714	0.6032	0.3648	0.2636	0.07432
0.903225806451613	0.8568	0.7703	0.6022	0.3642	0.2633	0.07327
0.935483870967742	0.8454	0.7568	0.5905	0.3504	0.2524	0.07219
0.967741935483871	0.8429	0.7538	0.588	0.3496	0.2519	0.0719

0.1 0.8858 0.80499 0.6321 0.39396 0.28747 0.084034

Average of yearly averages: 0.0790166666666667

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

Data used for this run:
Output File: CAGRAPES
Metfile: w93193.dvf
PRZM scenario: CAgrapesC.txt
EXAMS environment file: pond298.exv
Chemical Name: Indoxacarb

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	527 g/mol		
Henry's Law Const.	henry	6E-10	atm-m^3/mol	
Vapor Pressure	vapr	1.9E-9	torr	
Solubility	sol	8	mg/L	
Kd	Kd	25	mg/L	
Koc	Koc		mg/L	
Photolysis half-life	kdp	3	days	Half-life
Aerobic Aquatic Metabolism	kbacw	34	days	Halfife
Anaerobic Aquatic Metabolism	kbacs	248	days	Halfife
Aerobic Soil Metabolism	asm	156	days	Halfife
Hydrolysis:	pH 7	36	days	Half-life
Method:	CAM	2	integer	See PRZM manual
Incorporation Depth:	DEPI		cm	
Application Rate:	TAPP	0.1232	kg/ha	
Application Efficiency:	APPEFF	0.95	fraction	
Spray Drift	DRFT	0.05	fraction of application rate applied to pond	
Application Date	Date	1-6	dd/mm or dd/mmm or dd-mm or dd-mmm	
Interval 1	interval	5	days	Set to 0 or delete line for single app.
Interval 2	interval	5	days	Set to 0 or delete line for single app.
Interval 3	interval	5	days	Set to 0 or delete line for single app.
Record 17:	FILTRA			
IPSCND		1		
UPTKF				
Record 18:	PLVKRT			
PLDKRT		0.03086		
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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NC-PEANUTS- Aerial

stored as NCPEANUTS.out
Chemical: Indoxacarb
PRZM environment: NCpeanutC.txt modified Satday, 12 October 2002 at 16:12:46
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 15:33:30
Metfile: w13737.dvf modified Wedday, 3 July 2002 at 08:06:30
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	4.166	3.8	2.666	1.53	1.205	0.4033
1962	2.356	2.158	1.733	1.373	1.121	0.5155
1963	2.208	2.026	1.465	0.9135	0.7955	0.382
1964	5.613	5.121	4.199	2.832	2.182	0.8024
1965	1.272	1.164	0.9224	0.6951	0.5524	0.28
1966	3.586	3.289	2.769	1.706	1.357	0.5017
1967	3.582	3.263	2.311	2.084	1.735	0.6684
1968	1.055	0.9586	0.7924	0.5095	0.3848	0.2738
1969	5.007	4.647	3.47	2.116	1.669	0.5815
1970	1.582	1.44	1.24	0.7617	0.5885	0.2705
1971	2.184	2.054	1.674	1.332	1.174	0.5268
1972	1.231	1.127	0.8731	0.6513	0.5688	0.3312
1973	2.383	2.174	1.654	1.308	1.055	0.4074
1974	4.193	3.9	3.372	2.299	1.799	0.639
1975	6.451	5.864	4.186	2.519	1.981	0.694
1976	2.241	2.04	1.63	1.058	0.8881	0.3706
1977	2.049	1.858	1.285	0.8239	0.7999	0.3963
1978	1.714	1.564	1.125	0.772	0.6025	0.3077
1979	2.093	1.966	1.608	1.298	1.148	0.5278
1980	2.796	2.532	1.752	1.007	0.8607	0.3953
1981	1.855	1.701	1.367	1.08	1.084	0.4696
1982	2.189	1.998	1.531	1.084	0.9207	0.4468
1983	0.8835	0.796	0.6289	0.4642	0.4233	0.282
1984	1.63	1.486	1.127	0.8515	0.6717	0.2926
1985	2.308	2.096	1.515	1.013	1.021	0.4593
1986	1.009	0.9225	0.7376	0.5384	0.4435	0.2261
1987	1.011	0.925	0.6902	0.4756	0.4872	0.3101
1988	1.024	0.9262	0.7214	0.5749	0.5037	0.2259
1989	2.291	2.132	1.76	1.319	1.127	0.4291
1990	3.155	2.865	2.023	1.4 1.207	0.4653	

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	6.451	5.864	4.199	2.832	2.182	0.8024
0.0645161290322581	5.613	5.121	4.186	2.519	1.981	0.694
0.0967741935483871	5.007	4.647	3.47	2.299	1.799	0.6684

0.129032258064516	4.193	3.9 3.372	2.116	1.735	0.639	
0.161290322580645	4.166	3.8 2.769	2.084	1.669	0.5815	
0.193548387096774	3.586	3.289	2.666	1.706	1.357	0.5278
0.225806451612903	3.582	3.263	2.311	1.53	1.207	0.5268
0.258064516129032	3.155	2.865	2.023	1.4	1.205	0.5155
0.290322580645161	2.796	2.532	1.76	1.373	1.174	0.5017
0.32258064516129	2.383	2.174	1.752	1.332	1.148	0.4696
0.354838709677419	2.356	2.158	1.733	1.319	1.127	0.4653
0.387096774193548	2.308	2.132	1.674	1.308	1.121	0.4593
0.419354838709677	2.291	2.096	1.654	1.298	1.084	0.4468
0.451612903225806	2.241	2.054	1.63	1.084	1.055	0.4291
0.483870967741936	2.208	2.04	1.608	1.08	1.021	0.4074
0.516129032258065	2.189	2.026	1.531	1.058	0.9207	0.4033
0.548387096774194	2.184	1.998	1.515	1.013	0.8881	0.3963
0.580645161290323	2.093	1.966	1.465	1.007	0.8607	0.3953
0.612903225806452	2.049	1.858	1.367	0.9135	0.7999	0.382
0.645161290322581	1.855	1.701	1.285	0.8515	0.7955	0.3706
0.67741935483871	1.714	1.564	1.24	0.8239	0.6717	0.3312
0.709677419354839	1.63	1.486	1.127	0.772	0.6025	0.3101
0.741935483870968	1.582	1.44	1.125	0.7617	0.5885	0.3077
0.774193548387097	1.272	1.164	0.9224	0.6951	0.5688	0.2926
0.806451612903226	1.231	1.127	0.8731	0.6513	0.5524	0.282
0.838709677419355	1.055	0.9586	0.7924	0.5749	0.5037	0.28
0.870967741935484	1.024	0.9262	0.7376	0.5384	0.4872	0.2738
0.903225806451613	1.011	0.925	0.7214	0.5095	0.4435	0.2705
0.935483870967742	1.009	0.9225	0.6902	0.4756	0.4233	0.2261
0.967741935483871	0.8835	0.796	0.6289	0.4642	0.3848	0.2259

0.1 4.9256 4.5723 3.4602 2.2807 1.7926 0.66546

Average of yearly averages: 0.4294

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

Data used for this run:
Output File: NCPEANUTS
Metfile: w13737.dvf
PRZM scenario: NCpeanutC.txt
EXAMS environment file: pond298.exv
Chemical Name: Indoxacarb

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	527 g/mol		
Henry's Law Const.	henry	6E-10	atm-m^3/mol	
Vapor Pressure	vapr	1.9E-9	torr	
Solubility	sol	8	mg/L	
Kd	Kd	25	mg/L	
Koc	Koc		mg/L	
Photolysis half-life	kdp	3 days	Half-life	
Aerobic Aquatic Metabolism	kbacw	34	days	Halfife
Anaerobic Aquatic Metabolism	kbacs	248	days	Halfife
Aerobic Soil Metabolism	asm	156 days	Halfife	
Hydrolysis:	pH 7	36	days	Half-life
Method:	CAM	2	integer	See PRZM manual
Incorporation Depth:	DEPI		cm	

Application Rate:	TAPP	0.1232	kg/ha	
Application Efficiency:	APPEFF	0.95	fraction	
Spray Drift	DRFT	0.05	fraction of application rate applied to pond	
Application Date	Date	1-7	dd/mm or dd/mmm or dd-mm or dd-mmm	
Interval 1	interval	5	days	Set to 0 or delete line for single app.
Interval 2	interval	5	days	Set to 0 or delete line for single app.
Interval 3	interval	5	days	Set to 0 or delete line for single app.
Record 17:	FILTRA			
IPSCND		1		
UPTKF				
Record 18:	PLVKRT			
PLDKRT		0.03086		
FEXTRC		0.5		
Flag for Index Res. Run	IR	Pond		
Flag for runoff calc.	RUNOFF	none	none, monthly or total(average of entire run)	

MS-Soybeans-Aerial

stored as MSSOYBEANS.out
Chemical: Indoxacarb
PRZM environment: MSsoybeanC.txt modified Satday, 12 October 2002 at 16:07:44
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 15:33:30
Metfile: w13893.dvf modified Wedday, 3 July 2002 at 08:06:20
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	1.489	1.395	1.184	0.9511	0.6655	0.2494
1962	1.419	1.282	1.122	0.7831	0.7119	0.3873
1963	0.9133	0.8534	0.6882	0.5277	0.4453	0.2023
1964	1.025	0.9769	0.852	0.5936	0.508	0.3194
1965	1.746	1.591	1.177	0.8748	0.7835	0.3775
1966	1.129	1.024	0.807	0.5829	0.501	0.2572
1967	1.239	1.143	0.9024	0.7121	0.5763	0.2934
1968	1.781	1.623	1.185	0.7994	0.7057	0.3687
1969	2.559	2.377	1.727	1.035	0.828	0.4014
1970	1.15	1.037	0.7937	0.5205	0.4784	0.3157
1971	2.514	2.287	1.589	0.9755	0.7523	0.3089
1972	1.463	1.366	1.166	1.025	0.9389	0.3907
1973	2.22	2.001	1.359	0.9949	0.8562	0.4452
1974	1.405	1.26	1.006	0.7579	0.6239	0.3377
1975	0.8762	0.7894	0.6437	0.5243	0.4335	0.2781
1976	2.584	2.35	1.642	1.034	0.8858	0.398
1977	1.411	1.26	0.9883	0.5708	0.6073	0.3249
1978	3.239	2.91	2.19	1.383	1.072	0.5238
1979	1.353	1.234	1.076	0.7562	0.6714	0.4363
1980	2.275	2.083	1.571	0.8442	0.7457	0.3918
1981	1.321	1.219	0.9642	0.64	0.6171	0.3113
1982	1.477	1.41	1.145	0.7952	0.7173	0.3829
1983	1.803	1.688	1.503	0.9811	0.7238	0.4133
1984	1.558	1.407	1.026	0.7502	0.5986	0.3913
1985	1.724	1.544	1.318	0.785	0.6246	0.284
1986	2.255	2.156	1.672	1.208	0.9009	0.366

1987	1.66	1.539	1.253	0.9626	0.7178	0.4161
1988	1.94	1.798	1.546	0.9532	0.7273	0.4411
1989	1.323	1.192	0.842	0.6484	0.6109	0.4123
1990	1.29	1.168	0.9133	0.6907	0.5817	0.3419

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	3.239	2.91	2.19	1.383	1.072	0.5238
0.0645161290322581	2.584	2.377	1.727	1.208	0.9389	0.4452
0.0967741935483871	2.559	2.35	1.672	1.035	0.9009	0.4411
0.129032258064516	2.514	2.287	1.642	1.034	0.8858	0.4363
0.161290322580645	2.275	2.156	1.589	1.025	0.8562	0.4161
0.193548387096774	2.255	2.083	1.571	0.9949	0.828	0.4133
0.225806451612903	2.22	2.001	1.546	0.9811	0.7835	0.4123
0.258064516129032	1.94	1.798	1.503	0.9755	0.7523	0.4014
0.290322580645161	1.803	1.688	1.359	0.9626	0.7457	0.398
0.32258064516129	1.781	1.623	1.318	0.9532	0.7273	0.3918
0.354838709677419	1.746	1.591	1.253	0.9511	0.7238	0.3913
0.387096774193548	1.724	1.544	1.185	0.8748	0.7178	0.3907
0.419354838709677	1.66	1.539	1.184	0.8442	0.7173	0.3873
0.451612903225806	1.558	1.41	1.177	0.7994	0.7119	0.3829
0.483870967741936	1.489	1.407	1.166	0.7952	0.7057	0.3775
0.516129032258065	1.477	1.395	1.145	0.785	0.6714	0.3687
0.548387096774194	1.463	1.366	1.122	0.7831	0.6655	0.366
0.580645161290323	1.419	1.282	1.076	0.7579	0.6246	0.3419
0.612903225806452	1.411	1.26	1.026	0.7562	0.6239	0.3377
0.645161290322581	1.405	1.26	1.006	0.7502	0.6171	0.3249
0.67741935483871	1.353	1.234	0.9883	0.7121	0.6109	0.3194
0.709677419354839	1.323	1.219	0.9642	0.6907	0.6073	0.3157
0.741935483870968	1.321	1.192	0.9133	0.6484	0.5986	0.3113
0.774193548387097	1.29	1.168	0.9024	0.64	0.5817	0.3089
0.806451612903226	1.239	1.143	0.852	0.5936	0.5763	0.2934
0.838709677419355	1.15	1.037	0.842	0.5829	0.508	0.284
0.870967741935484	1.129	1.024	0.807	0.5708	0.501	0.2781
0.903225806451613	1.025	0.9769	0.7937	0.5277	0.4784	0.2572
0.935483870967742	0.9133	0.8534	0.6882	0.5243	0.4453	0.2494
0.967741935483871	0.8762	0.7894	0.6437	0.5205	0.4335	0.2023
0.1	2.5545	2.3437	1.669	1.0349	0.89939	0.44062

Average of yearly averages: 0.35893

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

Data used for this run:
Output File: MSSOYBEANS
Metfile: w13893.dvf
PRZM scenario: MSsoybeanC.txt
EXAMS environment file: pond298.exv
Chemical Name: Indoxacarb

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	527 g/mol		
Henry's Law Const.	henry	6E-10	atm-m^3/mol	
Vapor Pressure	vapr	1.9E-9	torr	

Solubility	sol	8	mg/L			
Kd	Kd	25	mg/L			
Koc	Koc		mg/L			
Photolysis half-life		kdp	3 days	Half-life		
Aerobic Aquatic Metabolism			kbacw	34	days	Halfife
Anaerobic Aquatic Metabolism			kbacs	248	days	Halfife
Aerobic Soil Metabolism		asm	156 days	Halfife		
Hydrolysis:	pH 7	36	days	Half-life		
Method:	CAM	2	integer	See PRZM manual		
Incorporation Depth:		DEPI	cm			
Application Rate:		TAPP	0.1232	kg/ha		
Application Efficiency:		APPEFF	0.95	fraction		
Spray Drift	DRFT	0.05	fraction of application rate applied to pond			
Application Date	Date	15-7	dd/mm or dd/mmm or dd-mm or dd-mmm			
Interval 1	interval	5	days	Set to 0 or delete line for single app.		
Interval 2	interval	5	days	Set to 0 or delete line for single app.		
Interval 3	interval	5	days	Set to 0 or delete line for single app.		
Record 17:	FILTRA					
IPSCND		1				
UPTKF						
Record 18:	PLVKRT					
PLDKRT		0.03086				
FEXTRC		0.5				
Flag for Index Res. Run		IR	Pond			
Flag for runoff calc.		RUNOFF	none	none, monthly or total(average of entire run)		

PRZM-EXAMS-Ground Applications

CA Alfalfa-Ground Spray

stored as CAAlfalfa.out
Chemical: Indoxacarb
PRZM environment: CAalfalfaC.txt modified Satday, 12 October 2002 at 15:27:56
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 15:33:30
Metfile: w93193.dvf modified Wedday, 3 July 2002 at 08:04:24
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	0.08227	0.07518	0.05419	0.04407	0.0416	0.01691
1962	0.08278	0.07547	0.05423	0.04514	0.04302	0.02131
1963	0.08251	0.07508	0.05429	0.0458	0.04367	0.02011
1964	0.0834	0.07633	0.05498	0.04502	0.04279	0.02061
1965	0.08428	0.07739	0.05635	0.04604	0.04372	0.01979
1966	0.0824	0.07525	0.05418	0.04421	0.04229	0.02033
1967	0.08098	0.07359	0.05236	0.04269	0.04078	0.02009
1968	0.08719	0.08144	0.0653	0.05991	0.05422	0.0253
1969	0.1345	0.1261	0.1017	0.07682	0.06207	0.03585
1970	0.08268	0.07552	0.05451	0.04459	0.04222	0.02194
1971	0.08255	0.0754	0.05455	0.04457	0.0423	0.01953
1972	0.08286	0.07578	0.05489	0.04479	0.04244	0.0217
1973	0.08343	0.07629	0.06043	0.04922	0.04573	0.02276
1974	0.08159	0.07405	0.05252	0.04351	0.04177	0.02288
1975	0.083	0.07555	0.05423	0.04527	0.04341	0.02039

1976	0.3059	0.2809	0.2029	0.1235	0.09824	0.03716
1977	0.08244	0.07518	0.05381	0.04414	0.04213	0.02154
1978	0.106	0.09679	0.0719	0.06174	0.05364	0.02398
1979	0.08061	0.07289	0.05116	0.04244	0.04083	0.01824
1980	0.08174	0.0744	0.05292	0.04338	0.04131	0.01858
1981	0.08069	0.0733	0.0523	0.04258	0.04037	0.01747
1982	0.165	0.1504	0.1084	0.07425	0.06381	0.02983
1983	0.08122	0.0736	0.05936	0.0466	0.04419	0.02543
1984	0.07903	0.07123	0.05005	0.04121	0.03921	0.01772
1985	0.08324	0.07606	0.05476	0.04493	0.04191	0.01997
1986	0.08193	0.07495	0.054	0.04338	0.0412	0.01922
1987	0.08206	0.07467	0.05298	0.04369	0.04221	0.01878
1988	0.081	0.0736	0.05208	0.04257	0.04038	0.01747
1989	0.09358	0.08525	0.06093	0.04803	0.04449	0.0196
1990	0.08141	0.07403	0.05256	0.04305	0.04094	0.01766

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	0.3059	0.2809	0.2029	0.1235	0.09824	0.03716
0.0645161290322581	0.165	0.1504	0.1084	0.07682	0.06381	0.03585
0.0967741935483871	0.1345	0.1261	0.1017	0.07425	0.06207	0.02983
0.129032258064516	0.106	0.09679	0.0719	0.06174	0.05422	0.02543
0.161290322580645	0.09358	0.08525	0.0653	0.05991	0.05364	0.0253
0.193548387096774	0.08719	0.08144	0.06093	0.04922	0.04573	0.02398
0.225806451612903	0.08428	0.07739	0.06043	0.04803	0.04449	0.02288
0.258064516129032	0.08343	0.07633	0.05936	0.0466	0.04419	0.02276
0.290322580645161	0.0834	0.07629	0.05635	0.04604	0.04372	0.02194
0.32258064516129	0.08324	0.07606	0.05498	0.0458	0.04367	0.0217
0.354838709677419	0.083	0.07578	0.05489	0.04527	0.04341	0.02154
0.387096774193548	0.08286	0.07555	0.05476	0.04514	0.04302	0.02131
0.419354838709677	0.08278	0.07552	0.05455	0.04502	0.04279	0.02061
0.451612903225806	0.08268	0.07547	0.05451	0.04493	0.04244	0.02039
0.483870967741936	0.08255	0.0754	0.05429	0.04479	0.0423	0.02033
0.516129032258065	0.08251	0.07525	0.05423	0.04459	0.04229	0.02011
0.548387096774194	0.08244	0.07518	0.05423	0.04457	0.04222	0.02009
0.580645161290323	0.0824	0.07518	0.05419	0.04421	0.04221	0.01997
0.612903225806452	0.08227	0.07508	0.05418	0.04414	0.04213	0.01979
0.645161290322581	0.08206	0.07495	0.054	0.04407	0.04191	0.0196
0.67741935483871	0.08193	0.07467	0.05381	0.04369	0.04177	0.01953
0.709677419354839	0.08174	0.0744	0.05298	0.04351	0.0416	0.01922
0.741935483870968	0.08159	0.07405	0.05292	0.04338	0.04131	0.01878
0.774193548387097	0.08141	0.07403	0.05256	0.04338	0.0412	0.01858
0.806451612903226	0.08122	0.0736	0.05252	0.04305	0.04094	0.01824
0.838709677419355	0.081	0.0736	0.05236	0.04269	0.04083	0.01772
0.870967741935484	0.08098	0.07359	0.0523	0.04258	0.04078	0.01766
0.903225806451613	0.08069	0.0733	0.05208	0.04257	0.04038	0.01747
0.935483870967742	0.08061	0.07289	0.05116	0.04244	0.04037	0.01747
0.967741935483871	0.07903	0.07123	0.05005	0.04121	0.03921	0.01691

0.1	0.13165	0.123169	0.09872	0.072999	0.061285	0.02939

Average of yearly averages: 0.0217383333333333

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

Data used for this run:
Output File: CAAlfalfa
Metfile: w93193.dvf
PRZM scenario: CAalfalfaC.txt
EXAMS environment file: pond298.exv
Chemical Name: Indoxacarb

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	527 g/mol		
Henry's Law Const.	henry	6E-10	atm-m^3/mol	
Vapor Pressure	vapr	1.9E-9	torr	
Solubility	sol	8	mg/L	
Kd	Kd	25	mg/L	
Koc	Koc		mg/L	
Photolysis half-life	kdp	3 days	Half-life	
Aerobic Aquatic Metabolism	kbacw	34	days	Halfife
Anaerobic Aquatic Metabolism	kbacs	248	days	Halfife
Aerobic Soil Metabolism	asm	156 days	Halfife	
Hydrolysis:	pH 7	36	days	Half-life
Method:	CAM	2	integer	See PRZM manual
Incorporation Depth:	DEPI	0.0 cm		
Application Rate:	TAPP	0.1232	kg/ha	
Application Efficiency:	APPEFF	0.99	fraction	
Spray Drift	DRFT	0.01	fraction of application rate applied to pond	
Application Date	Date	24-6	dd/mm or dd/mmm or dd-mm or dd-mmm	
Interval 1	interval	30	days	Set to 0 or delete line for single app.
Interval 2	interval	30	days	Set to 0 or delete line for single app.
Interval 3	interval	30	days	Set to 0 or delete line for single app.
Record 17:	FILTRA			
IPSCND		1		
UPTKF				
Record 18:	PLVKRT			
PLDKRT		0.03086		
FEXTRC		0.5		
Flag for Index Res. Run	IR	Pond		
Flag for runoff calc.	RUNOFF	none	none, monthly or total(average of entire run)	

MN Alfalfa-Ground Spray

stored as MNAlfGR.out
Chemical: Indoxacarb
PRZM environment: MNalfalfaC.txt modified Satday, 12 October 2002 at 16:04:22
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 15:33:30
Metfile: w14914.dvf modified Wedday, 3 July 2002 at 08:05:52
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	0.518	0.4978	0.386	0.2473	0.1961	0.07019
1962	0.4118	0.3778	0.2862	0.2373	0.2076	0.08838
1963	0.6238	0.569	0.4248	0.2509	0.1909	0.07953
1964	0.5459	0.4994	0.3874	0.2307	0.2263	0.09079
1965	0.2533	0.2324	0.1758	0.145	0.1361	0.07483
1966	0.3762	0.3436	0.2921	0.23	0.1819	0.07632

1967	0.1012	0.0938	0.06979	0.06176	0.06021	0.03688
1968	0.09906	0.0911	0.07064	0.06098	0.05955	0.03419
1969	0.7916	0.7419	0.5994	0.3773	0.2934	0.1129
1970	1.088	1.002	0.7358	0.4476	0.3451	0.1309
1971	0.7741	0.7137	0.5231	0.433	0.372	0.1446
1972	0.169	0.1556	0.1226	0.1097	0.0959	0.07023
1973	0.9902	0.9166	0.6954	0.5077	0.4157	0.1404
1974	1.315	1.208	0.8961	0.6227	0.4984	0.2011
1975	1.257	1.171	0.8406	0.5303	0.4385	0.1734
1976	0.09008	0.08264	0.06027	0.0522	0.0522	0.0364
1977	0.9535	0.8689	0.6174	0.3844	0.3534	0.1749
1978	0.7481	0.684	0.4904	0.2883	0.2447	0.1182
1979	0.5857	0.5342	0.3956	0.2588	0.208	0.1357
1980	0.6348	0.5877	0.438	0.3381	0.2723	0.114
1981	0.3027	0.2798	0.2056	0.1515	0.1394	0.06347
1982	1.705	1.583	1.19	0.7454	0.5758	0.1725
1983	0.3165	0.2888	0.2378	0.192	0.1779	0.106
1984	0.9426	0.8945	0.736	0.4764	0.3611	0.1442
1985	0.2649	0.2436	0.2183	0.1648	0.1586	0.09158
1986	0.481	0.4462	0.336	0.2356	0.2089	0.1051
1987	0.2638	0.24	0.1797	0.1357	0.1111	0.05314
1988	0.703	0.6627	0.4957	0.3051	0.2388	0.08712
1989	1.046	0.9651	0.7699	0.4656	0.3669	0.1509
1990	0.2472	0.2276	0.1825	0.1438	0.1215	0.06394

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	1.705	1.583	1.19	0.7454	0.5758	0.2011
0.0645161290322581	1.315	1.208	0.8961	0.6227	0.4984	0.1749
0.0967741935483871	1.257	1.171	0.8406	0.5303	0.4385	0.1734
0.129032258064516	1.088	1.002	0.7699	0.5077	0.4157	0.1725
0.161290322580645	1.046	0.9651	0.736	0.4764	0.372	0.1509
0.193548387096774	0.9902	0.9166	0.7358	0.4656	0.3669	0.1446
0.225806451612903	0.9535	0.8945	0.6954	0.4476	0.3611	0.1442
0.258064516129032	0.9426	0.8689	0.6174	0.433	0.3534	0.1404
0.290322580645161	0.7916	0.7419	0.5994	0.3844	0.3451	0.1357
0.32258064516129	0.7741	0.7137	0.5231	0.3773	0.2934	0.1309
0.354838709677419	0.7481	0.684	0.4957	0.3381	0.2723	0.1182
0.387096774193548	0.703	0.6627	0.4904	0.3051	0.2447	0.114
0.419354838709677	0.6348	0.5877	0.438	0.2883	0.2388	0.1129
0.451612903225806	0.6238	0.569	0.4248	0.2588	0.2263	0.106
0.483870967741936	0.5857	0.5342	0.3956	0.2509	0.2089	0.1051
0.516129032258065	0.5459	0.4994	0.3874	0.2473	0.208	0.09158
0.548387096774194	0.518	0.4978	0.386	0.2373	0.2076	0.09079
0.580645161290323	0.481	0.4462	0.336	0.2356	0.1961	0.08838
0.612903225806452	0.4118	0.3778	0.2921	0.2307	0.1909	0.08712
0.645161290322581	0.3762	0.3436	0.2862	0.23	0.1819	0.07953
0.67741935483871	0.3165	0.2888	0.2378	0.192	0.1779	0.07632
0.709677419354839	0.3027	0.2798	0.2183	0.1648	0.1586	0.07483
0.741935483870968	0.2649	0.2436	0.2056	0.1515	0.1394	0.07023
0.774193548387097	0.2638	0.24	0.1825	0.145	0.1361	0.07019
0.806451612903226	0.2533	0.2324	0.1797	0.1438	0.1215	0.06394
0.838709677419355	0.2472	0.2276	0.1758	0.1357	0.1111	0.06347

0.870967741935484	0.169	0.1556	0.1226	0.1097	0.0959	0.05314
0.903225806451613	0.1012	0.0938	0.07064	0.06176	0.06021	0.03688
0.935483870967742	0.09906	0.0911	0.06979	0.06098	0.05955	0.0364
0.967741935483871	0.09008	0.08264	0.06027	0.0522	0.0522	0.03419

0.1 1.2401 1.1541 0.83353 0.52804 0.43622 0.17331

Average of yearly averages: 0.104726333333333

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

Data used for this run:
Output File: MNAlfGR
Metfile: w14914.dvf
PRZM scenario: MNalfalfaC.txt
EXAMS environment file: pond298.exv
Chemical Name: Indoxacarb

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	527 g/mol		
Henry's Law Const.	henry	6E-10	atm-m^3/mol	
Vapor Pressure	vapr	1.9E-9	torr	
Solubility	sol	8	mg/L	
Kd	Kd	25	mg/L	
Koc	Koc		mg/L	
Photolysis half-life	kdp	3	days	Half-life
Aerobic Aquatic Metabolism	kbacw	34	days	Halfife
Anaerobic Aquatic Metabolism	kbacs	248	days	Halfife
Aerobic Soil Metabolism	asm	156	days	Halfife
Hydrolysis:	pH 7	36	days	Half-life
Method:	CAM	2	integer	See PRZM manual
Incorporation Depth:	DEPI	0.0	cm	
Application Rate:	TAPP	0.1232	kg/ha	
Application Efficiency:	APPEFF	0.99	fraction	
Spray Drift	DRFT	0.01	fraction of application rate applied to pond	
Application Date	Date	24-5	dd/mm or dd/mmm or dd-mm or dd-mmm	
Interval 1	interval	30	days	Set to 0 or delete line for single app.
Interval 2	interval	30	days	Set to 0 or delete line for single app.
Interval 3	interval	30	days	Set to 0 or delete line for single app.
Record 17:	FILTRA			
IPSCND	1			
UPTKF				
Record 18:	PLVKRT			
PLDKRT	0.03086			
FEXTRC	0.5			
Flag for Index Res. Run	IR	Pond		
Flag for runoff calc.	RUNOFF	none	none, monthly or total(average of entire run)	

NC Alfalfa-Ground Spray

stored as NCAlfGR.out
Chemical: Indoxacarb
PRZM environment: NCalfalfaC.txt modified Satday, 12 October 2002 at 16:08:44
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 15:33:30
Metfile: w03812.dvf modified Wedday, 3 July 2002 at 08:05:50

Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1965	0.6787	0.6306	0.4987	0.3333	0.2836	0.1383
1966	1.349	1.236	1.028	0.7766	0.6716	0.346
1967	2.739	2.592	1.992	1.255	1.053	0.4579
1968	1.595	1.49	1.206	0.7978	0.6414	0.3232
1969	2.565	2.325	1.658	1.093	0.8516	0.3232
1970	0.5991	0.5452	0.4261	0.2736	0.2085	0.1541
1971	0.5312	0.5018	0.4035	0.3108	0.2796	0.1944
1972	1.063	0.9897	0.7414	0.5263	0.4202	0.2532
1973	2.241	2.122	1.533	1.059	1.098	0.4969
1974	1.115	1.025	0.8305	0.5298	0.4359	0.2528
1975	1.24	1.14	0.8554	0.6062	0.5007	0.2576
1976	1.322	1.223	0.9207	0.6808	0.5737	0.3094
1977	1.571	1.44	1.116	0.8232	0.7593	0.3264
1978	1.227	1.131	0.8627	0.5908	0.4701	0.2702
1979	0.692	0.6459	0.518	0.4035	0.3863	0.2686
1980	0.7095	0.6563	0.4618	0.305	0.2781	0.1764
1981	1.503	1.389	1.077	0.6538	0.4953	0.1981
1982	1.45	1.324	1.069	0.7041	0.5466	0.3063
1983	0.5889	0.5538	0.4886	0.3663	0.3572	0.1943
1984	0.8261	0.7594	0.6742	0.5493	0.4572	0.2757
1985	1.729	1.578	1.177	0.7026	0.5459	0.2336
1986	1.181	1.083	0.8383	0.5852	0.4977	0.23
1987	1.599	1.463	1.086	0.7043	0.53	0.3214
1988	0.3723	0.3483	0.2717	0.2054	0.1836	0.1244
1989	1.268	1.161	0.9116	0.7336	0.6932	0.3563
1990	1.623	1.527	1.168	0.7636	0.7026	0.3346

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.037037037037037	2.739	2.592	1.992	1.255	1.098	0.4969
0.0740740740740741	2.565	2.325	1.658	1.093	1.053	0.4579
0.111111111111111	2.241	2.122	1.533	1.059	0.8516	0.3563
0.148148148148148	1.729	1.578	1.206	0.8232	0.7593	0.346
0.185185185185185	1.623	1.527	1.177	0.7978	0.7026	0.3346
0.222222222222222	1.599	1.49	1.168	0.7766	0.6932	0.3264
0.259259259259259	1.595	1.463	1.116	0.7636	0.6716	0.3232
0.296296296296296	1.571	1.44	1.086	0.7336	0.6414	0.3232
0.333333333333333	1.503	1.389	1.077	0.7043	0.5737	0.3214
0.37037037037037	1.45	1.324	1.069	0.7041	0.5466	0.3094
0.407407407407407	1.349	1.236	1.028	0.7026	0.5459	0.3063
0.444444444444444	1.322	1.223	0.9207	0.6808	0.53	0.2757
0.481481481481481	1.268	1.161	0.9116	0.6538	0.5007	0.2702
0.518518518518518	1.24	1.14	0.8627	0.6062	0.4977	0.2686
0.555555555555556	1.227	1.131	0.8554	0.5908	0.4953	0.2576
0.592592592592593	1.181	1.083	0.8383	0.5852	0.4701	0.2532
0.62962962962963	1.115	1.025	0.8305	0.5493	0.4572	0.2528
0.666666666666667	1.063	0.9897	0.7414	0.5298	0.4359	0.2336
0.703703703703704	0.8261	0.7594	0.6742	0.5263	0.4202	0.23
0.740740740740741	0.7095	0.6563	0.518	0.4035	0.3863	0.1981
0.777777777777778	0.692	0.6459	0.4987	0.3663	0.3572	0.1944

0.814814814814815	0.6787	0.6306	0.4886	0.3333	0.2836	0.1943
0.851851851851852	0.5991	0.5538	0.4618	0.3108	0.2796	0.1764
0.888888888888889	0.5889	0.5452	0.4261	0.305	0.2781	0.1541
0.925925925925926	0.5312	0.5018	0.4035	0.2736	0.2085	0.1383
0.962962962962963	0.3723	0.3483	0.2717	0.2054	0.1836	0.1244

0.1 2.3382 2.1829 1.5705 1.0692 0.91202 0.38678

Average of yearly averages: 0.273973076923077

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

Data used for this run:
Output File: NCAlfGR
Metfile: w03812.dvf
PRZM scenario: NCalfalfaC.txt
EXAMS environment file: pond298.exv
Chemical Name: Indoxacarb

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	527 g/mol		
Henry's Law Const.	henry	6E-10	atm-m^3/mol	
Vapor Pressure	vapr	1.9E-9	torr	
Solubility	sol	8	mg/L	
Kd	Kd	25	mg/L	
Koc	Koc		mg/L	
Photolysis half-life	kdp	3	days	Half-life
Aerobic Aquatic Metabolism	kbacw	34	days	Halfife
Anaerobic Aquatic Metabolism	kbacs	248	days	Halfife
Aerobic Soil Metabolism	asm	156	days	Halfife
Hydrolysis:	pH 7	36	days	Half-life
Method:	CAM	2	integer	See PRZM manual
Incorporation Depth:	DEPI	0.0	cm	
Application Rate:	TAPP	0.1232	kg/ha	
Application Efficiency:	APPEFF	0.99	fraction	
Spray Drift	DRFT	0.01	fraction of application rate applied to pond	
Application Date	Date	24-4	dd/mm or dd/mmm or dd-mm or dd-mmm	
Interval 1	interval	30	days	Set to 0 or delete line for single app.
Interval 2	interval	30	days	Set to 0 or delete line for single app.
Interval 3	interval	30	days	Set to 0 or delete line for single app.
Record 17:	FILTRA			
IPSCND	1			
UPTKF				
Record 18:	PLVKRT			
PLDKRT	0.03086			
FEXTRC	0.5			
Flag for Index Res. Run	IR	Pond		
Flag for runoff calc.	RUNOFF	none	none, monthly or total(average of entire run)	

NC Alfalfa-Ground Spray

stored as NCAlfGR.out
Chemical: Indoxacarb
PRZM environment: NCalfalfaC.txt modified Satday, 12 October 2002 at 16:08:44
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 15:33:30

Metfile: w03812.dvf modified Wedday, 3 July 2002 at 08:05:50
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1965	0.6787	0.6306	0.4987	0.3333	0.2836	0.1383
1966	1.349	1.236	1.028	0.7766	0.6716	0.346
1967	2.739	2.592	1.992	1.255	1.053	0.4579
1968	1.595	1.49	1.206	0.7978	0.6414	0.3232
1969	2.565	2.325	1.658	1.093	0.8516	0.3232
1970	0.5991	0.5452	0.4261	0.2736	0.2085	0.1541
1971	0.5312	0.5018	0.4035	0.3108	0.2796	0.1944
1972	1.063	0.9897	0.7414	0.5263	0.4202	0.2532
1973	2.241	2.122	1.533	1.059	1.098	0.4969
1974	1.115	1.025	0.8305	0.5298	0.4359	0.2528
1975	1.24	1.14	0.8554	0.6062	0.5007	0.2576
1976	1.322	1.223	0.9207	0.6808	0.5737	0.3094
1977	1.571	1.44	1.116	0.8232	0.7593	0.3264
1978	1.227	1.131	0.8627	0.5908	0.4701	0.2702
1979	0.692	0.6459	0.518	0.4035	0.3863	0.2686
1980	0.7095	0.6563	0.4618	0.305	0.2781	0.1764
1981	1.503	1.389	1.077	0.6538	0.4953	0.1981
1982	1.45	1.324	1.069	0.7041	0.5466	0.3063
1983	0.5889	0.5538	0.4886	0.3663	0.3572	0.1943
1984	0.8261	0.7594	0.6742	0.5493	0.4572	0.2757
1985	1.729	1.578	1.177	0.7026	0.5459	0.2336
1986	1.181	1.083	0.8383	0.5852	0.4977	0.23
1987	1.599	1.463	1.086	0.7043	0.53	0.3214
1988	0.3723	0.3483	0.2717	0.2054	0.1836	0.1244
1989	1.268	1.161	0.9116	0.7336	0.6932	0.3563
1990	1.623	1.527	1.168	0.7636	0.7026	0.3346

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.037037037037037	2.739	2.592	1.992	1.255	1.098	0.4969
0.0740740740740741	2.565	2.325	1.658	1.093	1.053	0.4579
0.111111111111111	2.241	2.122	1.533	1.059	0.8516	0.3563
0.148148148148148	1.729	1.578	1.206	0.8232	0.7593	0.346
0.185185185185185	1.623	1.527	1.177	0.7978	0.7026	0.3346
0.222222222222222	1.599	1.49	1.168	0.7766	0.6932	0.3264
0.259259259259259	1.595	1.463	1.116	0.7636	0.6716	0.3232
0.296296296296296	1.571	1.44	1.086	0.7336	0.6414	0.3232
0.333333333333333	1.503	1.389	1.077	0.7043	0.5737	0.3214
0.37037037037037	1.45	1.324	1.069	0.7041	0.5466	0.3094
0.407407407407407	1.349	1.236	1.028	0.7026	0.5459	0.3063
0.444444444444444	1.322	1.223	0.9207	0.6808	0.53	0.2757
0.481481481481481	1.268	1.161	0.9116	0.6538	0.5007	0.2702
0.518518518518518	1.24	1.14	0.8627	0.6062	0.4977	0.2686
0.555555555555556	1.227	1.131	0.8554	0.5908	0.4953	0.2576
0.592592592592593	1.181	1.083	0.8383	0.5852	0.4701	0.2532
0.62962962962963	1.115	1.025	0.8305	0.5493	0.4572	0.2528
0.666666666666667	1.063	0.9897	0.7414	0.5298	0.4359	0.2336
0.703703703703704	0.8261	0.7594	0.6742	0.5263	0.4202	0.23
0.740740740740741	0.7095	0.6563	0.518	0.4035	0.3863	0.1981

0.777777777777778	0.692	0.6459	0.4987	0.3663	0.3572	0.1944
0.814814814814815	0.6787	0.6306	0.4886	0.3333	0.2836	0.1943
0.851851851851852	0.5991	0.5538	0.4618	0.3108	0.2796	0.1764
0.888888888888889	0.5889	0.5452	0.4261	0.305	0.2781	0.1541
0.925925925925926	0.5312	0.5018	0.4035	0.2736	0.2085	0.1383
0.962962962962963	0.3723	0.3483	0.2717	0.2054	0.1836	0.1244

0.1 2.3382 2.1829 1.5705 1.0692 0.91202 0.38678

Average of yearly averages: 0.273973076923077

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

Data used for this run:
Output File: NCAlfGR
Metfile: w03812.dvf
PRZM scenario: NCalfalfaC.txt
EXAMS environment file: pond298.exv
Chemical Name: Indoxacarb

