8-30-94

file

DP Barcode :D204032
PC Code No :129099
EEB Out : 8/30/94

To: DENNIS EDWARDS
Product Manager 19
Registration Division (7505C)

From: Anthony F. Maciorowski, Chief
Ecological Effects Branch/EFED (7507C)

Attached, please find the EEB review of...

Reg./File # : 3F04169
Chemical Name : IMIDACLOPRID
Type Product : INSECTICIDE
Product Name : MERIT
Company Name : MILES INC
Purpose : REVIEW RERBUTTAL TO EARLIER EEB RISK ASSESSMENT ON COTTON, POTATOES AND APPLES

Action Code : 231 Date Due : 8/31/94
Reviewer : Dana Lateulere

EEB Guideline/MRID Summary Table: The review in this package contains an evaluation of the following:

GDLN NO	MRID NO	CAT	GDLN NO	MRID NO	CAT	GDLN NO	MRID NO	CAT
71-1(A)			72-2(A)			72-7(A)		
71-1(B)			72-2(B)			72-7(B)		
71-2(A)			72-3(A)			122-1(A)		
71-2(B)			72-3(B)			122-1(B)		
71-3			72-3(C)			122-2		
71-4(A)			72-3(D)			123-1(A)		
71-4(B)			72-3(E)			123-1(B)		
71-5(A)			72-3(F)			123-2		
71-5(B)			72-4(A)			124-1		
72-1(A)			72-4(B)			124-2		
72-1(B)			72-5			141-1		
72-1(C)			72-6			141-2		
72-1(D)						141-5		

Y=Acceptable (Study satisfied Guideline)/Concur
P=Partial (Study partially fulfilled Guideline but additional information is needed
S=Supplemental (Study provided useful information but Guideline was not satisfied)
N=Unacceptable (Study was rejected)/Nonconcur

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

MEMORANDUM

OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

Subject: DP# D204032, Imidacloprid (Shaugnessy #129099)
Re: Registration on Apples, Cotton and Potatoes; rebuttal of original review and risk assessment.

To: Dennis Edwards
PM 19
Registration Division 7505C

AUG 30 1994

From: Anthony F. Maciorowski, Chief
Ecological Effects Branch
Environmental Fate and Effects Division 7507C

EEB received a response from Miles Inc. regarding the 11/29/93 review, DP# D186039, Section 3 Registration request for Admire 2 Flowable, on apples cotton and potatoes. Also to be reconsidered because of new information will be the pending registration for Admire 2.5 Granular, DP# 189032, on cotton and potatoes. Note: the original rebuttal from Miles should accompany this memo for complete comprehension.

The following is a summary of the rebuttal positions stated by Miles Inc.:

1) they did not agree with the avian exposure calculation as presented by the Agency and request a reconsideration.

2) they stated that the aquatic EEC's, and therefore the subsequent LOC's, for potatoes were incorrect.

3) they proposed Endangered Species mitigation, gave results of their preliminary evaluation of the list of species of concern and requested a 9 to 12 month period for a full Endangered Species vs Crop evaluation.

4) they disagreed with the conclusion that Restricted Use classification is triggered for chemicals that display avian acute toxicity with LD50 values of 50 mg ai/kg or less.

The following is the EEB response:

1) The dietary preferences of key species was reevaluated for this use pattern. Small bird dietary preferences of insects will be used for the risk assessment instead of rangegrass as previously done.

Miles requests that a foliar half-life of 1.2 days, as determined by a residue study, be used when determining vegetative residues for representative food items for avian species. This study, MRID #425561-01 - "Evaluation of the Foliar Half-Life and Distribution of NTN 33893

in Potatoes", has not been reviewed by the Agency; because it is not a guideline requirement the EFGWB has no immediate plans to review the study. However, Ron Parker has used data from this study for runoff modeling. The EEB will consider this data in the risk assessment as part of a range of possible residues. However, these residue numbers are solely for potatoes, not for apples and cotton. Although these crops are similar, they have not been modeled together in the past and therefore, it will not be assumed that the foliar residues will be the same.

2) Ron Parker of the EFGWB has finalized aquatic residue computer modeling on several proposed crops for Imidacloprid, including potatoes, apples and cotton. This revision was done for flowable and granular formulations and included concerns raised by Miles for several input parameters. A revised risk assessment will be performed using the new information. (It should be noted that Miles requested the depth of incorporation for potatoes to be entered as 10 cm, Ron Parker determined that number to be incorrect and used 6.5 cm as the depth.)

The new EEC's for potatoes resulted in a lower risk quotient for the flowable formulation and an increase in the risk quotient for the granular formulation. Also, revised EEC's computed for the flowable formulation as a foliar ground spray on cotton resulted in higher risk quotients (previously only aerial foliar application EEC's had been determined). See amended risk assessments for specifics.

3). Endangered Species Evaluation was performed by Miles. A summary of the proposed mitigation steps are: 1) prohibiting use in specific counties of several states until such time that additional information is available to reevaluate concerns for species that did not have adequate available information, 2) a 200 foot buffer zone from natural ponds, lakes, streams, rivers and wetlands to limit exposure to several endangered aquatic invertebrates, 3) limit to only soil applications in counties where the Karner Blue Butterfly is believed to be at risk due to foliar applications, 4) in those counties where Miles has deemed it "not reasonable" to prohibit use, label restrictions have been suggested to limit applications to only periods when butterflies may not be present (i.e. flowering of apple trees).

After consultation with the EFED Endangered Species Protection Program (ESPP) Coordinator, it was decided that the proposed Endangered Species mitigation steps were acceptable. However, the following must also be included:

- Four California counties are listed as "No site data available" for the Valley Elderberry Longhorn Beetle. Miles has proposed no mitigation for these counties based on an assumption that the species is not present; this information comes from the California EPA database. The EEB ESPP Database indicates the beetle <u>is</u> present in these counties. A no-risk assumption cannot be made based solely on California's database; verification that the species is not located in these counties must be obtained from the USFWS. If the registrant cannot obtain this information directly, because of the sensitivity of the habitat location issue, please inform us. There are measures that can be taken to enable

the registrant to work with the USFWS to gain access to this information. Until such time as the concern is resolved, and unless other mitigation steps can be proposed, use must be prohibited in El Dorado, Fresno, Madera and Placer Counties, California.

- A total of 15 counties are listed as "No site data available" for the Vernal Pool Fairy Shrimp and/or the Vernal Pool Tadpole Shrimp. The same procedures as noted for the Valley Elderberry Longhorn Beetle must be taken. However, prohibition is not necessary if a label restriction is included requiring a 200 foot buffer zone from vernal pools in Butte, Contra Costa, Merced, Monterey, Placer, Riverside, Sacramento, San Joaquin, San Luis Obispo, Shasta, Stanislaus, Sutter, Tehama, Yolo, and Yuba Counties, California.

Miles has stated that they will continue this endangered species evaluation and submit a finalized profile in 9 to 12 months; at such time restrictions will be reconsidered. Also note, if a Conditional Registration is granted, EEB will require that habitat site verification for the Karner Blue Butterfly be determined because there is concern that the label restrictions will not keep the butterfly from risk as new areas are developed for farmland.

4) As stated in prior correspondence, the criteria that acute oral LD50's of 50 mg ai/kg or less will constitute consideration for Restricted Use classification will be utilized (previously, flowables were also included in this criteria - this is no longer the case).

Miles does <u>not</u> address the Restricted Use LOC's for non-endangered organisms. According to 40 CFR 152.170, there are several ecological criteria, in addition to the avian acute oral LD50 value, by which a chemical can be considered for Restricted Use classification. One applicable criteria is the acute and chronic levels of concern are exceeded for aquatic invertebrates for both the flowable and the granular formulations. A second applicable criteria is the potential possibility to cause reproduction effects to nontarget organisms. Until a reproduction NOEC has been established for the mallard duck, it will be assumed that there is reproductive risk to exposed birds. Finally, the granular product meets the criteria for Restricted Use classification based on the LD50 value to house sparrows. Also, EEB has received 6(a)(2) data indicating that Imidacloprid is acutely more toxic than previously indicated (i.e. Japanese quail LD50 = 31 mg/kg, female pigeon LD50 = 25 mg/kg).

Questions regarding this review, please contact Dana Lateulere of my staff at 308-2856.

[Attached are brief addendum risk assessments for 2.5% Granular on cotton and potatoes and Admire 2 Flowable on cotton, potatoes and apples.]

Addendum #1 - Supplement to DP# D189032
2.5% Granular - Cotton and Potatoes

Terrestrial
Application method - For both cotton and potatoes, apply as a narrow band in-furrow. For best results apply at seedline, for potatoes, make sure granules are in contact with seed pieces.
Rate - Cotton: 0.5 lb a.i./A
Potatoes: 0.3 lb a.i./A.

There is minimal acute or chronic concern for avian non-target species. The terrestrial exposure is expected to be at a minimum due to the implementation of in-furrow applications. LD50's/ft^2 were determined for this use at the maximum rate and the resultant quotient did not exceed LOC's. However, the acute oral toxicity to songbirds is below 50 mg a.i./kg; this toxicity alone classifies imidacloprid as a candidate for Restricted Use classification. Also, the EEB is awaiting information on toxicity data that indicates several other avian species have LD50's below 50 mg a.i./kg.

The chronic concern for avian eggshell thickness is not an issue for these uses as exposure is expected to be minimal to non-existent based on the in-furrow means of application which will not lead to residues on food items. Granules left on the soil due to spillage, etc. are not expected to be available for consumption on a chronic basis due to the properties of the chemical, i.e. highly soluble.

Aquatic
The following EEC's were determined for a single, soil banded, in-furrow application of Imidacloprid to potatoes at a rate of 0.3 lb a.i/A:
Instant EEC (Ten year return period) = 14.6 ppb
21 day chronic EEC (Ten year return period) = 5.1 ppb

For the most sensitive aquatic species, the following risk quotients were determined (RQ=EEC/LC50):
Mysid acute = 14.6 ppb/37.7 ppb
RQ = 0.39
Mysid chronic = 5.1 ppb/0.326 ppb
RQ = 15.6
The following are the aquatic invertebrate Levels of Concern (LOC):

EEC/LC50 $\geq$	0.5	High acute risk.
EEC/LC50 $\geq$	0.1	Risk that may be mitigated through RESTRICTED USE.
EEC/LC50 $\geq$	0.05	Endangered fish or invertebrates may be affected.
EEC/Chronic NOEL $\geq$	1	Chronic risk, endangered fish or invertebrates may be affected, RESTRICTED USE recommended.

The acute LOC for "risk that may be mitigated by Restricted Use" is exceeded by a factor of 3.9, the Endangered Species LOC is exceeded by a factor of 7.8. The chronic LOC for non-endangered and Federally Endangered organisms is exceeded by a factor of 15.6.

Miles has submitted possible mitigation steps to alleviate some of the Endangered Species concerns that arose in the Admire 2 Flowable risk assessment, the EEB also included several steps; these steps may also be used for Admire 2.5 Granular.

- prohibiting use in counties where a no-effect situation could not be determined
- 200 foot buffer zone from aquatic habitat in counties with endangered aquatic organisms
- 200 foot buffer zone from vernal ponds in counties where the vernal pond dwelling endangered species are known to inhabit.

Miles has **not** submitted mitigation to alleviate LOC's for non-endangered species.

Addendum #2 - Supplement to DP# D186039
Admire 2 Flowable - Cotton, Potatoes and Apples
Soil or foliar application:
Apple - 0.1 lb ai., 5 applications, ground foliar spray
Cotton - 0.05 lb ai, 10 applications, aerial or ground foliar spray
Potatoes - 0.05 lb ai, 4 applications, ground foliar spray

Terrestrial

Multiple application residues were determined for cotton, apples and potatoes. Miles submitted information suggesting that the proper foliar half-life for potatoes is 1.2 days . A 30 day half-life was utilized for apples and cotton. (After consultation with Ron Parker of the EFGWB, and after looking over several studies submitted for imidacloprid that offered a wide range of residues on soil and vegetation, a conservative average of 30 days was chosen). Miles may submit any data available to justify the use of a different foliar half life for cotton and apples.

The following multiple application residues were determined:

Apples:(0.10 lb a.i., 5 applications, 10 day interval)
Maximum on long grass = 40 ppm
Average on long grass = 25 ppm

Maximum on leafy crops = 45.4 ppm
Average on leafy crops = 28.5 ppm

Maximum on forage and insects = 19.2 ppm
Average on forage and insects = 12.3 ppm

Maximum on fruit = 2.54 ppm
Average on fruit = 1.60 ppm

Cotton:(0.05 lb a.i., 10 applications, 7 day interval)
Maximum on long grass = 30.6 ppm
Average on long grass = 19.9 ppm

Maximum on leafy crops = 34.8 ppm
Average on leafy crops = 22.6 ppm

Maximum on forage and insects = 16.1 ppm
Average on forage and insects = 10.5 ppm

Potatoes:(0.05 lb a.i., 4 applications, 7 day interval)
Maximum on long grass = 5.6 ppm
Average on long grass = 1.5 ppm

Maximum on leafy crops = 6.4 ppm
Average on leafy crops = 1.7 ppm

Maximum on forage and insects = 3.0 ppm
Average on forage and insects = 0.81 ppm

The acute dietary LOC is exceeded for Endangered bird species that may be exposed to the maximum expected residues on forage and insects from the cotton and apple use. However, the maximum expected residues will not be available for long term dietary exposure. Therefore, acute dietary risk to Federally endangered and non-endangered avian species is expected to be minimal. However, the LOC is exceeded for avian reproductive effects until a discernable NOEC is established for the mallard duck that proves otherwise. Until such time, birds exposed to any dietary residues will be assumed at reproductive risk.

Aquatic

The following EEC's were determined for 10 foliar ground spray applications of 0.05 lb a.i./A to cotton (the worst case scenario for this request):

Instant EEC (Ten year return period) = 23.7 ppb
21 day chronic EEC (Ten year return period) = 10.4 ppb

For the most sensitive aquatic species, the following risk quotients were determined (RQ = EEC/LC50):

Mysid acute = 23.7 ppb/37.7 ppb
RQ = .63
Mysid chronic =10.4 ppb/0.326 ppb
RQ = 31.9

The following are the aquatic invertebrate Levels of Concern (LOC):

EEC/LC50 ≥	0.5	High acute risk.
EEC/LC50 ≥	0.1	Risk that may be mitigated through RESTRICTED USE.
EEC/LC50 ≥	0.05	Endangered fish or invertebrates may be affected.
EEC/Chronic NOEL ≥	1	Chronic risk, endangered fish or invertebrates may be affected, RESTRICTED USE recommended.

The acute LOC for "high acute risk" is exceeded by a factor of 1.3, the acute LOC for "risk that may be mitigated by Restricted Use" is exceeded by a factor of 6.3, the Endangered Species LOC is exceeded by a factor of 12.6. The chronic LOC for non-endangered and Federally Endangered organisms is exceeded by a factor of 31.9.

Let it be noted that all uses exceed at least the Restricted Use LOC's for aquatic invertebrates, both acutely and chronically. The worst case scenario was utilized here - foliar ground spray of cotton. Miles has **not** submitted mitigation to alleviate LOC's for non-endangered species.

Miles has submitted possible mitigation steps to alleviate some of the Endangered Species concerns for Admire 2 Flowable and the EEB has also offered several steps. These have been deemed acceptable in lowering the possible risk to Federally endangered species associated with this use:

- prohibiting use in counties where a no-effect situation could not be determined
- 200 foot buffer zone from aquatic habitat in counties with endangered aquatic organisms
- 200 foot buffer zone from vernal ponds in counties where the vernal pond dwelling endangered species are known to inhabit.

EEC Modelling Summary

CHEMICAL COMMON NAME: NTN33893 **FORMULATION NAME:** CONFIDOR 2
RUNOFF MODEL: PRZM1 **RECEIVING WATER MODEL:** EXAMS 2.94
REGISTRANT(S): MILES **MODELLER:** RON PARKER **DATE:** 11/16/93

CHEMICAL PARAMETERS:
HYDROLYSIS t½:pH5 STABLE pH7 STABLE pH9 355 D AQU PHOTOL t½ 1 H
KOC KD 1.36 AEROBIC SOIL t½ 700 D ANEROBIC SOIL t½ 27 D
AEROBIC AQUATIC t½ 700 D ANAEROBIC AQUATIC t½ 27 D SOL 0.58
VAPOR PRESSURE 6.0e-09 HENRYS LAW CONSTANT 4.0e-12

CROP SITE 1

LOCATION:
CROP **APPLES** COUNTY WASHINGTON STATE NY MLRA 146
SOIL SERIES SHARKEY TEXTURE CLAY
JUSTIFICATION This is a high rainfall and runoff site and is representative of a high exposure, apple culture field.

MANAGEMENT:
TILLAGE TYPE N/A TILLAGE TIME N/A RESIDUES N/A
APPLICATION METHOD FOLIAR INCORPORATION DEPTH (IN) 0.0
CROP DATES: PLANTING N/A EMERGENCE N/A MATURITY N/A
HARVEST N/A SPRAY DRIFT 5.0 %

PESTICIDE APPLICATION:
RATE(LBS/AC) 0.102 DATES:1 15/6 2 30/6 3 15/7 4 30/7 5 15/8 6
7 8 9 10 JUSTIFICATION This is the maximum annual rate with 5 applications at the maximum single app. rate.