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	527 g/mol		
Henry's Law Const.	henry	6E-10	atm-m^3/mol	
Vapor Pressure	vapr	1.9E-9	torr	
Solubility	sol	8	mg/L	
Kd	Kd	25	mg/L	
Koc	Koc		mg/L	
Photolysis half-life	kdp	3 days	Half-life	
Aerobic Aquatic Metabolism	kbacw	34 days	Halfife	
Anaerobic Aquatic Metabolism	kbacs	248 days	Halfife	
Aerobic Soil Metabolism	asm	156 days	Halfife	
Hydrolysis:	pH 7	36 days	Half-life	
Method:	CAM	2	integer	See PRZM manual
Incorporation Depth:	DEPI	0.0 cm		
Application Rate:	TAPP	0.1232	kg/ha	
Application Efficiency:	APPEFF	0.99	fraction	
Spray Drift	DRFT	0.01	fraction of application rate applied to pond	
Application Date	Date	24-4	dd/mm or dd/mmm or dd-mm or dd-mmm	
Interval 1	interval	30	days	Set to 0 or delete line for single app.
Interval 2	interval	30	days	Set to 0 or delete line for single app.
Interval 3	interval	30	days	Set to 0 or delete line for single app.
Record 17:	FILTRA			
IPSCND	1			
UPTKF				
Record 18:	PLVKRT			
PLDKRT	0.03086			
FEXTRC	0.5			
Flag for Index Res. Run	IR	Pond		
Flag for runoff calc.	RUNOFF	none	none, monthly or total(average of entire run)	

PA Alfalfa-Ground Spray

stored as PAAlfGR.out
Chemical: Indoxacarb
PRZM environment: PAalfalfaC.txt modified Satday, 12 October 2002 at 16:24:04

EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 15:33:30
Metfile: w14737.dvf modified Wedday, 3 July 2002 at 08:06:12
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	1.13	1.026	0.7272	0.4804	0.3607	0.1314
1962	0.5567	0.5193	0.4497	0.3815	0.3413	0.2389
1963	1.071	0.9862	0.8568	0.6298	0.6015	0.245
1964	0.4454	0.4246	0.3838	0.312	0.2708	0.1645
1965	0.6493	0.605	0.4905	0.41	0.3633	0.1942
1966	0.874	0.806	0.694	0.5261	0.4379	0.2213
1967	0.5709	0.5228	0.432	0.3506	0.343	0.2323
1968	0.6038	0.5596	0.4151	0.2687	0.2176	0.183
1969	2.642	2.404	1.755	1.037	0.7938	0.2819
1970	0.8558	0.8281	0.7005	0.5787	0.4766	0.2351
1971	1.819	1.662	1.311	0.9983	0.8778	0.4048
1972	1.615	1.508	1.279	0.9222	0.6817	0.3693
1973	1.235	1.126	0.8117	0.5148	0.499	0.3473
1974	1.149	1.048	0.8933	0.7681	0.6769	0.3299
1975	1.334	1.231	0.92	0.7335	0.6083	0.307
1976	1.192	1.113	0.8168	0.6174	0.5986	0.2872
1977	0.6002	0.5668	0.4569	0.3957	0.3645	0.2291
1978	1.488	1.354	1.009	0.6566	0.5036	0.2427
1979	1.475	1.356	1.079	0.7954	0.6442	0.3159
1980	0.3664	0.3423	0.2666	0.2038	0.1549	0.1102
1981	0.2425	0.2285	0.1917	0.1534	0.1337	0.1053
1982	2.306	2.108	1.569	0.9335	0.714	0.319
1983	0.7208	0.6784	0.5754	0.436	0.3468	0.1905
1984	0.9679	0.8871	0.6822	0.5421	0.5051	0.269
1985	2.999	2.748	2.035	1.319	1.118	0.436
1986	0.4761	0.4547	0.4064	0.3604	0.3181	0.2207
1987	2.771	2.544	1.936	1.199	1.026	0.3937
1988	0.8401	0.7754	0.5907	0.4599	0.4056	0.2502
1989	1.066	0.9899	0.7598	0.5536	0.4407	0.2287
1990	1.246	1.136	0.8329	0.517	0.4338	0.2682

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	2.999	2.748	2.035	1.319	1.118	0.436
0.0645161290322581	2.771	2.544	1.936	1.199	1.026	0.4048
0.0967741935483871	2.642	2.404	1.755	1.037	0.8778	0.3937
0.129032258064516	2.306	2.108	1.569	0.9983	0.7938	0.3693
0.161290322580645	1.819	1.662	1.311	0.9335	0.714	0.3473
0.193548387096774	1.615	1.508	1.279	0.9222	0.6817	0.3299
0.225806451612903	1.488	1.356	1.079	0.7954	0.6769	0.319
0.258064516129032	1.475	1.354	1.009	0.7681	0.6442	0.3159
0.290322580645161	1.334	1.231	0.92	0.7335	0.6083	0.307
0.32258064516129	1.246	1.136	0.8933	0.6566	0.6015	0.2872
0.354838709677419	1.235	1.126	0.8568	0.6298	0.5986	0.2819
0.387096774193548	1.192	1.113	0.8329	0.6174	0.5051	0.269
0.419354838709677	1.149	1.048	0.8168	0.5787	0.5036	0.2682
0.451612903225806	1.13	1.026	0.8117	0.5536	0.499	0.2502
0.483870967741936	1.071	0.9899	0.7598	0.5421	0.4766	0.245

0.516129032258065	1.066	0.9862	0.7272	0.5261	0.4407	0.2427
0.548387096774194	0.9679	0.8871	0.7005	0.517	0.4379	0.2389
0.580645161290323	0.874	0.8281	0.694	0.5148	0.4338	0.2351
0.612903225806452	0.8558	0.806	0.6822	0.4804	0.4056	0.2323
0.645161290322581	0.8401	0.7754	0.5907	0.4599	0.3645	0.2291
0.67741935483871	0.7208	0.6784	0.5754	0.436	0.3633	0.2287
0.709677419354839	0.6493	0.605	0.4905	0.41	0.3607	0.2213
0.741935483870968	0.6038	0.5668	0.4569	0.3957	0.3468	0.2207
0.774193548387097	0.6002	0.5596	0.4497	0.3815	0.343	0.1942
0.806451612903226	0.5709	0.5228	0.432	0.3604	0.3413	0.1905
0.838709677419355	0.5567	0.5193	0.4151	0.3506	0.3181	0.183
0.870967741935484	0.4761	0.4547	0.4064	0.312	0.2708	0.1645
0.903225806451613	0.4454	0.4246	0.3838	0.2687	0.2176	0.1314
0.935483870967742	0.3664	0.3423	0.2666	0.2038	0.1549	0.1102
0.967741935483871	0.2425	0.2285	0.1917	0.1534	0.1337	0.1053

0.1 2.6084 2.3744 1.7364 1.03313 0.8694 0.39126

Average of yearly averages: 0.25841

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

Data used for this run:
Output File: PAAlfGR
Metfile: w14737.dvf
PRZM scenario: PAalfalfaC.txt
EXAMS environment file: pond298.exv
Chemical Name: Indoxacarb

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	527 g/mol		
Henry's Law Const.	henry	6E-10	atm-m^3/mol	
Vapor Pressure	vapr	1.9E-9	torr	
Solubility	sol	8	mg/L	
Kd	Kd	25	mg/L	
Koc	Koc		mg/L	
Photolysis half-life	kdp	3 days	Half-life	
Aerobic Aquatic Metabolism	kbacw	34 days	Halfife	
Anaerobic Aquatic Metabolism	kbacs	248 days	Halfife	
Aerobic Soil Metabolism	asm	156 days	Halfife	
Hydrolysis:	pH 7	36 days	Half-life	
Method:	CAM	2 integer	See PRZM manual	
Incorporation Depth:	DEPI	0.0 cm		
Application Rate:	TAPP	0.1232	kg/ha	
Application Efficiency:	APPEFF	0.99	fraction	
Spray Drift	DRFT	0.01	fraction of application rate applied to pond	
Application Date	Date	24-5	dd/mm or dd/mmm or dd-mm or dd-mmm	
Interval 1	interval	30 days	Set to 0 or delete line for single app.	
Interval 2	interval	30 days	Set to 0 or delete line for single app.	
Interval 3	interval	30 days	Set to 0 or delete line for single app.	
Record 17:	FILTRA			
	IPSCND	1		
	UPTKF			
Record 18:	PLVKRT			
	PLDKRT	0.03086		

FEXTRC	0.5		
Flag for Index Res. Run	IR	Pond	
Flag for runoff calc.	RUNOFF	none	none, monthly or total(average of entire run)

TX Alfalfa-Ground Spray

stored as TXAlfGR.out
Chemical: Indoxacarb
PRZM environment: TXalfalfaC.txt modified Satday, 12 October 2002 at 16:27:40
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 15:33:30
Metfile: w13958.dvf modified Wedday, 3 July 2002 at 08:06:24
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	2.986	2.795	2.146	1.63	1.246	0.4294
1962	2.24	1.99	1.411	0.9302	0.723	0.3805
1963	0.2865	0.2701	0.2144	0.1766	0.1637	0.09737
1964	2.922	2.622	1.773	0.9276	0.6766	0.3664
1965	1.792	1.614	1.181	0.8018	0.6888	0.4079
1966	2.099	1.941	1.311	0.8622	0.649	0.2915
1967	0.8799	0.8261	0.6329	0.5608	0.5449	0.2479
1968	1.271	1.146	0.7932	0.5392	0.536	0.2956
1969	1.399	1.28	1.004	0.6266	0.4829	0.2819
1970	1.266	1.166	0.9043	0.5891	0.44	0.2525
1971	1.715	1.6	1.113	0.6088	0.4603	0.2007
1972	1.095	0.9946	0.865	0.5678	0.457	0.2118
1973	2.426	2.284	1.804	1.314	0.9992	0.3794
1974	1.885	1.695	1.156	0.7921	0.6063	0.3464
1975	1.786	1.637	1.282	1.028	0.8626	0.421
1976	1.401	1.267	1.076	0.708	0.6413	0.3496
1977	0.335	0.3007	0.2259	0.1475	0.1326	0.1011
1978	1.048	0.9419	0.7505	0.494	0.4305	0.2445
1979	3.717	3.337	2.39	1.394	1.102	0.4646
1980	0.6967	0.6382	0.5086	0.3547	0.3015	0.1913
1981	4.553	4.26	3.203	2.184	1.642	0.5823
1982	1.026	0.9306	0.7191	0.4898	0.3919	0.1696
1983	0.5208	0.4697	0.3646	0.3037	0.3045	0.1861
1984	1.104	1.013	0.8327	0.559	0.4494	0.1541
1985	0.9863	0.9014	0.7196	0.4914	0.4148	0.2388
1986	1.24	1.136	0.9103	0.5801	0.5205	0.2816
1987	2.252	2.029	1.846	1.298	1.003	0.4236
1988	0.5853	0.5363	0.3762	0.2768	0.2446	0.1285
1989	0.896	0.8102	0.6224	0.4615	0.3623	0.1693
1990	1.038	0.9556	0.6985	0.4755	0.3957	0.2422

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	4.553	4.26	3.203	2.184	1.642	0.5823
0.0645161290322581	3.717	3.337	2.39	1.63	1.246	0.4646
0.0967741935483871	2.986	2.795	2.146	1.394	1.102	0.4294
0.129032258064516	2.922	2.622	1.846	1.314	1.003	0.4236
0.161290322580645	2.426	2.284	1.804	1.298	0.9992	0.421
0.193548387096774	2.252	2.029	1.773	1.028	0.8626	0.4079

0.225806451612903	2.24	1.99	1.411	0.9302	0.723	0.3805
0.258064516129032	2.099	1.941	1.311	0.9276	0.6888	0.3794
0.290322580645161	1.885	1.695	1.282	0.8622	0.6766	0.3664
0.32258064516129	1.792	1.637	1.181	0.8018	0.649	0.3496
0.354838709677419	1.786	1.614	1.156	0.7921	0.6413	0.3464
0.387096774193548	1.715	1.6 1.113	0.708	0.6063	0.2956	
0.419354838709677	1.401	1.28	1.076	0.6266	0.5449	0.2915
0.451612903225806	1.399	1.267	1.004	0.6088	0.536	0.2819
0.483870967741936	1.271	1.166	0.9103	0.5891	0.5205	0.2816
0.516129032258065	1.266	1.146	0.9043	0.5801	0.4829	0.2525
0.548387096774194	1.24	1.136	0.865	0.5678	0.4603	0.2479
0.580645161290323	1.104	1.013	0.8327	0.5608	0.457	0.2445
0.612903225806452	1.095	0.9946	0.7932	0.559	0.4494	0.2422
0.645161290322581	1.048	0.9556	0.7505	0.5392	0.44	0.2388
0.67741935483871	1.038	0.9419	0.7196	0.494	0.4305	0.2118
0.709677419354839	1.026	0.9306	0.7191	0.4914	0.4148	0.2007
0.741935483870968	0.9863	0.9014	0.6985	0.4898	0.3957	0.1913
0.774193548387097	0.896	0.8261	0.6329	0.4755	0.3919	0.1861
0.806451612903226	0.8799	0.8102	0.6224	0.4615	0.3623	0.1696
0.838709677419355	0.6967	0.6382	0.5086	0.3547	0.3045	0.1693
0.870967741935484	0.5853	0.5363	0.3762	0.3037	0.3015	0.1541
0.903225806451613	0.5208	0.4697	0.3646	0.2768	0.2446	0.1285
0.935483870967742	0.335	0.3007	0.2259	0.1766	0.1637	0.1011
0.967741935483871	0.2865	0.2701	0.2144	0.1475	0.1326	0.09737

0.1 2.9796 2.7777 2.116 1.386 1.0921 0.42882

Average of yearly averages: 0.284582333333333

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

Data used for this run:
Output File: TXAlfGR
Metfile: w13958.dvf
PRZM scenario: TXalfalfaC.txt
EXAMS environment file: pond298.exv
Chemical Name: Indoxacarb

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	527 g/mol		
Henry's Law Const.	henry	6E-10	atm-m^3/mol	
Vapor Pressure	vapr	1.9E-9	torr	
Solubility	sol	8	mg/L	
Kd	Kd	25	mg/L	
Koc	Koc		mg/L	
Photolysis half-life	kdp	3 days	Half-life	
Aerobic Aquatic Metabolism	kbacw	34 days	Halfife	
Anaerobic Aquatic Metabolism	kbacs	248 days	Halfife	
Aerobic Soil Metabolism	asm	156 days	Halfife	
Hydrolysis:	pH 7	36 days	Half-life	
Method:	CAM	2	integer	See PRZM manual
Incorporation Depth:	DEPI	0.0 cm		
Application Rate:	TAPP	0.1232	kg/ha	
Application Efficiency:	APPEFF	0.99	fraction	
Spray Drift	DRFT	0.01	fraction of application rate applied to pond	

Application Date	Date	24-4	dd/mm or dd/mmm or dd-mm or dd-mmm	
Interval 1	interval	30	days	Set to 0 or delete line for single app.
Interval 2	interval	30	days	Set to 0 or delete line for single app.
Interval 3	interval	30	days	Set to 0 or delete line for single app.
Record 17:	FILTRA			
IPSCND		1		
UPTKF				
Record 18:	PLVKRT			
PLDKRT		0.03086		
FEXTRC		0.5		
Flag for Index Res. Run		IR	Pond	
Flag for runoff calc.		RUNOFF	none	none, monthly or total(average of entire run)

FL Cabbage-Ground Spray

stored as FLCabGR.out
Chemical: Indoxacarb
PRZM environment: FLcabbageC.txt modified Satday, 12 October 2002 at 15:39:00
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 15:33:30
Metfile: w12842.dvf modified Wedday, 3 July 2002 at 08:04:28
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	0.5352	0.5081	0.2918	0.1021	0.0681	0.01679
1962	0.3969	0.3667	0.2715	0.1709	0.1665	0.09694
1963	0.5996	0.5612	0.4943	0.3599	0.2768	0.1195
1964	1.089	1.004	0.7397	0.602	0.5136	0.2258
1965	0.3421	0.3089	0.2469	0.1925	0.1688	0.08899
1966	0.4396	0.4072	0.3352	0.2373	0.1994	0.1075
1967	0.3595	0.3316	0.2653	0.1865	0.1589	0.09307
1968	0.3966	0.3651	0.2714	0.2161	0.1788	0.08254
1969	0.621	0.5892	0.4749	0.3187	0.2842	0.159
1970	0.5529	0.5123	0.3987	0.3305	0.3139	0.1309
1971	0.7501	0.6892	0.5131	0.3046	0.2476	0.1571
1972	0.3457	0.3272	0.2749	0.203	0.1608	0.1038
1973	0.4944	0.4524	0.3364	0.197	0.1817	0.1035
1974	1.123	1.011	0.6833	0.3805	0.2869	0.1341
1975	0.4459	0.4003	0.317	0.231	0.187	0.08506
1976	0.8012	0.7375	0.5364	0.3705	0.2889	0.1098
1977	0.3204	0.2975	0.2243	0.1595	0.1283	0.06117
1978	0.7016	0.6568	0.5062	0.3284	0.2785	0.114
1979	2.259	2.08	1.481	0.8241	0.6382	0.3316
1980	0.3095	0.2833	0.203	0.1588	0.145	0.08328
1981	1.058	0.9733	0.7066	0.4264	0.3208	0.1553
1982	0.8196	0.7565	0.6136	0.4179	0.3628	0.1896
1983	0.5162	0.4768	0.3897	0.3535	0.3098	0.1314
1984	0.3008	0.2782	0.2115	0.1579	0.1488	0.084
1985	0.4444	0.3976	0.2689	0.1856	0.1716	0.08502
1986	0.8023	0.7354	0.5422	0.3134	0.2362	0.1045
1987	1.19	1.093	0.8038	0.5399	0.4423	0.1784
1988	0.357	0.3285	0.2645	0.191	0.172	0.101
1989	0.3278	0.3093	0.1779	0.137	0.124	0.07011

1990	0.4979	0.4566	0.3489	0.2537	0.2043	0.1067

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	2.259	2.08	1.481	0.8241	0.6382	0.3316
0.0645161290322581	1.19	1.093	0.8038	0.602	0.5136	0.2258
0.0967741935483871	1.123	1.011	0.7397	0.5399	0.4423	0.1896
0.129032258064516	1.089	1.004	0.7066	0.4264	0.3628	0.1784
0.161290322580645	1.058	0.9733	0.6833	0.4179	0.3208	0.159
0.193548387096774	0.8196	0.7565	0.6136	0.3805	0.3139	0.1571
0.225806451612903	0.8023	0.7375	0.5422	0.3705	0.3098	0.1553
0.258064516129032	0.8012	0.7354	0.5364	0.3599	0.2889	0.1341
0.290322580645161	0.7501	0.6892	0.5131	0.3535	0.2869	0.1314
0.32258064516129	0.7016	0.6568	0.5062	0.3305	0.2842	0.1309
0.354838709677419	0.621	0.5892	0.4943	0.3284	0.2785	0.1195
0.387096774193548	0.5996	0.5612	0.4749	0.3187	0.2768	0.114
0.419354838709677	0.5529	0.5123	0.3987	0.3134	0.2476	0.1098
0.451612903225806	0.5352	0.5081	0.3897	0.3046	0.2362	0.1075
0.483870967741936	0.5162	0.4768	0.3489	0.2537	0.2043	0.1067
0.516129032258065	0.4979	0.4566	0.3364	0.2373	0.1994	0.1045
0.548387096774194	0.4944	0.4524	0.3352	0.231	0.187	0.1038
0.580645161290323	0.4459	0.4072	0.317	0.2161	0.1817	0.1035
0.612903225806452	0.4444	0.4003	0.2918	0.203	0.1788	0.101
0.645161290322581	0.4396	0.3976	0.2749	0.197	0.172	0.09694
0.67741935483871	0.3969	0.3667	0.2715	0.1925	0.1716	0.09307
0.709677419354839	0.3966	0.3651	0.2714	0.191	0.1688	0.08899
0.741935483870968	0.3595	0.3316	0.2689	0.1865	0.1665	0.08506
0.774193548387097	0.357	0.3285	0.2653	0.1856	0.1608	0.08502
0.806451612903226	0.3457	0.3272	0.2645	0.1709	0.1589	0.084
0.838709677419355	0.3421	0.3093	0.2469	0.1595	0.1488	0.08328
0.870967741935484	0.3278	0.3089	0.2243	0.1588	0.145	0.08254
0.903225806451613	0.3204	0.2975	0.2115	0.1579	0.1283	0.07011
0.935483870967742	0.3095	0.2833	0.203	0.137	0.124	0.06117
0.967741935483871	0.3008	0.2782	0.1779	0.1021	0.0681	0.01679
0.1	1.1196	1.0103	0.73639	0.52855	0.43435	0.18848

Average of yearly averages: 0.120349

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

Data used for this run:
Output File: FLCabGR
Metfile: w12842.dvf
PRZM scenario: FLcabbageC.txt
EXAMS environment file: pond298.exv
Chemical Name: Indoxacarb

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	527 g/mol		
Henry's Law Const.	henry	6E-10	atm-m^3/mol	
Vapor Pressure	vapr	1.9E-9	torr	
Solubility	sol	8	mg/L	
Kd	Kd	25	mg/L	
Koc	Koc		mg/L	

Photolysis half-life	kdp	3 days	Half-life		
Aerobic Aquatic Metabolism		kbacw	34	days	Halfife
Anaerobic Aquatic Metabolism		kbacs	248	days	Halfife
Aerobic Soil Metabolism	asm	156 days	Halfife		
Hydrolysis:	pH 7	36	days	Half-life	
Method:	CAM	2	integer	See PRZM manual	
Incorporation Depth:	DEPI		cm		
Application Rate:	TAPP	0.0728	kg/ha		
Application Efficiency:	APPEFF	0.99	fraction		
Spray Drift	DRFT	0.01	fraction of application rate applied to pond		
Application Date	Date	15-12	dd/mm or dd/mmm or dd-mm or dd-mmm		
Interval 1	interval	3	days	Set to 0 or delete line for single app.	
Interval 2	interval	3	days	Set to 0 or delete line for single app.	
Interval 3	interval	3	days	Set to 0 or delete line for single app.	
Record 17:	FILTRA				
IPSCND		1			
UPTKF					
Record 18:	PLVKRT				
PLDKRT		0.03086			
FEXTRC		0.5			
Flag for Index Res. Run	IR	Pond			
Flag for runoff calc.	RUNOFF	none	none, monthly or total(average of entire run)		

FL-Fire ants-Broadcast Bait (Granule)

stored as FLANTS.out
Chemical: Indoxacarb
PRZM environment: FLturfC.txt modified Satday, 12 October 2002 at 15:44:48
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 15:33:30
Metfile: w12834.dvf modified Wedday, 3 July 2002 at 08:04:28
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	0.07102	0.06435	0.04611	0.02953	0.02417	0.01458
1962	0.1264	0.1142	0.0807	0.04756	0.03597	0.0205
1963	0.1397	0.1257	0.08973	0.05186	0.04008	0.0226
1964	0.1134	0.1025	0.07024	0.04026	0.03261	0.02386
1965	0.1072	0.09706	0.06671	0.03677	0.02834	0.01651
1966	0.1671	0.1509	0.1172	0.07305	0.05566	0.02652
1967	0.09909	0.08991	0.06277	0.03656	0.02839	0.01783
1968	0.07879	0.07142	0.05608	0.0406	0.03116	0.0191
1969	0.1522	0.1372	0.0986	0.05797	0.04413	0.02172
1970	0.06233	0.05818	0.04556	0.03168	0.02702	0.01501
1971	0.07479	0.06781	0.04708	0.03528	0.03321	0.02298
1972	0.1151	0.1053	0.07434	0.04419	0.04067	0.02458
1973	0.07381	0.06648	0.04641	0.0279	0.02098	0.01544
1974	0.1123	0.1014	0.07021	0.04248	0.03239	0.01912
1975	0.08117	0.07381	0.05222	0.03024	0.0224	0.0157
1976	0.129	0.1179	0.08377	0.0517	0.04191	0.0238
1977	0.1175	0.109	0.08177	0.05181	0.04143	0.02139

1978	0.06065	0.05545	0.03938	0.02877	0.02565	0.01771
1979	0.07142	0.06607	0.05	0.03496	0.03062	0.0236
1980	0.04058	0.03767	0.03132	0.02048	0.01773	0.01312
1981	0.04783	0.04427	0.03269	0.0266	0.0229	0.0157
1982	0.1543	0.1393	0.09607	0.05403	0.04172	0.02564
1983	0.04328	0.04004	0.03335	0.02575	0.02113	0.01709
1984	0.08495	0.07813	0.05628	0.03605	0.03175	0.02126
1985	0.06587	0.05955	0.04502	0.02824	0.02106	0.01481
1986	0.1378	0.1296	0.09591	0.05807	0.04634	0.0245
1987	0.07136	0.06577	0.05118	0.03067	0.0272	0.01661
1988	0.0422	0.03896	0.02843	0.0239	0.02076	0.01425
1989	0.1935	0.1775	0.1279	0.07379	0.06072	0.02991
1990	0.04613	0.0425	0.03107	0.02347	0.02123	0.01351

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	0.1935	0.1775	0.1279	0.07379	0.06072	0.02991
0.0645161290322581	0.1671	0.1509	0.1172	0.07305	0.05566	0.02652
0.0967741935483871	0.1543	0.1393	0.0986	0.05807	0.04634	0.02564
0.129032258064516	0.1522	0.1372	0.09607	0.05797	0.04413	0.02458
0.161290322580645	0.1397	0.1296	0.09591	0.05403	0.04191	0.0245
0.193548387096774	0.1378	0.1257	0.08973	0.05186	0.04172	0.02386
0.225806451612903	0.129	0.1179	0.08377	0.05181	0.04143	0.0238
0.258064516129032	0.1264	0.1142	0.08177	0.0517	0.04067	0.0236
0.290322580645161	0.1175	0.109	0.0807	0.04756	0.04008	0.02298
0.32258064516129	0.1151	0.1053	0.07434	0.04419	0.03597	0.0226
0.354838709677419	0.1134	0.1025	0.07024	0.04248	0.03321	0.02172
0.387096774193548	0.1123	0.1014	0.07021	0.0406	0.03261	0.02139
0.419354838709677	0.1072	0.09706	0.06671	0.04026	0.03239	0.02126
0.451612903225806	0.09909	0.08991	0.06277	0.03677	0.03175	0.0205
0.483870967741936	0.08495	0.07813	0.05628	0.03656	0.03116	0.01912
0.516129032258065	0.08117	0.07381	0.05608	0.03605	0.03062	0.0191
0.548387096774194	0.07879	0.07142	0.05222	0.03528	0.02839	0.01783
0.580645161290323	0.07479	0.06781	0.05118	0.03496	0.02834	0.01771
0.612903225806452	0.07381	0.06648	0.05	0.03168	0.0272	0.01709
0.645161290322581	0.07142	0.06607	0.04708	0.03067	0.02702	0.01661
0.67741935483871	0.07136	0.06577	0.04641	0.03024	0.02565	0.01651
0.709677419354839	0.07102	0.06435	0.04611	0.02953	0.02417	0.0157
0.741935483870968	0.06587	0.05955	0.04556	0.02877	0.0229	0.0157
0.774193548387097	0.06233	0.05818	0.04502	0.02824	0.0224	0.01544
0.806451612903226	0.06065	0.05545	0.03938	0.0279	0.02123	0.01501
0.838709677419355	0.04783	0.04427	0.03335	0.0266	0.02113	0.01481
0.870967741935484	0.04613	0.0425	0.03269	0.02575	0.02106	0.01458
0.903225806451613	0.04328	0.04004	0.03132	0.0239	0.02098	0.01425
0.935483870967742	0.0422	0.03896	0.03107	0.02347	0.02076	0.01351
0.967741935483871	0.04058	0.03767	0.02843	0.02048	0.01773	0.01312
0.1	0.15409	0.13909	0.098347	0.05806	0.046119	0.025534

Average of yearly averages: 0.0196316666666667

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

Data used for this run:

Output File: FLANTS
Metfile: w12834.dvf
PRZM scenario: FLturfC.txt
EXAMS environment file: pond298.exv
Chemical Name: Indoxacarb

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	527 g/mol		
Henry's Law Const.	henry	6E-10	atm-m^3/mol	
Vapor Pressure	vapr	1.9E-9	torr	
Solubility	sol	8	mg/L	
Kd	Kd	25	mg/L	
Koc	Koc		mg/L	
Photolysis half-life	kdp	3 days	Half-life	
Aerobic Aquatic Metabolism	kbacw	34	days	Halfife
Anaerobic Aquatic Metabolism	kbacs	248	days	Halfife
Aerobic Soil Metabolism	asm	156 days	Halfife	
Hydrolysis:	pH 7	36	days	Half-life
Method:	CAM	4	integer	See PRZM manual
Incorporation Depth:	DEPI	0.1 cm		
Application Rate:	TAPP	7.5E-4	kg/ha	
Application Efficiency:	APPEFF	1.0 fraction		
Spray Drift	DRFT	0.00	fraction of application rate applied to pond	
Application Date	Date	1-1	dd/mm or dd/mmm or dd-mm or dd-mmm	
Interval 1	interval	84	days	Set to 0 or delete line for single app.
Interval 2	interval	84	days	Set to 0 or delete line for single app.
Interval 3	interval	84	days	Set to 0 or delete line for single app.
Record 17:	FILTRA			
	IPSCND	1		
	UPTKF			
Record 18:	PLVKRT			
	PLDKRT	0.03086		
	FEXTRC	0.5		
Flag for Index Res. Run	IR	Pond		
Flag for runoff calc.	RUNOFF	none	none, monthly or total(average of entire run)	

CA Grapes-Ground Spray

stored as CAGRPGR.out
Chemical: Indoxacarb
PRZM environment: CAgrapesC.txt modified Satday, 12 October 2002 at 15:36:14
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 15:33:30
Metfile: w93193.dvf modified Wedday, 3 July 2002 at 08:04:24
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	0.1711	0.1541	0.1202	0.07285	0.05284	0.01484
1962	0.1752	0.1585	0.1244	0.07647	0.05574	0.01717
1963	0.1776	0.1614	0.1269	0.07926	0.0581	0.01795
1964	0.1765	0.1602	0.1257	0.07767	0.05661	0.0168
1965	0.1782	0.1622	0.1275	0.07961	0.05821	0.01712
1966	0.1741	0.1573	0.1232	0.07596	0.05538	0.01672
1967	0.1767	0.1604	0.1259	0.07721	0.0559	0.01684
1968	0.173	0.156	0.1221	0.07425	0.05403	0.01629

1969	0.1792	0.1631	0.1285	0.08005	0.0585	0.02148
1970	0.1748	0.1581	0.124	0.07563	0.05489	0.01786
1971	0.1758	0.1594	0.125	0.07682	0.05582	0.01662
1972	0.1777	0.1604	0.1266	0.07694	0.05592	0.0169
1973	0.1728	0.1557	0.1219	0.07439	0.05419	0.01623
1974	0.1734	0.1565	0.1225	0.07484	0.05445	0.01634
1975	0.1753	0.1588	0.1245	0.07714	0.05651	0.01644
1976	0.177	0.1607	0.1263	0.07848	0.05762	0.01857
1977	0.1717	0.1544	0.1208	0.07309	0.053	0.01582
1978	0.1746	0.1578	0.1238	0.07556	0.05482	0.01765
1979	0.1727	0.1557	0.1219	0.07407	0.05377	0.01556
1980	0.1769	0.1606	0.1261	0.0774	0.05615	0.01693
1981	0.1688	0.151	0.1178	0.0701	0.05053	0.01507
1982	0.1773	0.1612	0.1266	0.0785	0.05721	0.01773
1983	0.175	0.1583	0.1242	0.0767	0.05594	0.01817
1984	0.1732	0.1563	0.1224	0.07339	0.05277	0.01516
1985	0.1691	0.1514	0.1182	0.07014	0.05053	0.01468
1986	0.1716	0.1543	0.1207	0.07306	0.05284	0.01635
1987	0.1729	0.1558	0.122	0.07522	0.05503	0.01735
1988	0.175	0.1584	0.1242	0.07521	0.05429	0.01547
1989	0.1737	0.1569	0.1229	0.07477	0.05425	0.01584
1990	0.174	0.1572	0.1232	0.07476	0.05412	0.01623

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	0.1792	0.1631	0.1285	0.08005	0.0585	0.02148
0.0645161290322581	0.1782	0.1622	0.1275	0.07961	0.05821	0.01857
0.0967741935483871	0.1777	0.1614	0.1269	0.07926	0.0581	0.01817
0.129032258064516	0.1776	0.1612	0.1266	0.0785	0.05762	0.01795
0.161290322580645	0.1773	0.1607	0.1266	0.07848	0.05721	0.01786
0.193548387096774	0.177	0.1606	0.1263	0.07767	0.05661	0.01773
0.225806451612903	0.1769	0.1604	0.1261	0.0774	0.05651	0.01765
0.258064516129032	0.1767	0.1604	0.1259	0.07721	0.05615	0.01735
0.290322580645161	0.1765	0.1602	0.1257	0.07714	0.05594	0.01717
0.32258064516129	0.1758	0.1594	0.125	0.07694	0.05592	0.01712
0.354838709677419	0.1753	0.1588	0.1245	0.07682	0.0559	0.01693
0.387096774193548	0.1752	0.1585	0.1244	0.0767	0.05582	0.0169
0.419354838709677	0.175	0.1584	0.1242	0.07647	0.05574	0.01684
0.451612903225806	0.175	0.1583	0.1242	0.07596	0.05538	0.0168
0.483870967741936	0.1748	0.1581	0.124	0.07563	0.05503	0.01672
0.516129032258065	0.1746	0.1578	0.1238	0.07556	0.05489	0.01662
0.548387096774194	0.1741	0.1573	0.1232	0.07522	0.05482	0.01644
0.580645161290323	0.174	0.1572	0.1232	0.07521	0.05445	0.01635
0.612903225806452	0.1737	0.1569	0.1229	0.07484	0.05429	0.01634
0.645161290322581	0.1734	0.1565	0.1225	0.07477	0.05425	0.01629
0.67741935483871	0.1732	0.1563	0.1224	0.07476	0.05419	0.01623
0.709677419354839	0.173	0.156	0.1221	0.07439	0.05412	0.01623
0.741935483870968	0.1729	0.1558	0.122	0.07425	0.05403	0.01584
0.774193548387097	0.1728	0.1557	0.1219	0.07407	0.05377	0.01582
0.806451612903226	0.1727	0.1557	0.1219	0.07339	0.053	0.01556
0.838709677419355	0.1717	0.1544	0.1208	0.07309	0.05284	0.01547
0.870967741935484	0.1716	0.1543	0.1207	0.07306	0.05284	0.01516
0.903225806451613	0.1711	0.1541	0.1202	0.07285	0.05277	0.01507

0.935483870967742	0.1691	0.1514	0.1182	0.07014	0.05053	0.01484
0.967741935483871	0.1688	0.151	0.1178	0.0701	0.05053	0.01468

0.1 0.17769 0.16138 0.12687 0.079184 0.058052 0.018148

Average of yearly averages: 0.0167393333333333

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

Data used for this run:
Output File: CAGRPGR
Metfile: w93193.dvf
PRZM scenario: CAgrapesC.txt
EXAMS environment file: pond298.exv
Chemical Name: Indoxacarb

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	527 g/mol		
Henry's Law Const.	henry	6E-10	atm-m^3/mol	
Vapor Pressure	vapr	1.9E-9	torr	
Solubility	sol	8	mg/L	
Kd	Kd	25	mg/L	
Koc	Koc		mg/L	
Photolysis half-life	kdp	3 days	Half-life	
Aerobic Aquatic Metabolism	kbacw	34	days	Halfife
Anaerobic Aquatic Metabolism	kbacs	248	days	Halfife
Aerobic Soil Metabolism	asm	156 days	Halfife	
Hydrolysis:	pH 7	36	days	Half-life
Method:	CAM	2	integer	See PRZM manual
Incorporation Depth:	DEPI		cm	
Application Rate:	TAPP	0.1232	kg/ha	
Application Efficiency:	APPEFF	0.99	fraction	
Spray Drift	DRFT	0.01	fraction of application rate applied to pond	
Application Date	Date	1-6	dd/mm or dd/mmm or dd-mm or dd-mmm	
Interval 1	interval	5	days	Set to 0 or delete line for single app.
Interval 2	interval	5	days	Set to 0 or delete line for single app.
Interval 3	interval	5	days	Set to 0 or delete line for single app.
Record 17:	FILTRA			
IPSCND		1		
UPTKF				
Record 18:	PLVKRT			
PLDKRT		0.03086		
FEXTRC		0.5		
Flag for Index Res. Run	IR	Pond		
Flag for runoff calc.	RUNOFF	none	none, monthly or total(average of entire run)	

FL-Mole Cricket-Broadcast Bait (Granule)

stored as FLMOLS.out
Chemical: Indoxacarb
PRZM environment: FLturfC.txt modified Satday, 12 October 2002 at 15:44:48
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 15:33:30
Metfile: w12834.dvf modified Wedday, 3 July 2002 at 08:04:28
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	1.429	1.313	0.9521	0.5724	0.426	0.1276
1962	0.7738	0.7096	0.4944	0.3258	0.2388	0.06621
1963	1.464	1.352	1.08	0.6607	0.506	0.151
1964	1.89	1.744	1.514	0.9638	0.7367	0.2285
1965	0.2711	0.25	0.1861	0.1278	0.1107	0.0531
1966	0.9173	0.8579	0.6396	0.4582	0.3808	0.1172
1967	0.5177	0.477	0.3688	0.2152	0.1584	0.07773
1968	1.289	1.163	0.8301	0.4673	0.3396	0.09405
1969	0.3714	0.337	0.2758	0.1767	0.1287	0.04358
1970	2.931	2.702	1.976	1.222	0.9373	0.2659
1971	8.882	8.166	5.936	3.486	2.662	0.7693
1972	0.9919	0.9074	0.6413	0.3652	0.3275	0.1073
1973	0.4862	0.4481	0.3423	0.2238	0.1844	0.05702
1974	1.196	1.092	0.7734	0.4291	0.3371	0.1055
1975	0.4733	0.4312	0.3098	0.1692	0.1302	0.04385
1976	4.016	3.661	2.574	1.527	1.13	0.3118
1977	1.477	1.362	1	0.5752	0.423	0.1455
1978	1.742	1.613	1.255	0.8504	0.6918	0.2222
1979	4.418	4.069	3.235	2.129	1.747	0.5204
1980	1.694	1.561	1.145	0.6689	0.5234	0.1613
1981	4.924	4.53	3.291	1.984	1.502	0.4331
1982	5.222	4.811	3.513	2.098	1.699	0.5327
1983	1.64	1.515	1.265	0.936	0.738	0.224
1984	1.587	1.461	1.054	0.8176	0.6903	0.2275
1985	0.5337	0.4866	0.3426	0.1962	0.1656	0.05558
1986	10.11	9.527	7.001	4.042	2.994	0.865
1987	3.807	3.502	2.601	1.557	1.176	0.3357
1988	4.371	4.032	2.95	1.772	1.337	0.38
1989	25.08	22.96	16.43	9.34	6.868	1.933
1990	4.708	4.302	3.138	1.764	1.29	0.3628

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly	
0.032258064516129	25.08	22.96	16.43	9.34	6.868	1.933	
0.0645161290322581	10.11	9.527	7.001	4.042	2.994	0.865	
0.0967741935483871	8.882	8.166	5.936	3.486	2.662	0.7693	
0.129032258064516	5.222	4.811	3.513	2.129	1.747	0.5327	
0.161290322580645	4.924	4.53	3.291	2.098	1.699	0.5204	
0.193548387096774	4.708	4.302	3.235	1.984	1.502	0.4331	
0.225806451612903	4.418	4.069	3.138	1.772	1.337	0.38	
0.258064516129032	4.371	4.032	2.95	1.764	1.29	0.3628	
0.290322580645161	4.016	3.661	2.601	1.557	1.176	0.3357	
0.32258064516129	3.807	3.502	2.574	1.527	1.13	0.3118	
0.354838709677419	2.931	2.702	1.976	1.222	0.9373	0.2659	
0.387096774193548	1.89	1.744	1.514	0.9638	0.738	0.2285	
0.419354838709677	1.742	1.613	1.265	0.936	0.7367	0.2275	
0.451612903225806	1.694	1.561	1.255	0.8504	0.6918	0.224	
0.483870967741936	1.64	1.515	1.145	0.8176	0.6903	0.2222	
0.516129032258065	1.587	1.461	1.08	0.6689	0.5234	0.1613	
0.548387096774194	1.477	1.362	1.054	0.6607	0.506	0.151	
0.580645161290323	1.464	1.352	1	0.5752	0.426	0.1455	
0.612903225806452	1.429	1.313	0.9521	0.5724	0.423	0.1276	