RESULTS:
MAXIMUM DISSOLVED CONCENTRATION[1] - TEN YEAR RETURN PERIOD (PPB)
POST LOAD[1] 8.6 96HOUR[2] 6.8 21DAY[3] 3.8 60DAY N/A
90DAY N/A DAY DAY AVE RAIN (INCH/YEAR) 36.7
AVE RUNOFF (IN/YEAR) 7.2 AVE EROSION (TONS/ACRE/YEAR) 0.025
LOADING BREAKDOWN[4]:RUNOFF % EROSION % SP DRIFT %

COMMENTS: _____

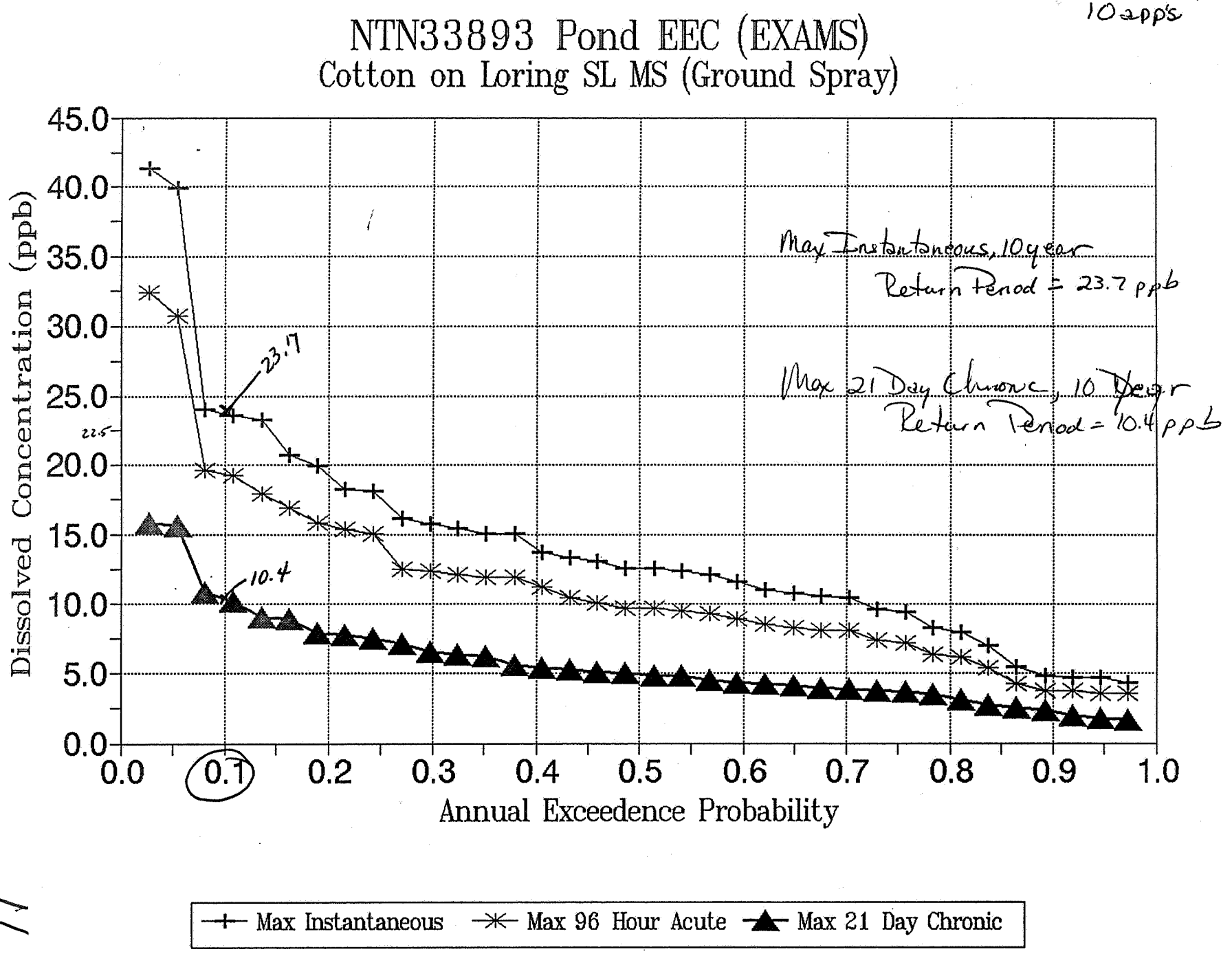
[1] POST LOAD - MAXIMUM OF ALL POND CONCENTRATIONS DURING THE YEAR CALCULATED IMMEDIATELY AFTER A RUNOFF OR SPRAY DRIFT LOADING AND COMPLETE MIXING IN THE POND BUT BEFORE ANY DEGREDATION OF THE LAST LOADING HAS TAKEN PLACE

[2] 96 HOUR - MAXIMUM OF THE RUNNING AVERAGE CONCENTRATIONS OF ANY CONSECUTIVE FOUR DAY PERIOD DURING THE YEAR

[3] 21 DAY - MAXIMUM OF THE RUNNING AVERAGE CONCENTRATIONS OF ANY CONSECUTIVE TWENTY-ONE DAY PERIOD DURING THE YEAR

[4] VALUES REFER TO THE % OF EACH FORM OF ANNUAL LOADING IN THE YEAR REPRESENTING THE ONE IN TEN YEAR EXCEEDENCE PROBABILITY

Rate = .05 lb ai/A
10 apps



EEC Modelling Summary

CHEMICAL COMMON NAME: NTN33893 **FORMULATION NAME:** CONFIDOR 2
RUNOFF MODEL: PRZM1 **RECEIVING WATER MODEL:** EXAMS
REGISTRANT(S): MILES **MODELLER:** RON PARKER **DATE:** 11/16/93

CHEMICAL PARAMETERS:
HYDROLYSIS t½:pH5 STABLE pH7 STABLE pH9 355 D AQU PHOTOL t½ 1 H
KOC KD 1.36 AEROBIC SOIL t½ 700 D ANEROBIC SOIL t½ 27 D
AEROBIC AQUATIC t½ 700 D ANAEROBIC AQUATIC t½ 27 D SOL 0.58
VAPOR PRESSURE 6.0e-09 HENRYS LAW CONSTANT 4.0e-12

CROP SITE 1

LOCATION:
CROP COTTON COUNTY YAZOO STATE MS MLRA 134
SOIL SERIES LORING TEXTURE SILT LOAM
JUSTIFICATION This site is representative of cotton culture in the southeast with highly erodible soil and erosive rainfall.

MANAGEMENT:
TILLAGE TYPE CONV/NT/NT TILLAGE TIME FALL RESIDUES REMAINING
APPLICATION METHOD CONVENTIONAL AERIAL INCORPORATION DEPTH 0.0
CROP DATES: PLANTING 4/24 EMERGENCE 5/1 MATURITY 7/9
HARVEST 22/9 SPRAY ~~DRIFT 5.0 %~~

PESTICIDE APPLICATION:
RATE(LBS/AC) 0.05 DATES:1 6/6 2 14/6 3 22/6 4 30/6 5 8/7 6 16/7 7 24/7 8 1/8 9 9/8 10 17/8 JUSTIFICATION This is the maximum label rate and maximum number of applications permitted on the label.

RESULTS:
MAXIMUM DISSOLVED CONCENTRATION[1] - TEN YEAR RETURN PERIOD (PPB)
POST LOAD[1] 12.2 96HOUR[2] 10.0 21DAY[3] 5.4 60DAY N/A
90DAY N/A DAY DAY AVE RAIN (INCH/YEAR) 50.0
AVE RUNOFF (IN/YEAR) 14.7 AVE EROSION (TONS/ACRE/YEAR) 10.0
LOADING BREAKDOWN[4]:RUNOFF % EROSION % SP DRIFT %

COMMENTS:

[1] POST LOAD - MAXIMUM OF ALL POND CONCENTRATIONS DURING THE YEAR CALCULATED IMMEDIATELY AFTER A RUNOFF OR SPRAY DRIFT LOADING AND COMPLETE MIXING IN THE POND BUT BEFORE ANY DEGREDATION OF THE LAST LOADING HAS TAKEN PLACE

[2] 96 HOUR - MAXIMUM OF THE RUNNING AVERAGE CONCENTRATIONS OF ANY CONSECUTIVE FOUR DAY PERIOD DURING THE YEAR

[3] 21 DAY - MAXIMUM OF THE RUNNING AVERAGE CONCENTRATIONS OF ANY CONSECUTIVE TWENTY-ONE DAY PERIOD DURING THE YEAR

[4] VALUES REFER TO THE PERCENT OF EACH FORM OF ANNUAL LOADING IN THE YEAR REPRESENTING THE ONE IN TEN YEAR EXCEEDENCE

EEC Modelling Summary

CHEMICAL COMMON NAME: NTN33893 **FORMULATION NAME:** CONFIDOR 2
RUNOFF MODEL: PRZM1 **RECEIVING WATER MODEL:** EXAMS 2.94
REGISTRANT(S): MILES **MODELLER:** RON PARKER **DATE:** 05/20/94

CHEMICAL PARAMETERS:
HYDROLYSIS t½:pH5 STABLE pH7 STABLE pH9 355 D AQU PHOTOL t½ 1 H
KOC KD 1.36 AEROBIC SOIL t½ 700 D ANEROBIC SOIL t½ 27 D
AEROBIC AQUATIC t½ 700 D ANAEROBIC AQUATIC t½ 27 D SOL 0.58
VAPOR PRESSURE 6.0e-09 HENRYS LAW CONSTANT 4.0e-12

CROP SITE 1

LOCATION:
CROP **POTATOES** COUNTY AROOSTOOK STATE ME MLRA 146
SOIL SERIES CONANT TEXTURE SILT LOAM
JUSTIFICATION This is a high rainfall and runoff site and is representative of potato culture in the northeast US.