0.645161290322581	1.289	1.163	0.8301	0.4673	0.3808	0.1172
0.67741935483871	1.196	1.092	0.7734	0.4582	0.3396	0.1073
0.709677419354839	0.9919	0.9074	0.6413	0.4291	0.3371	0.1055
0.741935483870968	0.9173	0.8579	0.6396	0.3652	0.3275	0.09405
0.774193548387097	0.7738	0.7096	0.4944	0.3258	0.2388	0.07773
0.806451612903226	0.5337	0.4866	0.3688	0.2238	0.1844	0.06621
0.838709677419355	0.5177	0.477	0.3426	0.2152	0.1656	0.05702
0.870967741935484	0.4862	0.4481	0.3423	0.1962	0.1584	0.05558
0.903225806451613	0.4733	0.4312	0.3098	0.1767	0.1302	0.0531
0.935483870967742	0.3714	0.337	0.2758	0.1692	0.1287	0.04385
0.967741935483871	0.2711	0.25	0.1861	0.1278	0.1107	0.04358

0.1 8.516 7.8305 5.6937 3.3503 2.5705 0.74564

Average of yearly averages: 0.300614

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

Data used for this run:
Output File: FLMOLS
Metfile: w12834.dvf
PRZM scenario: FLturfC.txt
EXAMS environment file: pond298.exv
Chemical Name: Indoxacarb

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	527 g/mol		
Henry's Law Const.	henry	6E-10	atm-m^3/mol	
Vapor Pressure	vapr	1.9E-9	torr	
Solubility	sol	8	mg/L	
Kd	Kd	25	mg/L	
Koc	Koc		mg/L	
Photolysis half-life	kdp	3 days	Half-life	
Aerobic Aquatic Metabolism	kbacw	34 days	Halfife	
Anaerobic Aquatic Metabolism	kbacs	248 days	Halfife	
Aerobic Soil Metabolism	asm	156 days	Halfife	
Hydrolysis:	pH 7	36 days	Half-life	
Method:	CAM	4 integer	See PRZM manual	
Incorporation Depth:	DEPI	0.1 cm		
Application Rate:	TAPP	0.25	kg/ha	
Application Efficiency:	APPEFF	1.0 fraction		
Spray Drift	DRFT	0.00	fraction of application rate applied to pond	
Application Date	Date	7-1	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	1		
	UPTKF			
Record 18:	PLVKRT			
	PLDKRT	0.03086		
	FEXTRC	0.5		
Flag for Index Res. Run	IR	Pond		
Flag for runoff calc.	RUNOFF	none	none, monthly or total(average of entire run)	

NC-PEANUTS-Ground Spray

stored as NCPEAGR.out
Chemical: Indoxacarb
PRZM environment: NCpeanutC.txt modified Satday, 12 October 2002 at 16:12:46
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 15:33:30
Metfile: w13737.dvf modified Wedday, 3 July 2002 at 08:06:30
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	4.079	3.72	2.606	1.492	1.171	0.3567
1962	2.095	1.919	1.571	1.106	0.9595	0.4647
1963	2.233	2.046	1.471	0.909	0.7919	0.3261
1964	5.749	5.243	4.298	2.895	2.227	0.764
1965	0.8984	0.8241	0.597	0.4176	0.3366	0.2204
1966	3.463	3.177	2.651	1.64	1.284	0.4518
1967	3.207	2.933	2.188	1.968	1.628	0.6235
1968	0.7563	0.7064	0.531	0.408	0.3226	0.2158
1969	4.826	4.468	3.354	2.052	1.592	0.5364
1970	1.032	0.972	0.7759	0.4863	0.3769	0.2116
1971	2.229	2.095	1.704	1.33	1.175	0.4782
1972	1.225	1.119	0.8622	0.6406	0.5508	0.2743
1973	2.186	1.994	1.53	1.077	0.8871	0.3554
1974	4.111	3.826	3.236	2.238	1.752	0.5962
1975	5.991	5.45	3.885	2.349	1.838	0.654
1976	1.975	1.798	1.465	0.9379	0.7533	0.316
1977	1.988	1.8	1.239	0.7825	0.7811	0.3465
1978	1.316	1.203	0.8503	0.5058	0.3977	0.2511
1979	2.1	1.998	1.631	1.306	1.089	0.4796
1980	2.752	2.49	1.717	0.9797	0.8411	0.3454
1981	1.8	1.648	1.329	1.023	0.902	0.4202
1982	2.071	1.888	1.434	0.9282	0.7999	0.395
1983	0.7383	0.6844	0.5227	0.446	0.4084	0.2266
1984	1.309	1.193	0.8548	0.5772	0.4658	0.2344
1985	2.26	2.062	1.538	1.024	0.9582	0.4091
1986	0.4422	0.4141	0.3193	0.2806	0.2365	0.1686
1987	0.9943	0.9074	0.6664	0.476	0.3981	0.2573
1988	0.7665	0.6952	0.5331	0.3515	0.3072	0.1681
1989	2.234	2.075	1.702	1.119	0.9799	0.3785
1990	3.17	2.876	2.023	1.369	1.086	0.4172

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	5.991	5.45	4.298	2.895	2.227	0.764
0.0645161290322581	5.749	5.243	3.885	2.349	1.838	0.654
0.0967741935483871	4.826	4.468	3.354	2.238	1.752	0.6235
0.129032258064516	4.111	3.826	3.236	2.052	1.628	0.5962
0.161290322580645	4.079	3.72	2.651	1.968	1.592	0.5364
0.193548387096774	3.463	3.177	2.606	1.64	1.284	0.4796
0.225806451612903	3.207	2.933	2.188	1.492	1.175	0.4782
0.258064516129032	3.17	2.876	2.023	1.369	1.171	0.4647
0.290322580645161	2.752	2.49	1.717	1.33	1.089	0.4518
0.32258064516129	2.26	2.095	1.704	1.306	1.086	0.4202
0.354838709677419	2.234	2.075	1.702	1.119	0.9799	0.4172
0.387096774193548	2.233	2.062	1.631	1.106	0.9595	0.4091

0.419354838709677	2.229	2.046	1.571	1.077	0.9582	0.395
0.451612903225806	2.186	1.998	1.538	1.024	0.902	0.3785
0.483870967741936	2.1	1.994	1.53	1.023	0.8871	0.3567
0.516129032258065	2.095	1.919	1.471	0.9797	0.8411	0.3554
0.548387096774194	2.071	1.888	1.465	0.9379	0.7999	0.3465
0.580645161290323	1.988	1.8 1.434	0.9282	0.7919	0.3454	
0.612903225806452	1.975	1.798	1.329	0.909	0.7811	0.3261
0.645161290322581	1.8	1.648	1.239	0.7825	0.7533	0.316
0.67741935483871	1.316	1.203	0.8622	0.6406	0.5508	0.2743
0.709677419354839	1.309	1.193	0.8548	0.5772	0.4658	0.2573
0.741935483870968	1.225	1.119	0.8503	0.5058	0.4084	0.2511
0.774193548387097	1.032	0.972	0.7759	0.4863	0.3981	0.2344
0.806451612903226	0.9943	0.9074	0.6664	0.476	0.3977	0.2266
0.838709677419355	0.8984	0.8241	0.597	0.446	0.3769	0.2204
0.870967741935484	0.7665	0.7064	0.5331	0.4176	0.3366	0.2158
0.903225806451613	0.7563	0.6952	0.531	0.408	0.3226	0.2116
0.935483870967742	0.7383	0.6844	0.5227	0.3515	0.3072	0.1686
0.967741935483871	0.4422	0.4141	0.3193	0.2806	0.2365	0.1681

0.1 4.7545 4.4038 3.3422 2.2194 1.7396 0.62077

Average of yearly averages: 0.37809

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

Data used for this run:
Output File: NCPEAGR
Metfile: w13737.dvf
PRZM scenario: NCpeanutC.txt
EXAMS environment file: pond298.exv
Chemical Name: Indoxacarb

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	527 g/mol		
Henry's Law Const.	henry	6E-10	atm-m^3/mol	
Vapor Pressure	vapr	1.9E-9	torr	
Solubility	sol	8	mg/L	
Kd	Kd	25	mg/L	
Koc	Koc		mg/L	
Photolysis half-life	kdp	3 days	Half-life	
Aerobic Aquatic Metabolism	kbacw	34	days	Halfife
Anaerobic Aquatic Metabolism	kbacs	248	days	Halfife
Aerobic Soil Metabolism	asm	156 days	Halfife	
Hydrolysis:	pH 7	36	days	Half-life
Method:	CAM	2	integer	See PRZM manual
Incorporation Depth:	DEPI		cm	
Application Rate:	TAPP	0.1232	kg/ha	
Application Efficiency:	APPEFF	0.99	fraction	
Spray Drift	DRFT	0.01	fraction of application rate applied to pond	
Application Date	Date	1-7	dd/mm or dd/mmm or dd-mm or dd-mmm	
Interval 1	interval	5	days	Set to 0 or delete line for single app.
Interval 2	interval	5	days	Set to 0 or delete line for single app.
Interval 3	interval	5	days	Set to 0 or delete line for single app.
Record 17:	FILTRA			
	IPSCND	1		

UPTKF			
Record 18:	PLVKRT		
PLDKRT	0.03086		
FEXTRC	0.5		
Flag for Index Res. Run	IR	Pond	
Flag for runoff calc.	RUNOFF	none	none, monthly or total(average of entire run)

MS SOYBEAN-Ground Spray

stored as MSSOYGR.out
Chemical: Indoxacarb
PRZM environment: MSsoybeanC.txt modified Satday, 12 October 2002 at 16:07:44
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 15:33:30
Metfile: w13893.dvf modified Wedday, 3 July 2002 at 08:06:20
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	1.527	1.43	1.209	0.9631	0.6598	0.1956
1962	1.327	1.196	1.062	0.7183	0.5677	0.3364
1963	0.6954	0.6332	0.4448	0.2731	0.237	0.143
1964	1.042	0.9931	0.8632	0.5018	0.4184	0.2642
1965	1.719	1.564	1.15	0.7525	0.6365	0.326
1966	0.5586	0.5236	0.4208	0.3071	0.3133	0.1991
1967	0.8819	0.8225	0.6774	0.4521	0.3862	0.2335
1968	1.773	1.613	1.171	0.7849	0.695	0.3166
1969	2.401	2.235	1.628	0.9023	0.6711	0.3515
1970	0.8139	0.7515	0.5984	0.4342	0.386	0.2617
1971	2.119	1.93	1.343	0.7418	0.5598	0.2538
1972	1.491	1.39	1.183	1.039	0.9435	0.3391
1973	1.97	1.775	1.2	0.8238	0.6751	0.3972
1974	0.9725	0.8811	0.6491	0.5113	0.4286	0.2835
1975	0.8248	0.7729	0.6057	0.5196	0.4191	0.2217
1976	2.563	2.328	1.618	1.014	0.8697	0.347
1977	1.064	0.9994	0.8087	0.5247	0.5271	0.2741
1978	2.838	2.548	1.954	1.229	0.9363	0.4809
1979	1.27	1.156	0.9885	0.6722	0.5415	0.3882
1980	1.977	1.76	1.174	0.6276	0.5929	0.3492
1981	1.335	1.23	0.969	0.6158	0.5894	0.2601
1982	1.515	1.445	1.172	0.804	0.7176	0.3348
1983	1.857	1.737	1.544	0.9989	0.7262	0.3681
1984	1.221	1.101	0.7922	0.561	0.4765	0.3407
1985	1.226	1.099	0.8952	0.5322	0.4462	0.2292
1986	2.32	2.216	1.715	1.232	0.9092	0.317
1987	1.701	1.576	1.28	0.9781	0.7178	0.369
1988	1.996	1.848	1.586	0.9683	0.728	0.3953
1989	0.9874	0.9224	0.8178	0.6611	0.5599	0.3625
1990	1.255	1.134	0.8859	0.6721	0.555	0.2912

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	2.838	2.548	1.954	1.232	0.9435	0.4809
0.0645161290322581	2.563	2.328	1.715	1.229	0.9363	0.3972
0.0967741935483871	2.401	2.235	1.628	1.039	0.9092	0.3953

0.129032258064516	2.32	2.216	1.618	1.014	0.8697	0.3882
0.161290322580645	2.119	1.93	1.586	0.9989	0.728	0.369
0.193548387096774	1.996	1.848	1.544	0.9781	0.7262	0.3681
0.225806451612903	1.977	1.775	1.343	0.9683	0.7178	0.3625
0.258064516129032	1.97	1.76	1.28	0.9631	0.7176	0.3515
0.290322580645161	1.857	1.737	1.209	0.9023	0.695	0.3492
0.32258064516129	1.773	1.613	1.2	0.8238	0.6751	0.347
0.354838709677419	1.719	1.576	1.183	0.804	0.6711	0.3407
0.387096774193548	1.701	1.564	1.174	0.7849	0.6598	0.3391
0.419354838709677	1.527	1.445	1.172	0.7525	0.6365	0.3364
0.451612903225806	1.515	1.43	1.171	0.7418	0.5929	0.3348
0.483870967741936	1.491	1.39	1.15	0.7183	0.5894	0.326
0.516129032258065	1.335	1.23	1.062	0.6722	0.5677	0.317
0.548387096774194	1.327	1.196	0.9885	0.6721	0.5599	0.3166
0.580645161290323	1.27	1.156	0.969	0.6611	0.5598	0.2912
0.612903225806452	1.255	1.134	0.8952	0.6276	0.555	0.2835
0.645161290322581	1.226	1.101	0.8859	0.6158	0.5415	0.2741
0.67741935483871	1.221	1.099	0.8632	0.561	0.5271	0.2642
0.709677419354839	1.064	0.9994	0.8178	0.5322	0.4765	0.2617
0.741935483870968	1.042	0.9931	0.8087	0.5247	0.4462	0.2601
0.774193548387097	0.9874	0.9224	0.7922	0.5196	0.4286	0.2538
0.806451612903226	0.9725	0.8811	0.6774	0.5113	0.4191	0.2335
0.838709677419355	0.8819	0.8225	0.6491	0.5018	0.4184	0.2292
0.870967741935484	0.8248	0.7729	0.6057	0.4521	0.3862	0.2217
0.903225806451613	0.8139	0.7515	0.5984	0.4342	0.386	0.1991
0.935483870967742	0.6954	0.6332	0.4448	0.3071	0.3133	0.1956
0.967741935483871	0.5586	0.5236	0.4208	0.2731	0.237	0.143

0.1 2.3929 2.2331 1.627 1.0365 0.90525 0.39459

Average of yearly averages: 0.307673333333333

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

Data used for this run:
Output File: MSSOYGR
Metfile: w13893.dvf
PRZM scenario: MSsoybeanC.txt
EXAMS environment file: pond298.exv
Chemical Name: Indoxacarb

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	527 g/mol		
Henry's Law Const.	henry	6E-10	atm-m^3/mol	
Vapor Pressure	vapr	1.9E-9	torr	
Solubility	sol	8	mg/L	
Kd	Kd	25	mg/L	
Koc	Koc	mg/L		
Photolysis half-life	kdp	3 days	Half-life	
Aerobic Aquatic Metabolism	kbacw	34 days	Halfife	
Anaerobic Aquatic Metabolism	kbacs	248 days	Halfife	
Aerobic Soil Metabolism	asm	156 days	Halfife	
Hydrolysis:	pH 7	36 days	Half-life	
Method:	CAM	2	integer	See PRZM manual
Incorporation Depth:	DEPI		cm	

Application Rate:	TAPP	0.1232	kg/ha	
Application Efficiency:	APPEFF	0.99	fraction	
Spray Drift	DRFT	0.01	fraction of application rate applied to pond	
Application Date	Date	15-7	dd/mm or dd/mmm or dd-mm or dd-mmm	
Interval 1	interval	5	days	Set to 0 or delete line for single app.
Interval 2	interval	5	days	Set to 0 or delete line for single app.
Interval 3	interval	5	days	Set to 0 or delete line for single app.
Record 17:	FILTRA			
IPSCND		1		
UPTKF				
Record 18:	PLVKRT			
PLDKRT		0.03086		
FEXTRC		0.5		
Flag for Index Res. Run	IR	Pond		
Flag for runoff calc.	RUNOFF	none	none, monthly or total(average of entire run)	

GENEEC for IN-JT333 and IN-MP819

```
RUN No.  1 FOR IN-JT333      ON  generic     * INPUT VALUES *
--------------------------------------------------------------------
 RATE (#/AC)  No.APPS &  SOIL  SOLUBIL  APPL TYPE NO-SPRAY INCORP
  ONE(MULT)   INTERVAL   Koc  (PPB )  (%DRIFT)  (FT)    (IN)
--------------------------------------------------------------------
.023(  .087)  4  5   5749.0 800.0  GRANUL(  .0)   .0   .0

FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)
--------------------------------------------------------------------
METABOLIC  DAYS UNTIL  HYDROLYSIS  PHOTOLYSIS  METABOLIC  COMBINED
 (FIELD)  RAIN/RUNOFF  (POND)   (POND-EFF)   (POND)    (POND)
--------------------------------------------------------------------
  96.00       2        N/A     .00-    .00   99.00    99.00



GENERIC EECs (IN NANOGRAMS/LITER (PPTr))    Version 2.0 Aug 1, 2001
--------------------------------------------------------------------
   PEAK     MAX 4 DAY    MAX 21 DAY   MAX 60 DAY   MAX 90 DAY
   GEEC     AVG GEEC      AVG GEEC     AVG GEEC     AVG GEEC
--------------------------------------------------------------------
  568.07    553.56       480.45       358.07       293.63

RUN No.  2 FOR IN-MP819      ON   generic     * INPUT VALUES *
--------------------------------------------------------------------
RATE (#/AC)  No.APPS &  SOIL  SOLUBIL  APPL TYPE  NO-SPRAY INCORP
 ONE(MULT)   INTERVAL    Kd   (PPM )   (%DRIFT)  ZONE(FT)  (IN)
--------------------------------------------------------------------
.002(  .008)  4  5   6356.0   1.4  GRANUL(  .0)   .0   .0
```

FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)

METABOLIC (FIELD)	DAYS UNTIL RAIN/RUNOFF	HYDROLYSIS (POND)	PHOTOLYSIS (POND-EFF)	METABOLIC (POND)	COMBINED (POND)
.00	2	N/A	.00- .00	.00	.00

GENERIC EECs (IN NANOGRAMS/LITER (PPTr)) Version 2.0 Aug 1, 2001

PEAK GEEC	MAX 4 DAY AVG GEEC	MAX 21 DAY AVG GEEC	MAX 60 DAY AVG GEEC	MAX 90 DAY AVG GEEC
16.06	8.63	1.88	.66	.44

APPENDIX C

TOXICITY DATA TABLES

Table C-1. Fish Acute Toxicity for DPX-MP062 and Degradates

Species	Chemical	%A.I.	LC50 mg/L (confidence interval)	MRID	Classification
Freshwater Species					
Rainbow trout	75% KN128 25% KN127	94.5	0.90 (0.71-1.46)	444772-10	core
Rainbow trout	JT333	98.7	0.024 (0.012-0.22)	444772-16	core
Rainbow trout	IN-KN127	99.8	0.394 (0.29-0.64)	444772-18	core
Rainbow trout	79% KN128 21% KN127	94.5	0.65	444772-09	core
Rainbow trout	29.3% KN128 10.3% KN127	39.6	0.71 (0.55-0.95)	444772-15	core for formulated product
Rainbow trout	14.7% KN128 4.3% KN127	19	>1.3	444772-13	supplemental
Rainbow trout	IN-MP819	98.6	>0.368	460225-01	supplemental
Bluegill sunfish	29.3% KN128 10.3% KN127	39.6	1.2 (0.9-1.6)	444772-14	core for formulated product
Carp	50% KN128 50% KN127	94.7	1.02 (0.88-1.16)	444879-01	supplemental
Carp	50% KN128 50% KN127	95	>0.32	444772-12	supplemental
Channel catfish	79% KN128 21% KN127	94.5	0.29 (0.25-0.39)	444772-11	core
Estuarine/Marine Species					
Sheepshead minnow	79% KN128 21% KN127	94.5	>0.37	444772-22	supplemental

Table C-2. Fish Chronic Exposure Toxicity for Indoxacarb

Species	Chemical	%A.I.	LOEL mg/L	NOEL mg/L	Effect	MRID	Classification
Freshwater Species							
Rainbow trout	79% KN128 21% KN127	94.5	0.25	0.15	survival and growth	444772-28	supplemental
Estuarine/Marine Species							
Sheepshead minnow	79% KN128 21% KN127	94.5	0.042	0.017	survival	444772-26	core

Table C-3 . Aquatic Invertebrate Acute Toxicity for Indoxacarb

Species	Chemical	%A.I.	EC50 mg/L (confidence interval)	MRID	Classification
Freshwater Species					
Daphnia carinata	50% KN128 50% KN127	94.7	2.94 (2.48-3.34)	444879-02	supplemental
Daphnia magna	JT333	98.7	>0.029	444772-21	supplemental
Daphnia magna	IN-MP819	98.6	0	460058-01	Core
Daphnia magna	79% KN128 21% KN127	94.5	0.60 (0.57-0.66)	444772-19	core
Estuarine/Marine Species					
Crassostrea virginica	79% KN128 21% KN127	94.5	0.203 (0.165-0.250)	444772-24	core
Mysidopsis bahia	79% KN128 21% KN127	94.5	0.0542 (0.0443-0.0657)	444772-23	core

Table C-4. Aquatic Invertebrate Chronic Exposure Toxicity for Indoxacarb

Species	Chemical	%A.I.	LOEL mg/L	NOEL mg/L	Effect	MRID	Classification
Freshwater Species							

Daphnia magna	79% KN128 21% KN127	95	0.19	0.075	survival	444772-25	core
Estuarine/Marine Species							
Mysidopsis bahia	79% KN128 21% KN127	94.5	0.0407	0.0184	Survival of first generation; # young/female; growth/weight	444772-27	core

Table C-5. Nontarget Aquatic Plant Toxicity (Tier I)

Species	Chemical	%A.I.	EC50 mg/L	MRID	Classification
Algal species *(Pseudokirchneriella subcapitata)*	75% KN128 25% KN127	94.5	>0.110	444917-02	Core
Algal species (*Anabaena flos-aquae*)	79% KN128 21% KN127	94.5	>1.93	444772-33	Core
Diatom (*Navicula pelliculosa*)	79% KN128 21% KN127	94.5	>1.68	444772-32	Core
Duckweed (*Lemna gibba*)	75% KN128 25%KN127	94.5	>0.084	444772-30	Supplemental

Table C-6. Nontarget Aquatic Plant Toxicity (Tier II)

Species	Chemical	%A.I.	EC50 mg/L	MRID	Classification
Marine diatom *(Skeletonema costatum)*	75% KN128 25% KN127	94.5	1.22 (1.12-1.32)	444772-31	Core

Table C-7. Avian Single Oral Dose Toxicity Data for DPX-MP062 and Degradates

Species	Chemical	%A.I.	LD50 mg/kg	MRID	Classification
Northern bobwhite	79% KN128 21% KN127	94.5	98	444772-01	core
Northern bobwhite	IN-JT333-20	98.7	1618	444772-03	core

Table C-8. Avian Subacute Dietary Toxicity for DPX-MP062

Species	Chemical	%A.I.	LC50 mg/kg-diet	MRID	Classification
Northern bobwhite	79% KN128 21% KN127	94.5	808	444917-01	core
Mallard duck	79% KN128 21% KN127	94.5	>5620	444772-04	core

Table C-9. Avian Reproductive Toxicity for DPX-MP062

Species	Chemical	%A.I.	LOEC mg/kg-diet	NOEC mg/kg-diet	Notes	MRID	Classification
Northern bobwhite	79% KN128 21% KN127	94.5	720	144	Adult female bodyweight; reduction in feed consumption	444772-05	core
Mallard duck	79% KN128 21% KN127	95	1000	200	Control problems	444772-08	supplemental
Mallard duck	79% KN128 21% KN127	94.5	>720	720	No effects at highest conc.	444772-06	core

Table C-10. Mammal Single Oral Dose Toxicity Data for DPX-MP062 and Degradates

Species	Chemical	LD50 mg/kg	Sex	MRID
Laboratory rat	79% KN128 21% KN127	>1000 268	male female	444771-13
Laboratory rat	99.7% KN128	843 179	male female	444771-15
Laboratory rat	98% KG433	>5000 174	male female	444771-16
Laboratory rat	98.7% IN-JT333-20	52 39	male female	444771-17

Table C-11. Mammal Developmental and Reproduction Toxicity Data for DPX-MP062

Species	Chemical	Study Type	LOEC mg/kg-diet	NOEC mg/kg-diet	Effects	MRID
Laboratory rat	50% KN128 50% KN127	15-day developmental dietary	40	20	reduced weight as maternal toxicity	444771-39
			80	40	reduced fetal weight, no other effects on development noted	
Laboratory rat	79% KN128 21% KN127	15-day developmental gavage	4 (mg/kg-bw)	2 (mg/kg-bw)	6% reduced fetal weight no malformations at highest dose	444771-38 & 444771-42
Laboratory rat	50% KN128 50% KN127	15-day developmental gavage	100 (mg/kg-bw)	10 (mg/kg-bw)	Maternal toxicity as mortality and weight loss reduced fetuses per litter	444771-40
Laboratory rat	50% KN128 50% KN127	2-generation reproduction dietary	60	20	LOEC based on hematological effects spleen and body weights	444771-44
				100	No reproduction effects at any dose	

Table C-12. Mammal Chronic/Subchronic Toxicity Data for DPX-MP062

Species	Chemical	Study Type	LOEC mg/kg-diet	NOEC mg/kg-diet	Effects	MRID
Laboratory rat	79% KN128 21% KN127	90-day dietary	50	10	Male hemolytic effects	444771-29
			10	none	Female hemolytic effects	
Laboratory rat	99% KN128	90-day dietary	50	20	Male hemolytic effects	444771-32
			20	8	Female hemolytic effects	
Laboratory rat	50% KN128 50% KN127	2-year dietary	60	40	Male transient hemolytic effects	444771-45
			40	20	Female transient hemolytic effects	

Table C-13. Non-Target Insect Toxicity Data

Species	Chemical	Study Type	Results	MRID	Classification
Honey bee *Apis mellifera*	50% KN128 50% KN127	dietary study	LC50 >1000 ppm	444772-35	core
Honey bee *Apis mellifera*	50% KN128 50% KN127	contact study	LD50 = 0.18 μg/bee	444772-34	core
Honey bee *Apis mellifera*	30% KN128 10% KN127	field application	DPX-MP062 at a rate of 133 g/ha caused significant mortality after 24 hour exposure (3 hours post application). At 167 g/ha had significant mortality after residues were 3, 8, and 24 hours.	444772-36	core

Table C-14. Acute Toxicity to Earthworm (*Eisenia foetida*)

Species	Chemical	Study Type	Results	MRID	Classification
Earthworm (*Eiseenia foetide*)	99.94% IN-MK368	acute toxicity study	LC50 = 552.9 mg/kg	457792-01	supplemental[a]
Earthworm (*Eiseenia foetide*)	95.4% IN-MK643	acute toxicity study	LC50 = 594.8 mg/kg	457442-02	supplemental[a]

[a] Performed under OECD guidelines. US EPA does not presently require acute toxicity testing with earthworms for pesticide registration

APPENDIX D

GENERALIZED EFED RISK ASSESSMENT METHOD
AND
CALCULATION TABLES FOR RISK QUOTIENTS

The risk assessment 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 acute and chronic exposure estimates by toxicity values.

RQ = EXPOSURE/TOXICITY

RQs are then compared to OPP's levels of concern (LOCs). These LOCs are used by OPP to assess 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 high -- potential for acute risk is high; regulatory action may be warranted in addition to restricted use classification, (2) acute restricted use -- the potential for acute risk is high, but may be mitigated through restricted use classification, (3) acute endangered species - endangered species may be adversely affected if actual exposure occurs, and (4) chronic risk - the potential for chronic risk is high, 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) LC50 (fish and birds), (2) LD50 (birds and mammals), (3) EC50 (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 exposure-related 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 exposure risks, although other values may be used when justified. Generally, the NOAEC is used as the ecotoxicity test value in assessing chronic exposure risks to fish and aquatic invertebrates.

Risk presumptions and the corresponding RQs and LOCs, are tabulated on the following page.

Risk Presumptions for Terrestrial Animals

Risk Presumption	RQ	LOC
Birds		
Acute High Risk	EEC[1]/LC50 or LD50/sqft[2] or LD50/day[3]	0.5
Acute Restricted Use	EEC/LC50 or LD50/sqft or LD50/day (or LD50 < 50 mg/kg)	0.2
Acute Endangered Species	EEC/LC50 or LD50/sqft or LD50/day	0.1
Chronic Risk	EEC/NOEC	1

[1] abbreviation for Estimated Environmental Concentration (ppm) on avian/mammalian food items

[2] $\frac{mg/ft^2}{LD50 * \text{wt. of bird}}$ [3] $\frac{\text{mg of toxicant consumed/day}}{LD50 * \text{wt. of bird}}$

Risk Presumptions for Aquatic Animals

Risk Presumption	RQ	LOC
Acute High Risk	EEC[1]/LC50 or EC50	0.5
Acute Restricted Use	EEC/LC50 or EC50	0.1
Acute Endangered Species	EEC/LC50 or EC50	0.05
Chronic Risk	EEC/MATC or NOEC	1

[1] EEC = (ppm or ppb) in water

Table D-1 . Aquatic Organism Risk Quotient Calculations for Multiple Aerial Applications

Chemical	Acute Toxicity Threshold (µg/L)	Chronic Toxicity Threshold (µg/L)	Peak Water Concentration (µg/L)	Acute RQ	21-day Average Water Concentration (µg/L)	60-day Average Water Concentration (µg/L)	Chronic RQ
Freshwater Fish							
KN 128	290.000	150.000	8.500	0.029	--	3.400	0.02
JT333	24.000	5.538	0.570	0.024		0.360	0.07
IN-MP819	>368.000	84.900	0.016	< 0.00004		0.001	0.00001
Freshwater Invertebrates							
KN 128	600.000	75.000	8.500	0.014	5.700	--	0.08
JT333	29.000	3.625	0.570	0.020	0.481	--	0.13
IN-MP819	64.000	8.000	0.016	0.0003	0.002		0.0003
Estuarine Fish							
KN 128	370.000	17.000	8.500	0.023	--	3.400	0.20
JT333	13.662	0.628	0.570	0.042	--	0.360	0.57
IN-MP819	209.500	5.500	0.016	0.0002		0.001	0.0002
Estuarine Invertebrates							
KN 128	54.200	18.400	8.500	0.157	5.700	--	0.31
JT333	2.620	0.889	0.570	0.218	0.481	--	0.54
IN-MP819	5.800	2.000	0.016	0.0028	0.002		0.001

Risk Presumption	Level of Concern
Acute High Risk	0.5

Acute Restricted Use	0.1
Acute Endangered	0.05
Chronic Risk	1

Table D-2. Aquatic Plant Risk Quotient Calculations for Multiple Aerial Applications

Plant type	Toxicity Threshold (µg/L)	Peak Water Concentration (µg/L)	RQ
Freshwater Aquatic Plants	>84	8.500	<0.10
Estuarine Aquatic Plants	1,220	8.500	<0.007

Table D-3. Avian Risk Quotient Calculations

Wildlife Food Item	Wildlife Food Item Residue Single Application (mg/kg-diet)	Wildlife Food Item Residue Multiple Applications (mg/kg-diet)	Acute Threshold (mg/kg-diet)	Chronic Threshold (mg/kg-diet)	Single Application Acute RQ	Single Application Chronic RQ	Multiple Application Acute RQ	Multiple Application Chronic RQ
Cotton, grape, soybean, peanut scenario								
short grass	35	113	808	144	0.043	0.244	0.140	0.784
tall grass	16	52			0.020	0.112	0.064	0.359
broadleaf forage/ small insects	20	63			0.024	0.137	0.079	0.441
fruit,pods,seeds, large insects	2	7			0.003	0.015	0.009	0.049
Apples and Pears Scenario								
short grass	35	104	808	144	0.043	0.244	0.129	0.725
tall grass	16	48			0.020	0.112	0.059	0.332
broadleaf forage/ small insects	20	59			0.024	0.137	0.073	0.408
fruit,pods,seeds, large insects	2	7			0.003	0.015	0.008	0.045
Alfalfa scenario								
short grass	35	41	808	144	0.043	0.243	0.051	0.285
tall grass	16	19			0.020	0 111	0.024	0.132
broadleaf forage/ small insects	20	23			0.025	0.139	0.028	0.160
fruit,pods,seeds, large insects	2	3			0.002	0.014	0.004	0.021
Corn, Brassica, Lettuce Scenario								
short grass	21	72	808	144	0.026	0.144	0.089	0.502
tall grass	10	33			0.012	0.066	0.041	0.230
broadleaf forage/ small insects	12	41			0.014	0.081	0.050	0.282
fruit,pods,seeds, large insects	1	5			0.002	0.009	0.006	0.031
Tomato and Pepper Scenario								
short grass	21	66	808	144	0.026	0.144	0.082	0.462
tall grass	10	30			0.012	0.066	0.038	0.212
broadleaf forage/ small insects	12	37			0.014	0.081	0.046	0.260

fruit,pods,seeds, large insects	1	4			0.002	0.009	0.005	0.029

Risk Presumption	Level of Concern
Acute High Risk	0.5
Acute Restricted Use	0.2
Acute Endangered Species	0.1
Chronic Risk	1

Table D-4. Herbivorous/Insectivorous Mammal Acute Risk Quotient Calculations

Herbovore/ Insectivore Weight Class (g)	Fraction Bodyweight Consumed Daily	Acute Threshold (mg/kg-bw)	Single App. Short Grass Residue (mg/kg)	Multiple App. Short Grass Residue (mg/kg)	Single App. Forage/Small Insect Residue (mg/kg)	Multiple App. Forage/Small Insect Residue (mg/kg)	Single App. Large Insect Residue (mg/kg)	Multiple App. Large Insect Residue (mg/kg)	Single App. Short Grass RQ	Multiple App. Short Grass RQ	Single App. Forage/Small Insect RQ	Multiple app. Forage/Small Insect RQ	Single App. Large Insect RQ	Multiple App. Large Insect RQ
Cotton, grape, soybean, peanut scenario														
15	0.95	179	26.40	85.03	14.85	47.83	1.65	5.31	0.140	0.451	0.079	0.254	0.009	0.028
35	0.66								0.097	0.314	0.055	0.176	0.006	0.020
1000	0.15								0.022	0.071	0.012	0.040	0.001	0.004
Apples and Pears Scenario														
15	0.95	179	26.40	78.62	14.85	44.22	1.65	4.91	0.140	0.417	0.079	0.254	0.009	0.028
35	0.66								0.097	0.290	0.055	0.176	0.006	0.020
1000	0.15								0.022	0.066	0.012	0.040	0.001	0.004
Alfalfa Scenario														
15	0.95	179	26.40	30.54	14.85	17.18	1.65	1.91	0.140	0.162	0.079	0.091	0.009	0.010
35	0.66								0.097	0.113	0.055	0.063	0.006	0.007
1000	0.15								0.022	0.026	0.012	0.014	0.001	0.002
Corn, Brassica, Lettuce Scenario														
15	0.95	179	15.60	54.60	8.78	30.71	0.98	3.41	0.083	0.290	0.047	0.163	0.005	0.018
35	0.66								0.058	0.201	0.032	0.113	0.004	0.013
1000	0.15								0.013	0.046	0.007	0.026	0.001	0.003
Tomato and Pepper Scenario														

15	0.95	179	15.60	50.25	8.78	28.26	0.98	3.14	0.083	0.267	0.047	0.163	0.005	0.018
35	0.66								0.058	0.185	0.032	0.113	0.004	0.013
1000	0.15								0.013	0.042	0.007	0.026	0.001	0.003

RQ = Residue/(Toxicity Threshold/Fraction Bodyweight Consumed)

Risk Presumption	**RQ Level of Concern**
Acute High Risk	**0.5**
Acute Restricted Use	**0.2**
Acute Endangered Species	**0.1**

Table D-5. Granivorous Mammal Acute Risk Quotient Calculations

Granivore Weight Class (g)	Fraction Bodyweight Consumed Daily	Acute Threshold (mg/kg-bw)	Single App. Seed Residue (mg/kg)	Multiple App. Seed Residue (mg/kg)	Single App. Seed RQ	Multiple App. Seed RQ
Cotton, grape, soybean, peanut Scenario						
15	0.21	179	1.65	5.31	0.0019	0.006
35	0.15				0.0014	0.004
1000	0.03				0.0003	0.001
Apples and Pears Scenario						
15	0.21	179	1.65	4.91	0.0019	0.006
35	0.15				0.0014	0.004
1000	0.03				0.0003	0.001
Alfalfa Scenario						
15	0.21	179	1.65	1.91	0.0019	0.002
35	0.15				0.0014	0.002
1000	0.03				0.0003	0.0003
Corn, Brassica, Lettuce Scenario						
15	0.21	179	0.98	3.41	0.0011	0.004
35	0.15				0.0008	0.003
1000	0.03				0.0002	0.001
Tomato and Pepper Scenario						
15	0.21	179	0.98	3.14	0.0011	0.004
35	0.15				0.0008	0.003
1000	0.03				0.0002	0.001
RQ = Residue/(Toxicity Threshold/Fraction Bodyweight Consumed)						

Risk Presumption	RQ Level of Concern
Acute High Risk	0.5
Acute Restricted Use	0.2
Acute Endangered Species	0.1

Table D-6. Mammal Reproduction Risk Quotient Calculations

Wildlife Food Item	Wildlife Food Item Residue Single Application (mg/kg-diet)	Wildlife Food Item Residue Multiple Applications	Chronic Threshold (mg/kg-diet)	Single Application Reproduction RQ	Multiple Application Reproduction RQ
Cotton, grape, soybean, peanut scenario					
short grass	35	113	40.00	0.88	2.82
tall grass	16	52		0.40	1.29
broadleaf forage/ small insects	20	63		0.49	1.59
fruit,pods,seeds, large	2	7		0.05	0.18
Apples and Pears Scenario					
short grass	35	104	40.00	0.88	2.61
tall grass	16	48		0.40	1.20
broadleaf forage/ small insects	20	59		0.49	1.47
fruit,pods,seeds, large	2	7		0.05	0.16
Alfalfa Scenario					
short grass	35	41	40.00	0.88	1.03
tall grass	16	19		0.40	0.48
broadleaf forage/ small insects	20	23		0.49	0.58
fruit,pods,seeds, large	2	3		0.05	0.08
Corn, Brassica, Lettuce Scenario					
short grass	21	72	40.00	0.52	1.81
tall grass	10	33		0.24	0.83
broadleaf forage/ small insects	12	41		0.29	1.02
fruit,pods,seeds, large	1	5		0.03	0.11
Tomato and Pepper Scenario					
short grass	21	66	40.00	0.52	1.66
tall grass	10	30		0.24	0.76
broadleaf forage/ small insects	12	37		0.29	0.93

fruit,pods,seeds, large	1	4		0.03	0.10

RQ = Residue/Toxicity Threshold

Risk Presumption	**RQ Level of Concern**
Chronic Risk	1

Table D-7. Mammal Hemolytic Risk Quotient Calculations

Wildlife Food Item	Single Application Wildlife Food Item Residue (mg/kg-diet)	Multiple Application Wildlife Food Item Residue (mg/kg-diet)	Chronic Threshold (mg/kg-diet)	Single Application Hemolytic RQ	Multiple Application Hemolytic RQ
Cotton, grape, soybean, peanut Scenario					
short grass	35	113	8.00	4.39	14.11
tall grass	16	52		2.01	6.47
broadleaf forage/ small insects	20	63		2.47	7.94
fruit,pods,seeds, large insects	2	7		0.27	0.88
Apples and Pears Scenario					
short grass	35	104	8.00	4.39	13.04
tall grass	16	48		2.01	5.98
broadleaf forage/ small insects	20	59		2.47	7.34
fruit,pods,seeds, large insects	2	7		0.27	0.82
Alfalfa Scenario					
short grass	35	41	8.00	4.39	5.13
tall grass	16	19		2.01	2.38
broadleaf forage/ small insects	20	23		2.47	2.88
fruit,pods,seeds, large insects	2	3		0.27	0.38
Corn, Brassica, Lettuce Scenario					
short grass	21	72	8.00	2.59	9.03
tall grass	10	33		1.19	4.14
broadleaf forage/ small insects	12	41		1.46	5.08
fruit,pods,seeds, large insects	1	5		0.16	0.56
Tomato and Pepper Scenario					
short grass	21	66	8.00	2.59	8.31
tall grass	10	30		1.19	3.81
broadleaf forage/ small insects	12	37		1.46	4.67
fruit,pods,seeds, large insects	1	4		0.16	0.52

RQ = Residue/Toxicity Threshold

Risk Presumption	**RQ Level of Concern**
Chronic Risk	1

APPENDIX E

LISTED SPECIES FROM LOCATES DATABASE

Species Details by State for Preliminary Assessment

Alfalfa hay (1), Alfalfa seed (2), Apples (5), Broccoli (22), Corn cut for dry fodder, hogged or graze (40), Corn for grain or seed (41), Corn for silage or green chop (42), Cotton (43), Grapes (76), Peppers, hot (92), Lettuce and romaine (105), Peanuts (143), Pears (144), Corn, pop (153), Soybeans (176), Corn, sweet, for seed (189), Corn, sweet (190), Peppers, sweet (191), Tomatoes (201), Alfalfa, all (300)

Minimum of 10 Acres.