MANAGEMENT:
TILLAGE TYPE CONV TILLAGE TIME FALL RESIDUES REMAINING
APPLICATION METHOD BANDED IN-FURROW INCORPORATION DEPTH 2.0
CROP DATES: PLANTING 1/4 EMERGENCE 10/4 MATURITY 8/9
HARVEST 18/9 SPRAY DRIFT N/A %

PESTICIDE APPLICATION:
RATE(LBS/AC) 0.30 DATES:1 1/4 2 3 4 5 6
7 8 9 10 JUSTIFICATION This is the maximum label rate for soil appl. and maximum permitted number of applications.

RESULTS:
MAXIMUM DISSOLVED CONCENTRATION[1] - TEN YEAR RETURN PERIOD (PPB)
POST LOAD[1] 14.6 96HOUR[2] 11.2 21DAY[3] 5.1 60DAY N/A
90DAY N/A DAY DAY AVE RAIN (INCH/YEAR) 43.5
AVE RUNOFF (IN/YEAR) 9.9 AVE EROSION (TONS/ACRE/YEAR) 12.7
LOADING BREAKDOWN[4]:RUNOFF % EROSION % SP DRIFT %

COMMENTS:

[1] POST LOAD - MAXIMUM OF ALL POND CONCENTRATIONS DURING THE YEAR CALCULATED IMMEDIATELY AFTER A RUNOFF OR SPRAY DRIFT LOADING AND COMPLETE MIXING IN THE POND BUT BEFORE ANY DEGREDATION OF THE LAST LOADING HAS TAKEN PLACE

[2] 96 HOUR - MAXIMUM OF THE RUNNING AVERAGE CONCENTRATIONS OF ANY CONSECUTIVE FOUR DAY PERIOD DURING THE YEAR

[3] 21 DAY - MAXIMUM OF THE RUNNING AVERAGE CONCENTRATIONS OF ANY CONSECUTIVE TWENTY-ONE DAY PERIOD DURING THE YEAR

[4] VALUES REFER TO THE % OF EACH FORM OF ANNUAL LOADING IN THE YEAR REPRESENTING THE ONE IN TEN YEAR EXCEEDENCE PROBABILITY

EEC Modelling Summary

CHEMICAL COMMON NAME: NTN33893 **FORMULATION NAME:** CONFIDOR 2
RUNOFF MODEL: PRZM1 **RECEIVING WATER MODEL:** EXAMS 2.94
REGISTRANT(S): MILES **MODELLER:** RON PARKER **DATE:** 11/16/93

CHEMICAL PARAMETERS:
HYDROLYSIS t½:pH5 STABLE pH7 STABLE pH9 355 D AQU PHOTOL t½ 1 H
KOC KD 1.36 AEROBIC SOIL t½ 700 D ANEROBIC SOIL t½ 27 D
AEROBIC AQUATIC t½ 700 D ANAEROBIC AQUATIC t½ 27 D SOL 0.58
VAPOR PRESSURE 6.0e-09 HENRYS LAW CONSTANT 4.0e-12

CROP SITE 1

LOCATION:
CROP POTATOES COUNTY AROOSTOOK STATE ME MLRA 146
SOIL SERIES CONANT TEXTURE SILT LOAM
JUSTIFICATION This is a high rainfall and runoff site and is representative of potato culture in the northeast US.

MANAGEMENT:
TILLAGE TYPE CONV TILLAGE TIME FALL RESIDUES REMAINING
APPLICATION METHOD FOLIAR INCORPORATION DEPTH 0.0
CROP DATES: PLANTING 1/4 EMERGENCE 10/4 MATURITY 8/9
HARVEST 18/9 SPRAY DRIFT 5.0 %

PESTICIDE APPLICATION:
RATE(LBS/AC) 0.05 DATES:1 16/5 2 23/5 3 30/5 4 6/6 5 6
7 8 9 10 JUSTIFICATION This is the maximum foliar label rate and maximum permitted number of applications.

RESULTS:
MAXIMUM DISSOLVED CONCENTRATION[1] - TEN YEAR RETURN PERIOD (PPB)
POST LOAD[1] 10.9 96HOUR[2] 8.4 21DAY[3] 4.2 60DAY N/A
90DAY N/A DAY DAY AVE RAIN (INCH/YEAR) 43.5
AVE RUNOFF (IN/YEAR) 9.9 AVE EROSION (TONS/ACRE/YEAR) 12.7
LOADING BREAKDOWN[4]:RUNOFF % EROSION % SP DRIFT %

COMMENTS:

[1] POST LOAD - MAXIMUM OF ALL POND CONCENTRATIONS DURING THE YEAR CALCULATED IMMEDIATELY AFTER A RUNOFF OR SPRAY DRIFT LOADING AND COMPLETE MIXING IN THE POND BUT BEFORE ANY DEGREDATION OF THE LAST LOADING HAS TAKEN PLACE

[2] 96 HOUR - MAXIMUM OF THE RUNNING AVERAGE CONCENTRATIONS OF ANY CONSECUTIVE FOUR DAY PERIOD DURING THE YEAR

[3] 21 DAY - MAXIMUM OF THE RUNNING AVERAGE CONCENTRATIONS OF ANY CONSECUTIVE TWENTY-ONE DAY PERIOD DURING THE YEAR

[4] VALUES REFER TO THE % OF EACH FORM OF ANNUAL LOADING IN THE YEAR REPRESENTING THE ONE IN TEN YEAR EXCEEDENCE PROBABILITY

MILES

Agriculture Division

Miles Inc.
8400 Hawthorn Road
P.O. Box 4913
Kansas City, MO 64120-0013
Phone: 816 242-2000

May 20, 1994

Mr. Dennis Edwards, Jr.
Product Manager (19)
Registration Division (7505C)
U.S. Environmental Protection Agency
401 M Street, SW
Washington, D.C. 20460-0001

Subject: NTN 33893, imidacloprid - Food Use
PP # 3F4169
FAP # 3H5655
Miles' Response to EEB Review

Dear Mr. Edwards:

Miles has submitted for registration of the chemical imidacloprid on the crops of apples, potatoes and cotton in PP # 3F4169 and FAP # 3H5655. The EEB has reviewed this petition and replied in their review identified as DP Barcode D186039 dated 11/29/93. In this review, the Agency concluded that the use of imidacloprid on apples, cotton and potatoes represents a high risk to avian species; calculated the potential for adverse effects to aquatic species and listed multiple Endangered Species which may be of concern to the proposed use.

Miles scientists have studied the EEB review and their response is attached to this letter. Miles position is outlined briefly below:

1. Miles does not agree with the avian exposure calculation as presented by the Agency and request that the Agency reconsider based on details as presented in the Attachment.

2. All Levels of Concern expressed by the Agency for aquatic adverse effects were correct with the one exception of the EEC expressed for potato.

3. Miles is submitting the results of our preliminary evaluation of the Endangered Species issue which discounts many of the species on EPA's list as their habitats are not located in agricultural areas. However data are not available to fully address all species and Miles feels that a period of 9 - 12 months will be required to fully evaluate the situation. In the interim, Miles has proposed several Risk Mitigation Measures which include specific county restrictions, a 200 ft buffer zone to natural aquatic habitats in those counties with aquatic endangered species concerns and limitation to soil only application on potatoes in those counties with concerns for the Karner Blue Butterfly.

Miles would like to meet with representatives of the Agency to discuss the proposed risk mitigation measures and revisit the entire Endangered Species issue. Karen Pither will be in contact with Portia Jenkins to establish a meeting time that is mutually agreeable.

Yours very truly,

MILES INC.
AGRICULTURE DIVISION

John S. Thornton

John S. Thornton
Manager, Registrations

JST:KMP:brh
Enclosure: Miles' Response to Agency Review

Admire 2 - Flowable
Cotton , Apples and Potatoes
Ecological Effects

Miles Response to Agency Review

EPA / EEB has reviewed the proposed use of Imidacloprid on Cotton, Apples and Potatoes and provided a risk assessment. Below is Miles response to a number of issues / conclusions identified within the risk assessment.

101.2 Likelihood of Adverse Effects to Non-target Organisms

Terrestrial

The EEB review concluded that "use of NTN on apples, cotton and potatoes presents a high risk to avian species from dietary and chronic exposures." The basis for this conclusion was that estimated residue levels in some types of avian food items (short grass and/or leafy plants) were expected to exceed (1) the acute dietary level of concern (LOC) derived from an estimated songbird LC50 value and (2) the chronic dietary LOC which is presently assumed to be any residue value greater than zero because a no-effect-level (NEL) has not been established.