Alabama (88species)

ACORNSHELL, SOUTHERN	Unionidae	Critical Habitat	Clam
AMPHIANTHUS, LITTLE	Scrophulariaceae	Critical Habitat	Plant
BARBARA'S BUTTONS, MOHR'S	Asteraceae	Critical Habitat	Plant
BAT, GRAY	Vespertilionidae	Critical Habitat	Mammal
BAT, INDIANA	Vespertilionidae	Critical Habitat	Mammal
BLADDERPOD, LYRATE	Brassicaceae	Critical Habitat	Plant
CAMPELOMA, SLENDER	Viviparidae	Critical Habitat	Snail
CAVEFISH, ALABAMA	Amblyopsidae	Critical Habitat	Fish
CHUB, SPOTFIN	Cyprinidae	Critical Habitat	Fish
CLUBSHELL, OVATE	Unionidae	Critical Habitat	Clam
CLUBSHELL, SOUTHERN	Unionidae	Critical Habitat	Clam
COMBSHELL, CUMBERLAND	Unionidae	Critical Habitat	Clam
COMBSHELL, SOUTHERN (=PENITENT MUSSEL)	Unionidae	Critical Habitat	Clam
COMBSHELL, UPLAND	Unionidae	Critical Habitat	Clam
DARTER, BOULDER	Percidae	Critical Habitat	Fish
DARTER, GOLDLINE	Percidae	Critical Habitat	Fish
DARTER, SLACKWATER	Percidae	Critical Habitat	Fish
DARTER, SNAIL	Percidae	Critical Habitat	Fish
DARTER, VERMILION	Percidae	Critical Habitat	Fish
DARTER, WATERCRESS	Percidae	Critical Habitat	Fish
EAGLE, BALD	Accipitridae	Critical Habitat	Bird
ELIMIA, LACY	Pleuroceridae	Critical Habitat	Snail
FERN, ALABAMA STREAK-SORUS	Thelypteridaceae	Critical Habitat	Plant
FERN, AMERICAN HART'S-TONGUE	Aspleniaceae	Critical Habitat	Plant

Species Details by State for Preliminary Assessment

Alfalfa hay (1), Alfalfa seed (2), Apples (5), Broccoli (22), Corn cut for dry fodder, hogged or graze (40), Corn for grain or seed (41), Corn for silage or green chop (42), Cotton (43), Grapes (76), Peppers, hot (92), Lettuce and romaine (105), Peanuts (143), Pears (144), Corn, pop (153), Soybeans (176), Corn, sweet, for seed (189), Corn, sweet (190), Peppers, sweet (191), Tomatoes (201), Alfalfa, all (300)

Minimum of 10 Acres.

GRASS, TENNESSEE YELLOW-EYED	Xyridaceae	Critical Habitat	Plant
HARPERELLA	Apiaceae	Critical Habitat	Plant
HEELSPLITTER, INFLATED	Unionidae	Critical Habitat	Clam
KIDNEYSHELL, TRIANGULAR	Unionidae	Critical Habitat	Clam
LEATHER-FLOWER, ALABAMA	Ranunculaceae	Critical Habitat	Plant
LEATHER-FLOWER, MOREFIELD'S	Ranunculaceae	Critical Habitat	Plant
LIOPLAX, CYLINDRICAL	Viviparidae	Critical Habitat	Snail
MOCCASINSHELL, ALABAMA	Unionidae	Critical Habitat	Clam
MOCCASINSHELL, COOSA	Unionidae	Critical Habitat	Clam
MOUSE, ALABAMA BEACH	Cricetidae	Critical Habitat	Mammal
MOUSE, PERDIDO KEY BEACH	Cricetidae	Critical Habitat	Mammal
MUCKET, ORANGE-NACRE	Unionidae	Critical Habitat	Clam
MUSSEL, RING PINK (=GOLF STICK PEARLY)	Unionidae	Critical Habitat	Clam
PEARLYMUSSEL, ALABAMA LAMP	Unionidae	Critical Habitat	Clam
PEARLYMUSSEL, CRACKING	Unionidae	Critical Habitat	Clam
PEARLYMUSSEL, CUMBERLAND MONKEYFACE	Unionidae	Critical Habitat	Clam
PEARLYMUSSEL, ORANGE-FOOTED	Unionidae	Critical Habitat	Clam
PEARLYMUSSEL, PALE LILLIPUT	Unionidae	Critical Habitat	Clam
PEARLYMUSSEL, PINK MUCKET	Unionidae	Critical Habitat	Clam
PEARLYMUSSEL, TURGID-BLOSSOM	Unionidae	Critical Habitat	Clam
PEARLYMUSSEL, WHITE WARTYBACK	Unionidae	Critical Habitat	Clam
PEBBLESNAIL, FLAT	Hydrobiidae	Critical Habitat	Snail
PIGTOE, DARK	Unionidae	Critical Habitat	Clam
PIGTOE, FINE-RAYED	Unionidae	Critical Habitat	Clam
PIGTOE, FLAT (=MARSHALL'S MUSSEL)	Unionidae	Critical Habitat	Clam
PIGTOE, HEAVY (=JUDGE TAIT'S MUSSEL)	Unionidae	Critical Habitat	Clam

Species Details by State for Preliminary Assessment

Alfalfa hay (1), Alfalfa seed (2), Apples (5), Broccoli (22), Corn cut for dry fodder, hogged or graze (40), Corn for grain or seed (41), Corn for silage or green chop (42), Cotton (43), Grapes (76), Peppers, hot (92), Lettuce and romaine (105), Peanuts (143), Pears (144), Corn, pop (153), Soybeans (176), Corn, sweet, for seed (189), Corn, sweet (190), Peppers, sweet (191), Tomatoes (201), Alfalfa, all (300)

Minimum of 10 Acres.

PIGTOE, ROUGH	Unionidae	Critical Habitat	Clam
PIGTOE, SHINY	Unionidae	Critical Habitat	Clam
PIGTOE, SOUTHERN	Unionidae	Critical Habitat	Clam
PITCHER-PLANT, ALABAMA CANEBRAKE	Sarraceniaceae	Critical Habitat	Plant
PITCHER-PLANT, GREEN	Sarraceniaceae	Critical Habitat	Plant
PLOVER, PIPING	Charadriidae	Critical Habitat	Bird
POCKETBOOK, FINE-LINED	Unionidae	Critical Habitat	Clam
POCKETBOOK, SHINY-RAYED	Unionidae	Critical Habitat	Clam
POTATO-BEAN, PRICE'S	Fabaceae	Critical Habitat	Plant
PRAIRIE-CLOVER, LEAFY	Fabaceae	Critical Habitat	Plant
QUILLWORT, LOUISIANA	Isoetaceae	Critical Habitat	Plant
RIVERSNAIL, ANTHONY'S	Pleuroceridae	Critical Habitat	Snail
ROCKSNAIL, PAINTED	Pleuroceridae	Critical Habitat	Snail
ROCKSNAIL, PLICATE	Pleuroceridae	Critical Habitat	Snail
ROCKSNAIL, ROUND	Pleuroceridae	Critical Habitat	Snail
SALAMANDER, FLATWOODS	Ambystomatidae	Critical Habitat	Amphibian
SALAMANDER, RED HILLS	Plethodontidae	Critical Habitat	Amphibian
SCULPIN, PYGMY	Cottidae	Critical Habitat	Fish
SHINER, BLUE	Cyprinidae	Critical Habitat	Fish
SHINER, CAHABA	Cyprinidae	Critical Habitat	Fish
SHINER, PALEZONE	Cyprinidae	Critical Habitat	Fish
SHRIMP, ALABAMA CAVE	Atyidae	Critical Habitat	Crustacean
SNAIL, ARMORED	Hydrobiidae	Critical Habitat	Snail
SNAIL, TULOTOMA	Viviparidae	Critical Habitat	Snail
SNAKE, EASTERN INDIGO	Colubridae	Critical Habitat	Reptile
STIRRUP SHELL	Unionidae	Critical Habitat	Clam

Species Details by State for Preliminary Assessment

Alfalfa hay (1), Alfalfa seed (2), Apples (5), Broccoli (22), Corn cut for dry fodder, hogged or graze (40), Corn for grain or seed (41), Corn for silage or green chop (42), Cotton (43), Grapes (76), Peppers, hot (92), Lettuce and romaine (105), Peanuts (143), Pears (144), Corn, pop (153), Soybeans (176), Corn, sweet, for seed (189), Corn, sweet (190), Peppers, sweet (191), Tomatoes (201), Alfalfa, all (300)

Minimum of 10 Acres.

STORK, WOOD	Ciconiidae	Critical Habitat	Bird
STURGEON, ALABAMA	Acipenseridae	Critical Habitat	Fish
STURGEON, GULF	Acipenseridae	Critical Habitat	Fish
SUNFLOWER, EGGERT'S	Asteraceae	Critical Habitat	Plant
TORTOISE, GOPHER	Testudinidae	Critical Habitat	Reptile
TREEFROG, PINE BARRENS	Acanthaceae	Critical Habitat	Amphibian
TRILLIUM, RELICT	Liliaceae	Critical Habitat	Plant
TURTLE, ALABAMA RED-BELLIED	Emydidae	Critical Habitat	Reptile
TURTLE, FLATTENED MUSK	Kinosternidae	Critical Habitat	Reptile
TURTLE, LOGGERHEAD SEA	Cheloniidae	Critical Habitat	Reptile
WATER-PLANTAIN, KRAL'S	Alismataceae	Critical Habitat	Plant
WOODPECKER, RED-COCKADED	Picidae	Critical Habitat	Bird

Arizona (59species)

AGAVE, ARIZONA	Agavaceae	Critical Habitat	Plant
AMBERSNAIL, KANAB	Succineidae	Critical Habitat	Snail
BAT, LESSER (=SANBORN'S) LONG-NOSED	Phyllostomidae	Critical Habitat	Mammal
BLUE-STAR, KEARNEY'S	Apocynaceae	Critical Habitat	Plant
BOBWHITE, MASKED	Phasianidae	Critical Habitat	Bird
CACTUS, ARIZONA HEDGEHOG	Cactaceae	Critical Habitat	Plant
CACTUS, BRADY PINCUSHION	Cactaceae	Critical Habitat	Plant
CACTUS, COCHISE PINCUSHION	Cactaceae	Critical Habitat	Plant
CACTUS, NICHOL'S TURK'S HEAD	Cactaceae	Critical Habitat	Plant
CACTUS, PEEBLES NAVAJO	Cactaceae	Critical Habitat	Plant
CACTUS, PIMA PINEAPPLE	Cactaceae	Critical Habitat	Plant
CACTUS, SILER PINCUSHION	Cactaceae	Critical Habitat	Plant

Species Details by State for Preliminary Assessment

Alfalfa hay (1), Alfalfa seed (2), Apples (5), Broccoli (22), Corn cut for dry fodder, hogged or graze (40), Corn for grain or seed (41), Corn for silage or green chop (42), Cotton (43), Grapes (76), Peppers, hot (92), Lettuce and romaine (105), Peanuts (143), Pears (144), Corn, pop (153), Soybeans (176), Corn, sweet, for seed (189), Corn, sweet (190), Peppers, sweet (191), Tomatoes (201), Alfalfa, all (300)

Minimum of 10 Acres.

CATFISH, YAQUI	Ictaluridae	Critical Habitat	Fish
CHUB, BONYTAIL	Cyprinidae	Critical Habitat	Fish
Chub, Gila	Cyprinidae	Critical Habitat	Fish
CHUB, HUMPBACK	Cyprinidae	Critical Habitat	Fish
CHUB, SONORA	Cyprinidae	Critical Habitat	Fish
CHUB, VIRGIN RIVER	Cyprinidae	Critical Habitat	Fish
CHUB, YAQUI	Cyprinidae	Critical Habitat	Fish
CLIFFROSE, ARIZONA	Rosaceae	Critical Habitat	Plant
CYCLADENIA, JONES	Apocynaceae	Critical Habitat	Plant
DOCK, CHIRICAHUA	Polygonaceae	Critical Habitat	Plant
EAGLE, BALD	Accipitridae	Critical Habitat	Bird
FALCON, NORTHERN APLOMADO	Falconidae	Critical Habitat	Bird
FLEABANE, ZUNI	Asteraceae	Critical Habitat	Plant
FLYCATCHER, SOUTHWESTERN WILLOW	Tyrannidae	Critical Habitat	Bird
FROG, CHIRICAHUA LEOPARD	Ranidae	Critical Habitat	Amphibian
GROUNDSEL, SAN FRANCISCO PEAKS	Asteraceae	Critical Habitat	Plant
JAGUAR	Felidae	Critical Habitat	Mammal
Jaguarundi, Sinaloan	Felidae	Critical Habitat	Mammal
LADIES'-TRESSES, CANELO HILLS	Orchidaceae	Critical Habitat	Plant
MILK-VETCH, HOLMGREN	Fabaceae	Critical Habitat	Plant
MILK-VETCH, SENTRY	Fabaceae	Critical Habitat	Plant
MILKWEED, WELSH'S	Asclepiadaceae	Critical Habitat	Plant
MINNOW, LOACH	Cyprinidae	Critical Habitat	Fish
OCELOT	Felidae	Critical Habitat	Mammal
OWL, MEXICAN SPOTTED	Strigidae	Critical Habitat	Bird
PELICAN, BROWN	Pelicanidae	Critical Habitat	Bird

Species Details by State for Preliminary Assessment

Alfalfa hay (1), Alfalfa seed (2), Apples (5), Broccoli (22), Corn cut for dry fodder, hogged or graze (40), Corn for grain or seed (41), Corn for silage or green chop (42), Cotton (43), Grapes (76), Peppers, hot (92), Lettuce and romaine (105), Peanuts (143), Pears (144), Corn, pop (153), Soybeans (176), Corn, sweet, for seed (189), Corn, sweet (190), Peppers, sweet (191), Tomatoes (201), Alfalfa, all (300)

Minimum of 10 Acres.

PLOVER, MOUNTAIN	Charadriidae	Critical Habitat	Bird
PRONGHORN, SONORAN	Antilocapridae	Critical Habitat	Mammal
PUPFISH, DESERT	Cyprinodontidae	Critical Habitat	Fish
PYGMY-OWL, CACTUS FERRUGINOUS	Strigidae	Critical Habitat	Bird
RAIL, YUMA CLAPPER	Rallidae	Critical Habitat	Bird
RATTLESNAKE, NEW MEXICAN RIDGE-NOSED	Crotalidae	Critical Habitat	Reptile
SALAMANDER, SONORA TIGER	Ambystomatidae	Critical Habitat	Amphibian
SEDGE, NAVAJO	Cyperaceae	Critical Habitat	Plant
SHINER, BEAUTIFUL	Cyprinidae	Critical Habitat	Fish
SPIKEDACE	Cyprinidae	Critical Habitat	Fish
SPINEDACE, LITTLE COLORADO	Cyprinidae	Critical Habitat	Fish
SQUAWFISH, COLORADO	Cyprinidae	Critical Habitat	Fish
SQUIRREL, MOUNT GRAHAM RED	Sciuridae	Critical Habitat	Mammal
SUCKER, RAZORBACK	Catostomidae	Critical Habitat	Fish
TOPMINNOW, GILA (YAQUI)	Poeciliidae	Critical Habitat	Fish
TORTOISE, DESERT	Testudinidae	Critical Habitat	Reptile
TROUT, APACHE	Salmonidae	Critical Habitat	Fish
TROUT, GILA	Salmonidae	Critical Habitat	Fish
UMBEL, HUACHUCA WATER	Apiaceae	Critical Habitat	Plant
VOLE, HUALAPAI MEXICAN	Cricetidae	Critical Habitat	Mammal
WOLF, GRAY	Canidae	Critical Habitat	Mammal

Arkansas (23species)

BAT, GRAY	Vespertilionidae	Critical Habitat	Mammal
BAT, INDIANA	Vespertilionidae	Critical Habitat	Mammal
BAT, OZARK BIG-EARED	Vespertilionidae	Critical Habitat	Mammal

BEETLE, AMERICAN BURYING	Silphidae	Critical Habitat	Insect
BLADDERPOD, MISSOURI	Brassicaceae	Critical Habitat	Plant
CAVEFISH, OZARK	Amblyopsidae	Critical Habitat	Fish
CRAYFISH, CAVE (CAMBARUS ACULABRUM)	Cambaridae	Critical Habitat	Crustacean
CRAYFISH, CAVE (CAMBARUS ZOPHONASTES)	Cambaridae	Critical Habitat	Crustacean
DARTER, LEOPARD	Percidae	Critical Habitat	Fish
EAGLE, BALD	Accipitridae	Critical Habitat	Bird
FATMUCKET, ARKANSAS	Unionidae	Critical Habitat	Clam
GEOCARPON MINIMUM	Caryophyllaceae	Critical Habitat	Plant
HARPERELLA	Apiaceae	Critical Habitat	Plant
MUSSEL, SCALESHELL	Unionidae	Critical Habitat	Clam
PEARLYMUSSEL, PINK MUCKET	Unionidae	Critical Habitat	Clam
POCKETBOOK, FAT	Unionidae	Critical Habitat	Clam
POCKETBOOK, SPECKLED	Unionidae	Critical Habitat	Clam
PONDBERRY	Lauraceae	Critical Habitat	Plant
ROCK-POCKETBOOK, OUACHITA (=WHEELER'S PM)	Unionidae	Critical Habitat	Clam
SHAGREEN, MAGAZINE MOUNTAIN	Polygyridae	Critical Habitat	Snail
STURGEON, PALLID	Acipenseridae	Critical Habitat	Fish
TERN, INTERIOR (POPULATION) LEAST	Laridae	Critical Habitat	Bird
WOODPECKER, RED-COCKADED	Picidae	Critical Habitat	Bird

California (292species)

ADOBE SUNBURST, SAN JOAQUIN	Asteraceae	Critical Habitat	Plant
ALLOCARYA, CALISTOGA	Boraginaceae	Critical Habitat	Plant
ALOPECURUS, SONOMA	Poaceae	Critical Habitat	Plant
AMBROSIA, SAN DIEGO	Asteraceae	Critical Habitat	Plant

Species Details by State for Preliminary Assessment

Alfalfa hay (1), Alfalfa seed (2), Apples (5), Broccoli (22), Corn cut for dry fodder, hogged or graze (40), Corn for grain or seed (41), Corn for silage or green chop (42), Cotton (43), Grapes (76), Peppers, hot (92), Lettuce and romaine (105), Peanuts (143), Pears (144), Corn, pop (153), Soybeans (176), Corn, sweet, for seed (189), Corn, sweet (190), Peppers, sweet (191), Tomatoes (201), Alfalfa, all (300)

Minimum of 10 Acres.

Amole, Camatta Canyon	Liliaceae	Critical Habitat	Plant
AMOLE, PURPLE	Liliaceae	Critical Habitat	Plant
ASTER, DEL MAR SAND	Asteraceae	Critical Habitat	Plant
BACCHARIS, ENCINITAS	Asteraceae	Critical Habitat	Plant
BARBERRY, ISLAND	Berberidaceae	Critical Habitat	Plant
BARBERRY, NEVIN'S	Berberidaceae	Critical Habitat	Plant
BEDSTRAW, EL DORADO	Rubiaceae	Critical Habitat	Plant
BEDSTRAW, ISLAND	Rubiaceae	Critical Habitat	Plant
BEETLE, DELTA GREEN GROUND	Carabidae	Critical Habitat	Insect
BEETLE, MOUNT HERMON JUNE	Scarabaeidae	Critical Habitat	Insect
BEETLE, OHLONE TIGER	Cicindelidae	Critical Habitat	Insect
BEETLE, VALLEY ELDERBERRY LONGHORN	Cesambycidae	Critical Habitat	Insect
BIRD'S-BEAK, PALMATE-BRACTED	Scrophulariaceae	Critical Habitat	Plant
BIRD'S-BEAK, PENNELL'S	Scrophulariaceae	Critical Habitat	Plant
BIRD'S-BEAK, SALT MARSH	Scrophulariaceae	Critical Habitat	Plant
BIRD'S-BEAK, SOFT	Scrophulariaceae	Critical Habitat	Plant
BLADDERPOD, SAN BERNARDINO MOUNTAINS	Brassicaceae	Critical Habitat	Plant
BLUECURLS, HIDDEN LAKE	Lamiaceae	Critical Habitat	Plant
BLUEGRASS, NAPA	Poaceae	Critical Habitat	Plant
BLUEGRASS, SAN BERNARDINO	Poaceae	Critical Habitat	Plant
BRODIAEA, CHINESE CAMP	Liliaceae	Critical Habitat	Plant
BRODIAEA, THREAD-LEAVED	Liliaceae	Critical Habitat	Plant
BROOM, SAN CLEMENTE ISLAND	Fabaceae	Critical Habitat	Plant
BUCKWHEAT, CUSHENBURY	Polygonaceae	Critical Habitat	Plant
BUCKWHEAT, IONE (IRISH HILL)	Polygonaceae	Critical Habitat	Plant
BUCKWHEAT, SOUTHERN MOUNTAIN WILD	Polygonaceae	Critical Habitat	Plant

Species Details by State for Preliminary Assessment

Alfalfa hay (1), Alfalfa seed (2), Apples (5), Broccoli (22), Corn cut for dry fodder, hogged or graze (40), Corn for grain or seed (41), Corn for silage or green chop (42), Cotton (43), Grapes (76), Peppers, hot (92), Lettuce and romaine (105), Peanuts (143), Pears (144), Corn, pop (153), Soybeans (176), Corn, sweet, for seed (189), Corn, sweet (190), Peppers, sweet (191), Tomatoes (201), Alfalfa, all (300)

Minimum of 10 Acres.

BUSH-MALLOW, SAN CLEMENTE ISLAND	Malvaceae	Critical Habitat	Plant
BUSHMALLOW, SANTA CRUZ ISLAND	Malvaceae	Critical Habitat	Plant
BUTTERFLY, BAY CHECKERSPOT	Nymphalidae	Critical Habitat	Insect
BUTTERFLY, BEHREN'S SILVERSPOT	Nymphalidae	Critical Habitat	Insect
BUTTERFLY, CALLIPPE SILVERSPOT	Nymphalidae	Critical Habitat	Insect
BUTTERFLY, EL SEGUNDO BLUE	Lycaenidae	Critical Habitat	Insect
BUTTERFLY, LANGE'S METALMARK	Lycaenidae	Critical Habitat	Insect
BUTTERFLY, LOTIS BLUE	Lycaenidae	Critical Habitat	Insect
BUTTERFLY, MISSION BLUE	Lycaenidae	Critical Habitat	Insect
BUTTERFLY, MYRTLE'S SILVERSPOT	Nymphalidae	Critical Habitat	Insect
BUTTERFLY, PALOS VERDES BLUE	Lycaenidae	Critical Habitat	Insect
BUTTERFLY, QUINO CHECKERSPOT	Nymphalidae	Critical Habitat	Insect
BUTTERFLY, SAN BRUNO ELFIN	Lycaenidae	Critical Habitat	Insect
BUTTERFLY, SMITH'S BLUE	Lycaenidae	Critical Habitat	Insect
BUTTERWEED, LAYNE'S	Asteraceae	Critical Habitat	Plant
BUTTON-CELERY, SAN DIEGO	Apiaceae	Critical Habitat	Plant
CACTUS, BAKERSFIELD	Cactaceae	Critical Habitat	Plant
CEANOTHUS, COYOTE	Rhamnaceae	Critical Habitat	Plant
CEANOTHUS, PINE HILL	Rhamnaceae	Critical Habitat	Plant
CEANOTHUS, VAIL LAKE	Rhamnaceae	Critical Habitat	Plant
CENTAURY, SPRING-LOVING	Gentianaceae	Critical Habitat	Plant
CHECKER-MALLOW, KECK'S	Malvaceae	Critical Habitat	Plant
CHECKER-MALLOW, KENWOOD MARSH	Malvaceae	Critical Habitat	Plant
CHECKER-MALLOW, PEDATE	Malvaceae	Critical Habitat	Plant
CHUB, BONYTAIL	Cyprinidae	Critical Habitat	Fish
CHUB, COWHEAD LAKE TUI	Cyprinidae	Critical Habitat	Fish

Species Details by State for Preliminary Assessment

Alfalfa hay (1), Alfalfa seed (2), Apples (5), Broccoli (22), Corn cut for dry fodder, hogged or graze (40), Corn for grain or seed (41), Corn for silage or green chop (42), Cotton (43), Grapes (76), Peppers, hot (92), Lettuce and romaine (105), Peanuts (143), Pears (144), Corn, pop (153), Soybeans (176), Corn, sweet, for seed (189), Corn, sweet (190), Peppers, sweet (191), Tomatoes (201), Alfalfa, all (300)

Minimum of 10 Acres.

CHUB, MOHAVE TUI	Cyprinidae	Critical Habitat	Fish
CHUB, OWENS TUI	Cyprinidae	Critical Habitat	Fish
CLARKIA, PISMO	Onagraceae	Critical Habitat	Plant
CLARKIA, PRESIDIO	Onagraceae	Critical Habitat	Plant
CLARKIA, SPRINGVILLE	Onagraceae	Critical Habitat	Plant
CLARKIA, VINE HILL	Onagraceae	Critical Habitat	Plant
CLOVER, MONTEREY	Fabaceae	Critical Habitat	Plant
CLOVER, SHOWY INDIAN	Fabaceae	Critical Habitat	Plant
CONDOR, CALIFORNIA	Cathartidae	Critical Habitat	Bird
COYOTE-THISTLE, LOCH LOMOND	Apiaceae	Critical Habitat	Plant
CRAYFISH, SHASTA	Cambaridae	Critical Habitat	Crustacean
CROWN-BEARD, BIG-LEAVED	Asteraceae	Critical Habitat	Plant
CROWNSCALE, SAN JACINTO VALLEY	Chenopodiaceae	Critical Habitat	Plant
CYPRESS, GOWEN	Cupressaceae	Critical Habitat	Plant
CYPRESS, SANTA CRUZ	Cupressaceae	Critical Habitat	Plant
DACE, ASH MEADOWS SPECKLED	Cyprinidae	Critical Habitat	Fish
DAISY, PARISH'S	Asteraceae	Critical Habitat	Plant
DUDLEYA, CONEJO	Crassulaceae	Critical Habitat	Plant
DUDLEYA, MARCESCENT	Crassulaceae	Critical Habitat	Plant
DUDLEYA, SANTA CLARA VALLEY	Crassulaceae	Critical Habitat	Plant
DUDLEYA, SANTA CRUZ ISLAND	Crassulaceae	Critical Habitat	Plant
DUDLEYA, SANTA MONICA MOUNTAINS	Crassulaceae	Critical Habitat	Plant
DUDLEYA, VERITY'S	Crassulaceae	Critical Habitat	Plant
DWARF-FLAX, MARIN	Linaceae	Critical Habitat	Plant
EAGLE, BALD	Accipitridae	Critical Habitat	Bird
EVENING-PRIMROSE, ANTIOCH DUNES	Onagraceae	Critical Habitat	Plant

Species Details by State for Preliminary Assessment

Alfalfa hay (1), Alfalfa seed (2), Apples (5), Broccoli (22), Corn cut for dry fodder, hogged or graze (40), Corn for grain or seed (41), Corn for silage or green chop (42), Cotton (43), Grapes (76), Peppers, hot (92), Lettuce and romaine (105), Peanuts (143), Pears (144), Corn, pop (153), Soybeans (176), Corn, sweet, for seed (189), Corn, sweet (190), Peppers, sweet (191), Tomatoes (201), Alfalfa, all (300)

Minimum of 10 Acres.

EVENING-PRIMROSE, EUREKA VALLEY	Onagraceae	Critical Habitat	Plant
EVENING-PRIMROSE, SAN BENITO	Onagraceae	Critical Habitat	Plant
FIDDLENECK, LARGE-FLOWERED	Boraginaceae	Critical Habitat	Plant
FLANNELBUSH, MEXICAN	Sterculiaceae	Critical Habitat	Plant
FLANNELBUSH, PINE HILL	Sterculiaceae	Critical Habitat	Plant
FLY, DELHI SANDS FLOWER-LOVING	Apioceridae	Critical Habitat	Insect
FLYCATCHER, SOUTHWESTERN WILLOW	Tyrannidae	Critical Habitat	Bird
FOX, SAN JOAQUIN KIT	Canidae	Critical Habitat	Mammal
FOX, SAN MIGUEL ISLAND	Canidae	Critical Habitat	Mammal
FOX, SANTA CATALINA ISLAND	Canidae	Critical Habitat	Mammal
FOX, SANTA CRUZ ISLAND	Canidae	Critical Habitat	Mammal
FOX, SANTA ROSA ISLAND	Canidae	Critical Habitat	Mammal
FRINGEPOD, SANTA CRUZ ISLAND	Brassicaceae	Critical Habitat	Plant
FROG, CALIFORNIA RED-LEGGED	Ranidae	Critical Habitat	Amphibian
FROG, MOUNTAIN YELLOW-LEGGED	Ranidae	Critical Habitat	Amphibian
GILIA, HOFFMANN'S SLENDER-FLOWERED	Polemoniaceae	Critical Habitat	Plant
GILIA, MONTEREY	Polemoniaceae	Critical Habitat	Plant
GNATCATCHER, COASTAL CALIFORNIA	Certhiidae	Critical Habitat	Bird
GOBY, TIDEWATER	Gobiidae	Critical Habitat	Fish
GOLDEN SUNBURST, HARTWEG'S	Asteraceae	Critical Habitat	Plant
GOLDFIELDS, BURKE'S	Asteraceae	Critical Habitat	Plant
GOLDFIELDS, CONTRA COSTA	Asteraceae	Critical Habitat	Plant
GRASS, CALIFORNIA ORCUTT	Poaceae	Critical Habitat	Plant
GRASS, COLUSA	Poaceae	Critical Habitat	Plant
GRASS, EUREKA DUNE	Poaceae	Critical Habitat	Plant
GRASS, HAIRY ORCUTT	Euphorbiaceae	Critical Habitat	Plant

Species Details by State for Preliminary Assessment

Alfalfa hay (1), Alfalfa seed (2), Apples (5), Broccoli (22), Corn cut for dry fodder, hogged or graze (40), Corn for grain or seed (41), Corn for silage or green chop (42), Cotton (43), Grapes (76), Peppers, hot (92), Lettuce and romaine (105), Peanuts (143), Pears (144), Corn, pop (153), Soybeans (176), Corn, sweet, for seed (189), Corn, sweet (190), Peppers, sweet (191), Tomatoes (201), Alfalfa, all (300)

Minimum of 10 Acres.

GRASS, SACRAMENTO ORCUTT	Euphorbiaceae	Critical Habitat	Plant
GRASS, SAN JOAQUIN VALLEY ORCUTT	Poaceae	Critical Habitat	Plant
GRASS, SLENDER ORCUTT	Euphorbiaceae	Critical Habitat	Plant
GRASS, SOLANO	Poaceae	Critical Habitat	Plant
GRASSHOPPER, ZAYANTE BAND-WINGED	Acrididae	Critical Habitat	Insect
GUMPLANT, ASH MEADOWS	Asteraceae	Critical Habitat	Plant
IVESIA, ASH MEADOWS	Rosaceae	Critical Habitat	Plant
JEWELFLOWER, CALIFORNIA	Brassicaceae	Critical Habitat	Plant
JEWELFLOWER, TIBURON	Brassicaceae	Critical Habitat	Plant
KANGAROO RAT, FRESNO	Heteromyidae	Critical Habitat	Mammal
KANGAROO RAT, GIANT	Heteromyidae	Critical Habitat	Mammal
KANGAROO RAT, MORRO BAY	Heteromyidae	Critical Habitat	Mammal
KANGAROO RAT, SAN BERNARDINO	Heteromyidae	Critical Habitat	Mammal
KANGAROO RAT, STEPHENS'	Heteromyidae	Critical Habitat	Mammal
KANGAROO RAT, TIPTON	Heteromyidae	Critical Habitat	Mammal
LARKSPUR, BAKER'S	Ranunculaceae	Critical Habitat	Plant
LARKSPUR, SAN CLEMENTE ISLAND	Ranunculaceae	Critical Habitat	Plant
LARKSPUR, YELLOW	Ranunculaceae	Critical Habitat	Plant
LAYIA, BEACH	Asteraceae	Critical Habitat	Plant
LESSINGIA, SAN FRANCISCO	Asteraceae	Critical Habitat	Plant
LILY, PITKIN MARSH	Liliaceae	Critical Habitat	Plant
LILY, WESTERN	Liliaceae	Critical Habitat	Plant
LIVEFOREVER, LAGUNA BEACH	Crassulaceae	Critical Habitat	Plant
LIVEFOREVER, SANTA BARBARA ISLAND	Crassulaceae	Critical Habitat	Plant
LIZARD, BLUNT-NOSED LEOPARD	Iguanidae	Critical Habitat	Reptile
LIZARD, COACHELLA VALLEY FRINGE-TOED	Iguanidae	Critical Habitat	Reptile

Species Details by State for Preliminary Assessment

Alfalfa hay (1), Alfalfa seed (2), Apples (5), Broccoli (22), Corn cut for dry fodder, hogged or graze (40), Corn for grain or seed (41), Corn for silage or green chop (42), Cotton (43), Grapes (76), Peppers, hot (92), Lettuce and romaine (105), Peanuts (143), Pears (144), Corn, pop (153), Soybeans (176), Corn, sweet, for seed (189), Corn, sweet (190), Peppers, sweet (191), Tomatoes (201), Alfalfa, all (300)

Minimum of 10 Acres.

LIZARD, ISLAND NIGHT	Xantusiidae	Critical Habitat	Reptile
LUPINE, CLOVER	Fabaceae	Critical Habitat	Plant
LUPINE, NIPOMO MESA	Fabaceae	Critical Habitat	Plant
MALACOTHRIX, ISLAND	Asteraceae	Critical Habitat	Plant
MALACOTHRIX, SANTA CRUZ ISLAND	Asteraceae	Critical Habitat	Plant
MALLOW, KERN	Malvaceae	Critical Habitat	Plant
MANZANITA, DEL MAR	Ericaceae	Critical Habitat	Plant
MANZANITA, IONE	Ericaceae	Critical Habitat	Plant
MANZANITA, MORRO	Ericaceae	Critical Habitat	Plant
MANZANITA, PALLID	Ericaceae	Critical Habitat	Plant
MANZANITA, SAN BRUNO MOUNTAIN	Ericaceae	Critical Habitat	Plant
MANZANITA, SANTA ROSA ISLAND	Ericaceae	Critical Habitat	Plant
MEADOWFOAM, BUTTE COUNTY	Limnanthaceae	Critical Habitat	Plant
MEADOWFOAM, SEBASTOPOL	Limnanthaceae	Critical Habitat	Plant
MILK-VETCH, BRAUNTON'S	Fabaceae	Critical Habitat	Plant
MILK-VETCH, CLARA HUNT'S	Fabaceae	Critical Habitat	Plant
MILK-VETCH, COACHELLA VALLEY	Fabaceae	Critical Habitat	Plant
MILK-VETCH, COASTAL DUNES	Fabaceae	Critical Habitat	Plant
MILK-VETCH, CUSHENBURY	Fabaceae	Critical Habitat	Plant
MILK-VETCH, FISH SLOUGH	Fabaceae	Critical Habitat	Plant
MILK-VETCH, LANE MOUNTAIN	Fabaceae	Critical Habitat	Plant
MILK-VETCH, PIERSON'S	Fabaceae	Critical Habitat	Plant
MILK-VETCH, TRIPLE-RIBBED	Fabaceae	Critical Habitat	Plant
MILK-VETCH, VENTURA MARSH	Fabaceae	Critical Habitat	Plant
MINT, OTAY MESA	Lamiaceae	Critical Habitat	Plant
MINT, SAN DIEGO MESA	Lamiaceae	Critical Habitat	Plant

Species Details by State for Preliminary Assessment

Alfalfa hay (1), Alfalfa seed (2), Apples (5), Broccoli (22), Corn cut for dry fodder, hogged or graze (40), Corn for grain or seed (41), Corn for silage or green chop (42), Cotton (43), Grapes (76), Peppers, hot (92), Lettuce and romaine (105), Peanuts (143), Pears (144), Corn, pop (153), Soybeans (176), Corn, sweet, for seed (189), Corn, sweet (190), Peppers, sweet (191), Tomatoes (201), Alfalfa, all (300)

Minimum of 10 Acres.

MONARDELLA, WILLOWY	Lamiaceae	Critical Habitat	Plant
MORNING-GLORY, STEBBINS	Convolvulaceae	Critical Habitat	Plant
MOTH, KERN PRIMROSE SPHINX	Sphingidae	Critical Habitat	Insect
MOUNTAIN BEAVER, POINT ARENA	Aplodontidae	Critical Habitat	Mammal
MOUNTAINBALM, INDIAN KNOB	Hydrophyllaceae	Critical Habitat	Plant
MOUNTAIN-MAHOGANY, CATALINA ISLAND	Rosaceae	Critical Habitat	Plant
MOUSE, PACIFIC POCKET	Heteromyidae	Critical Habitat	Mammal
MOUSE, SALT MARSH HARVEST	Cricetidae	Critical Habitat	Mammal
MURRELET, MARBLED	Alcidae	Critical Habitat	Bird
MUSTARD, SLENDER-PETALED	Brassicaceae	Critical Habitat	Plant
NAVARRETIA, FEW-FLOWERED	Polemoniaceae	Critical Habitat	Plant
NAVARRETIA, MANY-FLOWERED	Polemoniaceae	Critical Habitat	Plant
NAVARRETIA, SPREADING	Polemoniaceae	Critical Habitat	Plant
NITERWORT, AMARGOSA	Chenopodiaceae	Critical Habitat	Plant
ONION, MUNZ'S	Liliaceae	Critical Habitat	Plant
OTTER, SOUTHERN SEA	Mustelidae	Critical Habitat	Mammal
OWL, NORTHERN SPOTTED	Strigidae	Critical Habitat	Bird
OWL'S-CLOVER, FLESHY	Scrophulariaceae	Critical Habitat	Plant
OXYTHECA, CUSHENBURY	Polygonaceae	Critical Habitat	Plant
PAINTBRUSH, ASH-GREY INDIAN	Scrophulariaceae	Critical Habitat	Plant
PAINTBRUSH, SAN CLEMENTE ISLAND INDIAN	Scrophulariaceae	Critical Habitat	Plant
PAINTBRUSH, SOFT-LEAVED	Scrophulariaceae	Critical Habitat	Plant
PAINTBRUSH, TIBURON	Scrophulariaceae	Critical Habitat	Plant
PELICAN, BROWN	Pelicanidae	Critical Habitat	Bird
PENNY-CRESS, KNEELAND PRAIRIE	Brassicaceae	Critical Habitat	Plant
PENTACHAETA, LYON'S	Asteraceae	Critical Habitat	Plant

Species Details by State for Preliminary Assessment

Alfalfa hay (1), Alfalfa seed (2), Apples (5), Broccoli (22), Corn cut for dry fodder, hogged or graze (40), Corn for grain or seed (41), Corn for silage or green chop (42), Cotton (43), Grapes (76), Peppers, hot (92), Lettuce and romaine (105), Peanuts (143), Pears (144), Corn, pop (153), Soybeans (176), Corn, sweet, for seed (189), Corn, sweet (190), Peppers, sweet (191), Tomatoes (201), Alfalfa, all (300)

Minimum of 10 Acres.