Miles disagrees with the Agency's conclusion that the proposed use of imidacloprid (NTN 33893, the active ingredient of ADMIRE 2F) on cotton, potatoes and apples presents a high acute or chronic dietary risk to birds. In our view, the exposure estimates used in the EEB review are unrealistically high because they did not take into account dietary preferences of key species groups (e.g., songbirds) and calculations assumed an inappropriate residue half-life. As detailed below, we believe that data are adequate to characterize the acute dietary avian risk as minimal. With respect to the chronic dietary risk, we believe existing data do not support the conclusion that chronic effects are likely. However, we can understand that the Agency needs to be conservative and conclude that chronic risks can not be ruled out until a chronic NEL is established. A new mallard reproduction study is in progress (completion expected 11/94) that should establish a NEL. We expect the NEL to be greater than maximum EECs in avian food items if calculations are made with the appropriate half-life (see below).

Acute Dietary Risk

The EEB review used the following estimates of maximum residue levels (ppm) on avian foods.

TABLE 1	Short Grass	Leafy Crops	Forage/Insects
Cotton	73.0	38.0	17.7
Potatoes	40.2	24.7	9.7
Apples	86.8	45.2	21.0

See Figs. 1-3 for plots of expected residue levels through time and summary of above calculations.

The diet of the vast majority of avian species, including all songbirds, consists of arthropods (mostly insects), seeds and fruits. Little if any plant vegetation is eaten. Residue levels in short grasses and leafy crops are not relevant to a characterization of dietary exposure of these species (i.e., songbirds, doves, woodpeckers, raptors, shorebirds, etc.). This was acknowledged by the Agency in its risk assessment for use of imidacloprid on turf and ornamentals. In this risk assessment, the forage/insect residue value was used to characterize potential exposure to songbirds. In fact, in an effort to reduce acute avian risk to acceptable levels, Miles agreed to reduce the turf application rate so that the forage/insect EEC was reduced to a level less than 1/5 of the songbird LC50. Residue levels on short grass were not used in the songbird risk characterization. The short grass residue value was only used to characterize potential exposure to herbivorous species such as waterfowl. The approach used for the turf registration should also apply here.

Using the forage/insect residue values in Table 1, the maximum dietary exposure of songbirds is estimated to be 17.7 ppm in cotton, 9.7 ppm in potatoes and 21.0 ppm in apples (see also Figs 1-3). All of these values are below the regulatory LOCs of 1/2 of the songbird LC50 (71.35) and 1/5 of the songbird LC50 (28.54 ppm). Thus, acute dietary risk to songbirds may be characterized as minimal.

For herbivorous species such as waterfowl and galliformes (represented by the mallard and northern bobwhite), maximum dietary exposure estimates (based on values in Table 1) are 73.0 ppm in cotton, 40.2 ppm in potatoes and 86.8 ppm in apples (see also Figs 1-3). All of these values are well below 1/2 and 1/5 of the mallard LC50 (>5000 ppm) and 1/2 and 1/5 of the northern bobwhite LC50 (1536 ppm). Therefore, acute dietary risk to these species may be characterized as minimal.

Although the above risk assessment predicts minimal risk, the true risk is even much lower than predicted because exposure estimates used above were based on a long residue half-life. In performing EEC calculations, EEB assumed a half-life of **39 days**. However, a Miles field study (Miles No. 103233, MRID 42488101) showed that the mean half-life of imidacloprid residues on potato foliage was only **1.2 days**. This empirically determined half-life is appropriate for EEC calculations for the proposed use patterns (cotton, potatoes, apples). Miles repeated the EEC calculations using a 1.2 day half-life. The maximum residue levels (ppm) by food type are listed in Table 2.

TABLE 2	Short Grass	Leafy Crops	Forage/Insects
Cotton	12.2	6.4	3
Potatoes	12.2	6.4	3
Apples	24.1	12.5	5.8

See Figs. 4-6 for plots of expected residue levels through time and summary of the above calculations.

None of the EEC values in Table 2, even those for short grass, exceed 1/5 of the estimated

songbird LC50 (see also Figs 4-6). Thus, no matter what assumptions regarding avian diets are made, the conclusion is reached that the acute avian risk is minimal. Taking into account both the short foliar half-life of imidacloprid in the field and the dietary preferences of birds for insects, seeds and fruits, a large margin of safety is expected between maximum field concentrations (3-6 ppm) and dietary levels that pose a risk to birds.

Chronic Dietary Risk

The definitive assessment of avian chronic risk can not be completed until a clear chronic NEL is established. However, existing data suggest that the lowest level tested in mallards (61 ppm) is close to the NEL. Only one endpoint (eggshell thickness) was affected at this test concentration, the effect was minor (3% thinning with no loss of eggshell strength), and the effect was detectable as statistically significant only if the most powerful statistical method (Williams Test) was used. As indicated in Table 2 above, maximum (i.e., single day peak) dietary exposure is expected to be no more than 24.1 ppm, and true chronic exposure (i.e., lasting 21+ days) is expected to be $\leq$6.4 ppm (see also Figs 4-6). Miles expects the new mallard reproduction study to establish the NEL to be in the range of 25-55 ppm. If so, the NEL would be greater than any of the EEC values in Table 2 and chronic avian risks could therefore be considered to be minimal.

Acute Risk - Restricted Use Trigger of LD50 < 50 mg/kg

The EEB Review stated that "based upon intended interpretation of CFR 152.170 (c) (2) (i), Imidacloprid is a candidate for Restricted Use classification and/or mitigation" because the songbird LD50 is less than 50 mg a.i./kg. Reference was made to an earlier memorandum (#D192262) in which EEB stated, "the intention of EFED was to trigger Restricted Use when the avian acute oral LD50 for the active ingredient is 50 mg/kg or less; this classification was intended for a granular or flowable end product."

Miles disagrees with the Agency's finding that imidacloprid triggers restricted use classification based on avian acute toxicity. As Miles previously pointed out during correspondence with the Agency regarding the turf registration, CFR 152.170 (c) (2) (i) clearly states that this Restricted Use trigger applies to the toxicity of the formulated product (as determined via direct testing or extrapolation of tests with the active ingredient), and not the active ingredient. Second, Miles questions EEB's assertion that this trigger was intended to apply to flowable products. A footnote to Table 1 (copy attached) of the Agency's SEP for Ecological Risk Assessment states that this Restricted Use trigger is "for granular products only." Moreover, in Attachment B of the SEP (copy attached), in which the Agency's restricted use criteria for hazard to non-target organisms is explained in detail, the 50 mg/kg trigger is listed only under the heading "Granular Products" and it is unequivocally stated that this trigger applies to the toxicity of the formulated product "as determined by extrapolation from tests conducted with the technical material or directly with the formulated product." Therefore, this restricted use trigger should not apply to the use of imidacloprid on cotton , potatoes or apples either as a flowable formulation (because the 50 mg/kg trigger does not apply) or as a 2.5% granular formulation (because the avian LD50 for this formulation is much greater than 50 mg/kg).

101.2 Likelihood of Adverse Effects to Non-target Organisms

Aquatic

All of the Levels of Concern (LOC's) expressed by the Agency were correct and consistent with those used in previous risk assessments.

The only value which we believe needs to be re-visited is the EEC generated for potatoes. Based on discussions with Dr. Ron Parker, it is our understanding that some of the model input parameters upon which the potato EEC was based may need modification. Specifically:

Based on the label, the application scheme should be either:

(1) 1 soil application at a rate of 0.3 lbs per acre or

(2) 4 foliar applications at a rate of 0.05 lbs per acre.

For the foliar application, a foliar half life of 1.2 days should be used. This is based upon a specific study which measured the foliar half-life in potatoes (MRN 103233: Evaluation of the Foliar Half-life and Distribution of NTN 33893 in Potatoes).

For the soil application an incorporation depth of 10 cm should be used. References justifying this depth have been provided to Dr. Parker and are attached for your convenience.

Based upon the above information we would request that the EEC for potato be recalculated and the associated risk conclusions reconsidered. Information supporting recalculation of the potato EEC has already been provided to Ron Parker of EFGWB.

101.3 Endangered Species

The Agency review provided a list of the endangered species of concern. Miles has made every effort, in the short time available, to evaluate the potential for exposure of these species to imidacloprid. Unfortunately the available data base for such an assessment is diffuse and standard procedures for conducting such an evaluation are simply not available. Regardless, within the given time frame, Miles has been able to establish that some of the species, principally those from California, should not be of concern because their habitats are not located in agricultural areas. In other instances we were able to eliminate some, but not all, of the counties of concern for a particular species.

In conducting this evaluation, Miles specific objectives were:

1. Working with state and federal endangered species experts, locate / identify the habitat for as many of the endangered species as possible.

2. For the endangered species habitats identified, evaluate their proximity (and thus potential for exposure) to the crops of interest (cotton, potato and apple).

3. Identify the next steps necessary for addressing the concerns for those species which could not be eliminated from the list.