PENTACHAETA, WHITE-RAYED	Asteraceae	Critical Habitat	Plant
PHACELIA, ISLAND	Hydrophyllaceae	Critical Habitat	Plant
PHLOX, YREKA	Polemoniaceae	Critical Habitat	Plant
PIPERIA, YADON'S	Orchidaceae	Critical Habitat	Plant
PLOVER, MOUNTAIN	Charadriidae	Critical Habitat	Bird
PLOVER, WESTERN SNOWY	Charadriidae	Critical Habitat	Bird
POLYGONUM, SCOTT'S VALLEY	Polygonaceae	Critical Habitat	Plant
POTENTILLA, HICKMAN'S	Rosaceae	Critical Habitat	Plant
PUPFISH, DESERT	Cyprinodontidae	Critical Habitat	Fish
PUPFISH, OWENS	Cyprinodontidae	Critical Habitat	Fish
PUSSYPAWS, MARIPOSA	Portulacaceae	Critical Habitat	Plant
RABBIT, RIPARIAN BRUSH	Leporidae	Critical Habitat	Mammal
RAIL, CALIFORNIA CLAPPER	Rallidae	Critical Habitat	Bird
RAIL, LIGHT-FOOTED CLAPPER	Rallidae	Critical Habitat	Bird
RAIL, YUMA CLAPPER	Rallidae	Critical Habitat	Bird
ROCK-CRESS, HOFFMANN'S	Brassicaceae	Critical Habitat	Plant
ROCK-CRESS, MCDONALD'S	Brassicaceae	Critical Habitat	Plant
ROCK-CRESS, SANTA CRUZ ISLAND	Brassicaceae	Critical Habitat	Plant
RUSH-ROSE, ISLAND	Cistaceae	Critical Habitat	Plant
SALAMANDER, CALIFORNIA TIGER	Ambystomatidae	Critical Habitat	Amphibian
SALAMANDER, DESERT SLENDER	Plethodontidae	Critical Habitat	Amphibian
SALAMANDER, SANTA CRUZ LONG-TOED	Ambystomatidae	Critical Habitat	Amphibian
SALMON, CHINOOK (CALIFORNIA COASTAL ESU)	Salmonidae	Critical Habitat	Fish
SALMON, CHINOOK (CENTRAL VALLEY SPRING RUN)	Salmonidae	Critical Habitat	Fish
SALMON, CHINOOK (SACRAMENTO RIVER WINTER RUN)	Salmonidae	Critical Habitat	Fish
SALMON, COHO (CENTRAL CALIFORNIA COAST POP)	Salmonidae	Critical Habitat	Fish

Species Details by State for Preliminary Assessment

Alfalfa hay (1), Alfalfa seed (2), Apples (5), Broccoli (22), Corn cut for dry fodder, hogged or graze (40), Corn for grain or seed (41), Corn for silage or green chop (42), Cotton (43), Grapes (76), Peppers, hot (92), Lettuce and romaine (105), Peanuts (143), Pears (144), Corn, pop (153), Soybeans (176), Corn, sweet, for seed (189), Corn, sweet (190), Peppers, sweet (191), Tomatoes (201), Alfalfa, all (300)

Minimum of 10 Acres.

SALMON, COHO (SOUTHERN OR/NORTHERN CA COAST)	Salmonidae	Critical Habitat	Fish
SANDWORT, BEAR VALLEY	Caryophyllaceae	Critical Habitat	Plant
SANDWORT, MARSH	Caryophyllaceae	Critical Habitat	Plant
SEA-BLITE, CALIFORNIA	Chenopodiaceae	Critical Habitat	Plant
SEAL, GUADALUPE FUR	Phocidae	Critical Habitat	Mammal
SEDGE, WHITE	Cyperaceae	Critical Habitat	Plant
SHEEP, PENINSULAR BIGHORN	Bovidae	Critical Habitat	Mammal
SHEEP, SIERRA NEVADA BIGHORN	Ovidae	Critical Habitat	Mammal
SHREW, BUENA VISTA	Soricidae	Critical Habitat	Mammal
SHRIKE, SAN CLEMENTE LOGGERHEAD	Laniidae	Critical Habitat	Bird
SHRIMP, CALIFORNIA FRESHWATER	Palaemonidae	Critical Habitat	Crustacean
SHRIMP, CONSERVANCY FAIRY	Branchinectidae	Critical Habitat	Crustacean
SHRIMP, LONGHORN FAIRY	Branchinectidae	Critical Habitat	Crustacean
SHRIMP, RIVERSIDE FAIRY	Streptocephalidae	Critical Habitat	Crustacean
SHRIMP, SAN DIEGO FAIRY	Branchinectidae	Critical Habitat	Crustacean
SHRIMP, VERNAL POOL FAIRY	Branchinectidae	Critical Habitat	Crustacean
SHRIMP, VERNAL POOL TADPOLE	Triopidae	Critical Habitat	Crustacean
SKIPPER, CARSON WANDERING	Hesperiidae	Critical Habitat	Insect
SKIPPER, LAGUNA MOUNTAIN	Hesperiidae	Critical Habitat	Insect
SMELT, DELTA	Osmeridae	Critical Habitat	Fish
SNAIL, MORRO SHOULDERBAND	Helminthoglyptidae	Critical Habitat	Snail
SNAKE, GIANT GARTER	Colubridae	Critical Habitat	Reptile
SNAKE, SAN FRANCISCO GARTER	Colubridae	Critical Habitat	Reptile
SPARROW, SAN CLEMENTE SAGE	Emberizidae	Critical Habitat	Bird
SPINEFLOWER, BEN LOMOND	Polygonaceae	Critical Habitat	Plant
SPINEFLOWER, HOWELL'S	Polygonaceae	Critical Habitat	Plant

Species Details by State for Preliminary Assessment

Alfalfa hay (1), Alfalfa seed (2), Apples (5), Broccoli (22), Corn cut for dry fodder, hogged or graze (40), Corn for grain or seed (41), Corn for silage or green chop (42), Cotton (43), Grapes (76), Peppers, hot (92), Lettuce and romaine (105), Peanuts (143), Pears (144), Corn, pop (153), Soybeans (176), Corn, sweet, for seed (189), Corn, sweet (190), Peppers, sweet (191), Tomatoes (201), Alfalfa, all (300)

Minimum of 10 Acres.

SPINEFLOWER, MONTEREY	Polygonaceae	Critical Habitat	Plant
SPINEFLOWER, ORCUTT'S	Polygonaceae	Critical Habitat	Plant
SPINEFLOWER, ROBUST	Polygonaceae	Critical Habitat	Plant
SPINEFLOWER, SCOTTS VALLEY	Polygonaceae	Critical Habitat	Plant
SPINEFLOWER, SLENDER-HORNED	Polygonaceae	Critical Habitat	Plant
SPINEFLOWER, SONOMA	Polygonaceae	Critical Habitat	Plant
SPURGE, HOOVER'S	Euphorbiaceae	Critical Habitat	Plant
SQUAWFISH, COLORADO	Cyprinidae	Critical Habitat	Fish
STEELHEAD, CALIFORNIA CENTRAL VALLEY POP	Salmonidae	Critical Habitat	Fish
STEELHEAD, CENTRAL CALIFORNIA POPULATION	Salmonidae	Critical Habitat	Fish
STEELHEAD, NORTHERN CALIFORNIA POPULATION	Salmonidae	Critical Habitat	Fish
STEELHEAD, SOUTH-CENTRAL CALIFORNIA POP	Salmonidae	Critical Habitat	Fish
STEELHEAD, SOUTHERN CALIFORNIA POPULATION	Salmonidae	Critical Habitat	Fish
STICKLEBACK, UNARMORED THREESPINE	Gasterosteidae	Critical Habitat	Fish
STICKYSEED, BAKER'S	Asteraceae	Critical Habitat	Plant
STONECROP, LAKE COUNTY	Crassulaceae	Critical Habitat	Plant
SUCKER, LOST RIVER	Catostomidae	Critical Habitat	Fish
SUCKER, MODOC	Catostomidae	Critical Habitat	Fish
SUCKER, RAZORBACK	Catostomidae	Critical Habitat	Fish
SUCKER, SANTA ANA	Catostomidae	Critical Habitat	Fish
SUCKER, SHORTNOSE	Catostomidae	Critical Habitat	Fish
SUNFLOWER, SAN MATEO WOOLLY	Asteraceae	Critical Habitat	Plant
TARAXACUM, CALIFORNIA	Asteraceae	Critical Habitat	Plant
TARPLANT, GAVIOTA	Asteraceae	Critical Habitat	Plant
TARPLANT, OTAY	Asteraceae	Critical Habitat	Plant
TARPLANT, SANTA CRUZ	Asteraceae	Critical Habitat	Plant

Species Details by State for Preliminary Assessment

Alfalfa hay (1), Alfalfa seed (2), Apples (5), Broccoli (22), Corn cut for dry fodder, hogged or graze (40), Corn for grain or seed (41), Corn for silage or green chop (42), Cotton (43), Grapes (76), Peppers, hot (92), Lettuce and romaine (105), Peanuts (143), Pears (144), Corn, pop (153), Soybeans (176), Corn, sweet, for seed (189), Corn, sweet (190), Peppers, sweet (191), Tomatoes (201), Alfalfa, all (300)

Minimum of 10 Acres.

TERN, CALIFORNIA LEAST	Laridae	Critical Habitat	Bird
THISTLE, CHORRO CREEK BOG	Asteraceae	Critical Habitat	Plant
THISTLE, FOUNTAIN	Asteraceae	Critical Habitat	Plant
THISTLE, LA GRACIOSA	Asteraceae	Critical Habitat	Plant
THISTLE, SUISUN	Asteraceae	Critical Habitat	Plant
THORNMINT, SAN DIEGO	Lamiaceae	Critical Habitat	Plant
THORNMINT, SAN MATEO	Lamiaceae	Critical Habitat	Plant
TOAD, ARROYO SOUTHWESTERN	Bufonidae	Critical Habitat	Amphibian
TORTOISE, DESERT	Testudinidae	Critical Habitat	Reptile
TOWHEE, INYO BROWN	Emberizidae	Critical Habitat	Bird
TROUT, LAHONTAN CUTTHROAT	Salmonidae	Critical Habitat	Fish
TROUT, LITTLE KERN GOLDEN	Salmonidae	Critical Habitat	Fish
TROUT, PAIUTE CUTTHROAT	Salmonidae	Critical Habitat	Fish
TUCTORIA, GREEN'S	Euphorbiaceae	Critical Habitat	Plant
TURTLE, OLIVE (PACIFIC) RIDLEY SEA	Cheloniidae	Critical Habitat	Reptile
VERVAIN, CALIFORNIA	Verbenaceae	Critical Habitat	Plant
VIREO, LEAST BELL'S	Vireonidae	Critical Habitat	Bird
VOLE, AMARGOSA	Cricetidae	Critical Habitat	Mammal
WALLFLOWER, BEN LOMOND	Brassicaceae	Critical Habitat	Plant
WALLFLOWER, CONTRA COSTA	Brassicaceae	Critical Habitat	Plant
WALLFLOWER, MENZIE'S	Brassicaceae	Critical Habitat	Plant
WATERCRESS, GAMBEL'S	Brassicaceae	Critical Habitat	Plant
WHIPSNAKE (=striped racer), ALAMEDA	Colubridae	Critical Habitat	Reptile
WOODLAND-STAR, SAN CLEMENTE ISLAND	Saxifragaceae	Critical Habitat	Plant
WOODRAT, RIPARIAN	Cricetidae	Critical Habitat	Mammal
WOOLLY-STAR, SANTA ANA RIVER	Polemoniaceae	Critical Habitat	Plant

WOOLLY-THREADS, SAN JOAQUIN	Asteraceae	Critical Habitat	Plant
YERBA SANTA, LOMPOC	Hydrophyllaceae	Critical Habitat	Plant

Colorado (22species)

BLADDERPOD, DUDLEY BLUFFS	Brassicaceae	Critical Habitat	Plant
BUTTERFLY PLANT, COLORADO	Onagraceae	Critical Habitat	Plant
BUTTERFLY, UNCOMPAHGRE FRITILLARY	Nymphalidae	Critical Habitat	Insect
CACTUS, KNOWLTON	Cactaceae	Critical Habitat	Plant
CACTUS, MESA VERDE	Cactaceae	Critical Habitat	Plant
CACTUS, UINTA BASIN HOOKLESS	Cactaceae	Critical Habitat	Plant
CHUB, BONYTAIL	Cyprinidae	Critical Habitat	Fish
CHUB, HUMPBACK	Cyprinidae	Critical Habitat	Fish
CRANE, WHOOPING	Gruidae	Critical Habitat	Bird
EAGLE, BALD	Accipitridae	Critical Habitat	Bird
FERRET, BLACK-FOOTED	Mustelidae	Critical Habitat	Mammal
LADIES'-TRESSES, UTE	Orchidaceae	Critical Habitat	Plant
MILK-VETCH, MANCOS	Fabaceae	Critical Habitat	Plant
MOUSE, PREBLE'S MEADOW JUMPING	Zapodidae	Critical Habitat	Mammal
OWL, MEXICAN SPOTTED	Strigidae	Critical Habitat	Bird
PLOVER, MOUNTAIN	Charadriidae	Critical Habitat	Bird
SKIPPER, PAWNEE MONTANE	Hesperiidae	Critical Habitat	Insect
SQUAWFISH, COLORADO	Cyprinidae	Critical Habitat	Fish
SUCKER, RAZORBACK	Catostomidae	Critical Habitat	Fish
TROUT, GREENBACK CUTTHROAT	Salmonidae	Critical Habitat	Fish
TWINPOD, DUDLEY BLUFFS	Brassicaceae	Critical Habitat	Plant
WILD-BUCKWHEAT, CLAY-LOVING	Polygonaceae	Critical Habitat	Plant

Species Details by State for Preliminary Assessment

Alfalfa hay (1), Alfalfa seed (2), Apples (5), Broccoli (22), Corn cut for dry fodder, hogged or graze (40), Corn for grain or seed (41), Corn for silage or green chop (42), Cotton (43), Grapes (76), Peppers, hot (92), Lettuce and romaine (105), Peanuts (143), Pears (144), Corn, pop (153), Soybeans (176), Corn, sweet, for seed (189), Corn, sweet (190), Peppers, sweet (191), Tomatoes (201), Alfalfa, all (300)

Minimum of 10 Acres.

Connecticut (11species)

BAT, INDIANA	Vespertilionidae	Critical Habitat	Mammal
BEETLE, PURITAN TIGER	Cicindelidae	Critical Habitat	Insect
EAGLE, BALD	Accipitridae	Critical Habitat	Bird
GERARDIA, SANDPLAIN	Scrophulariaceae	Critical Habitat	Plant
MUSSEL, DWARF WEDGE	Unionidae	Critical Habitat	Clam
PLOVER, PIPING	Charadriidae	Critical Habitat	Bird
POGONIA, SMALL WHORLED	Orchidaceae	Critical Habitat	Plant
STURGEON, SHORTNOSE	Acipenseridae	Critical Habitat	Fish
TERN, ROSEATE	Laridae	Critical Habitat	Bird
TURTLE, BOG (NORTHERN POPULATION)	Emydidae	Critical Habitat	Reptile
WHALE, NORTHERN RIGHT	Balaenidae	Critical Habitat	Mammal

Delaware (8species)

EAGLE, BALD	Accipitridae	Critical Habitat	Bird
PINK, SWAMP	Liliaceae	Critical Habitat	Plant
PLOVER, PIPING	Charadriidae	Critical Habitat	Bird
POGONIA, SMALL WHORLED	Orchidaceae	Critical Habitat	Plant
SQUIRREL, DELMARVA PENINSULA FOX	Sciuridae	Critical Habitat	Mammal
STURGEON, SHORTNOSE	Acipenseridae	Critical Habitat	Fish
TURTLE, BOG (NORTHERN POPULATION)	Emydidae	Critical Habitat	Reptile
WHALE, NORTHERN RIGHT	Balaenidae	Critical Habitat	Mammal

Florida (89species)

ASTER, FLORIDA GOLDEN	Asteraceae	Critical Habitat	Plant

Species Details by State for Preliminary Assessment

Alfalfa hay (1), Alfalfa seed (2), Apples (5), Broccoli (22), Corn cut for dry fodder, hogged or graze (40), Corn for grain or seed (41), Corn for silage or green chop (42), Cotton (43), Grapes (76), Peppers, hot (92), Lettuce and romaine (105), Peanuts (143), Pears (144), Corn, pop (153), Soybeans (176), Corn, sweet, for seed (189), Corn, sweet (190), Peppers, sweet (191), Tomatoes (201), Alfalfa, all (300)

Minimum of 10 Acres.

BANKCLIMBER, PURPLE	Unionidae	Critical Habitat	Clam
BAT, GRAY	Vespertilionidae	Critical Habitat	Mammal
BAT, INDIANA	Vespertilionidae	Critical Habitat	Mammal
BEARGRASS, BRITTON'S	Liliaceae	Critical Habitat	Plant
BIRDS-IN-A-NEST, WHITE	Lamiaceae	Critical Habitat	Plant
BLAZING STAR, SCRUB	Asteraceae	Critical Habitat	Plant
BONAMIA, FLORIDA	Convolvulaceae	Critical Habitat	Plant
BUCKWHEAT, SCRUB	Polygonaceae	Critical Habitat	Plant
BUTTERFLY, SCHAUS SWALLOWTAIL	Papilionidae	Critical Habitat	Insect
BUTTERWORT, GODFREY'S	Lentibulariceae	Critical Habitat	Plant
CAMPION, FRINGED	Caryophyllaceae	Critical Habitat	Plant
CARACARA, AUDUBON'S CRESTED	Falconidae	Critical Habitat	Bird
CHAFFSEED, AMERICAN	Scrophulariaceae	Critical Habitat	Plant
CLADONIA, FLORIDA PERFORATE	Cladoniaceae	Critical Habitat	Plant
CROCODILE, AMERICAN	Crocodylidae	Critical Habitat	Reptile
DARTER, OKALOOSA	Percidae	Critical Habitat	Fish
EAGLE, BALD	Accipitridae	Critical Habitat	Bird
FRINGE TREE, PYGMY	Oleaceae	Critical Habitat	Plant
GOOSEBERRY, MICCOSUKEE (FLORIDA)	Saxifragaceae	Critical Habitat	Plant
GOURD, OKEECHOBEE	Cucurbitaceae	Critical Habitat	Plant
HAREBELLS, AVON PARK	Fabaceae	Critical Habitat	Plant
HYPERICUM, HIGHLANDS SCRUB	Hypericaceae	Critical Habitat	Plant
JACQUEMONTIA, BEACH	Convolvulaceae	Critical Habitat	Plant
JAY, FLORIDA SCRUB	Corvidae	Critical Habitat	Bird
KITE, EVERGLADE SNAIL	Accipitridae	Critical Habitat	Bird
LEAD-PLANT, CRENULATE	Fabaceae	Critical Habitat	Plant

Species Details by State for Preliminary Assessment

Alfalfa hay (1), Alfalfa seed (2), Apples (5), Broccoli (22), Corn cut for dry fodder, hogged or graze (40), Corn for grain or seed (41), Corn for silage or green chop (42), Cotton (43), Grapes (76), Peppers, hot (92), Lettuce and romaine (105), Peanuts (143), Pears (144), Corn, pop (153), Soybeans (176), Corn, sweet, for seed (189), Corn, sweet (190), Peppers, sweet (191), Tomatoes (201), Alfalfa, all (300)

Minimum of 10 Acres.

LUPINE, SCRUB	Fabaceae	Critical Habitat	Plant
MANATEE, WEST INDIAN (FLORIDA)	Trichechidae	Critical Habitat	Mammal
MEADOWRUE, COOLEY'S	Ranunculaceae	Critical Habitat	Plant
MILKPEA, SMALL'S	Fabaceae	Critical Habitat	Plant
MINT, GARRETT'S	Lamiaceae	Critical Habitat	Plant
MINT, LONGSPURRED	Lamiaceae	Critical Habitat	Plant
MINT, SCRUB	Lamiaceae	Critical Habitat	Plant
MOCCASINSHELL, GULF	Unionidae	Critical Habitat	Clam
MOCCASINSHELL, OCHLOCKONEE	Unionidae	Critical Habitat	Clam
MOUSE, ANASTASIA ISLAND BEACH	Cricetidae	Critical Habitat	Mammal
MOUSE, CHOCTAWHATCHEE BEACH	Cricetidae	Critical Habitat	Mammal
MOUSE, PERDIDO KEY BEACH	Cricetidae	Critical Habitat	Mammal
MOUSE, ST. ANDREW BEACH	Cricetidae	Critical Habitat	Mammal
MUSTARD, CARTER'S	Brassicaceae	Critical Habitat	Plant
PANTHER, FLORIDA	Felidae	Critical Habitat	Mammal
PAWPAW, BEAUTIFUL	Annonaceae	Critical Habitat	Plant
PAWPAW, FOUR-PETAL	Annonaceae	Critical Habitat	Plant
PAWPAW, RUGEL'S	Annonaceae	Critical Habitat	Plant
PIGTOE, OVAL	Unionidae	Critical Habitat	Clam
PINKROOT, GENTIAN	Loganiaceae	Critical Habitat	Plant
PLOVER, PIPING	Charadriidae	Critical Habitat	Bird
PLUM, SCRUB	Rosaceae	Critical Habitat	Plant
POCKETBOOK, SHINY-RAYED	Unionidae	Critical Habitat	Clam
POLYGALA, LEWTON'S	Polygalaceae	Critical Habitat	Plant
POLYGALA, TINY	Polygalaceae	Critical Habitat	Plant
RHODODENDRON, CHAPMAN	Ericaceae	Critical Habitat	Plant

Species Details by State for Preliminary Assessment

Alfalfa hay (1), Alfalfa seed (2), Apples (5), Broccoli (22), Corn cut for dry fodder, hogged or graze (40), Corn for grain or seed (41), Corn for silage or green chop (42), Cotton (43), Grapes (76), Peppers, hot (92), Lettuce and romaine (105), Peanuts (143), Pears (144), Corn, pop (153), Soybeans (176), Corn, sweet, for seed (189), Corn, sweet (190), Peppers, sweet (191), Tomatoes (201), Alfalfa, all (300)

Minimum of 10 Acres.

ROSEMARY, ETONIA	Lamiaceae	Critical Habitat	Plant
ROSEMARY, SHORT-LEAVED	Lamiaceae	Critical Habitat	Plant
SALAMANDER, FLATWOODS	Ambystomatidae	Critical Habitat	Amphibian
SANDLACE	Polygonaceae	Critical Habitat	Plant
SAWFISH, SMALLTOOTH	Pristidae	Critical Habitat	Fish
SEAGRASS, JOHNSON'S	Hydrocharitaceae	Critical Habitat	Plant
SHRIMP, SQUIRREL CHIMNEY CAVE	Palaemonidae	Critical Habitat	Crustacean
SKINK, BLUE-TAILED MOLE	Scincidae	Critical Habitat	Reptile
SKINK, SAND	Scincidae	Critical Habitat	Reptile
SLABSHELL, CHIPOLA	Unionidae	Critical Habitat	Clam
SNAKE, ATLANTIC SALT MARSH	Colubridae	Critical Habitat	Reptile
SNAKE, EASTERN INDIGO	Colubridae	Critical Habitat	Reptile
SNAKEROOT	Apiaceae	Critical Habitat	Plant
SPARROW, CAPE SABLE SEASIDE	Emberizidae	Critical Habitat	Bird
SPARROW, FLORIDA GRASSHOPPER	Emberizidae	Critical Habitat	Bird
SPURGE, DELTOID	Euphorbiaceae	Critical Habitat	Plant
SPURGE, GARBER'S	Euphorbiaceae	Critical Habitat	Plant
SPURGE, TELEPHUS	Euphorbiaceae	Critical Habitat	Plant
STORK, WOOD	Ciconiidae	Critical Habitat	Bird
STURGEON, GULF	Acipenseridae	Critical Habitat	Fish
STURGEON, SHORTNOSE	Acipenseridae	Critical Habitat	Fish
THREERIDGE, FAT	Unionidae	Critical Habitat	Clam
TORREYA, FLORIDA	Taxaceae	Critical Habitat	Plant
TURTLE, GREEN SEA	Cheloniidae	Critical Habitat	Reptile
TURTLE, HAWKSBILL SEA	Cheloniidae	Critical Habitat	Reptile
TURTLE, KEMP'S (ATLANTIC) RIDLEY SEA	Cheloniidae	Critical Habitat	Reptile

Species Details by State for Preliminary Assessment

Alfalfa hay (1), Alfalfa seed (2), Apples (5), Broccoli (22), Corn cut for dry fodder, hogged or graze (40), Corn for grain or seed (41), Corn for silage or green chop (42), Cotton (43), Grapes (76), Peppers, hot (92), Lettuce and romaine (105), Peanuts (143), Pears (144), Corn, pop (153), Soybeans (176), Corn, sweet, for seed (189), Corn, sweet (190), Peppers, sweet (191), Tomatoes (201), Alfalfa, all (300)

Minimum of 10 Acres.

TURTLE, LEATHERBACK SEA	Dermochelyidae	Critical Habitat	Reptile
TURTLE, LOGGERHEAD SEA	Cheloniidae	Critical Habitat	Reptile
VOLE, FLORIDA SALT MARSH	Cricetidae	Critical Habitat	Mammal
WAREA, WIDE-LEAF	Brassicaceae	Critical Habitat	Plant
WHALE, NORTHERN RIGHT	Balaenidae	Critical Habitat	Mammal
WHITLOW-WORT, PAPERY	Caryophyllaceae	Critical Habitat	Plant
WINGS, PIGEON	Fabaceae	Critical Habitat	Plant
WIREWEED	Polygonaceae	Critical Habitat	Plant
WOODPECKER, RED-COCKADED	Picidae	Critical Habitat	Bird
ZIZIPHUS, FLORIDA	Rhamnaceae	Critical Habitat	Plant

Georgia (58species)

ACORNSHELL, SOUTHERN	Unionidae	Critical Habitat	Clam
AMPHIANTHUS, LITTLE	Scrophulariaceae	Critical Habitat	Plant
BANKCLIMBER, PURPLE	Unionidae	Critical Habitat	Clam
BARBARA'S BUTTONS, MOHR'S	Asteraceae	Critical Habitat	Plant
BAT, GRAY	Vespertilionidae	Critical Habitat	Mammal
BAT, INDIANA	Vespertilionidae	Critical Habitat	Mammal
BAT, VIRGINIA BIG-EARED	Vespertilionidae	Critical Habitat	Mammal
BEETLE, AMERICAN BURYING	Silphidae	Critical Habitat	Insect
CAMPION, FRINGED	Caryophyllaceae	Critical Habitat	Plant
CHUB, SPOTFIN	Cyprinidae	Critical Habitat	Fish
CLUBSHELL, OVATE	Unionidae	Critical Habitat	Clam
CLUBSHELL, SOUTHERN	Unionidae	Critical Habitat	Clam
COMBSHELL, UPLAND	Unionidae	Critical Habitat	Clam
DARTER, AMBER	Percidae	Critical Habitat	Fish

Species Details by State for Preliminary Assessment

Alfalfa hay (1), Alfalfa seed (2), Apples (5), Broccoli (22), Corn cut for dry fodder, hogged or graze (40), Corn for grain or seed (41), Corn for silage or green chop (42), Cotton (43), Grapes (76), Peppers, hot (92), Lettuce and romaine (105), Peanuts (143), Pears (144), Corn, pop (153), Soybeans (176), Corn, sweet, for seed (189), Corn, sweet (190), Peppers, sweet (191), Tomatoes (201), Alfalfa, all (300)

Minimum of 10 Acres.

DARTER, CHEROKEE	Percidae	Critical Habitat	Fish
DARTER, ETOWAH	Percidae	Critical Habitat	Fish
DARTER, GOLDLINE	Percidae	Critical Habitat	Fish
DARTER, SNAIL	Percidae	Critical Habitat	Fish
DROPWORT, CANBY'S	Apiaceae	Critical Habitat	Plant
EAGLE, BALD	Accipitridae	Critical Habitat	Bird
GRASS, TENNESSEE YELLOW-EYED	Xyridaceae	Critical Habitat	Plant
KIDNEYSHELL, TRIANGULAR	Unionidae	Critical Habitat	Clam
LOGPERCH, CONASAUGA	Percidae	Critical Habitat	Fish
MADTOM, YELLOWFIN	Ictaluridae	Critical Habitat	Fish
MANATEE, WEST INDIAN (FLORIDA)	Trichechidae	Critical Habitat	Mammal
MOCCASINSHELL, ALABAMA	Unionidae	Critical Habitat	Clam
MOCCASINSHELL, COOSA	Unionidae	Critical Habitat	Clam
MOCCASINSHELL, GULF	Unionidae	Critical Habitat	Clam
PEARLYMUSSEL, PINK MUCKET	Unionidae	Critical Habitat	Clam
PIGTOE, OVAL	Unionidae	Critical Habitat	Clam
PIGTOE, SOUTHERN	Unionidae	Critical Habitat	Clam
PINK, SWAMP	Liliaceae	Critical Habitat	Plant
PITCHER-PLANT, GREEN	Sarraceniaceae	Critical Habitat	Plant
PLOVER, PIPING	Charadriidae	Critical Habitat	Bird
POCKETBOOK, FINE-LINED	Unionidae	Critical Habitat	Clam
POCKETBOOK, SHINY-RAYED	Unionidae	Critical Habitat	Clam
POGONIA, SMALL WHORLED	Orchidaceae	Critical Habitat	Plant
PONDBERRY	Lauraceae	Critical Habitat	Plant
QUILLWORT, BLACK-SPORED	Isoetaceae	Critical Habitat	Plant
QUILLWORT, MAT-FORMING	Isoetaceae	Critical Habitat	Plant

RATTLEWEED, HAIRY	Fabaceae	Critical Habitat	Plant
SALAMANDER, FLATWOODS	Ambystomatidae	Critical Habitat	Amphibian
SHINER, BLUE	Cyprinidae	Critical Habitat	Fish
SKULLCAP, LARGE-FLOWERED	Lamiaceae	Critical Habitat	Plant
SNAKE, EASTERN INDIGO	Colubridae	Critical Habitat	Reptile
SPIRAEA, VIRGINIA	Rosaceae	Critical Habitat	Plant
STORK, WOOD	Ciconiidae	Critical Habitat	Bird
STURGEON, GULF	Acipenseridae	Critical Habitat	Fish
STURGEON, SHORTNOSE	Acipenseridae	Critical Habitat	Fish
SUMAC, MICHAUX'S	Anacardiaceae	Critical Habitat	Plant
THREERIDGE, FAT	Unionidae	Critical Habitat	Clam
TORREYA, FLORIDA	Taxaceae	Critical Habitat	Plant
TRILLIUM, PERSISTENT	Liliaceae	Critical Habitat	Plant
TRILLIUM, RELICT	Liliaceae	Critical Habitat	Plant
TURTLE, LOGGERHEAD SEA	Cheloniidae	Critical Habitat	Reptile
WARBLER (WOOD), KIRTLAND'S	Parulidae	Critical Habitat	Bird
WATER-PLANTAIN, KRAL'S	Alismataceae	Critical Habitat	Plant
WOODPECKER, RED-COCKADED	Picidae	Critical Habitat	Bird

Hawaii (165species)

ACHYRANTHES MUTICA (NCN)	Amaranthaceae	Critical Habitat	Plant
A'E (ZANTHOXYLUM DIPETALUM VAR. TOMENTOSUM)	Rutaceae	Critical Habitat	Plant
A'E (ZANTHOXYLUM HAWAIIENSE)	Rutaceae	Critical Habitat	Plant
'AIEA (NOTHOCESTRUM BREVIFLORUM)	Solanaceae	Critical Habitat	Plant
'AIEA (NOTHOCESTRUM PELTATUM)	Solanaceae	Critical Habitat	Plant
'AKEPA, HAWAII	Fringillidae	Critical Habitat	Bird

Species Details by State for Preliminary Assessment

Alfalfa hay (1), Alfalfa seed (2), Apples (5), Broccoli (22), Corn cut for dry fodder, hogged or graze (40), Corn for grain or seed (41), Corn for silage or green chop (42), Cotton (43), Grapes (76), Peppers, hot (92), Lettuce and romaine (105), Peanuts (143), Pears (144), Corn, pop (153), Soybeans (176), Corn, sweet, for seed (189), Corn, sweet (190), Peppers, sweet (191), Tomatoes (201), Alfalfa, all (300)

Minimum of 10 Acres.

'AKIA LOA, KAUAI (HEMIGNATHUS PROCERUS)	Fringillidae	Critical Habitat	Bird
'AKIA POLA'AU (HEMIGNATHUS MUNROI)	Fringillidae	Critical Habitat	Bird
'AKOKO (EUPHORBIA HAELEELEANA)	Euphorbiaceae	Critical Habitat	Plant
ALANI (MELICOPE HAUPUENSIS)	Rutaceae	Critical Habitat	Plant
ALANI (MELICOPE KNUDSENII)	Rutaceae	Critical Habitat	Plant
ALANI (MELICOPE PALLIDA)	Rutaceae	Critical Habitat	Plant
ALANI (MELICOPE QUADRANGULARIS)	Rutaceae	Critical Habitat	Plant
ALANI (MELICOPE ZAHLBRUCKNERI)	Rutaceae	Critical Habitat	Plant
ALSINIDENDRON VISCOSUM (NCN)	Caryophyllaceae	Critical Habitat	Plant
AMPHIPOD, KAUAI CAVE	Talitridae	Critical Habitat	Crustacean
'ANUNU (SICYOS ALBA)	Cucurbitaceae	Critical Habitat	Plant
ASPLENIUM FRAGILE VAR. INSULARE (NCN)	Aspleniaceae	Critical Habitat	Plant
AUPAKA (ISODENDRION HOSAKAE)	Violaceae	Critical Habitat	Plant
AUPAKA (ISODENDRION LAURIFOLIUM)	Violaceae	Critical Habitat	Plant
AUPAKA (ISODENDRION LONGIFOLIUM)	Violaceae	Critical Habitat	Plant
'AWIWI (CENTAURIUM SEBAEOIDES)	Gentianaceae	Critical Habitat	Plant
'AWIWI (HEDYOTIS COOKIANA)	Rubiaceae	Critical Habitat	Plant
BAT, HAWAIIAN HOARY	Vespertilionidae	Critical Habitat	Mammal
BLUEGRASS, HAWAIIAN	Poaceae	Critical Habitat	Plant
BLUEGRASS, MANN'S (POA MANNII)	Poaceae	Critical Habitat	Plant
BONAMIA MENZIESII (NCN)	Convolvulaceae	Critical Habitat	Plant
CHAMAESYCE HALEMANUI	Euphorbiaceae	Critical Habitat	Plant
COOT, HAWAIIAN (=ALAE KEO KEO)	Rallidae	Critical Habitat	Bird
CREEPER, HAWAII	Fringillidae	Critical Habitat	Bird
CROW, HAWAIIAN ('ALALA)	Corvidae	Critical Habitat	Bird
CYANEA UNDULATA (NCN)	Campanulaceae	Critical Habitat	Plant

DELISSEA RHYTODISPERMA (NCN)	Campanulaceae	Critical Habitat	Plant
DIELLIA ERECTA (NCN)	Aspleniaceae	Critical Habitat	Plant
DIELLIA PALLIDA (NCN)	Campanulaceae	Critical Habitat	Plant
DROSOPHILA HETERONEURA (NCN)	Drosopholidae	Critical Habitat	Insect
DROSOPHILA MULLI (NCN)	Drosophilidae	Critical Habitat	Insect
DROSOPHILA MUSAPHILIA (NCN)	Drosophilidae	Critical Habitat	Insect
DROSOPHILA OCHROBASIS (NCN)	Drosophilidae	Critical Habitat	Insect
DUBAUTIA LATIFOLIA	Asteraceae	Critical Habitat	Plant
DUBAUTIA PAUCIFLORULA	Asteraceae	Critical Habitat	Plant
DUCK, HAWAIIAN (KOLOA)	Anatidae	Critical Habitat	Bird
FERN, PENDANT KIHI (ADENOPHORUS PERIENS)	Grammitidaceae	Critical Habitat	Plant
GOOSE, HAWAIIAN (NENE)	Anatidae	Critical Habitat	Bird
GOUANIA MEYENII (NCN)	Rhamnaceae	Critical Habitat	Plant
HAHA (CYANEA ASARIFOLIA)	Campanulaceae	Critical Habitat	Plant
HAHA (CYANEA COPELANDII SSP. COPELANDII)	Campanulaceae	Critical Habitat	Plant
HAHA (CYANEA HAMATIFLORA SSP. CARLSONII)	Campanulaceae	Critical Habitat	Plant
HAHA (CYANEA PLATYPHYLLA)	Campanulaceae	Critical Habitat	Plant
HAHA (CYANEA RECTA)	Campanulaceae	Critical Habitat	Plant
HAHA (CYANEA REMYI)	Campanulaceae	Critical Habitat	Plant
HAHA (CYANEA SHIPMANII)	Campanulaceae	Critical Habitat	Plant
HAHA (CYANEA STICTOPHYLLA)	Campanulaceae	Critical Habitat	Plant
HA'IWALE (CYRTANDRA GIFFARDII)	Gesneriaceae	Critical Habitat	Plant
HA'IWALE (CYRTANDRA LIMAHULIENSIS)	Gesneriaceae	Critical Habitat	Plant
HALA PEPE (PLEOMELE HAWAIIENSIS)	Liliaceae	Critical Habitat	Plant
HAPLOSTACHYS HAPLOSTACHYA (NCN)	Lamiaceae	Critical Habitat	Plant
HAU KAUHIWI (HIBISCADELPHUS WOODI)	Malvaceae	Critical Habitat	Plant

Species Details by State for Preliminary Assessment

Alfalfa hay (1), Alfalfa seed (2), Apples (5), Broccoli (22), Corn cut for dry fodder, hogged or graze (40), Corn for grain or seed (41), Corn for silage or green chop (42), Cotton (43), Grapes (76), Peppers, hot (92), Lettuce and romaine (105), Peanuts (143), Pears (144), Corn, pop (153), Soybeans (176), Corn, sweet, for seed (189), Corn, sweet (190), Peppers, sweet (191), Tomatoes (201), Alfalfa, all (300)

Minimum of 10 Acres.

HAU KUAHIWI (HIBISCADELPHUS DISTANS)	Malvaceae	Critical Habitat	Plant
HAWK, HAWAIIAN (IO)	Accipitridae	Critical Habitat	Bird
HEAU (EXOCARPOS LUTEOLUS)	Santalaceae	Critical Habitat	Plant
HEDYOTIS ST.-JOHNII (NCN)	Rubiaceae	Critical Habitat	Plant
HESPEROMANNIA LYDGATEI (NCN)	Asteraceae	Critical Habitat	Plant
HIBISCUS, CLAY'S	Malvaceae	Critical Habitat	Plant
HILO ISCHAEMUM (ISCHAEMUM BYRONE)	Poaceae	Critical Habitat	Plant
HOLEI (OCHROSIA KILAUEAENSIS)	Apocynaceae	Critical Habitat	Plant
ILIAU (WILKESIA HOBDYI)	Asteraceae	Critical Habitat	Plant
KAMAKAHALA (LABORDIA LYDGATEI)	Loganiaceae	Critical Habitat	Plant
KAMAKAHALA (LABORDIA TINIFOLIA VAR. WAHIAWAEN	Loganiaceae	Critical Habitat	Plant
KAUILA (COLUBRINA OPPOSITIFOLIA)	Rhamnaceae	Critical Habitat	Plant
KAULU (PTERALYXIA KAUAIENSIS)	Apocynaceae	Critical Habitat	Plant
KIO'ELE (HEDYOTIS CORIACEA)	Rubiaceae	Critical Habitat	Plant
KIPONAPONA (PHYLLOSTEGIA RACEMOSA)	Lamiaceae	Critical Habitat	Plant
KOKI'O (KOKIA DRYNARIOIDES)	Malvaceae	Critical Habitat	Plant
KOKI'O (KOKIA KAUAIENSIS)	Malvaceae	Critical Habitat	Plant
KOKI'O KE'OKE'O (HIBISCUS WAIMEAE SSP. HANNER	Malvaceae	Critical Habitat	Plant
KOLEA (MYRSINE LINEARIFOLIA)	Myrsinaceae	Critical Habitat	Plant
KO'OLOA'ULA (ABUTILON MENZIESII)	Malvaceae	Critical Habitat	Plant
KUAWAWAENOHU (ALSINIDENDRON LYCHNOIDES)	Caryophyllaceae	Critical Habitat	Plant
LAU'EHU (PANICUM NIIHAUENSE)	Poaceae	Critical Habitat	Plant
LAUKAHI KUAHIWI (PLANTAGO HAWAIENSIS)	Plantaginaceae	Critical Habitat	Plant
LAUKAHI KUAHIWI (PLANTAGO PRINCEPS)	Plantaginaceae	Critical Habitat	Plant
LAULIHILIHI (SCHIEDEA STELLARIOIDES)	Caryophyllaceae	Critical Habitat	Plant
LIPOCHAETA VENOSA (NCN)	Asteraceae	Critical Habitat	Plant

Species Details by State for Preliminary Assessment

Alfalfa hay (1), Alfalfa seed (2), Apples (5), Broccoli (22), Corn cut for dry fodder, hogged or graze (40), Corn for grain or seed (41), Corn for silage or green chop (42), Cotton (43), Grapes (76), Peppers, hot (92), Lettuce and romaine (105), Peanuts (143), Pears (144), Corn, pop (153), Soybeans (176), Corn, sweet, for seed (189), Corn, sweet (190), Peppers, sweet (191), Tomatoes (201), Alfalfa, all (300)

Minimum of 10 Acres.