After spending a few weeks investigating the endangered species list, it became clear that evaluation of all the species was going to take considerable effort and was outside the time scope allotted for this evaluation. The primary problems encountered in this evaluation were (1) identifying federal, state and local personnel ***willing*** to provide the required information, (2) the basic lack of information (distribution; habitat location) on specific species and (3) the lack of information, in the appropriate format, on crop locations. Due to these problems, we were unable to address all of the species of concern on the Agency's list.

A complete "progress report" outlining the information which was obtained and the species we were able to eliminate as a concern because their habitats were not in "agricultural areas" is provided as Attachment 1. The species / county combinations which were resolved or remain unresolved are outlined in Table 1.

To gather all the information necessary to adequately address the entire list will take, at a minimum, another 9 - 12 months. We propose that, under a conditional registration, Miles will provide a complete evaluation of the species on the list, including:

1. Specific habitat characteristics and, if available, locations for all species,
2. General location of the crops of interest (cotton, apple and potato) in the region,
3. When possible, comparison of crop location to endangered species location and evaluation of the potential for exposure.

In the interim, Miles is willing to consider potential mitigation options to address the unresolved endangered species issues. The mitigation measures outlined below will be re-evaluated when more data are available (9 - 12 months) on the endangered species / crop interactions. Specific mitigation measures include:

1. The use of Admire - 2F will be prohibited in the following counties:

State	County	Species of Concern
Florida	Alachua	Squirrel Chimney Cave Shrimp
Alabama	Madison	Alabama Cave Shrimp
Virginia	Lee	Lee County Cave Isopod
Illinois	Lake	Karner Blue Butterfly
New York	Saratoga	Karner Blue Butterfly
	Schenectady	Karner Blue Butterfly
New Hampshire	Merrimack	Karner Blue Butterfly

State	County	Species of Concern
California	Glenn Sacremento Sutter Tehema	Valley Elderberry Longhorn Beetle

2. For specific counties where exposure to natural aquatic habitats is a concern for a specific endangered species, a 200 foot buffer zone between the site of application and any natural aquatic habitat (natural ponds, lakes, streams, rivers and wetlands) will be required. The specific counties, and associated endangered species of concern, for which we recommend the buffer zone restriction include:

State	County	Species of Concern
California	Butte Merced	Conservancy Fairy Shrimp
California	Napa Sonoma	California Freshwater Shrimp
	Contra Costa	Longhorn Fairy Shrimp
California	Alameda Contra Costa Merced Monterey Napa Placer Riverside Sacremento San Joaquin San Luis Obispo San Mateo Santa Barbara Solano Sonoma Yuba	California Linderiella

3. The Karner Blue Butterfly is a concern in 7 counties in Wisconsin. These 7 counties do not appear in the 1987 Census of Agriculture list of the top 100 apple producing counties; therefore, apples should be of minor concern. The only crop associated with

this petition which is grown in these counties is potatoes. Given that butterfly exposure is primarily associated with foliar applications, the use of Admire will be restricted to soil application in these counties.

4. The Karner Blue Butterfly is also a concern in 6 counties in Michigan. Both potato and apples can be grown in these counties. For potatoes, the use will be restricted to soil application. For apples, it is not reasonable to prohibit use in these counties; however interim label language will be proposed which will help minimize exposure. As discussed above, during the next 9 - 12 months, additional information will be gathered to further evaluate this species. Recommended label language is:

> Avoid applications of Admire 2-F during times when exposure to butterflies may occur (i.e., flowering of apple trees).

Although the above language does not specifically address the endangered butterfly species, other factors should be considered when evaluating the level of concern for this organism. Specifically:

> - Imidacloprid is generally not effective against lepidopterous insects such as butterflies. Imported cabbage worm (*Pieris rapae*) is in the same superfamily (Papilionidae) as the Karner Blue Butterfly. Our data show that direct foliar applications provide only a weak effect on the imported cabbage worm in screening trials. Other lepidoptera are therefore not expected to be strongly affected.
>
> - On a comparative basis, imidacloprid will be displacing more toxic alternatives, so the overall risk to endangered species should decrease. Specifically, imidacloprid will displace the use of Lorsban (chlorpyriphos), Thiodan (endosulfan) and Vydate (Oxamyl). All of these products are more active against lepidopterous insects such as butterflies.
>
> - The general habitat of the Karner Blue Butterfly does not appear to be typical of agricultural settings (see attachment 1). This will be investigated in more detail in future, follow-up evaluations.

When it is stated in Table 1 that there is "no site data available", this indicates that the California EPA database does not indicate the presence of the species in the county listed by the EPA. Given that the Cal EPA data base is likely the most recent and up-to-date, Miles feels it is best to continue to evaluate these species before specific label restrictions are applied.

It is important to emphasize again that the label restrictions outlined above are only applicable on an interim basis and as additional information is obtained the need for such restrictions will be re-evaluated.

102 Conclusions

As discussed above, Miles does not agree with the Agency's conclusion concerning acute and chronic risk to birds and the need for a restricted use classification based on avian risk. We request that the Agency review their conclusion regarding aquatic risk associated with the potato use pattern based on a revised EEC calculation.

Concerning the need for mitigation, Miles is certainly willing to discuss available options with the Agency and for specific endangered species concerns, have proposed such options above. One option which was mentioned by EPA in this section, the elimination of aerial application from the cotton label, is not acceptable given the importance of this mode of application in the cotton market. Other options may be available.

Table 1. Endangered Insects and Aquatic Invertebrates of Concern for Admire -2 Flowable.

STATE	GROUP	SPECIES	COUNTY	MILES EVALUATION
CA	Crustacean	Shasta Crayfish	Shasta	Concern resolved*
CA	Crustacean	California Linderiella	Alameda	Not in CA EPA database**
			Contra Costa	Not in CA EPA database
			Merced	Not in CA EPA database
			Monterey	Not in CA EPA database
			Napa	Not in CA EPA database
			Placer	Not in CA EPA database
			Riverside	Not in CA EPA database
			Sacramento	Not in CA EPA database
			San Joaquin	Not in CA EPA database
			San Luis Obispo	Not in CA EPA database
			San Mateo	Not in CA EPA database
			Santa Barbara	Not in CA EPA database
			Solano	Not in CA EPA database
			Sonoma	Not in CA EPA database
			Yuba	Not in CA EPA database
CA	Crustacean	California Freshwater Shrimp	Napa	Concern unresolved***
			Sonoma	Concern unresolved
CA	Crustacean	Conservancy Fairy Shrimp	Butte	Not in CA EPA database
			Merced	Not in CA EPA database
CA	Crustacean	Longhorn Fairy Shrimp	Alameda	Concern resolved
			Contra Costa	Concern unresolved
			San Luis Obispo	Concern resolved
CA	Crustacean	Riverside Fairy Shrimp	Riverside	Concern resolved
CA	Crustacean	Vernal Pool Fairy Shrimp	Alameda	Concern resolved
			Contra Costa	No site data available****
			Merced	No site data available
			Monterey	No site data available
			Placer	No site data available
			Riverside	No site data available
			Sacramento	Concern resolved
			San Joaquin	No site data available
			Solano	Concern resolved
			Yuba	No site data available
CA	Crustacean	Vernal Pool Tadpole Shrimp	Butte	No site data available
			Placer	No site data available
			Sacramento	No site data available
			San Joaquin	No site data available
			San Luis Obispo	No site data available
			Shasta	No site data available
			Solano	Concern resolved
			Stanislaus	No site data available
			Sutter	No site data available
			Tehama	No site data available
			Yolo	No site data available
			Yuba	No site data available

*Concerns are resolved when, based on CA EPA database comparison, it was determined that no crop-species associations occur.

**These species are new listings and are not yet in CA EPA database (as of 12/93)

***Concerns are unresolved when, based on CA EPA database comparison, crop-species associations cannot yet be ruled out.

****CA EPA's database, which is the most comprehensive available, does not include habitat site locations in these counties.