LOBELIA NIIHAUENSIS (NCN)	Campanulaceae	Critical Habitat	Plant
LOULU (PRITCHARDIA AFFINIS)	Arecaceae	Critical Habitat	Plant
LOULU (PRITCHARDIA NAPALIENSIS)	Arecaceae	Critical Habitat	Plant
LOULU (PRITCHARDIA SCHATTAUERI)	Arecaceae	Critical Habitat	Plant
LOULU (PRITCHARDIA VISCOSA)	Arecaceae	Critical Habitat	Plant
LYSIMACHIA FILIFOLIA (NCN)	Primulaceae	Critical Habitat	Plant
MAHOE (ALECTRYON MACROCOCCUS)	Sapindaceae	Critical Habitat	Plant
MAKOU (PEUCEDANUM SANDWICENSE)	Apiaceae	Critical Habitat	Plant
MA'O HAU HELE (HIBISCUS BRACKENRIDGEI)	Malvaceae	Critical Habitat	Plant
MA'OLI'OLI (SCHIEDEA APOKREMNOS)	Caryophyllaceae	Critical Habitat	Plant
MAPELE (CYRTANDRA CYANEOIDES)	Gesneriaceae	Critical Habitat	Plant
MARISCUS FAURIEI (NCN)	Cyperaceae	Critical Habitat	Plant
MARISCUS PENNATIFORMIS (NCN)	Cyperaceae	Critical Habitat	Plant
MEHAMEHAME (FLUEGGEA NEOWAWRAEA)	Euphorbiaceae	Critical Habitat	Plant
MOORHEN, HAWAIIAN COMMON	Rallidae	Critical Habitat	Bird
MOTH, BLACKBURN'S SPHINX	Sphingidae	Critical Habitat	Insect
MUNROIDENDRON RACEMOSUM (NCN)	Araliaceae	Critical Habitat	Plant
NANI WAI'ALE'ALE (VIOLA KAUAENSIS VAR. WAHIAW	Violaceae	Critical Habitat	Plant
NEHE (LIPOCHAETA FAURIEI)	Asteraceae	Critical Habitat	Plant
NEHE (LIPOCHAETA MICRANTHA)	Asteraceae	Critical Habitat	Plant
NEHE (LIPOCHAETA WAIMEAENSIS)	Asteraceae	Critical Habitat	Plant
NERAUDIA OVATA (NCN)	Urticaceae	Critical Habitat	Plant
NERAUDIA SERICEA (NCN)	Urticaceae	Critical Habitat	Plant
NOHOANU (GERANIUM MULTIFLORUM)	Geraniaceae	Critical Habitat	Plant
NUKU PU'U	Fringillidae	Critical Habitat	Bird
'OHA (DELISSEA RIVULARIS)	Campanulaceae	Critical Habitat	Plant

Species Details by State for Preliminary Assessment

Alfalfa hay (1), Alfalfa seed (2), Apples (5), Broccoli (22), Corn cut for dry fodder, hogged or graze (40), Corn for grain or seed (41), Corn for silage or green chop (42), Cotton (43), Grapes (76), Peppers, hot (92), Lettuce and romaine (105), Peanuts (143), Pears (144), Corn, pop (153), Soybeans (176), Corn, sweet, for seed (189), Corn, sweet (190), Peppers, sweet (191), Tomatoes (201), Alfalfa, all (300)

Minimum of 10 Acres.

'OHA (DELISSEA UNDULATA)	Campanulaceae	Critical Habitat	Plant
'OHA WAI (CLERMONTIA DREPANOMORPHA)	Campanulaceae	Critical Habitat	Plant
'OHA WAI (CLERMONTIA LINDSEYANA)	Campanulaceae	Critical Habitat	Plant
'OHA WAI (CLERMONTIA PELEANA)	Campanulaceae	Critical Habitat	Plant
'OHA WAI (CLERMONTIA PYRULARIA)	Campanulaceae	Critical Habitat	Plant
'OHAI (SESBANIA TOMENTOSA)	Fabaceae	Critical Habitat	Plant
'OLULU (BRIGHAMIA INSIGNIS)	Campanulaceae	Critical Habitat	Plant
'O'O, KAUAI (='A'A)	Meliphagidae	Critical Habitat	Bird
'O'U (HONEYCREEPER)	Fringillidae	Critical Habitat	Bird
PALILA	Fringillidae	Critical Habitat	Bird
PETREL, HAWAIIAN DARK-RUMPED	Procellariidae	Critical Habitat	Bird
PHYLLOSTEGIA KNUDSENII (NCN)	Lamiaceae	Critical Habitat	Plant
PHYLLOSTEGIA VELUTINA (NCN)	Lamiaceae	Critical Habitat	Plant
PHYLLOSTEGIA WAIMEAE (NCN)	Lamiaceae	Critical Habitat	Plant
PHYLLOSTEGIA WARSHAUERI (NCN)	Lamiaceae	Critical Habitat	Plant
PHYLLOSTEGIA WAWRANA (NCN)	Lamiaceae	Critical Habitat	Plant
PLATANTHERA HOLOCHILA (NCN)	Orchidaceae	Critical Habitat	Plant
POA SIPHONOGLOSSA (NCN)	Poaceae	Critical Habitat	Plant
PO'E (PORTULACA SCLEROCARPA)	Portulacaceae	Critical Habitat	Plant
POPOLO 'AIAKEAKUA (SOLANUM SANDWICENSE)	Solanaceae	Critical Habitat	Plant
POPOLO KU MAI (SOLANUM INCOMPLETUM)	Solanaceae	Critical Habitat	Plant
PU'UKA'A (CYPERUS TRACHYSANTHOS)	Cyperaceae	Critical Habitat	Plant
REMYA KAUAIENSIS (NCN)	Asteraceae	Critical Habitat	Plant
REMYA MONTGOMERYI (NCN)	Asteraceae	Critical Habitat	Plant
SCHIEDEA HELLERI (NCN)	Caryophyllaceae	Critical Habitat	Plant
SCHIEDEA KAUAIENSIS (NCN)	Caryophyllaceae	Critical Habitat	Plant

SCHIEDEA MEMBRANACEA (NCN)	Caryophyllaceae	Critical Habitat	Plant
SCHIEDEA NUTTALLII (NCN)	Caryophyllaceae	Critical Habitat	Plant
SCHIEDEA SPERGULINA VAR. LEIOPODA (NCN)	Caryophyllaceae	Critical Habitat	Plant
SCHIEDEA SPERGULINA VAR. SPERGULINA (NCN)	Caryophyllaceae	Critical Habitat	Plant
SEAL, HAWAIIAN MONK	Phocidae	Critical Habitat	Mammal
SHEARWATER, NEWELL'S TOWNSEND'S	Procellariidae	Critical Habitat	Bird
SILENE HAWAIIENSIS (NCN)	Caryophyllaceae	Critical Habitat	Plant
SILENE LANCEOLATA (NCN)	Caryophyllaceae	Critical Habitat	Plant
SILVERSWORD, KA'U (ARGYROXIPHIUM KAUENSE)	Asteraceae	Critical Habitat	Plant
SILVERSWORD, MAUNA KEA ('AHINAHINA)	Asteraceae	Critical Habitat	Plant
SNAIL, NEWCOMB'S	Lymnaeidae	Critical Habitat	Snail
SPERMOLEPIS HAWAIIENSIS (NCN)	Apiaceae (parsley)	Critical Habitat	Plant
SPIDER, KAUAI CAVE WOLF	Lycosidae	Critical Habitat	Arachnid
STENOGYNE ANGUSTIFOLIA (NCN)	Lamiaceae	Critical Habitat	Plant
STENOGYNE CAMPANULATA (NCN)	Lamiaceae	Critical Habitat	Plant
STILT, HAWAIIAN (=AE'O)	Recurvirostridae	Critical Habitat	Bird
TETRAMOLOPIUM ARENARIUM (NCN)	Asteraceae	Critical Habitat	Plant
THRUSH, LARGE KAUAI	Muscicapidae	Critical Habitat	Bird
THRUSH, SMALL KAUAI (PUAIOHI)	Muscicapidae	Critical Habitat	Bird
TURTLE, GREEN SEA	Cheloniidae	Critical Habitat	Reptile
TURTLE, HAWKSBILL SEA	Cheloniidae	Critical Habitat	Reptile
UHIUHI (CAESALPINIA KAVAIENSIS)	Fabaceae	Critical Habitat	Plant
VETCH, HAWAIIAN (VICIA MENZIESII)	Fabaceae	Critical Habitat	Plant
VIGNA O-WAHUENSIS (NCN)	Fabaceae	Critical Habitat	Plant
VIOLA HELENAE (NCN)	Violaceae	Critical Habitat	Plant
WAHINE NOHO KULA (ISODENDRION PYRIFOLIUM)	Violaceae	Critical Habitat	Plant

Species Details by State for Preliminary Assessment

Alfalfa hay (1), Alfalfa seed (2), Apples (5), Broccoli (22), Corn cut for dry fodder, hogged or graze (40), Corn for grain or seed (41), Corn for silage or green chop (42), Cotton (43), Grapes (76), Peppers, hot (92), Lettuce and romaine (105), Peanuts (143), Pears (144), Corn, pop (153), Soybeans (176), Corn, sweet, for seed (189), Corn, sweet (190), Peppers, sweet (191), Tomatoes (201), Alfalfa, all (300)

Minimum of 10 Acres.

WAWAE'IOLE (PHLEGMARIURUS (=HUPERZIA) MANNII)	Lycopodiaceae	Critical Habitat	Plant
WAWAE'IOLE (PHLEGMARIURUS (=LYCOPODIUM) NUTAN Plant		Lycopodiaceae	Critical Habitat
XYLOSMA CRENATUM (NCN)	Flacourtiaceae	Critical Habitat	Plant

Idaho (21species)

BEAR, GRIZZLY	Ursidae	Critical Habitat	Mammal
CARIBOU, WOODLAND	Cervidae	Critical Habitat	Mammal
CATCHFLY, SPALDING'S	Caryophyllaceae	Critical Habitat	Plant
EAGLE, BALD	Accipitridae	Critical Habitat	Bird
FOUR-O'CLOCK, MACFARLANE'S	Nyctaginaceae	Critical Habitat	Plant
HOWELLIA, WATER	Campanulaceae	Critical Habitat	Plant
LIMPET, BANBURY SPRINGS	Lymnaeidae	Critical Habitat	Snail
PEPPERGRASS, SLICK SPOT	Brassicaceae	Critical Habitat	Plant
SALMON, CHINOOK (SNAKE RIVER FALL RUN)	Salmonidae	Critical Habitat	Fish
SALMON, CHINOOK (SNAKE RIVER SPRING/SUMMER)	Salmonidae	Critical Habitat	Fish
SALMON, SOCKEYE (SNAKE RIVER POPULATION)	Salmonidae	Critical Habitat	Fish
SNAIL, BLISS RAPIDS	Hydrobiidae	Critical Habitat	Snail
SNAIL, SNAKE RIVER PHYSA	Physidae	Critical Habitat	Snail
SNAIL, UTAH VALVATA	Valvatidae	Critical Habitat	Snail
SPRINGSNAIL, BRUNEAU HOT	Hydrobiidae	Critical Habitat	Snail
SPRINGSNAIL, IDAHO	Hydrobiidae	Critical Habitat	Snail
SQUIRREL, NORTHERN IDAHO GROUND	Sciuridae	Critical Habitat	Mammal
STEELHEAD, SNAKE RIVER BASIN POPULATION	Salmonidae	Critical Habitat	Fish
STURGEON, WHITE	Acipenseridae	Critical Habitat	Fish
TROUT, BULL	Salmonidae	Critical Habitat	Fish

Species Details by State for Preliminary Assessment

Alfalfa hay (1), Alfalfa seed (2), Apples (5), Broccoli (22), Corn cut for dry fodder, hogged or graze (40), Corn for grain or seed (41), Corn for silage or green chop (42), Cotton (43), Grapes (76), Peppers, hot (92), Lettuce and romaine (105), Peanuts (143), Pears (144), Corn, pop (153), Soybeans (176), Corn, sweet, for seed (189), Corn, sweet (190), Peppers, sweet (191), Tomatoes (201), Alfalfa, all (300)

Minimum of 10 Acres.

WOLF, GRAY	Canidae	Critical Habitat	Mammal

Illinois (24species)

AMPHIPOD, ILLINOIS CAVE	Gammaridae	Critical Habitat	Crustacean
ASTER, DECURRENT FALSE	Asteraceae	Critical Habitat	Plant
BAT, GRAY	Vespertilionidae	Critical Habitat	Mammal
BAT, INDIANA	Vespertilionidae	Critical Habitat	Mammal
BUSH-CLOVER, PRAIRIE	Fabaceae	Critical Habitat	Plant
BUTTERFLY, KARNER BLUE	Lycaenidae	Critical Habitat	Insect
DAISY, LAKESIDE	Asteraceae	Critical Habitat	Plant
DRAGONFLY, HINES EMERALD	Libellulidae	Critical Habitat	Insect
EAGLE, BALD	Accipitridae	Critical Habitat	Bird
FANSHELL	Unionidae	Critical Habitat	Clam
MILKWEED, MEAD'S	Asclepiadaceae	Critical Habitat	Plant
ORCHID, EASTERN PRAIRIE FRINGED	Orchidaceae	Critical Habitat	Plant
PEARLYMUSSEL, HIGGINS' EYE	Unionidae	Critical Habitat	Clam
PEARLYMUSSEL, ORANGE-FOOTED	Unionidae	Critical Habitat	Clam
PEARLYMUSSEL, PINK MUCKET	Unionidae	Critical Habitat	Clam
PEARLYMUSSEL, WHITE WARTYBACK	Unionidae	Critical Habitat	Clam
PLOVER, PIPING	Charadriidae	Critical Habitat	Bird
POCKETBOOK, FAT	Unionidae	Critical Habitat	Clam
POGONIA, SMALL WHORLED	Orchidaceae	Critical Habitat	Plant
POTATO-BEAN, PRICE'S	Fabaceae	Critical Habitat	Plant
PRAIRIE-CLOVER, LEAFY	Fabaceae	Critical Habitat	Plant
SNAIL, IOWA PLEISTOCENE	Discidae	Critical Habitat	Snail
STURGEON, PALLID	Acipenseridae	Critical Habitat	Fish

Species Details by State for Preliminary Assessment

Alfalfa hay (1), Alfalfa seed (2), Apples (5), Broccoli (22), Corn cut for dry fodder, hogged or graze (40), Corn for grain or seed (41), Corn for silage or green chop (42), Cotton (43), Grapes (76), Peppers, hot (92), Lettuce and romaine (105), Peanuts (143), Pears (144), Corn, pop (153), Soybeans (176), Corn, sweet, for seed (189), Corn, sweet (190), Peppers, sweet (191), Tomatoes (201), Alfalfa, all (300)

Minimum of 10 Acres.

TERN, INTERIOR (POPULATION) LEAST	Laridae	Critical Habitat	Bird

Indiana (19species)

BAT, GRAY	Vespertilionidae	Critical Habitat	Mammal
BAT, INDIANA	Vespertilionidae	Critical Habitat	Mammal
BUTTERFLY, KARNER BLUE	Lycaenidae	Critical Habitat	Insect
BUTTERFLY, MITCHELL'S SATYR	Nymphalidae	Critical Habitat	Insect
CLOVER, RUNNING BUFFALO	Fabaceae	Critical Habitat	Plant
CLUBSHELL	Unionidae	Critical Habitat	Clam
EAGLE, BALD	Accipitridae	Critical Habitat	Bird
FANSHELL	Unionidae	Critical Habitat	Clam
MUSSEL, RING PINK (=GOLF STICK PEARLY)	Unionidae	Critical Habitat	Clam
PEARLYMUSSEL, ORANGE-FOOTED	Unionidae	Critical Habitat	Clam
PEARLYMUSSEL, PINK MUCKET	Unionidae	Critical Habitat	Clam
PEARLYMUSSEL, TUBERCLED-BLOSSOM	Unionidae	Critical Habitat	Clam
PEARLYMUSSEL, WHITE CAT'S PAW	Unionidae	Critical Habitat	Clam
PEARLYMUSSEL, WHITE WARTYBACK	Unionidae	Critical Habitat	Clam
PIGTOE, ROUGH	Unionidae	Critical Habitat	Clam
POCKETBOOK, FAT	Unionidae	Critical Habitat	Clam
SNAKE, NORTHERN COPPERBELLY WATER	Colubridae	Critical Habitat	Reptile
TERN, INTERIOR (POPULATION) LEAST	Laridae	Critical Habitat	Bird
THISTLE, PITCHER'S	Asteraceae	Critical Habitat	Plant

Iowa (15species)

BAT, INDIANA	Vespertilionidae	Critical Habitat	Mammal
BUSH-CLOVER, PRAIRIE	Fabaceae	Critical Habitat	Plant

Species Details by State for Preliminary Assessment

Alfalfa hay (1), Alfalfa seed (2), Apples (5), Broccoli (22), Corn cut for dry fodder, hogged or graze (40), Corn for grain or seed (41), Corn for silage or green chop (42), Cotton (43), Grapes (76), Peppers, hot (92), Lettuce and romaine (105), Peanuts (143), Pears (144), Corn, pop (153), Soybeans (176), Corn, sweet, for seed (189), Corn, sweet (190), Peppers, sweet (191), Tomatoes (201), Alfalfa, all (300)

Minimum of 10 Acres.

EAGLE, BALD	Accipitridae	Critical Habitat	Bird
FERN, AMERICAN HART'S-TONGUE	Aspleniaceae	Critical Habitat	Plant
MILKWEED, MEAD'S	Asclepiadaceae	Critical Habitat	Plant
MONKSHOOD, NORTHERN WILD	Ranunculaceae	Critical Habitat	Plant
ORCHID, EASTERN PRAIRIE FRINGED	Orchidaceae	Critical Habitat	Plant
ORCHID, WESTERN PRAIRIE FRINGED	Orchidaceae	Critical Habitat	Plant
PEARLYMUSSEL, HIGGINS' EYE	Unionidae	Critical Habitat	Clam
PLOVER, PIPING	Charadriidae	Critical Habitat	Bird
POCKETBOOK, FAT	Unionidae	Critical Habitat	Clam
SHINER, TOPEKA	Cyprinidae	Critical Habitat	Fish
SNAIL, IOWA PLEISTOCENE	Discidae	Critical Habitat	Snail
STURGEON, PALLID	Acipenseridae	Critical Habitat	Fish
TERN, INTERIOR (POPULATION) LEAST	Laridae	Critical Habitat	Bird

Kansas (14species)

BAT, GRAY	Vespertilionidae	Critical Habitat	Mammal
BEETLE, AMERICAN BURYING	Silphidae	Critical Habitat	Insect
CRANE, WHOOPING	Gruidae	Critical Habitat	Bird
EAGLE, BALD	Accipitridae	Critical Habitat	Bird
FERRET, BLACK-FOOTED	Mustelidae	Critical Habitat	Mammal
MADTOM, NEOSHO	Ictaluridae	Critical Habitat	Fish
MILKWEED, MEAD'S	Asclepiadaceae	Critical Habitat	Plant
ORCHID, WESTERN PRAIRIE FRINGED	Orchidaceae	Critical Habitat	Plant
PLOVER, MOUNTAIN	Charadriidae	Critical Habitat	Bird
PLOVER, PIPING	Charadriidae	Critical Habitat	Bird
SHINER, ARKANSAS RIVER	Cyprinidae	Critical Habitat	Fish

SHINER, TOPEKA	Cyprinidae	Critical Habitat	Fish
STURGEON, PALLID	Acipenseridae	Critical Habitat	Fish
TERN, INTERIOR (POPULATION) LEAST	Laridae	Critical Habitat	Bird

Kentucky (43species)

BAT, GRAY	Vespertilionidae	Critical Habitat	Mammal
BAT, INDIANA	Vespertilionidae	Critical Habitat	Mammal
BAT, VIRGINIA BIG-EARED	Vespertilionidae	Critical Habitat	Mammal
CLOVER, RUNNING BUFFALO	Fabaceae	Critical Habitat	Plant
CLUBSHELL	Unionidae	Critical Habitat	Clam
COMBSHELL, CUMBERLAND	Unionidae	Critical Habitat	Clam
DACE, BLACKSIDE	Cyprinidae	Critical Habitat	Fish
DARTER, BLUEMASK (=JEWEL)	Percidae	Critical Habitat	Fish
DARTER, RELICT	Percidae	Critical Habitat	Fish
EAGLE, BALD	Accipitridae	Critical Habitat	Bird
ELKTOE, CUMBERLAND	Unionidae	Critical Habitat	Clam
FANSHELL	Unionidae	Critical Habitat	Clam
GOLDENROD, SHORT'S	Asteraceae	Critical Habitat	Plant
GOLDENROD, WHITE-HAIRED	Asteraceae	Critical Habitat	Plant
MUSSEL, OYSTER	Unionidae	Critical Habitat	Clam
MUSSEL, RING PINK (=GOLF STICK PEARLY)	Unionidae	Critical Habitat	Clam
PEARLYMUSSEL, APPALACHIAN MONKEYFACE	Unionidae	Critical Habitat	Clam
PEARLYMUSSEL, CRACKING	Unionidae	Critical Habitat	Clam
PEARLYMUSSEL, CUMBERLAND BEAN	Unionidae	Critical Habitat	Clam
PEARLYMUSSEL, DROMEDARY	Unionidae	Critical Habitat	Clam
PEARLYMUSSEL, LITTLE-WING	Unionidae	Critical Habitat	Clam

PEARLYMUSSEL, ORANGE-FOOTED	Unionidae	Critical Habitat	Clam
PEARLYMUSSEL, PINK MUCKET	Unionidae	Critical Habitat	Clam
PEARLYMUSSEL, PURPLE CAT'S PAW	Unionidae	Critical Habitat	Clam
PEARLYMUSSEL, TUBERCLED-BLOSSOM	Unionidae	Critical Habitat	Clam
PEARLYMUSSEL, WHITE WARTYBACK	Unionidae	Critical Habitat	Clam
PEARLYMUSSEL, YELLOW-BLOSSOM	Unionidae	Critical Habitat	Clam
PIGTOE, ROUGH	Unionidae	Critical Habitat	Clam
POCKETBOOK, FAT	Unionidae	Critical Habitat	Clam
POTATO-BEAN, PRICE'S	Fabaceae	Critical Habitat	Plant
RIFFLESHELL, NORTHERN	Unionidae	Critical Habitat	Clam
RIFFLESHELL, TAN	Unionidae	Critical Habitat	Clam
ROCK-CRESS, LARGE (=BRAUN'S)	Brassicaceae	Critical Habitat	Plant
ROCK-CRESS, SMALL	Brassicaceae	Critical Habitat	Plant
ROSEMARY, CUMBERLAND	Lamiaceae	Critical Habitat	Plant
SANDWORT, CUMBERLAND	Caryophyllaceae	Critical Habitat	Plant
SHINER, PALEZONE	Cyprinidae	Critical Habitat	Fish
SHRIMP, KENTUCKY CAVE	Atyidae	Critical Habitat	Crustacean
SPIRAEA, VIRGINIA	Rosaceae	Critical Habitat	Plant
STURGEON, PALLID	Acipenseridae	Critical Habitat	Fish
SUNFLOWER, EGGERT'S	Asteraceae	Critical Habitat	Plant
TERN, INTERIOR (POPULATION) LEAST	Laridae	Critical Habitat	Bird
WOODPECKER, RED-COCKADED	Picidae	Critical Habitat	Bird

Louisiana (16species)

BEAR, AMERICAN BLACK	Ursidae	Critical Habitat	Mammal
BEAR, LOUISIANA BLACK	Ursidae	Critical Habitat	Mammal

EAGLE, BALD	Accipitridae	Critical Habitat	Bird
HEELSPLITTER, INFLATED	Unionidae	Critical Habitat	Clam
PEARLSHELL, LOUISIANA	Margaritiferidae	Critical Habitat	Clam
PELICAN, BROWN	Pelicanidae	Critical Habitat	Bird
PLOVER, PIPING	Charadriidae	Critical Habitat	Bird
QUILLWORT, LOUISIANA	Isoetaceae	Critical Habitat	Plant
STURGEON, GULF	Acipenseridae	Critical Habitat	Fish
STURGEON, PALLID	Acipenseridae	Critical Habitat	Fish
TERN, CALIFORNIA LEAST	Laridae	Critical Habitat	Bird
TERN, INTERIOR (POPULATION) LEAST	Laridae	Critical Habitat	Bird
TORTOISE, GOPHER	Testudinidae	Critical Habitat	Reptile
TURTLE, LOGGERHEAD SEA	Cheloniidae	Critical Habitat	Reptile
TURTLE, RINGED SAWBACK	Emydidae	Critical Habitat	Reptile
WOODPECKER, RED-COCKADED	Picidae	Critical Habitat	Bird

Maine (10species)

EAGLE, BALD	Accipitridae	Critical Habitat	Bird
LOUSEWORT, FURBISH	Scrophulariaceae	Critical Habitat	Plant
LYNX, CANADA	Felidae	Critical Habitat	Mammal
ORCHID, EASTERN PRAIRIE FRINGED	Orchidaceae	Critical Habitat	Plant
PLOVER, PIPING	Charadriidae	Critical Habitat	Bird
POGONIA, SMALL WHORLED	Orchidaceae	Critical Habitat	Plant
SALMON, ATLANTIC	Salmonidae	Critical Habitat	Fish
STURGEON, SHORTNOSE	Acipenseridae	Critical Habitat	Fish
TERN, ROSEATE	Laridae	Critical Habitat	Bird
WHALE, NORTHERN RIGHT	Balaenidae	Critical Habitat	Mammal

Species Details by State for Preliminary Assessment

Alfalfa hay (1), Alfalfa seed (2), Apples (5), Broccoli (22), Corn cut for dry fodder, hogged or graze (40), Corn for grain or seed (41), Corn for silage or green chop (42), Cotton (43), Grapes (76), Peppers, hot (92), Lettuce and romaine (105), Peanuts (143), Pears (144), Corn, pop (153), Soybeans (176), Corn, sweet, for seed (189), Corn, sweet (190), Peppers, sweet (191), Tomatoes (201), Alfalfa, all (300)

Minimum of 10 Acres.

Maryland (17species)

BAT, INDIANA	Vespertilionidae	Critical Habitat	Mammal
BEETLE, NORTHEASTERN BEACH TIGER	Cicindelidae	Critical Habitat	Insect
BEETLE, PURITAN TIGER	Cicindelidae	Critical Habitat	Insect
BULRUSH, NORTHEASTERN (=BARBED BRISTLE)	Cyperaceae	Critical Habitat	Plant
DARTER, MARYLAND	Percidae	Critical Habitat	Fish
DROPWORT, CANBY'S	Apiaceae	Critical Habitat	Plant
EAGLE, BALD	Accipitridae	Critical Habitat	Bird
GERARDIA, SANDPLAIN	Scrophulariaceae	Critical Habitat	Plant
HARPERELLA	Apiaceae	Critical Habitat	Plant
JOINT-VETCH, SENSITIVE	Fabaceae	Critical Habitat	Plant
MUSSEL, DWARF WEDGE	Unionidae	Critical Habitat	Clam
PINK, SWAMP	Liliaceae	Critical Habitat	Plant
PLOVER, PIPING	Charadriidae	Critical Habitat	Bird
SQUIRREL, DELMARVA PENINSULA FOX	Sciuridae	Critical Habitat	Mammal
STURGEON, SHORTNOSE	Acipenseridae	Critical Habitat	Fish
TURTLE, BOG (NORTHERN POPULATION)	Emydidae	Critical Habitat	Reptile
WHALE, NORTHERN RIGHT	Balaenidae	Critical Habitat	Mammal

Massachusetts (12species)

BAT, INDIANA	Vespertilionidae	Critical Habitat	Mammal
BEETLE, PURITAN TIGER	Cicindelidae	Critical Habitat	Insect
BULRUSH, NORTHEASTERN (=BARBED BRISTLE)	Cyperaceae	Critical Habitat	Plant
EAGLE, BALD	Accipitridae	Critical Habitat	Bird
GERARDIA, SANDPLAIN	Scrophulariaceae	Critical Habitat	Plant

Species Details by State for Preliminary Assessment

Alfalfa hay (1), Alfalfa seed (2), Apples (5), Broccoli (22), Corn cut for dry fodder, hogged or graze (40), Corn for grain or seed (41), Corn for silage or green chop (42), Cotton (43), Grapes (76), Peppers, hot (92), Lettuce and romaine (105), Peanuts (143), Pears (144), Corn, pop (153), Soybeans (176), Corn, sweet, for seed (189), Corn, sweet (190), Peppers, sweet (191), Tomatoes (201), Alfalfa, all (300)

Minimum of 10 Acres.

PLOVER, PIPING	Charadriidae	Critical Habitat	Bird
POGONIA, SMALL WHORLED	Orchidaceae	Critical Habitat	Plant
STURGEON, SHORTNOSE	Acipenseridae	Critical Habitat	Fish
TERN, ROSEATE	Laridae	Critical Habitat	Bird
TURTLE, BOG (NORTHERN POPULATION)	Emydidae	Critical Habitat	Reptile
TURTLE, PLYMOUTH RED-BELLIED	Emydidae	Critical Habitat	Reptile
WHALE, NORTHERN RIGHT	Balaenidae	Critical Habitat	Mammal

Michigan (18species)

BAT, INDIANA	Vespertilionidae	Critical Habitat	Mammal
BEETLE, HUNGERFORD'S CRAWLING WATER	Haliplidae	Critical Habitat	Insect
BUTTERFLY, KARNER BLUE	Lycaenidae	Critical Habitat	Insect
BUTTERFLY, MITCHELL'S SATYR	Nymphalidae	Critical Habitat	Insect
CLUBSHELL	Unionidae	Critical Habitat	Clam
EAGLE, BALD	Accipitridae	Critical Habitat	Bird
FERN, AMERICAN HART'S-TONGUE	Aspleniaceae	Critical Habitat	Plant
GOLDENROD, HOUGHTON'S	Asteraceae	Critical Habitat	Plant
IRIS, DWARF LAKE	Iridaceae	Critical Habitat	Plant
MONKEY-FLOWER, MICHIGAN	Scrophulariaceae	Critical Habitat	Plant
ORCHID, EASTERN PRAIRIE FRINGED	Orchidaceae	Critical Habitat	Plant
PLOVER, PIPING	Charadriidae	Critical Habitat	Bird
POGONIA, SMALL WHORLED	Orchidaceae	Critical Habitat	Plant
RIFFLESHELL, NORTHERN	Unionidae	Critical Habitat	Clam
SNAKE, NORTHERN COPPERBELLY WATER	Colubridae	Critical Habitat	Reptile
THISTLE, PITCHER'S	Asteraceae	Critical Habitat	Plant
WARBLER (WOOD), KIRTLAND'S	Parulidae	Critical Habitat	Bird

Species Details by State for Preliminary Assessment

Alfalfa hay (1), Alfalfa seed (2), Apples (5), Broccoli (22), Corn cut for dry fodder, hogged or graze (40), Corn for grain or seed (41), Corn for silage or green chop (42), Cotton (43), Grapes (76), Peppers, hot (92), Lettuce and romaine (105), Peanuts (143), Pears (144), Corn, pop (153), Soybeans (176), Corn, sweet, for seed (189), Corn, sweet (190), Peppers, sweet (191), Tomatoes (201), Alfalfa, all (300)

Minimum of 10 Acres.

WOLF, GRAY	Canidae	Critical Habitat	Mammal

Minnesota (9species)

BUSH-CLOVER, PRAIRIE	Fabaceae	Critical Habitat	Plant
EAGLE, BALD	Accipitridae	Critical Habitat	Bird
LILY, MINNESOTA TROUT	Liliaceae	Critical Habitat	Plant
MUSSEL, WINGED MAPLELEAF	Unionidae	Critical Habitat	Clam
ORCHID, WESTERN PRAIRIE FRINGED	Orchidaceae	Critical Habitat	Plant
PEARLYMUSSEL, HIGGINS' EYE	Unionidae	Critical Habitat	Clam
PLOVER, PIPING	Charadriidae	Critical Habitat	Bird
ROSEROOT, LEEDY'S	Crassulaceae	Critical Habitat	Plant
WOLF, GRAY	Canidae	Critical Habitat	Mammal

Mississippi (21species)

BEAR, LOUISIANA BLACK	Ursidae	Critical Habitat	Mammal
CLUBSHELL, BLACK (=CURTUS' MUSSEL)	Unionidae	Critical Habitat	Clam
COMBSHELL, SOUTHERN (=PENITENT MUSSEL)	Unionidae	Critical Habitat	Clam
CRANE, MISSISSIPPI SANDHILL	Gruidae	Critical Habitat	Bird
DARTER, BAYOU	Percidae	Critical Habitat	Fish
EAGLE, BALD	Accipitridae	Critical Habitat	Bird
FROG, DUSKY GOPHER (MISSISSIPPI DPS)	Ranidae	Critical Habitat	Amphibian
PELICAN, BROWN	Pelicanidae	Critical Habitat	Bird
PIGTOE, HEAVY (=JUDGE TAIT'S MUSSEL)	Unionidae	Critical Habitat	Clam
PLOVER, PIPING	Charadriidae	Critical Habitat	Bird
PONDBERRY	Lauraceae	Critical Habitat	Plant
POTATO-BEAN, PRICE'S	Fabaceae	Critical Habitat	Plant

Species Details by State for Preliminary Assessment

Alfalfa hay (1), Alfalfa seed (2), Apples (5), Broccoli (22), Corn cut for dry fodder, hogged or graze (40), Corn for grain or seed (41), Corn for silage or green chop (42), Cotton (43), Grapes (76), Peppers, hot (92), Lettuce and romaine (105), Peanuts (143), Pears (144), Corn, pop (153), Soybeans (176), Corn, sweet, for seed (189), Corn, sweet (190), Peppers, sweet (191), Tomatoes (201), Alfalfa, all (300)

Minimum of 10 Acres.

SNAKE, EASTERN INDIGO	Colubridae	Critical Habitat	Reptile
STURGEON, GULF	Acipenseridae	Critical Habitat	Fish
STURGEON, PALLID	Acipenseridae	Critical Habitat	Fish
TERN, INTERIOR (POPULATION) LEAST	Laridae	Critical Habitat	Bird
TORTOISE, GOPHER	Testudinidae	Critical Habitat	Reptile
TURTLE, LOGGERHEAD SEA	Cheloniidae	Critical Habitat	Reptile
TURTLE, RINGED SAWBACK	Emydidae	Critical Habitat	Reptile
TURTLE, YELLOW-BLOTCHED MAP	Emydidae	Critical Habitat	Reptile
WOODPECKER, RED-COCKADED	Picidae	Critical Habitat	Bird

Missouri (27species)

ASTER, DECURRENT FALSE	Asteraceae	Critical Habitat	Plant
BAT, GRAY	Vespertilionidae	Critical Habitat	Mammal
BAT, INDIANA	Vespertilionidae	Critical Habitat	Mammal
BEETLE, AMERICAN BURYING	Silphidae	Critical Habitat	Insect
BLADDERPOD, MISSOURI	Brassicaceae	Critical Habitat	Plant
CAVEFISH, OZARK	Amblyopsidae	Critical Habitat	Fish
CAVESNAIL, TUMBLING CREEK	Hydrobiidae	Critical Habitat	Snail
CHUB, HUMPBACK	Cyprinidae	Critical Habitat	Fish
CLOVER, RUNNING BUFFALO	Fabaceae	Critical Habitat	Plant
DARTER, NIANGUA	Percidae	Critical Habitat	Fish
EAGLE, BALD	Accipitridae	Critical Habitat	Bird
GEOCARPON MINIMUM	Caryophyllaceae	Critical Habitat	Plant
MADTOM, NEOSHO	Ictaluridae	Critical Habitat	Fish
MILKWEED, MEAD'S	Asclepiadaceae	Critical Habitat	Plant
MUSSEL, SCALESHELL	Unionidae	Critical Habitat	Clam

Species Details by State for Preliminary Assessment

Alfalfa hay (1), Alfalfa seed (2), Apples (5), Broccoli (22), Corn cut for dry fodder, hogged or graze (40), Corn for grain or seed (41), Corn for silage or green chop (42), Cotton (43), Grapes (76), Peppers, hot (92), Lettuce and romaine (105), Peanuts (143), Pears (144), Corn, pop (153), Soybeans (176), Corn, sweet, for seed (189), Corn, sweet (190), Peppers, sweet (191), Tomatoes (201), Alfalfa, all (300)

Minimum of 10 Acres.

ORCHID, WESTERN PRAIRIE FRINGED	Orchidaceae	Critical Habitat	Plant
PEARLYMUSSEL, CURTIS'	Unionidae	Critical Habitat	Clam
PEARLYMUSSEL, HIGGINS' EYE	Unionidae	Critical Habitat	Clam
PEARLYMUSSEL, PINK MUCKET	Unionidae	Critical Habitat	Clam
PLOVER, PIPING	Charadriidae	Critical Habitat	Bird
POCKETBOOK, FAT	Unionidae	Critical Habitat	Clam
PONDBERRY	Lauraceae	Critical Habitat	Plant
SHINER, TOPEKA	Cyprinidae	Critical Habitat	Fish
SNEEZEWEED, VIRGINIA	Asteraceae	Critical Habitat	Plant
STURGEON, GULF	Acipenseridae	Critical Habitat	Fish
STURGEON, PALLID	Acipenseridae	Critical Habitat	Fish
TERN, INTERIOR (POPULATION) LEAST	Laridae	Critical Habitat	Bird

Montana (13species)

BEAR, GRIZZLY	Ursidae	Critical Habitat	Mammal
CATCHFLY, SPALDING'S	Caryophyllaceae	Critical Habitat	Plant
CRANE, WHOOPING	Gruidae	Critical Habitat	Bird
EAGLE, BALD	Accipitridae	Critical Habitat	Bird
FERRET, BLACK-FOOTED	Mustelidae	Critical Habitat	Mammal
HOWELLIA, WATER	Campanulaceae	Critical Habitat	Plant
PLOVER, MOUNTAIN	Charadriidae	Critical Habitat	Bird
PLOVER, PIPING	Charadriidae	Critical Habitat	Bird
STURGEON, PALLID	Acipenseridae	Critical Habitat	Fish
STURGEON, WHITE	Acipenseridae	Critical Habitat	Fish
TERN, INTERIOR (POPULATION) LEAST	Laridae	Critical Habitat	Bird
TROUT, BULL	Salmonidae	Critical Habitat	Fish

WOLF, GRAY	Canidae	Critical Habitat	Mammal

Nebraska (12species)

BUTTERFLY PLANT, COLORADO	Onagraceae	Critical Habitat	Plant
CLUBSHELL, SOUTHERN	Unionidae	Critical Habitat	Clam
CRANE, WHOOPING	Gruidae	Critical Habitat	Bird
EAGLE, BALD	Accipitridae	Critical Habitat	Bird
FERRET, BLACK-FOOTED	Mustelidae	Critical Habitat	Mammal
ORCHID, WESTERN PRAIRIE FRINGED	Orchidaceae	Critical Habitat	Plant
PENSTEMON, BLOWOUT	Scrophulariaceae	Critical Habitat	Plant
PLOVER, MOUNTAIN	Charadriidae	Critical Habitat	Bird
PLOVER, PIPING	Charadriidae	Critical Habitat	Bird
SHINER, TOPEKA	Cyprinidae	Critical Habitat	Fish
STURGEON, PALLID	Acipenseridae	Critical Habitat	Fish
TERN, INTERIOR (POPULATION) LEAST	Laridae	Critical Habitat	Bird

Nevada (38species)

BLAZING STAR, ASH MEADOWS	Loasaceae	Critical Habitat	Plant
BUCKWHEAT, STEAMBOAT	Polygonaceae	Critical Habitat	Plant
CENTAURY, SPRING-LOVING	Gentianaceae	Critical Habitat	Plant
CHUB, BONYTAIL	Cyprinidae	Critical Habitat	Fish
CHUB, PAHRANAGAT ROUNDTAIL	Cyprinidae	Critical Habitat	Fish
CHUB, VIRGIN RIVER	Cyprinidae	Critical Habitat	Fish
CUI-UI	Catostomidae	Critical Habitat	Fish
DACE, ASH MEADOWS SPECKLED	Cyprinidae	Critical Habitat	Fish
DACE, CLOVER VALLEY SPECKLED	Cyprinidae	Critical Habitat	Fish

Species Details by State for Preliminary Assessment

Alfalfa hay (1), Alfalfa seed (2), Apples (5), Broccoli (22), Corn cut for dry fodder, hogged or graze (40), Corn for grain or seed (41), Corn for silage or green chop (42), Cotton (43), Grapes (76), Peppers, hot (92), Lettuce and romaine (105), Peanuts (143), Pears (144), Corn, pop (153), Soybeans (176), Corn, sweet, for seed (189), Corn, sweet (190), Peppers, sweet (191), Tomatoes (201), Alfalfa, all (300)

Minimum of 10 Acres.

DACE, DESERT	Cyprinidae	Critical Habitat	Fish
DACE, INDEPENDENCE VALLEY SPECKLED	Cyprinidae	Critical Habitat	Fish
DACE, MOAPA	Cyprinidae	Critical Habitat	Fish
EAGLE, BALD	Accipitridae	Critical Habitat	Bird
GUMPLANT, ASH MEADOWS	Asteraceae	Critical Habitat	Plant
IVESIA, ASH MEADOWS	Rosaceae	Critical Habitat	Plant
LADIES'-TRESSES, UTE	Orchidaceae	Critical Habitat	Plant
MILK-VETCH, ASH MEADOWS	Fabaceae	Critical Habitat	Plant
NAUCORID, ASH MEADOWS	Naucoridae	Critical Habitat	Insect
NITERWORT, AMARGOSA	Chenopodiaceae	Critical Habitat	Plant
PLOVER, MOUNTAIN	Charadriidae	Critical Habitat	Bird
POOLFISH, PAHRUMP (= PAHRUMP KILLIFISH)	Goodeniaceae	Critical Habitat	Fish
PUPFISH, ASH MEADOWS AMARGOSA	Cyprinodontidae	Critical Habitat	Fish
PUPFISH, DEVILS HOLE	Cyprinodontidae	Critical Habitat	Fish
PUPFISH, WARM SPRINGS	Cyprinodontidae	Critical Habitat	Fish
RAIL, YUMA CLAPPER	Rallidae	Critical Habitat	Bird
SKIPPER, CARSON WANDERING	Hesperiidae	Critical Habitat	Insect
SPINEDACE, BIG SPRING	Cyprinidae	Critical Habitat	Fish
SPINEDACE, WHITE RIVER	Cyprinidae	Critical Habitat	Fish
SPRINGFISH, HIKO WHITE RIVER	Cyprinodontidae	Critical Habitat	Fish
SPRINGFISH, RAILROAD VALLEY	Cyprinodontidae	Critical Habitat	Fish
SPRINGFISH, WHITE RIVER	Cyprinodontidae	Critical Habitat	Fish
SUCKER, RAZORBACK	Catostomidae	Critical Habitat	Fish
SUCKER, WARNER	Catostomidae	Critical Habitat	Fish
SUNRAY, ASH MEADOWS	Asteraceae	Critical Habitat	Plant
TORTOISE, DESERT	Testudinidae	Critical Habitat	Reptile

Species Details by State for Preliminary Assessment

Alfalfa hay (1), Alfalfa seed (2), Apples (5), Broccoli (22), Corn cut for dry fodder, hogged or graze (40), Corn for grain or seed (41), Corn for silage or green chop (42), Cotton (43), Grapes (76), Peppers, hot (92), Lettuce and romaine (105), Peanuts (143), Pears (144), Corn, pop (153), Soybeans (176), Corn, sweet, for seed (189), Corn, sweet (190), Peppers, sweet (191), Tomatoes (201), Alfalfa, all (300)

Minimum of 10 Acres.

TROUT, BULL	Salmonidae	Critical Habitat	Fish
TROUT, LAHONTAN CUTTHROAT	Salmonidae	Critical Habitat	Fish
WOUNDFIN	Cyprinidae	Critical Habitat	Fish

New Hampshire (6species)

BAT, INDIANA	Vespertilionidae	Critical Habitat	Mammal
BUTTERFLY, KARNER BLUE	Lycaenidae	Critical Habitat	Insect
EAGLE, BALD	Accipitridae	Critical Habitat	Bird
MILK-VETCH, JESUP'S	Fabaceae	Critical Habitat	Plant
MUSSEL, DWARF WEDGE	Unionidae	Critical Habitat	Clam
POGONIA, SMALL WHORLED	Orchidaceae	Critical Habitat	Plant

New Jersey (12species)

BAT, INDIANA	Vespertilionidae	Critical Habitat	Mammal
BEAKED-RUSH, KNIESKERN'S	Cyperaceae	Critical Habitat	Plant
CHAFFSEED, AMERICAN	Scrophulariaceae	Critical Habitat	Plant
CURLEW, ESKIMO	Scolopacidae	Critical Habitat	Bird
EAGLE, BALD	Accipitridae	Critical Habitat	Bird
JOINT-VETCH, SENSITIVE	Fabaceae	Critical Habitat	Plant
PINK, SWAMP	Liliaceae	Critical Habitat	Plant
PLOVER, PIPING	Charadriidae	Critical Habitat	Bird
POGONIA, SMALL WHORLED	Orchidaceae	Critical Habitat	Plant
STURGEON, SHORTNOSE	Acipenseridae	Critical Habitat	Fish
TURTLE, BOG (NORTHERN POPULATION)	Emydidae	Critical Habitat	Reptile
WHALE, NORTHERN RIGHT	Balaenidae	Critical Habitat	Mammal

Species Details by State for Preliminary Assessment

Alfalfa hay (1), Alfalfa seed (2), Apples (5), Broccoli (22), Corn cut for dry fodder, hogged or graze (40), Corn for grain or seed (41), Corn for silage or green chop (42), Cotton (43), Grapes (76), Peppers, hot (92), Lettuce and romaine (105), Peanuts (143), Pears (144), Corn, pop (153), Soybeans (176), Corn, sweet, for seed (189), Corn, sweet (190), Peppers, sweet (191), Tomatoes (201), Alfalfa, all (300)

Minimum of 10 Acres.

New Mexico (45species)

Amphipod, Noel's	Gammaridae	Critical Habitat	Crustacean
BAT, LESSER (=SANBORN'S) LONG-NOSED	Phyllostomidae	Critical Habitat	Mammal
BAT, MEXICAN LONG-NOSED	Phyllostomidae	Critical Habitat	Mammal
CACTUS, KNOWLTON	Cactaceae	Critical Habitat	Plant
CACTUS, KUENZLER HEDGEHOG	Cactaceae	Critical Habitat	Plant
CACTUS, LEE PINCUSHION	Cactaceae	Critical Habitat	Plant
CACTUS, MESA VERDE	Cactaceae	Critical Habitat	Plant
CACTUS, SNEED PINCUSHION	Cactaceae	Critical Habitat	Plant
CHUB, CHIHUAHUA	Cyprinidae	Critical Habitat	Fish
DOCK, CHIRICAHUA	Polygonaceae	Critical Habitat	Plant
EAGLE, BALD	Accipitridae	Critical Habitat	Bird
FALCON, NORTHERN APLOMADO	Falconidae	Critical Habitat	Bird
FERRET, BLACK-FOOTED	Mustelidae	Critical Habitat	Mammal
FLEABANE, ZUNI	Asteraceae	Critical Habitat	Plant
FLYCATCHER, SOUTHWESTERN WILLOW	Tyrannidae	Critical Habitat	Bird
FROG, CHIRICAHUA LEOPARD	Ranidae	Critical Habitat	Amphibian
GAMBUSIA, PECOS	Poeciliidae	Critical Habitat	Fish
IPOMOPSIS, HOLY GHOST	Polemoniaceae	Critical Habitat	Plant
ISOPOD, SOCORRO	Sphaeromatidae	Critical Habitat	Crustacean
JAGUAR	Felidae	Critical Habitat	Mammal
MILK-VETCH, MANCOS	Fabaceae	Critical Habitat	Plant
MINNOW, LOACH	Cyprinidae	Critical Habitat	Fish
MINNOW, RIO GRANDE SILVERY	Cyprinidae	Critical Habitat	Fish
OWL, MEXICAN SPOTTED	Strigidae	Critical Habitat	Bird

Species Details by State for Preliminary Assessment

Alfalfa hay (1), Alfalfa seed (2), Apples (5), Broccoli (22), Corn cut for dry fodder, hogged or graze (40), Corn for grain or seed (41), Corn for silage or green chop (42), Cotton (43), Grapes (76), Peppers, hot (92), Lettuce and romaine (105), Peanuts (143), Pears (144), Corn, pop (153), Soybeans (176), Corn, sweet, for seed (189), Corn, sweet (190), Peppers, sweet (191), Tomatoes (201), Alfalfa, all (300)

Minimum of 10 Acres.

PENNYROYAL, TODSEN'S	Lamiaceae	Critical Habitat	Plant
PLOVER, MOUNTAIN	Charadriidae	Critical Habitat	Bird
POPPY, SACRAMENTO PRICKLY	Papaveraceae	Critical Habitat	Plant
RATTLESNAKE, NEW MEXICAN RIDGE-NOSED	Crotalidae	Critical Habitat	Reptile
SHINER, BEAUTIFUL	Cyprinidae	Critical Habitat	Fish
SHINER, PECOS BLUNTNOSE	Cyprinidae	Critical Habitat	Fish
Snail, Koster's Tryonia	Hydrobiidae	Critical Habitat	Snail
Snail, Pecos Assiminea		Critical Habitat	Snail
SPIKEDACE	Cyprinidae	Critical Habitat	Fish
SPRINGSNAIL, ALAMOSA	Hydrobiidae	Critical Habitat	Snail
Springsnail, Roswell	Hydrobiidae	Critical Habitat	Snail
SPRINGSNAIL, SOCORRO	Hydrobiidae	Critical Habitat	Snail
SQUAWFISH, COLORADO	Cyprinidae	Critical Habitat	Fish
SUCKER, RAZORBACK	Catostomidae	Critical Habitat	Fish
SUNFLOWER, PECOS	Asteraceae	Critical Habitat	Plant
TERN, INTERIOR (POPULATION) LEAST	Laridae	Critical Habitat	Bird
THISTLE, SACRAMENTO MOUNTAINS	Asteraceae	Critical Habitat	Plant
TOPMINNOW, GILA (YAQUI)	Poeciliidae	Critical Habitat	Fish
TROUT, GILA	Salmonidae	Critical Habitat	Fish
WILD-BUCKWHEAT, GYPSUM	Polygonaceae	Critical Habitat	Plant
WOLF, GRAY	Canidae	Critical Habitat	Mammal

New York (16species)

AMARANTH, SEABEACH	Amaranthaceae	Critical Habitat	Plant
BAT, INDIANA	Vespertilionidae	Critical Habitat	Mammal
BUTTERFLY, KARNER BLUE	Lycaenidae	Critical Habitat	Insect

Species Details by State for Preliminary Assessment

Alfalfa hay (1), Alfalfa seed (2), Apples (5), Broccoli (22), Corn cut for dry fodder, hogged or graze (40), Corn for grain or seed (41), Corn for silage or green chop (42), Cotton (43), Grapes (76), Peppers, hot (92), Lettuce and romaine (105), Peanuts (143), Pears (144), Corn, pop (153), Soybeans (176), Corn, sweet, for seed (189), Corn, sweet (190), Peppers, sweet (191), Tomatoes (201), Alfalfa, all (300)

Minimum of 10 Acres.

EAGLE, BALD	Accipitridae	Critical Habitat	Bird
FERN, AMERICAN HART'S-TONGUE	Aspleniaceae	Critical Habitat	Plant
GERARDIA, SANDPLAIN	Scrophulariaceae	Critical Habitat	Plant
MONKSHOOD, NORTHERN WILD	Ranunculaceae	Critical Habitat	Plant
MUSSEL, DWARF WEDGE	Unionidae	Critical Habitat	Clam
PLOVER, PIPING	Charadriidae	Critical Habitat	Bird
POGONIA, SMALL WHORLED	Orchidaceae	Critical Habitat	Plant
ROSEROOT, LEEDY'S	Crassulaceae	Critical Habitat	Plant
SNAIL, CHITTENANGO OVATE AMBER	Succineidae	Critical Habitat	Snail
STURGEON, SHORTNOSE	Acipenseridae	Critical Habitat	Fish
TERN, ROSEATE	Laridae	Critical Habitat	Bird
TURTLE, BOG (NORTHERN POPULATION)	Emydidae	Critical Habitat	Reptile
WHALE, NORTHERN RIGHT	Balaenidae	Critical Habitat	Mammal

North Carolina (52species)

AMARANTH, SEABEACH	Amaranthaceae	Critical Habitat	Plant
ARROWHEAD, BUNCHED	Alismataceae	Critical Habitat	Plant
AVENS, SPREADING	Rosaceae	Critical Habitat	Plant
BAT, INDIANA	Vespertilionidae	Critical Habitat	Mammal
BAT, VIRGINIA BIG-EARED	Vespertilionidae	Critical Habitat	Mammal
BITTERCRESS, SMALL-ANTHERED	Brassicaceae	Critical Habitat	Plant
BLAZING STAR, HELLER'S	Asteraceae	Critical Habitat	Plant
BLUET, ROAN MOUNTAIN	Rubiaceae	Critical Habitat	Plant
BUTTERFLY, SAINT FRANCIS' SATYR	Nymphalidae	Critical Habitat	Insect
CAHOW	Procellariidae	Critical Habitat	Bird
CHAFFSEED, AMERICAN	Scrophulariaceae	Critical Habitat	Plant

Species Details by State for Preliminary Assessment

Alfalfa hay (1), Alfalfa seed (2), Apples (5), Broccoli (22), Corn cut for dry fodder, hogged or graze (40), Corn for grain or seed (41), Corn for silage or green chop (42), Cotton (43), Grapes (76), Peppers, hot (92), Lettuce and romaine (105), Peanuts (143), Pears (144), Corn, pop (153), Soybeans (176), Corn, sweet, for seed (189), Corn, sweet (190), Peppers, sweet (191), Tomatoes (201), Alfalfa, all (300)

Minimum of 10 Acres.

CHUB, SPOTFIN	Cyprinidae	Critical Habitat	Fish
CONEFLOWER, SMOOTH	Asteraceae	Critical Habitat	Plant
DROPWORT, CANBY'S	Apiaceae	Critical Habitat	Plant
EAGLE, BALD	Accipitridae	Critical Habitat	Bird
ELKTOE, APPALACHIAN	Unionidae	Critical Habitat	Clam
GOLDENROD, BLUE RIDGE	Asteraceae	Critical Habitat	Plant
HARPERELLA	Apiaceae	Critical Habitat	Plant
HEARTLEAF, DWARF-FLOWERED	Aristolochiaceae	Critical Habitat	Plant
HEATHER, MOUNTAIN GOLDEN	Cistaceae	Critical Habitat	Plant
HEELSPLITTER, CAROLINA	Unionidae	Critical Habitat	Clam
IRISETTE, WHITE	Iridaceae	Critical Habitat	Plant
JOINT-VETCH, SENSITIVE	Fabaceae	Critical Habitat	Plant
LICHEN, ROCK GNOME	Cladoniaceae	Critical Habitat	Plant
LOOSESTRIFE, ROUGH-LEAVED	Primulaceae	Critical Habitat	Plant
MANATEE, WEST INDIAN (FLORIDA)	Trichechidae	Critical Habitat	Mammal
MEADOWRUE, COOLEY'S	Ranunculaceae	Critical Habitat	Plant
MUSSEL, DWARF WEDGE	Unionidae	Critical Habitat	Clam
PEARLYMUSSEL, LITTLE-WING	Unionidae	Critical Habitat	Clam
PINK, SWAMP	Liliaceae	Critical Habitat	Plant
PITCHER-PLANT, GREEN	Sarraceniaceae	Critical Habitat	Plant
PITCHER-PLANT, MOUNTAIN SWEET	Sarraceniaceae	Critical Habitat	Plant
PLOVER, PIPING	Charadriidae	Critical Habitat	Bird
POGONIA, SMALL WHORLED	Orchidaceae	Critical Habitat	Plant
PONDBERRY	Lauraceae	Critical Habitat	Plant
SEDGE, GOLDEN	Cyperaceae	Critical Habitat	Plant
SHINER, CAPE FEAR	Cyprinidae	Critical Habitat	Fish

Species Details by State for Preliminary Assessment

Alfalfa hay (1), Alfalfa seed (2), Apples (5), Broccoli (22), Corn cut for dry fodder, hogged or graze (40), Corn for grain or seed (41), Corn for silage or green chop (42), Cotton (43), Grapes (76), Peppers, hot (92), Lettuce and romaine (105), Peanuts (143), Pears (144), Corn, pop (153), Soybeans (176), Corn, sweet, for seed (189), Corn, sweet (190), Peppers, sweet (191), Tomatoes (201), Alfalfa, all (300)

Minimum of 10 Acres.

SILVERSIDE, WACCAMAW	Atherinidae	Critical Habitat	Fish
SNAIL, NOONDAY	Polygyridae	Critical Habitat	Snail
SPIDER, SPRUCE-FIR MOSS	Dipluridae	Critical Habitat	Arachnid
SPINYMUSSEL, TAR RIVER	Unionidae	Critical Habitat	Clam
SPIRAEA, VIRGINIA	Rosaceae	Critical Habitat	Plant
SQUIRREL, CAROLINA NORTHERN FLYING	Sciuridae	Critical Habitat	Mammal
STORK, WOOD	Ciconiidae	Critical Habitat	Bird
STURGEON, SHORTNOSE	Acipenseridae	Critical Habitat	Fish
SUMAC, MICHAUX'S	Anacardiaceae	Critical Habitat	Plant
SUNFLOWER, SCHWEINITZ'S	Asteraceae	Critical Habitat	Plant
TERN, ROSEATE	Laridae	Critical Habitat	Bird
TURTLE, LOGGERHEAD SEA	Cheloniidae	Critical Habitat	Reptile
WHALE, NORTHERN RIGHT	Balaenidae	Critical Habitat	Mammal
WOLF, RED	Canidae	Critical Habitat	Mammal
WOODPECKER, RED-COCKADED	Picidae	Critical Habitat	Bird

North Dakota (6species)

CRANE, WHOOPING	Gruidae	Critical Habitat	Bird
EAGLE, BALD	Accipitridae	Critical Habitat	Bird
ORCHID, WESTERN PRAIRIE FRINGED	Orchidaceae	Critical Habitat	Plant
PLOVER, PIPING	Charadriidae	Critical Habitat	Bird
STURGEON, PALLID	Acipenseridae	Critical Habitat	Fish
TERN, INTERIOR (POPULATION) LEAST	Laridae	Critical Habitat	Bird

Ohio (17species)

BAT, INDIANA	Vespertilionidae	Critical Habitat	Mammal

Species Details by State for Preliminary Assessment

Alfalfa hay (1), Alfalfa seed (2), Apples (5), Broccoli (22), Corn cut for dry fodder, hogged or graze (40), Corn for grain or seed (41), Corn for silage or green chop (42), Cotton (43), Grapes (76), Peppers, hot (92), Lettuce and romaine (105), Peanuts (143), Pears (144), Corn, pop (153), Soybeans (176), Corn, sweet, for seed (189), Corn, sweet (190), Peppers, sweet (191), Tomatoes (201), Alfalfa, all (300)

Minimum of 10 Acres.

CLOVER, RUNNING BUFFALO	Fabaceae	Critical Habitat	Plant
CLUBSHELL	Unionidae	Critical Habitat	Clam
DAISY, LAKESIDE	Asteraceae	Critical Habitat	Plant
DRAGONFLY, HINES EMERALD	Libellulidae	Critical Habitat	Insect
EAGLE, BALD	Accipitridae	Critical Habitat	Bird
FANSHELL	Unionidae	Critical Habitat	Clam
MADTOM, SCIOTO	Ictaluridae	Critical Habitat	Fish
MONKSHOOD, NORTHERN WILD	Ranunculaceae	Critical Habitat	Plant
ORCHID, EASTERN PRAIRIE FRINGED	Orchidaceae	Critical Habitat	Plant
PEARLYMUSSEL, PINK MUCKET	Unionidae	Critical Habitat	Clam
PEARLYMUSSEL, PURPLE CAT'S PAW	Unionidae	Critical Habitat	Clam
PEARLYMUSSEL, WHITE CAT'S PAW	Unionidae	Critical Habitat	Clam
PLOVER, PIPING	Charadriidae	Critical Habitat	Bird
RIFFLESHELL, NORTHERN	Unionidae	Critical Habitat	Clam
SNAKE, LAKE ERIE WATER	Colubridae	Critical Habitat	Reptile
SNAKE, NORTHERN COPPERBELLY WATER	Colubridae	Critical Habitat	Reptile

Oklahoma (20species)

BAT, GRAY	Vespertilionidae	Critical Habitat	Mammal
BAT, INDIANA	Vespertilionidae	Critical Habitat	Mammal
BAT, OZARK BIG-EARED	Vespertilionidae	Critical Habitat	Mammal
BEETLE, AMERICAN BURYING	Silphidae	Critical Habitat	Insect
CAVEFISH, OZARK	Amblyopsidae	Critical Habitat	Fish
CRANE, WHOOPING	Gruidae	Critical Habitat	Bird
CURLEW, ESKIMO	Scolopacidae	Critical Habitat	Bird
DARTER, LEOPARD	Percidae	Critical Habitat	Fish

Species Details by State for Preliminary Assessment

Alfalfa hay (1), Alfalfa seed (2), Apples (5), Broccoli (22), Corn cut for dry fodder, hogged or graze (40), Corn for grain or seed (41), Corn for silage or green chop (42), Cotton (43), Grapes (76), Peppers, hot (92), Lettuce and romaine (105), Peanuts (143), Pears (144), Corn, pop (153), Soybeans (176), Corn, sweet, for seed (189), Corn, sweet (190), Peppers, sweet (191), Tomatoes (201), Alfalfa, all (300)

Minimum of 10 Acres.

EAGLE, BALD	Accipitridae	Critical Habitat	Bird
MADTOM, NEOSHO	Ictaluridae	Critical Habitat	Fish
MUSSEL, SCALESHELL	Unionidae	Critical Habitat	Clam
ORCHID, EASTERN PRAIRIE FRINGED	Orchidaceae	Critical Habitat	Plant
ORCHID, WESTERN PRAIRIE FRINGED	Orchidaceae	Critical Habitat	Plant
PLOVER, MOUNTAIN	Charadriidae	Critical Habitat	Bird
PLOVER, PIPING	Charadriidae	Critical Habitat	Bird
ROCK-POCKETBOOK, OUACHITA (=WHEELER'S PM)	Unionidae	Critical Habitat	Clam
SHINER, ARKANSAS RIVER	Cyprinidae	Critical Habitat	Fish
TERN, INTERIOR (POPULATION) LEAST	Laridae	Critical Habitat	Bird
VIREO, BLACK-CAPPED	Vireonidae	Critical Habitat	Bird
WOODPECKER, RED-COCKADED	Picidae	Critical Habitat	Bird

Oregon (46species)

BUTTERFLY, FENDER'S BLUE	Lycaenidae	Critical Habitat	Insect
BUTTERFLY, OREGON SILVERSPOT	Nymphalidae	Critical Habitat	Insect
CATCHFLY, SPALDING'S	Caryophyllaceae	Critical Habitat	Plant
CHECKER-MALLOW, NELSON'S	Malvaceae	Critical Habitat	Plant
CHUB, BORAX LAKE	Cyprinidae	Critical Habitat	Fish
CHUB, HUTTON TUI	Cyprinidae	Critical Habitat	Fish
CHUB, OREGON	Cyprinidae	Critical Habitat	Fish
DACE, FOSKETT SPECKLED	Cyprinidae	Critical Habitat	Fish
DAISY, WILLAMETTE	Asteraceae	Critical Habitat	Plant
DEER, COLUMBIAN WHITE-TAILED	Cervidae	Critical Habitat	Mammal
EAGLE, BALD	Accipitridae	Critical Habitat	Bird
FOUR-O'CLOCK, MACFARLANE'S	Nyctaginaceae	Critical Habitat	Plant

Species Details by State for Preliminary Assessment

Alfalfa hay (1), Alfalfa seed (2), Apples (5), Broccoli (22), Corn cut for dry fodder, hogged or graze (40), Corn for grain or seed (41), Corn for silage or green chop (42), Cotton (43), Grapes (76), Peppers, hot (92), Lettuce and romaine (105), Peanuts (143), Pears (144), Corn, pop (153), Soybeans (176), Corn, sweet, for seed (189), Corn, sweet (190), Peppers, sweet (191), Tomatoes (201), Alfalfa, all (300)

Minimum of 10 Acres.

FRITILLARY, GENTNER'S	Liliaceae	Critical Habitat	Plant
LILY, WESTERN	Liliaceae	Critical Habitat	Plant
LOMATIUM, BRADSHAW'S	Apiaceae	Critical Habitat	Plant
LOMATIUM, COOK'S	Apiaceae	Critical Habitat	Plant
LUPINE, KINCAID'S	Fabaceae	Critical Habitat	Plant
MEADOWFOAM, LARGE-FLOWERED WOOLY	Limnanthaceae	Critical Habitat	Plant
MILK-VETCH, APPLEGATE'S	Fabaceae	Critical Habitat	Plant
MURRELET, MARBLED	Alcidae	Critical Habitat	Bird
OWL, NORTHERN SPOTTED	Strigidae	Critical Habitat	Bird
PELICAN, BROWN	Pelicanidae	Critical Habitat	Bird
PLOVER, WESTERN SNOWY	Charadriidae	Critical Habitat	Bird
POPCORNFLOWER, ROUGH	Boraginaceae	Critical Habitat	Plant
SALMON, CHINOOK (LOWER COLUMBIA RIVER)	Salmonidae	Critical Habitat	Fish
SALMON, CHINOOK (SNAKE RIVER FALL RUN)	Salmonidae	Critical Habitat	Fish
SALMON, CHINOOK (SNAKE RIVER SPRING/SUMMER)	Salmonidae	Critical Habitat	Fish
SALMON, CHINOOK (UPPER COLUMBIA RIVER SPRING)	Salmonidae	Critical Habitat	Fish
SALMON, CHINOOK (UPPER WILLAMETTE RIVER)	Salmonidae	Critical Habitat	Fish
SALMON, CHUM (COLUMBIA RIVER POPULATION)	Salmonidae	Critical Habitat	Fish
SALMON, COHO (OREGON COAST POPULATION)	Salmonidae	Critical Habitat	Fish
SALMON, COHO (SOUTHERN OR/NORTHERN CA COAST)	Salmonidae	Critical Habitat	Fish
SALMON, SOCKEYE (SNAKE RIVER POPULATION)	Salmonidae	Critical Habitat	Fish
SHRIMP, VERNAL POOL FAIRY	Branchinectidae	Critical Habitat	Crustacean
STEELHEAD, LOWER COLUMBIA RIVER POPULATION	Salmonidae	Critical Habitat	Fish
STEELHEAD, MIDDLE COLUMBIA RIVER POPULATION	Salmonidae	Critical Habitat	Fish
STEELHEAD, SNAKE RIVER BASIN POPULATION	Salmonidae	Critical Habitat	Fish

Species Details by State for Preliminary Assessment

Alfalfa hay (1), Alfalfa seed (2), Apples (5), Broccoli (22), Corn cut for dry fodder, hogged or graze (40), Corn for grain or seed (41), Corn for silage or green chop (42), Cotton (43), Grapes (76), Peppers, hot (92), Lettuce and romaine (105), Peanuts (143), Pears (144), Corn, pop (153), Soybeans (176), Corn, sweet, for seed (189), Corn, sweet (190), Peppers, sweet (191), Tomatoes (201), Alfalfa, all (300)

Minimum of 10 Acres.

STEELHEAD, UPPER COLUMBIA RIVER POPULATION	Salmonidae	Critical Habitat	Fish
STEELHEAD, UPPER WILLAMETTE RIVER POPULATION	Salmonidae	Critical Habitat	Fish
SUCKER, LOST RIVER	Catostomidae	Critical Habitat	Fish
SUCKER, SHORTNOSE	Catostomidae	Critical Habitat	Fish
SUCKER, WARNER	Catostomidae	Critical Habitat	Fish
THELYPODY, HOWELL'S SPECTACULAR	Brassicaceae	Critical Habitat	Plant
TROUT, BULL	Salmonidae	Critical Habitat	Fish
TROUT, LAHONTAN CUTTHROAT	Salmonidae	Critical Habitat	Fish
WIRE-LETTUCE, MALHEUR	Asteraceae	Critical Habitat	Plant

Pennsylvania (9species)

BAT, INDIANA	Vespertilionidae	Critical Habitat	Mammal
BULRUSH, NORTHEASTERN (=BARBED BRISTLE)	Cyperaceae	Critical Habitat	Plant
CLUBSHELL	Unionidae	Critical Habitat	Clam
EAGLE, BALD	Accipitridae	Critical Habitat	Bird
PLOVER, PIPING	Charadriidae	Critical Habitat	Bird
POGONIA, SMALL WHORLED	Orchidaceae	Critical Habitat	Plant
RIFFLESHELL, NORTHERN	Unionidae	Critical Habitat	Clam
SQUIRREL, DELMARVA PENINSULA FOX	Sciuridae	Critical Habitat	Mammal
TURTLE, BOG (NORTHERN POPULATION)	Emydidae	Critical Habitat	Reptile

Rhode Island (7species)

BAT, INDIANA	Vespertilionidae	Critical Habitat	Mammal
BEETLE, AMERICAN BURYING	Silphidae	Critical Habitat	Insect
GERARDIA, SANDPLAIN	Scrophulariaceae	Critical Habitat	Plant
PLOVER, PIPING	Charadriidae	Critical Habitat	Bird

Species Details by State for Preliminary Assessment

Alfalfa hay (1), Alfalfa seed (2), Apples (5), Broccoli (22), Corn cut for dry fodder, hogged or graze (40), Corn for grain or seed (41), Corn for silage or green chop (42), Cotton (43), Grapes (76), Peppers, hot (92), Lettuce and romaine (105), Peanuts (143), Pears (144), Corn, pop (153), Soybeans (176), Corn, sweet, for seed (189), Corn, sweet (190), Peppers, sweet (191), Tomatoes (201), Alfalfa, all (300)

Minimum of 10 Acres.

POGONIA, SMALL WHORLED	Orchidaceae	Critical Habitat	Plant
STURGEON, SHORTNOSE	Acipenseridae	Critical Habitat	Fish
WHALE, NORTHERN RIGHT	Balaenidae	Critical Habitat	Mammal

South Carolina (31species)

AMARANTH, SEABEACH	Amaranthaceae	Critical Habitat	Plant
AMPHIANTHUS, LITTLE	Scrophulariaceae	Critical Habitat	Plant
ARROWHEAD, BUNCHED	Alismataceae	Critical Habitat	Plant
CHAFFSEED, AMERICAN	Scrophulariaceae	Critical Habitat	Plant
CONEFLOWER, SMOOTH	Asteraceae	Critical Habitat	Plant
DROPWORT, CANBY'S	Apiaceae	Critical Habitat	Plant
EAGLE, BALD	Accipitridae	Critical Habitat	Bird
HARPERELLA	Apiaceae	Critical Habitat	Plant
HEARTLEAF, DWARF-FLOWERED	Aristolochiaceae	Critical Habitat	Plant
HEELSPLITTER, CAROLINA	Unionidae	Critical Habitat	Clam
IRISETTE, WHITE	Iridaceae	Critical Habitat	Plant
LOOSESTRIFE, ROUGH-LEAVED	Primulaceae	Critical Habitat	Plant
MANATEE, WEST INDIAN (FLORIDA)	Trichechidae	Critical Habitat	Mammal
PINK, SWAMP	Liliaceae	Critical Habitat	Plant
PITCHER-PLANT, MOUNTAIN SWEET	Sarraceniaceae	Critical Habitat	Plant
PLOVER, PIPING	Charadriidae	Critical Habitat	Bird
POGONIA, SMALL WHORLED	Orchidaceae	Critical Habitat	Plant
PONDBERRY	Lauraceae	Critical Habitat	Plant
QUILLWORT, BLACK-SPORED	Isoetaceae	Critical Habitat	Plant
SALAMANDER, FLATWOODS	Ambystomatidae	Critical Habitat	Amphibian
SNAKE, EASTERN INDIGO	Colubridae	Critical Habitat	Reptile

Species Details by State for Preliminary Assessment

Alfalfa hay (1), Alfalfa seed (2), Apples (5), Broccoli (22), Corn cut for dry fodder, hogged or graze (40), Corn for grain or seed (41), Corn for silage or green chop (42), Cotton (43), Grapes (76), Peppers, hot (92), Lettuce and romaine (105), Peanuts (143), Pears (144), Corn, pop (153), Soybeans (176), Corn, sweet, for seed (189), Corn, sweet (190), Peppers, sweet (191), Tomatoes (201), Alfalfa, all (300)

Minimum of 10 Acres.

STORK, WOOD	Ciconiidae	Critical Habitat	Bird
STURGEON, SHORTNOSE	Acipenseridae	Critical Habitat	Fish
SUNFLOWER, SCHWEINITZ'S	Asteraceae	Critical Habitat	Plant
TREEFROG, PINE BARRENS	Acanthaceae	Critical Habitat	Amphibian
TRILLIUM, PERSISTENT	Liliaceae	Critical Habitat	Plant
TRILLIUM, RELICT	Liliaceae	Critical Habitat	Plant
TURTLE, LOGGERHEAD SEA	Cheloniidae	Critical Habitat	Reptile
WHALE, NORTHERN RIGHT	Balaenidae	Critical Habitat	Mammal
WOLF, RED	Canidae	Critical Habitat	Mammal
WOODPECKER, RED-COCKADED	Picidae	Critical Habitat	Bird

South Dakota (9species)

BEETLE, AMERICAN BURYING	Silphidae	Critical Habitat	Insect
CRANE, WHOOPING	Gruidae	Critical Habitat	Bird
EAGLE, BALD	Accipitridae	Critical Habitat	Bird
FERRET, BLACK-FOOTED	Mustelidae	Critical Habitat	Mammal
ORCHID, WESTERN PRAIRIE FRINGED	Orchidaceae	Critical Habitat	Plant
PLOVER, PIPING	Charadriidae	Critical Habitat	Bird
SHINER, TOPEKA	Cyprinidae	Critical Habitat	Fish
STURGEON, PALLID	Acipenseridae	Critical Habitat	Fish
TERN, INTERIOR (POPULATION) LEAST	Laridae	Critical Habitat	Bird

Tennessee (74species)

ASTER, RUTH'S GOLDEN	Asteraceae	Critical Habitat	Plant
AVENS, SPREADING	Rosaceae	Critical Habitat	Plant
BAT, GRAY	Vespertilionidae	Critical Habitat	Mammal

Species Details by State for Preliminary Assessment

Alfalfa hay (1), Alfalfa seed (2), Apples (5), Broccoli (22), Corn cut for dry fodder, hogged or graze (40), Corn for grain or seed (41), Corn for silage or green chop (42), Cotton (43), Grapes (76), Peppers, hot (92), Lettuce and romaine (105), Peanuts (143), Pears (144), Corn, pop (153), Soybeans (176), Corn, sweet, for seed (189), Corn, sweet (190), Peppers, sweet (191), Tomatoes (201), Alfalfa, all (300)

Minimum of 10 Acres.

BAT, INDIANA	Vespertilionidae	Critical Habitat	Mammal
BEAN, PURPLE	Unionidae	Critical Habitat	Clam
BLADDERPOD, SPRING CREEK	Brassicaceae	Critical Habitat	Plant
BLUET, ROAN MOUNTAIN	Rubiaceae	Critical Habitat	Plant
CHUB, SLENDER	Cyprinidae	Critical Habitat	Fish
CHUB, SPOTFIN	Cyprinidae	Critical Habitat	Fish
COMBSHELL, CUMBERLAND	Unionidae	Critical Habitat	Clam
CONEFLOWER, TENNESSEE PURPLE	Asteraceae	Critical Habitat	Plant
CRAYFISH, NASHVILLE	Cambaridae	Critical Habitat	Crustacean
DACE, BLACKSIDE	Cyprinidae	Critical Habitat	Fish
DARTER, AMBER	Percidae	Critical Habitat	Fish
DARTER, BOULDER	Percidae	Critical Habitat	Fish
DARTER, DUSKYTAIL	Percidae	Critical Habitat	Fish
DARTER, SLACKWATER	Percidae	Critical Habitat	Fish
DARTER, SNAIL	Percidae	Critical Habitat	Fish
EAGLE, BALD	Accipitridae	Critical Habitat	Bird
ELKTOE, APPALACHIAN	Unionidae	Critical Habitat	Clam
ELKTOE, CUMBERLAND	Unionidae	Critical Habitat	Clam
FANSHELL	Unionidae	Critical Habitat	Clam
FERN, AMERICAN HART'S-TONGUE	Aspleniaceae	Critical Habitat	Plant
GOLDENROD, BLUE RIDGE	Asteraceae	Critical Habitat	Plant
GRASS, TENNESSEE YELLOW-EYED	Xyridaceae	Critical Habitat	Plant
GROUND-PLUM, GUTHRIE'S	Fabaceae	Critical Habitat	Plant
LICHEN, ROCK GNOME	Cladoniaceae	Critical Habitat	Plant
LOGPERCH, CONASAUGA	Percidae	Critical Habitat	Fish
MADTOM, PYGMY	Ictaluridae	Critical Habitat	Fish

Species Details by State for Preliminary Assessment

Alfalfa hay (1), Alfalfa seed (2), Apples (5), Broccoli (22), Corn cut for dry fodder, hogged or graze (40), Corn for grain or seed (41), Corn for silage or green chop (42), Cotton (43), Grapes (76), Peppers, hot (92), Lettuce and romaine (105), Peanuts (143), Pears (144), Corn, pop (153), Soybeans (176), Corn, sweet, for seed (189), Corn, sweet (190), Peppers, sweet (191), Tomatoes (201), Alfalfa, all (300)

Minimum of 10 Acres.

MADTOM, SMOKY	Ictaluridae	Critical Habitat	Fish
MADTOM, YELLOWFIN	Ictaluridae	Critical Habitat	Fish
MARSTONIA, ROYAL (=ROYAL SNAIL)	Hydrobiidae	Critical Habitat	Snail
MUSSEL, OYSTER	Unionidae	Critical Habitat	Clam
MUSSEL, RING PINK (=GOLF STICK PEARLY)	Unionidae	Critical Habitat	Clam
PEARLYMUSSEL, ALABAMA LAMP	Unionidae	Critical Habitat	Clam
PEARLYMUSSEL, APPALACHIAN MONKEYFACE	Unionidae	Critical Habitat	Clam
PEARLYMUSSEL, BIRDWING	Unionidae	Critical Habitat	Clam
PEARLYMUSSEL, CRACKING	Unionidae	Critical Habitat	Clam
PEARLYMUSSEL, CUMBERLAND BEAN	Unionidae	Critical Habitat	Clam
PEARLYMUSSEL, CUMBERLAND MONKEYFACE	Unionidae	Critical Habitat	Clam
PEARLYMUSSEL, DROMEDARY	Unionidae	Critical Habitat	Clam
PEARLYMUSSEL, GREEN-BLOSSOM	Unionidae	Critical Habitat	Clam
PEARLYMUSSEL, LITTLE-WING	Unionidae	Critical Habitat	Clam
PEARLYMUSSEL, ORANGE-FOOTED	Unionidae	Critical Habitat	Clam
PEARLYMUSSEL, PALE LILLIPUT	Unionidae	Critical Habitat	Clam
PEARLYMUSSEL, PINK MUCKET	Unionidae	Critical Habitat	Clam
PEARLYMUSSEL, PURPLE CAT'S PAW	Unionidae	Critical Habitat	Clam
PEARLYMUSSEL, TURGID-BLOSSOM	Unionidae	Critical Habitat	Clam
PEARLYMUSSEL, WHITE WARTYBACK	Unionidae	Critical Habitat	Clam
PEARLYMUSSEL, YELLOW-BLOSSOM	Unionidae	Critical Habitat	Clam
PIGTOE, CUMBERLAND (=CUMBERLAND PIGTOE MUSSEL Clam		Unionidae	Critical Habitat
PIGTOE, FINE-RAYED	Unionidae	Critical Habitat	Clam
PIGTOE, ROUGH	Unionidae	Critical Habitat	Clam
PIGTOE, SHINY	Unionidae	Critical Habitat	Clam
POGONIA, SMALL WHORLED	Orchidaceae	Critical Habitat	Plant

Species Details by State for Preliminary Assessment

Alfalfa hay (1), Alfalfa seed (2), Apples (5), Broccoli (22), Corn cut for dry fodder, hogged or graze (40), Corn for grain or seed (41), Corn for silage or green chop (42), Cotton (43), Grapes (76), Peppers, hot (92), Lettuce and romaine (105), Peanuts (143), Pears (144), Corn, pop (153), Soybeans (176), Corn, sweet, for seed (189), Corn, sweet (190), Peppers, sweet (191), Tomatoes (201), Alfalfa, all (300)

Minimum of 10 Acres.