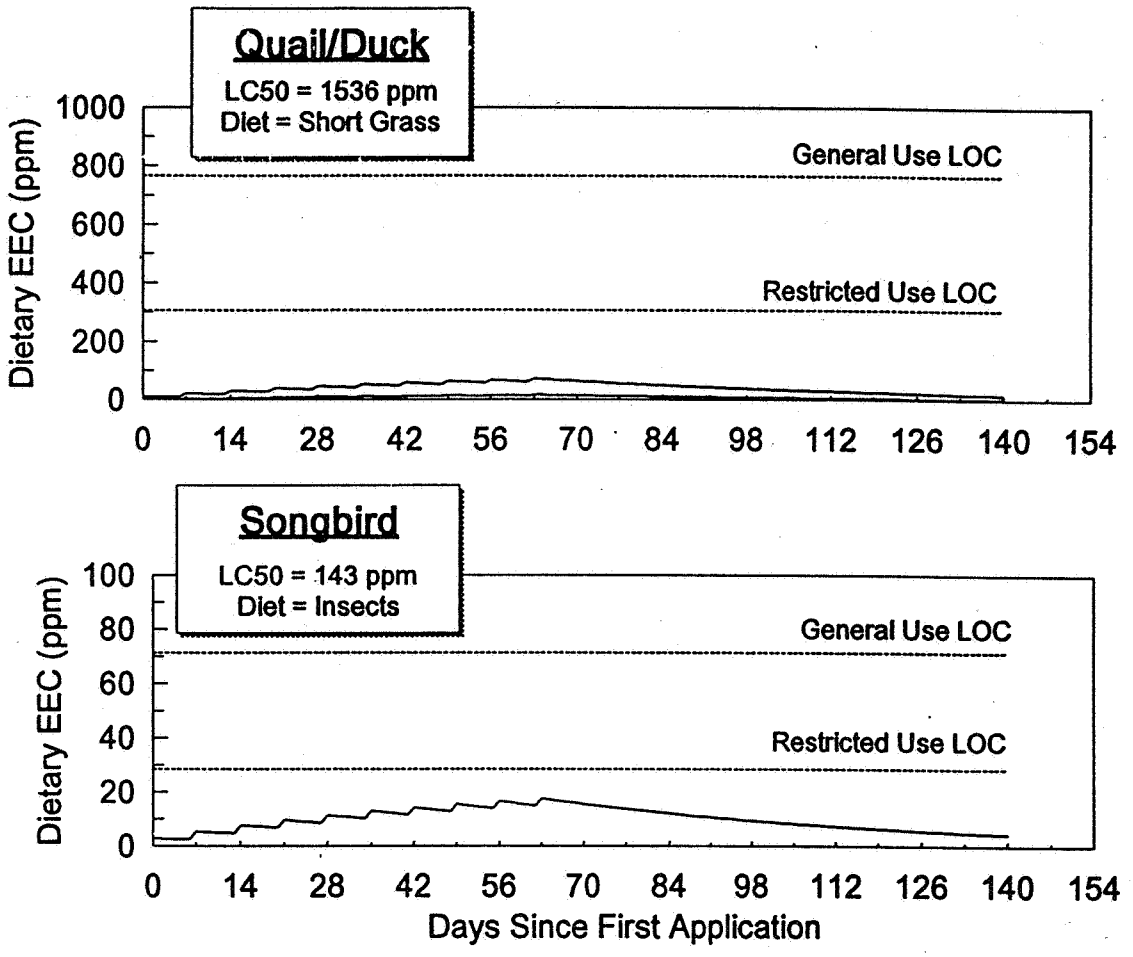
Table 1 cont.

STATE	GROUP	SPECIES	COUNTY	STATUS BASED ON MILES EVALUATION
CA	Insect	Valley Elderberry Longhorn Beetle	Butte	Concern resolved
			Colusa	Concern resolved
			El Dorado	No site data available
			Fresno	No site data available
			Glenn	Concern unresolved
			Madera	No site data available
			Mariposa	Concern resolved
			Merced	Concern resolved
			Placer	No site data available
			Sacramento	Concern unresolved
			San Joaquin	Concern resolved
			Solano	Concern resolved
			Stanislaus	Concern resolved
			Sutter	Concern unresolved
			Tehama	Concern unresolved
			Yolo	Concern resolved
			Yuba	Concern resolved
	Insect	Lotus Blue Butterfly	Mendocino	Concern resolved
	Insect	Delhi Sands Flower-Loving Fly	San Bernardino	Concern resolved
FL	Crustacean	Squirrel Chimney Cave Shrimp	Alachua	Concern unresolved
AL	Crustacean	Alabama Cave Shrimp	Madison	Concern unresolved
VA	Crustacean	Lee County Cave Isopod	Lee	Concern unresolved
IL	Insect	Karner Blue Butterfly	Lake	Concern unresolved
WI	Insect	Karner Blue Butterfly	Clark	Concern unresolved
			Green Lake	Concern unresolved
			Jackson	Concern unresolved
			Juneau	Concern unresolved
			Sauk	Concern unresolved
			Waupaca	Concern unresolved
			Waushara	Concern unresolved
MI	Insect	Karner Blue Butterfly	Allegan	Concern unresolved
			Lake	Concern unresolved
			Monroe	Concern unresolved
			Muskegon	Concern unresolved
			Newaygo	Concern unresolved
			Oceana	Concern unresolved
NY	Insect	Karner Blue Butterfly	Saratoga	Concern unresolved
			Schenectady	Concern unresolved
NH	Insect	Karner Blue Butterfly	Merrimack	Concern unresolved

Figures 1 - 6: Attached Figures illustrate the expected avian exposure profiles, given different estimated foliar half-lives, for the apple, cotton and potato use patterns.

ADMIRE 2F: Avian Acute EECs and Regulatory LOCs

Use Pattern = Cotton, Assumed Half-Life = 39 Days



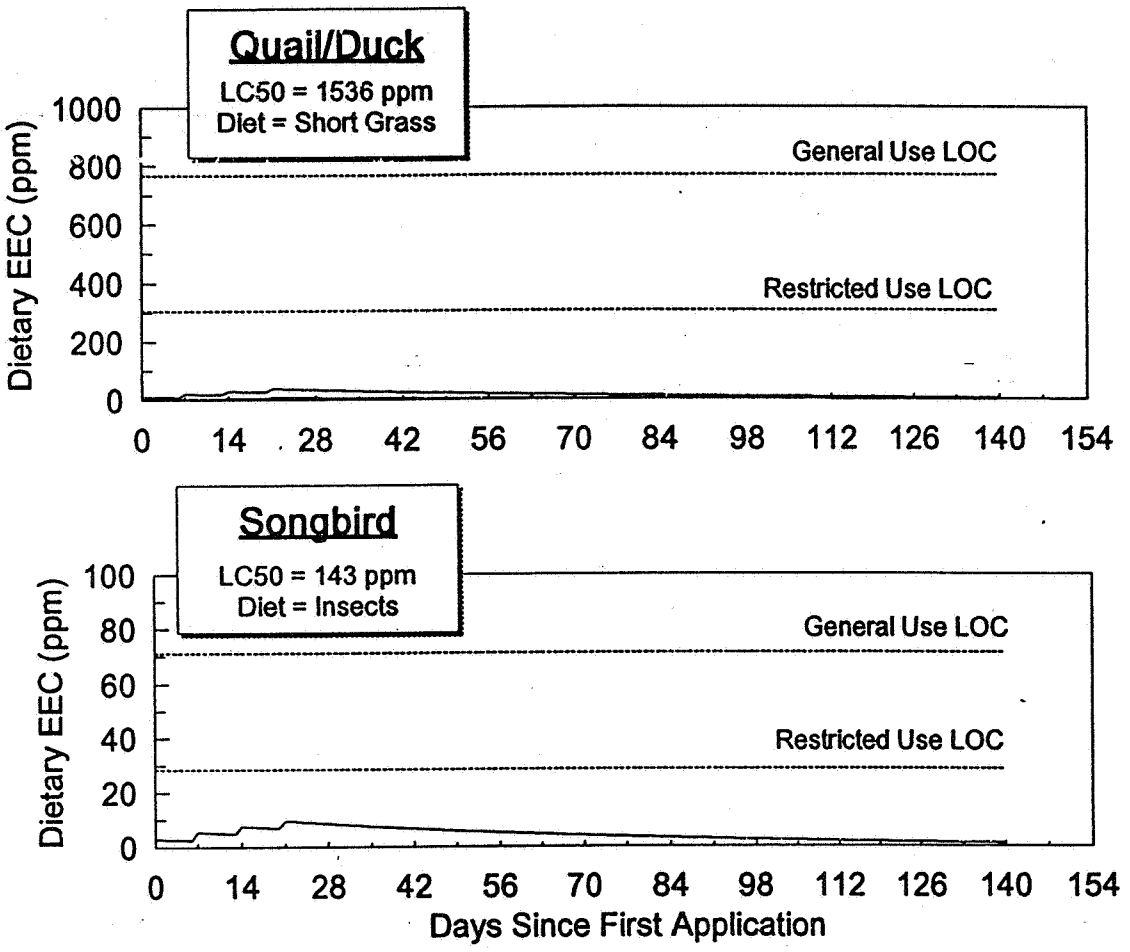
DAILY ACCUMULATED PESTICIDE RESIDUES

	Short grass	Leafy Plants	Forage/ Insects
Kenaga RUD Values	240	125	58
Single Application Rate (lbs/A)		0.05	
Initial Conc (Rate x RUD)	12	6.25	2.9
Number of Applications		10	
Application Interval		7	
Assumed Half-Life		39	

Admire 2F (Imidacloprid)
Use Pattern = **Cotton (foliar)**

	Short grass PPM	Leafy Plants PPM	Forage/ Insects PPM
Max. Instant. EEC	73.0	38.0	17.6
Max. 21-day Avg. EEC	65.4	34.1	15.8
Max. 42-day Avg. EEC	61.3	31.9	14.8
Max. 70-day Avg. EEC	55.4	28.9	13.4