POTATO-BEAN, PRICE'S	Fabaceae	Critical Habitat	Plant
PRAIRIE-CLOVER, LEAFY	Fabaceae	Critical Habitat	Plant
RABBITSFOOT, ROUGH	Unionidae	Critical Habitat	Clam
RIFFLESHELL, TAN	Unionidae	Critical Habitat	Clam
RIVERSNAIL, ANTHONY'S	Pleuroceridae	Critical Habitat	Snail
ROCK-CRESS, LARGE (=BRAUN'S)	Brassicaceae	Critical Habitat	Plant
ROSEMARY, CUMBERLAND	Lamiaceae	Critical Habitat	Plant
SANDWORT, CUMBERLAND	Caryophyllaceae	Critical Habitat	Plant
SHINER, BLUE	Cyprinidae	Critical Habitat	Fish
SKULLCAP, LARGE-FLOWERED	Lamiaceae	Critical Habitat	Plant
SNAIL, PAINTED SNAKE COILED FOREST	Stylomataphora	Critical Habitat	Snail
SPIDER, SPRUCE-FIR MOSS	Dipluridae	Critical Habitat	Arachnid
SPIRAEA, VIRGINIA	Rosaceae	Critical Habitat	Plant
SQUIRREL, CAROLINA NORTHERN FLYING	Sciuridae	Critical Habitat	Mammal
STURGEON, PALLID	Acipenseridae	Critical Habitat	Fish
SUNFLOWER, EGGERT'S	Asteraceae	Critical Habitat	Plant
TERN, INTERIOR (POPULATION) LEAST	Laridae	Critical Habitat	Bird
WOLF, RED	Canidae	Critical Habitat	Mammal
WOODPECKER, RED-COCKADED	Picidae	Critical Habitat	Bird

Texas (71species)

AMBROSIA, SOUTH TEXAS	Asteraceae	Critical Habitat	Plant
AMPHIPOD, PECK'S CAVE	Gammaridae	Critical Habitat	Crustacean
AYENIA, TEXAS	Sterculiaceae	Critical Habitat	Plant
BEAR, LOUISIANA BLACK	Ursidae	Critical Habitat	Mammal
BEETLE, COFFIN CAVE MOLD	Pselaphidae	Critical Habitat	Insect

Species Details by State for Preliminary Assessment

Alfalfa hay (1), Alfalfa seed (2), Apples (5), Broccoli (22), Corn cut for dry fodder, hogged or graze (40), Corn for grain or seed (41), Corn for silage or green chop (42), Cotton (43), Grapes (76), Peppers, hot (92), Lettuce and romaine (105), Peanuts (143), Pears (144), Corn, pop (153), Soybeans (176), Corn, sweet, for seed (189), Corn, sweet (190), Peppers, sweet (191), Tomatoes (201), Alfalfa, all (300)

Minimum of 10 Acres.

BEETLE, COMAL SPRINGS DRYOPID	Dryopidae	Critical Habitat	Insect
BEETLE, COMAL SPRINGS RIFFLE	Elmidae	Critical Habitat	Insect
BEETLE, HELOTES MOLD	Pselaphidae	Critical Habitat	Insect
BEETLE, KRETSCHMARR CAVE MOLD	Pselaphidae	Critical Habitat	Insect
BEETLE, TOOTH CAVE GROUND	Carabidae	Critical Habitat	Insect
BLADDERPOD, ZAPATA	Brassicaceae	Critical Habitat	Plant
CACTUS, BLACK LACE	Cactaceae	Critical Habitat	Plant
CACTUS, LLOYD'S MARIPOSA	Cactaceae	Critical Habitat	Plant
CACTUS, SNEED PINCUSHION	Cactaceae	Critical Habitat	Plant
CACTUS, STAR	Cactaceae	Critical Habitat	Plant
CACTUS, TOBUSCH FISHHOOK	Cactaceae	Critical Habitat	Plant
CICURINA VENII (NCN)	Agelenidae	Critical Habitat	Arachnid
CRANE, WHOOPING	Gruidae	Critical Habitat	Bird
CURLEW, ESKIMO	Scolopacidae	Critical Habitat	Bird
DARTER, FOUNTAIN	Percidae	Critical Habitat	Fish
DAWN-FLOWER, TEXAS PRAIRIE (=TEXAS BITTERWEED	Asteraceae	Critical Habitat	Plant
DOGWEED, ASHY	Asteraceae	Critical Habitat	Plant
EAGLE, BALD	Accipitridae	Critical Habitat	Bird
FALCON, NORTHERN APLOMADO	Falconidae	Critical Habitat	Bird
GAMBUSIA, PECOS	Poeciliidae	Critical Habitat	Fish
GAMBUSIA, SAN MARCOS	Poeciliidae	Critical Habitat	Fish
HARVESTMAN, BEE CREEK CAVE	Phalangodidae	Critical Habitat	Arachnid
HARVESTMAN, BONE CAVE	Phalangodidae	Critical Habitat	Arachnid
HARVESTMAN, ROBBER BARON CAVE	Phalangodidae	Critical Habitat	Arachnid
JAGUARUNDI, Gulf Coast	Felidae	Critical Habitat	Mammal
LADIES'-TRESSES, NAVASOTA	Orchidaceae	Critical Habitat	Plant

Species Details by State for Preliminary Assessment

Alfalfa hay (1), Alfalfa seed (2), Apples (5), Broccoli (22), Corn cut for dry fodder, hogged or graze (40), Corn for grain or seed (41), Corn for silage or green chop (42), Cotton (43), Grapes (76), Peppers, hot (92), Lettuce and romaine (105), Peanuts (143), Pears (144), Corn, pop (153), Soybeans (176), Corn, sweet, for seed (189), Corn, sweet (190), Peppers, sweet (191), Tomatoes (201), Alfalfa, all (300)

Minimum of 10 Acres.

MANIOC, WALKER'S	Euphorbiaceae	Critical Habitat	Plant
MINNOW, DEVILS RIVER	Cyprinidae	Critical Habitat	Fish
OAK, HINCKLEY	Fagaceae	Critical Habitat	Plant
OCELOT	Felidae	Critical Habitat	Mammal
PELICAN, BROWN	Pelicanidae	Critical Habitat	Bird
PHLOX, TEXAS TRAILING	Polemoniaceae	Critical Habitat	Plant
PLOVER, MOUNTAIN	Charadriidae	Critical Habitat	Bird
PLOVER, PIPING	Charadriidae	Critical Habitat	Bird
PONDWEED, LITTLE AGUJA CREEK	Potamogetonaceae	Critical Habitat	Plant
POPPY-MALLOW, TEXAS	Malvaceae	Critical Habitat	Plant
PRAIRIE-CHICKEN, ATTWATER'S GREATER	Phasianidae	Critical Habitat	Bird
PSEUDOSCORPION, TOOTH CAVE	Neobisiidae	Critical Habitat	Arachnid
PUPFISH, COMANCHE SPRINGS	Cyprinodontidae	Critical Habitat	Fish
PUPFISH, LEON SPRINGS	Cyprinodontidae	Critical Habitat	Fish
RHADINE EXILIS (NCN)	Carabidae	Critical Habitat	Insect
RHADINE INFERNALIS (NCN)	Carabidae	Critical Habitat	Insect
RUSH-PEA, SLENDER	Fabaceae	Critical Habitat	Plant
SALAMANDER, BARTON SPRINGS	Plethodontidae	Critical Habitat	Amphibian
SALAMANDER, SAN MARCOS	Plethodontidae	Critical Habitat	Amphibian
SALAMANDER, TEXAS BLIND	Plethodontidae	Critical Habitat	Amphibian
SAND-VERBENA, LARGE-FRUITED	Nyctaginaceae	Critical Habitat	Plant
SHINER, ARKANSAS RIVER	Cyprinidae	Critical Habitat	Fish
Snail, Pecos Assiminea		Critical Habitat	Snail
SNAKE, CONCHO WATER	Colubridae	Critical Habitat	Reptile
SNOWBELLS, TEXAS	Styracaceae	Critical Habitat	Plant
SPIDER, GOVERNMENT CANYON CAVE	Leptonetidae	Critical Habitat	Arachnid

SPIDER, MADLA'S CAVE	Agelenidae	Critical Habitat	Arachnid
SPIDER, ROBBER BARON CAVE	Agelenidae	Critical Habitat	Arachnid
SPIDER, TOOTH CAVE	Leptonetidae	Critical Habitat	Arachnid
SPIDER, VESPER CAVE	Agelenidae	Critical Habitat	Arachnid
SPIDERLING, MATHIS	Nyctaginaceae	Critical Habitat	Plant
SUNFLOWER, PECOS	Asteraceae	Critical Habitat	Plant
TERN, INTERIOR (POPULATION) LEAST	Laridae	Critical Habitat	Bird
TOAD, HOUSTON	Bufonidae	Critical Habitat	Amphibian
TURTLE, KEMP'S (ATLANTIC) RIDLEY SEA	Cheloniidae	Critical Habitat	Reptile
TURTLE, LOGGERHEAD SEA	Cheloniidae	Critical Habitat	Reptile
VIREO, BLACK-CAPPED	Vireonidae	Critical Habitat	Bird
WARBLER (WOOD), GOLDEN-CHEEKED	Emberizidae	Critical Habitat	Bird
WILD-RICE, TEXAS	Poaceae	Critical Habitat	Plant
WOODPECKER, RED-COCKADED	Picidae	Critical Habitat	Bird

Utah (39species)

BEAR-POPPY, DWARF	Papaveraceae	Critical Habitat	Plant
BLADDERPOD, KODACHROME	Brassicaceae	Critical Habitat	Plant
BUTTERCUP, AUTUMN	Ranunculaceae	Critical Habitat	Plant
CACTUS, SAN RAFAEL	Cactaceae	Critical Habitat	Plant
CACTUS, SILER PINCUSHION	Cactaceae	Critical Habitat	Plant
CACTUS, UINTA BASIN HOOKLESS	Cactaceae	Critical Habitat	Plant
CACTUS, WINKLER	Cactaceae	Critical Habitat	Plant
CACTUS, WRIGHT FISHHOOK	Cactaceae	Critical Habitat	Plant
CHUB, BONYTAIL	Cyprinidae	Critical Habitat	Fish
CHUB, HUMPBACK	Cyprinidae	Critical Habitat	Fish

Species Details by State for Preliminary Assessment

Alfalfa hay (1), Alfalfa seed (2), Apples (5), Broccoli (22), Corn cut for dry fodder, hogged or graze (40), Corn for grain or seed (41), Corn for silage or green chop (42), Cotton (43), Grapes (76), Peppers, hot (92), Lettuce and romaine (105), Peanuts (143), Pears (144), Corn, pop (153), Soybeans (176), Corn, sweet, for seed (189), Corn, sweet (190), Peppers, sweet (191), Tomatoes (201), Alfalfa, all (300)

Minimum of 10 Acres.

CHUB, VIRGIN RIVER	Cyprinidae	Critical Habitat	Fish
CYCLADENIA, JONES	Apocynaceae	Critical Habitat	Plant
DAISY, MAGUIRE	Asteraceae	Critical Habitat	Plant
EAGLE, BALD	Accipitridae	Critical Habitat	Bird
FERRET, BLACK-FOOTED	Mustelidae	Critical Habitat	Mammal
LADIES'-TRESSES, UTE	Orchidaceae	Critical Habitat	Plant
MILK-VETCH, DESERET	Fabaceae	Critical Habitat	Plant
MILK-VETCH, HELIOTROPE	Fabaceae	Critical Habitat	Plant
MILK-VETCH, HOLMGREN	Fabaceae	Critical Habitat	Plant
MILK-VETCH, SHIVWITS	Fabaceae	Critical Habitat	Plant
MILKWEED, WELSH'S	Asclepiadaceae	Critical Habitat	Plant
OWL, MEXICAN SPOTTED	Strigidae	Critical Habitat	Bird
PEPPER-GRASS, KODACHROME	Brassicaceae	Critical Habitat	Plant
PHACELIA, CLAY	Hydrophyllaceae	Critical Habitat	Plant
PLOVER, MOUNTAIN	Charadriidae	Critical Habitat	Bird
PRAIRIE DOG, UTAH	Sciuridae	Critical Habitat	Mammal
PRIMROSE, MAGUIRE	Primulaceae	Critical Habitat	Plant
REED-MUSTARD, BARNEBY	Brassicaceae	Critical Habitat	Plant
REED-MUSTARD, CLAY	Brassicaceae	Critical Habitat	Plant
REED-MUSTARD, SHRUBBY	Brassicaceae	Critical Habitat	Plant
RIDGE-CRESS (=PEPPER-CRESS), BARNEBY	Brassicaceae	Critical Habitat	Plant
SEDGE, NAVAJO	Cyperaceae	Critical Habitat	Plant
SQUAWFISH, COLORADO	Cyprinidae	Critical Habitat	Fish
SUCKER, JUNE	Catostomidae	Critical Habitat	Fish
SUCKER, RAZORBACK	Catostomidae	Critical Habitat	Fish
TORTOISE, DESERT	Testudinidae	Critical Habitat	Reptile

TOWNSENDIA, LAST CHANCE	Asteraceae	Critical Habitat	Plant
TROUT, LAHONTAN CUTTHROAT	Salmonidae	Critical Habitat	Fish
WOUNDFIN	Cyprinidae	Critical Habitat	Fish

Vermont (5species)

BAT, INDIANA	Vespertilionidae	Critical Habitat	Mammal
BULRUSH, NORTHEASTERN (=BARBED BRISTLE)	Cyperaceae	Critical Habitat	Plant
EAGLE, BALD	Accipitridae	Critical Habitat	Bird
MILK-VETCH, JESUP'S	Fabaceae	Critical Habitat	Plant
MUSSEL, DWARF WEDGE	Unionidae	Critical Habitat	Clam

Virginia (51species)

BAT, GRAY	Vespertilionidae	Critical Habitat	Mammal
BAT, INDIANA	Vespertilionidae	Critical Habitat	Mammal
BAT, VIRGINIA BIG-EARED	Vespertilionidae	Critical Habitat	Mammal
BEAN, PURPLE	Unionidae	Critical Habitat	Clam
BEETLE, NORTHEASTERN BEACH TIGER	Cicindelidae	Critical Habitat	Insect
BIRCH, VIRGINIA ROUND-LEAF	Betulaceae	Critical Habitat	Plant
BITTERCRESS, SMALL-ANTHERED	Brassicaceae	Critical Habitat	Plant
BULRUSH, NORTHEASTERN (=BARBED BRISTLE)	Cyperaceae	Critical Habitat	Plant
CHUB, SLENDER	Cyprinidae	Critical Habitat	Fish
CHUB, SPOTFIN	Cyprinidae	Critical Habitat	Fish
COMBSHELL, CUMBERLAND	Unionidae	Critical Habitat	Clam
CONEFLOWER, SMOOTH	Asteraceae	Critical Habitat	Plant
DARTER, DUSKYTAIL	Percidae	Critical Habitat	Fish
EAGLE, BALD	Accipitridae	Critical Habitat	Bird

Species Details by State for Preliminary Assessment

Alfalfa hay (1), Alfalfa seed (2), Apples (5), Broccoli (22), Corn cut for dry fodder, hogged or graze (40), Corn for grain or seed (41), Corn for silage or green chop (42), Cotton (43), Grapes (76), Peppers, hot (92), Lettuce and romaine (105), Peanuts (143), Pears (144), Corn, pop (153), Soybeans (176), Corn, sweet, for seed (189), Corn, sweet (190), Peppers, sweet (191), Tomatoes (201), Alfalfa, all (300)

Minimum of 10 Acres.

FANSHELL	Unionidae	Critical Habitat	Clam
ISOPOD, LEE COUNTY CAVE	Asellidae	Critical Habitat	Crustacean
ISOPOD, MADISON CAVE	Cirolanidae	Critical Habitat	Crustacean
JOINT-VETCH, SENSITIVE	Fabaceae	Critical Habitat	Plant
LOGPERCH, ROANOKE	Percidae	Critical Habitat	Fish
MADTOM, YELLOWFIN	Ictaluridae	Critical Habitat	Fish
MALLOW, PETER'S MOUNTAIN	Malvaceae	Critical Habitat	Plant
MUSSEL, DWARF WEDGE	Unionidae	Critical Habitat	Clam
MUSSEL, OYSTER	Unionidae	Critical Habitat	Clam
ORCHID, EASTERN PRAIRIE FRINGED	Orchidaceae	Critical Habitat	Plant
PEARLYMUSSEL, APPALACHIAN MONKEYFACE	Unionidae	Critical Habitat	Clam
PEARLYMUSSEL, BIRDWING	Unionidae	Critical Habitat	Clam
PEARLYMUSSEL, CRACKING	Unionidae	Critical Habitat	Clam
PEARLYMUSSEL, CUMBERLAND MONKEYFACE	Unionidae	Critical Habitat	Clam
PEARLYMUSSEL, DROMEDARY	Unionidae	Critical Habitat	Clam
PEARLYMUSSEL, GREEN-BLOSSOM	Unionidae	Critical Habitat	Clam
PEARLYMUSSEL, LITTLE-WING	Unionidae	Critical Habitat	Clam
PIGTOE, FINE-RAYED	Unionidae	Critical Habitat	Clam
PIGTOE, ROUGH	Unionidae	Critical Habitat	Clam
PIGTOE, SHINY	Unionidae	Critical Habitat	Clam
PINK, SWAMP	Liliaceae	Critical Habitat	Plant
PLOVER, PIPING	Charadriidae	Critical Habitat	Bird
POGONIA, SMALL WHORLED	Orchidaceae	Critical Habitat	Plant
RABBITSFOOT, ROUGH	Unionidae	Critical Habitat	Clam
RIFFLESHELL, TAN	Unionidae	Critical Habitat	Clam
ROCK-CRESS, SHALE BARREN	Brassicaceae	Critical Habitat	Plant

Species Details by State for Preliminary Assessment

Alfalfa hay (1), Alfalfa seed (2), Apples (5), Broccoli (22), Corn cut for dry fodder, hogged or graze (40), Corn for grain or seed (41), Corn for silage or green chop (42), Cotton (43), Grapes (76), Peppers, hot (92), Lettuce and romaine (105), Peanuts (143), Pears (144), Corn, pop (153), Soybeans (176), Corn, sweet, for seed (189), Corn, sweet (190), Peppers, sweet (191), Tomatoes (201), Alfalfa, all (300)

Minimum of 10 Acres.

SALAMANDER, SHENANDOAH	Plethodontidae	Critical Habitat	Amphibian
SNAIL, VIRGINIA FRINGED MOUNTAIN	Helicodiscidae	Critical Habitat	Snail
SNEEZEWEED, VIRGINIA	Asteraceae	Critical Habitat	Plant
SPINYMUSSEL, JAMES RIVER	Unionidae	Critical Habitat	Clam
SPIRAEA, VIRGINIA	Rosaceae	Critical Habitat	Plant
SQUIRREL, DELMARVA PENINSULA FOX	Sciuridae	Critical Habitat	Mammal
SQUIRREL, VIRGINIA NORTHERN FLYING	Sciuridae	Critical Habitat	Mammal
SUMAC, MICHAUX'S	Anacardiaceae	Critical Habitat	Plant
TURTLE, LOGGERHEAD SEA	Cheloniidae	Critical Habitat	Reptile
WHALE, NORTHERN RIGHT	Balaenidae	Critical Habitat	Mammal
WOODPECKER, RED-COCKADED	Picidae	Critical Habitat	Bird

Washington (33species)

BEAR, GRIZZLY	Ursidae	Critical Habitat	Mammal
BUTTERFLY, OREGON SILVERSPOT	Nymphalidae	Critical Habitat	Insect
CARIBOU, WOODLAND	Cervidae	Critical Habitat	Mammal
CATCHFLY, SPALDING'S	Caryophyllaceae	Critical Habitat	Plant
CHECKER-MALLOW, NELSON'S	Malvaceae	Critical Habitat	Plant
CHECKER-MALLOW, WENATCHEE MOUNTAINS	Malvaceae	Critical Habitat	Plant
DEER, COLUMBIAN WHITE-TAILED	Cervidae	Critical Habitat	Mammal
EAGLE, BALD	Accipitridae	Critical Habitat	Bird
HOWELLIA, WATER	Campanulaceae	Critical Habitat	Plant
LUPINE, KINCAID'S	Fabaceae	Critical Habitat	Plant
MURRELET, MARBLED	Alcidae	Critical Habitat	Bird
OWL, NORTHERN SPOTTED	Strigidae	Critical Habitat	Bird
PAINTBRUSH, GOLDEN	Scrophulariaceae	Critical Habitat	Plant

Species Details by State for Preliminary Assessment

Alfalfa hay (1), Alfalfa seed (2), Apples (5), Broccoli (22), Corn cut for dry fodder, hogged or graze (40), Corn for grain or seed (41), Corn for silage or green chop (42), Cotton (43), Grapes (76), Peppers, hot (92), Lettuce and romaine (105), Peanuts (143), Pears (144), Corn, pop (153), Soybeans (176), Corn, sweet, for seed (189), Corn, sweet (190), Peppers, sweet (191), Tomatoes (201), Alfalfa, all (300)

Minimum of 10 Acres.

PELICAN, BROWN	Pelicanidae	Critical Habitat	Bird
PLOVER, WESTERN SNOWY	Charadriidae	Critical Habitat	Bird
RABBIT, PYGMY	Leporidae	Critical Habitat	Mammal
SALMON, CHINOOK (LOWER COLUMBIA RIVER)	Salmonidae	Critical Habitat	Fish
SALMON, CHINOOK (PUGET SOUND)	Salmonidae	Critical Habitat	Fish
SALMON, CHINOOK (SNAKE RIVER FALL RUN)	Salmonidae	Critical Habitat	Fish
SALMON, CHINOOK (SNAKE RIVER SPRING/SUMMER)	Salmonidae	Critical Habitat	Fish
SALMON, CHINOOK (UPPER COLUMBIA RIVER SPRING)	Salmonidae	Critical Habitat	Fish
SALMON, CHUM (COLUMBIA RIVER POPULATION)	Salmonidae	Critical Habitat	Fish
SALMON, CHUM (HOOD CANAL SUMMER POPULATION)	Salmonidae	Critical Habitat	Fish
SALMON, SOCKEYE (OZETTE LAKE POPULATION)	Salmonidae	Critical Habitat	Fish
SALMON, SOCKEYE (SNAKE RIVER POPULATION)	Salmonidae	Critical Habitat	Fish
STEELHEAD, LOWER COLUMBIA RIVER POPULATION	Salmonidae	Critical Habitat	Fish
STEELHEAD, MIDDLE COLUMBIA RIVER POPULATION	Salmonidae	Critical Habitat	Fish
STEELHEAD, SNAKE RIVER BASIN POPULATION	Salmonidae	Critical Habitat	Fish
STEELHEAD, UPPER COLUMBIA RIVER POPULATION	Salmonidae	Critical Habitat	Fish
STEELHEAD, UPPER WILLAMETTE RIVER POPULATION	Salmonidae	Critical Habitat	Fish
STICKSEED, SHOWY	Boraginaceae	Critical Habitat	Plant
TROUT, BULL	Salmonidae	Critical Habitat	Fish
WOLF, GRAY	Canidae	Critical Habitat	Mammal

West virginia (18species)

BAT, GRAY	Vespertilionidae	Critical Habitat	Mammal
BAT, INDIANA	Vespertilionidae	Critical Habitat	Mammal
BAT, VIRGINIA BIG-EARED	Vespertilionidae	Critical Habitat	Mammal

Species Details by State for Preliminary Assessment

Alfalfa hay (1), Alfalfa seed (2), Apples (5), Broccoli (22), Corn cut for dry fodder, hogged or graze (40), Corn for grain or seed (41), Corn for silage or green chop (42), Cotton (43), Grapes (76), Peppers, hot (92), Lettuce and romaine (105), Peanuts (143), Pears (144), Corn, pop (153), Soybeans (176), Corn, sweet, for seed (189), Corn, sweet (190), Peppers, sweet (191), Tomatoes (201), Alfalfa, all (300)

Minimum of 10 Acres.

BULRUSH, NORTHEASTERN (=BARBED BRISTLE)	Cyperaceae	Critical Habitat	Plant
CLOVER, RUNNING BUFFALO	Fabaceae	Critical Habitat	Plant
CLUBSHELL	Unionidae	Critical Habitat	Clam
EAGLE, BALD	Accipitridae	Critical Habitat	Bird
FANSHELL	Unionidae	Critical Habitat	Clam
HARPERELLA	Apiaceae	Critical Habitat	Plant
PEARLYMUSSEL, PINK MUCKET	Unionidae	Critical Habitat	Clam
PEARLYMUSSEL, TUBERCLED-BLOSSOM	Unionidae	Critical Habitat	Clam
ROCK-CRESS, SHALE BARREN	Brassicaceae	Critical Habitat	Plant
SALAMANDER, CHEAT MOUNTAIN	Plethodontidae	Critical Habitat	Amphibian
SNAIL, FLAT-SPIRED THREE-TOOTHED	Polygyridae	Critical Habitat	Snail
SPINYMUSSEL, JAMES RIVER	Unionidae	Critical Habitat	Clam
SPIRAEA, VIRGINIA	Rosaceae	Critical Habitat	Plant
SQUIRREL, CAROLINA NORTHERN FLYING	Sciuridae	Critical Habitat	Mammal
SQUIRREL, VIRGINIA NORTHERN FLYING	Sciuridae	Critical Habitat	Mammal

Wisconsin (14species)

BUSH-CLOVER, PRAIRIE	Fabaceae	Critical Habitat	Plant
BUTTERFLY, KARNER BLUE	Lycaenidae	Critical Habitat	Insect
DRAGONFLY, HINES EMERALD	Libellulidae	Critical Habitat	Insect
EAGLE, BALD	Accipitridae	Critical Habitat	Bird
IRIS, DWARF LAKE	Iridaceae	Critical Habitat	Plant
LOCOWEED, FASSETT'S	Fabaceae	Critical Habitat	Plant
MONKSHOOD, NORTHERN WILD	Ranunculaceae	Critical Habitat	Plant
MUSSEL, WINGED MAPLELEAF	Unionidae	Critical Habitat	Clam
ORCHID, EASTERN PRAIRIE FRINGED	Orchidaceae	Critical Habitat	Plant

PEARLYMUSSEL, HIGGINS' EYE	Unionidae	Critical Habitat	Clam
PLOVER, PIPING	Charadriidae	Critical Habitat	Bird
THISTLE, PITCHER'S	Asteraceae	Critical Habitat	Plant
WARBLER (WOOD), KIRTLAND'S	Parulidae	Critical Habitat	Bird
WOLF, GRAY	Canidae	Critical Habitat	Mammal

Wyoming (11species)

BEAR, GRIZZLY	Ursidae	Critical Habitat	Mammal
BUTTERFLY PLANT, COLORADO	Onagraceae	Critical Habitat	Plant
DACE, KENDALL WARM SPRINGS	Cyprinidae	Critical Habitat	Fish
DACE, MOAPA	Cyprinidae	Critical Habitat	Fish
EAGLE, BALD	Accipitridae	Critical Habitat	Bird
FERRET, BLACK-FOOTED	Mustelidae	Critical Habitat	Mammal
MOUSE, PREBLE'S MEADOW JUMPING	Zapodidae	Critical Habitat	Mammal
PLOVER, MOUNTAIN	Charadriidae	Critical Habitat	Bird
TOAD, WYOMING	Bufonidae	Critical Habitat	Amphibian
WOLF, GRAY	Canidae	Critical Habitat	Mammal
YELLOWHEAD, DESERT	Asteraceae	Critical Habitat	Plant

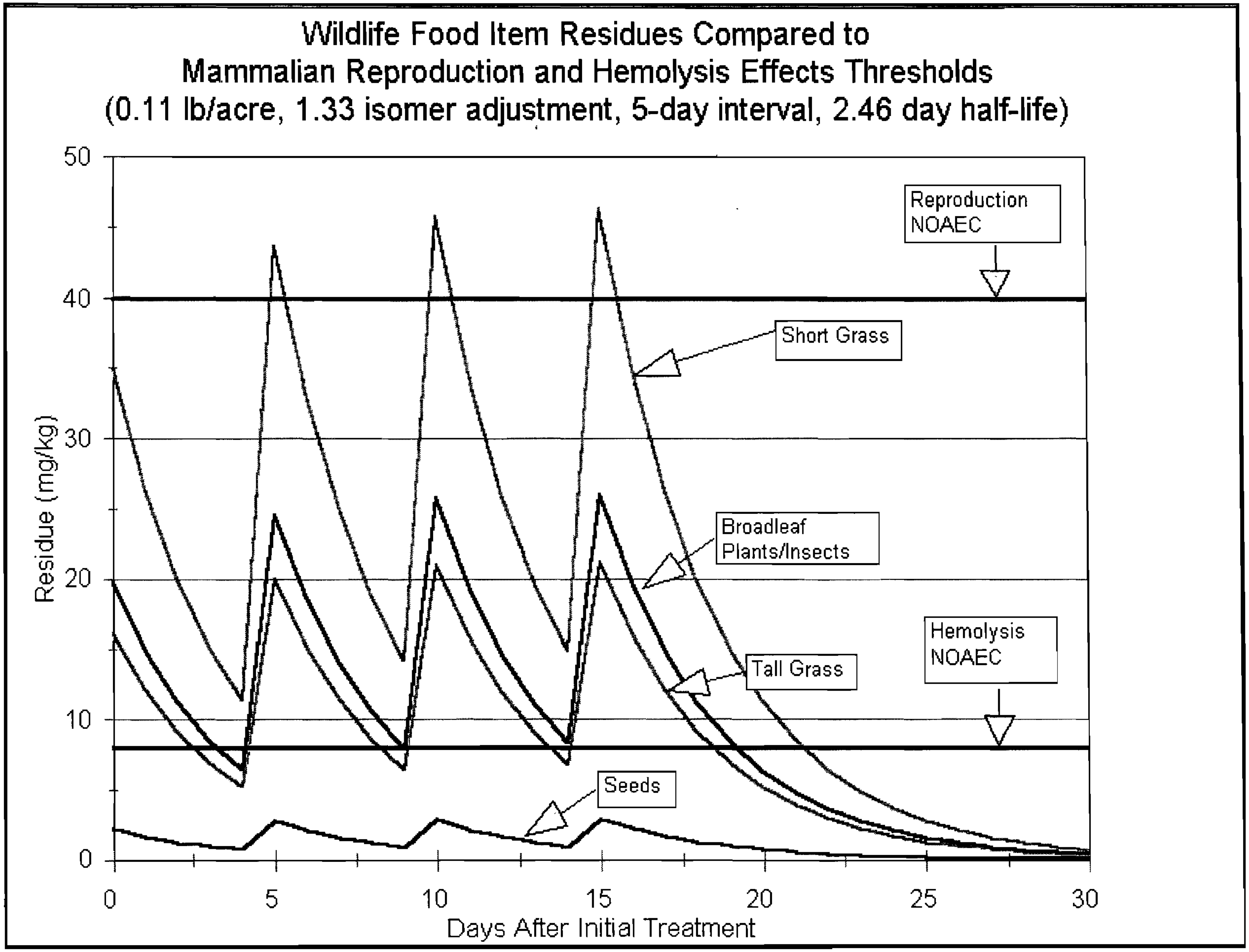
APPENDIX F

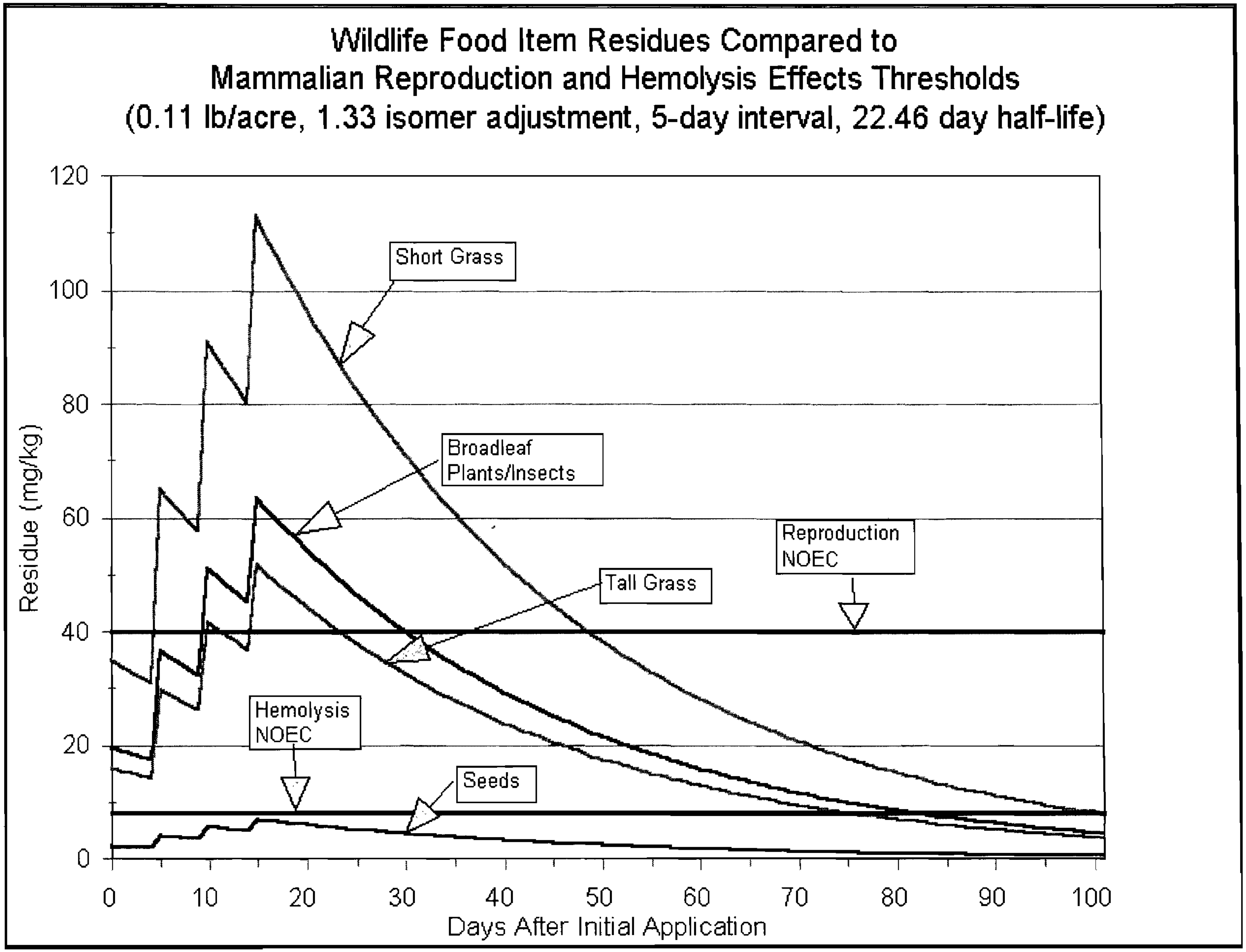
FOLIAR HALF-LIFE IMPORTANCE TO TERRESTRIAL EXPOSURE ESTIMATES
AND
GRAPHS OF RESIDUE DECLINE CURVES vs. TOXICITY THRESHOLDS

Impact of Alternative Dissipation Half-Lives on Terrestrial Exposure

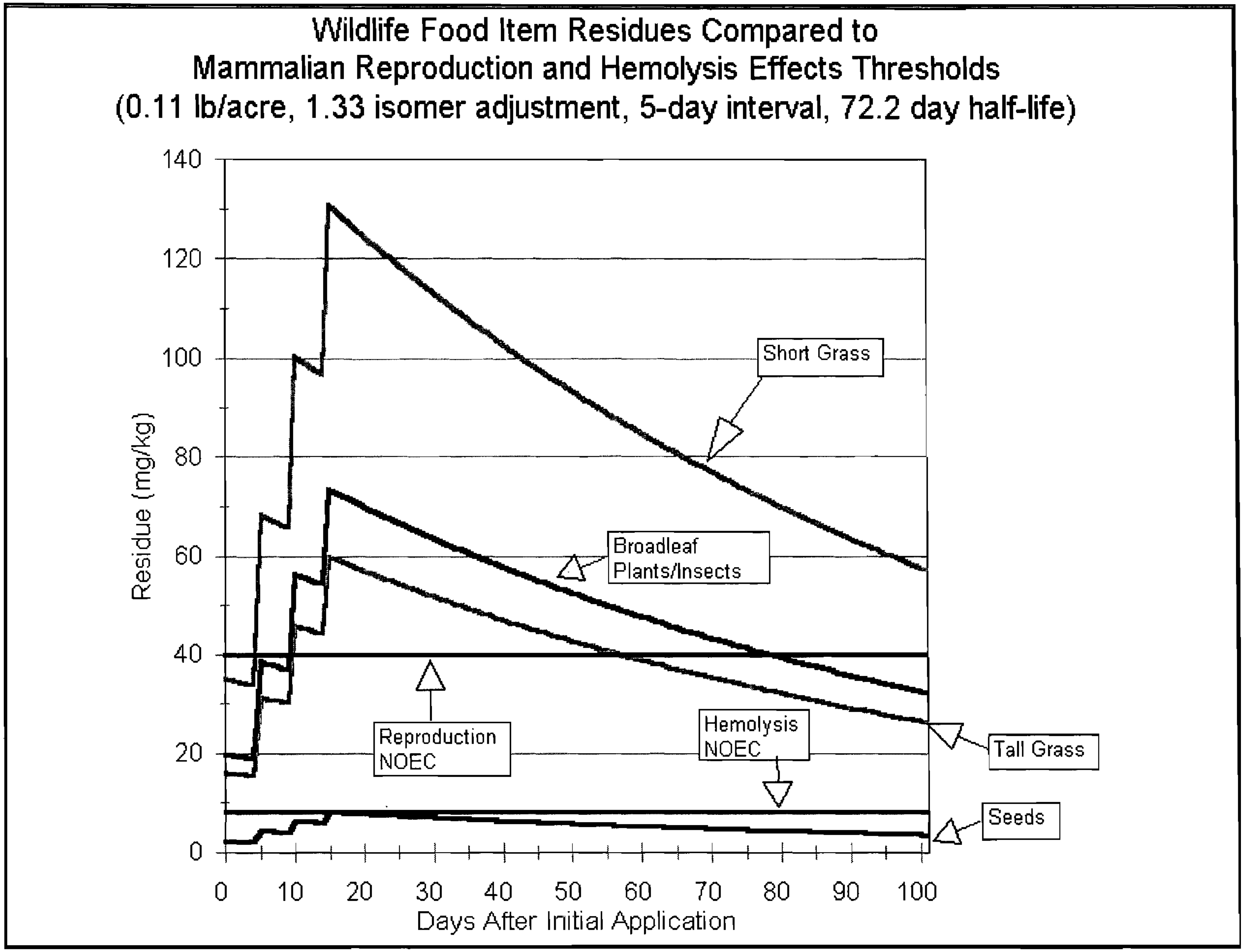
Application Rate (lb DPX/acre)	Avian Food Item	Wildlife Food Item Residue with 22.46 Day Half-Life (mg/kg)	Wildlife Food Item Residue with 2.46 Day Half-Life (mg/kg)	Wildlife Food Item Residue with 72.2 day Half-Life (mg/kg)
Cotton scenario				
0.11 lb DPX/acre	short grass	85	46	131
4 applications	tall grass	39	21	60
5 day interval	broadleaf forage/ small insects	48	26	73
	fruit,pods,seeds, large insects	5	3	8
Apple and pears				
0.11 lb DPX/acre	short grass	79	41	127
4 applications	tall grass	36	19	58
7 day interval	broadleaf forage/ small insects	44	23	71
	fruit,pods,seeds, large insects	5	3	8
Corn, brassica, and lettuce				
0.065 lb DPX/acre	short grass	55	35	79
4 applications	tall grass	25	16	36
3 day interval	broadleaf forage/ small insects	31	20	45
	fruit,pods,seeds, large insects	3	2	5
Tomato and peppers				
0.065 lb DPX/acre	short grass	50	27	77
4 applications	tall grass	23	12	35
5 day interval	broadleaf forage/ small insects	28	15	43
	fruit,pods,seeds, large insects	3	2	5

Assumes pseudo first-order decline. Calculations based on FATE model output.


Wildlife Food Item Residues Compared to
Mammalian Reproduction and Hemolysis Effects Thresholds
(0.11 lb/acre, 1.33 isomer adjustment, 5-day interval, 2.46 day half-life)
Residue (mg/kg)
50
40
30
20
10
0
0
5
10
15
20
25
30
Days After Initial Treatment
Reproduction NOAEC
Short Grass
Broadleaf Plants/Insects
Tall Grass
Hemolysis NOAEC
Seeds



Wildlife Food Item Residues Compared to
Mammalian Reproduction and Hemolysis Effects Thresholds
(0.11 lb/acre, 1.33 isomer adjustment, 5-day interval, 22.46 day half-life)
Short Grass
Broadleaf Plants/Insects
Tall Grass
Reproduction NOEC
Hemolysis NOEC
Seeds
Residue (mg/kg)
0
20
40
60
80
100
120
0
10
20
30
40
50
60
70
80
90
100
Days After Initial Application


Wildlife Food Item Residues Compared to
Mammalian Reproduction and Hemolysis Effects Thresholds
(0.11 lb/acre, 1.33 isomer adjustment, 5-day interval, 72.2 day half-life)
Residue (mg/kg)
0
20
40
60
80
100
120
140
Days After Initial Application
0
10
20
30
40
50
60
70
80
90
100
Short Grass
Broadleaf Plants/Insects
Reproduction NOEC
Hemolysis NOEC
Tall Grass
Seeds