ADMIRE 2F: Avian Acute EECs and Regulatory LOCs
Use Pattern = Potatoes, Assumed Half-Life = 39 Days



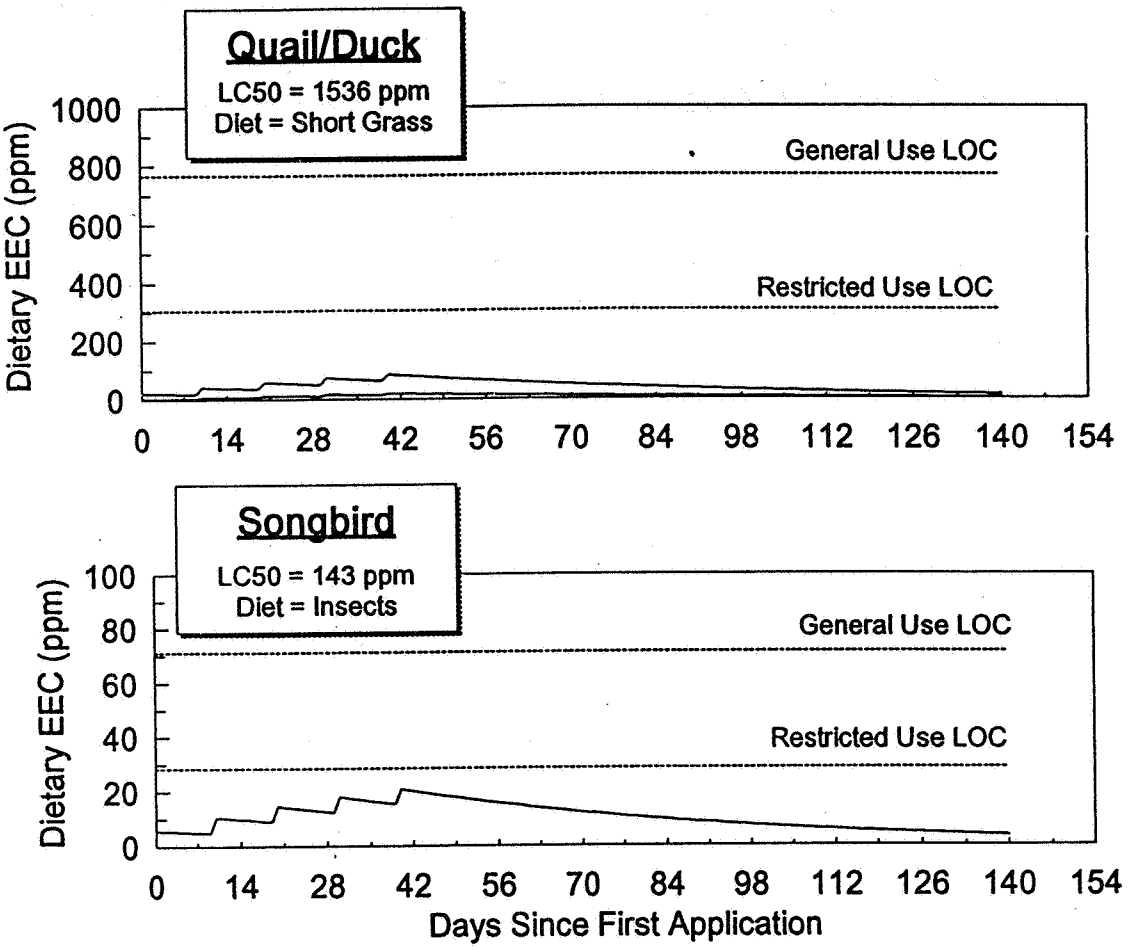
DAILY ACCUMULATED PESTICIDE RESIDUES

	Short grass	Leafy Plants	Forage/ Insects
Kenaga RUD Values	240	125	58
Single Application Rate (lbs/A)		0.05	
Initial Conc (Rate x RUD)	12	6.25	2.9
Number of Applications		4	
Application Interval		7	
Assumed Half-Life		39	

Admire 2F (Imidacloprid)
Use Pattern = Potatoes (foliar)

	Short grass PPM	Leafy Plants PPM	Forage/ Insects PPM
Max. Instant. EEC	40.2	20.9	9.7
Max. 21-day Avg. EEC	34.1	17.7	8.2
Max. 42-day Avg. EEC	30.2	15.7	7.3
Max. 70-day Avg. EEC	25.7	13.4	6.2

ADMIRE 2F: Avian Acute EECs and Regulatory LOCs
Use Pattern = Apples, Assumed Half-Life = 39 Days



DAILY ACCUMULATED PESTICIDE RESIDUES

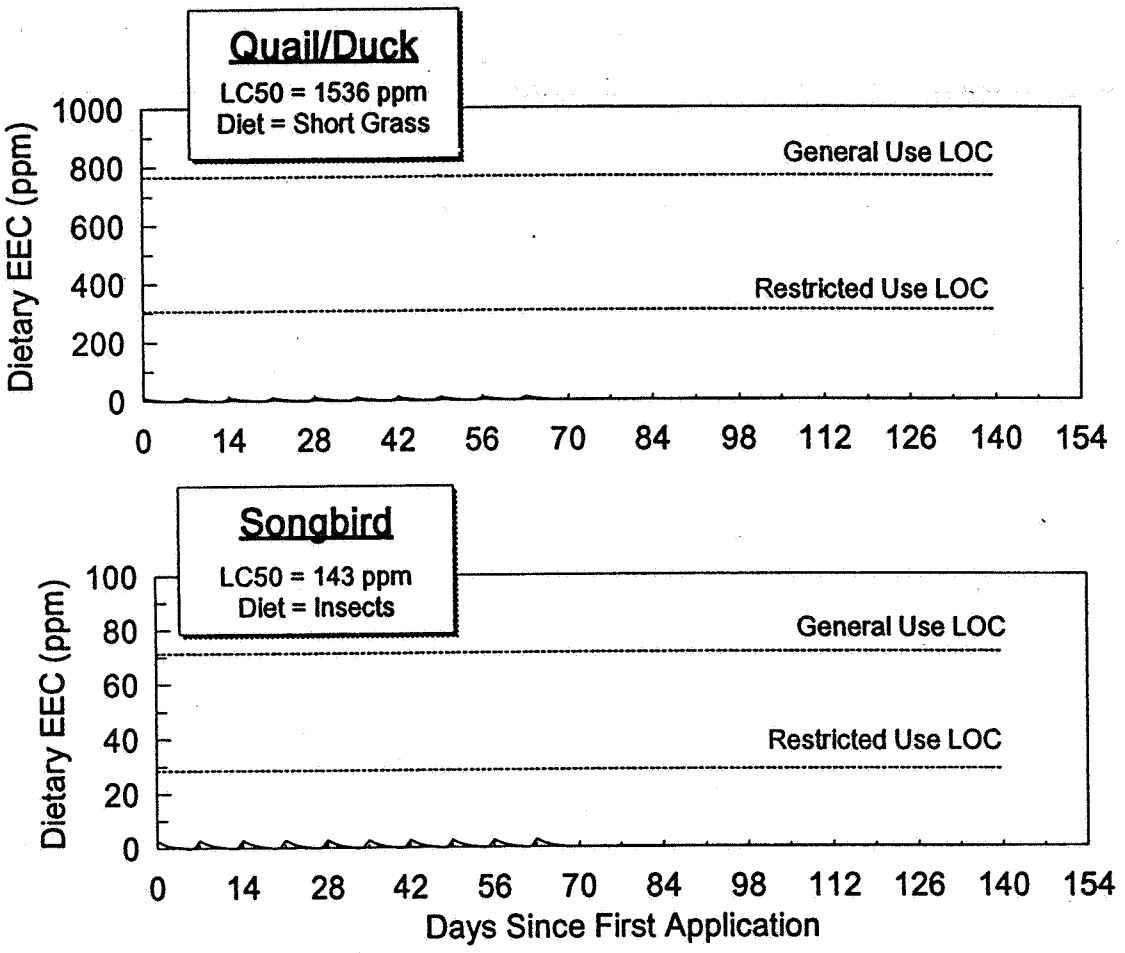
	Short grass	Leafy Plants	Forage/ Insects
Kenaga RUD Values	240	125	58
Single Application Rate (lbs/A)		0.1	
Initial Conc (Rate x RUD)	24	12.5	5.8
Number of Applications		5	
Application Interval		10	
Assumed Half-Life		39	

Admire 2F (Imidacloprid)
Use Pattern = Apples (foliar)

	Short grass PPM	Leafy Plants PPM	Forage/ insects PPM
Max. Instant. EEC	86.8	45.2	21.0
Max. 21-day Avg. EEC	74.7	38.9	18.0
Max. 42-day Avg. EEC	67.9	35.3	16.4
Max. 70-day Avg. EEC	59.6	31.0	14.4

ADMIRE 2F: Avian Acute EECs and Regulatory LOCs

Use Pattern = Cotton, Assumed Half-Life = 1.2 Days



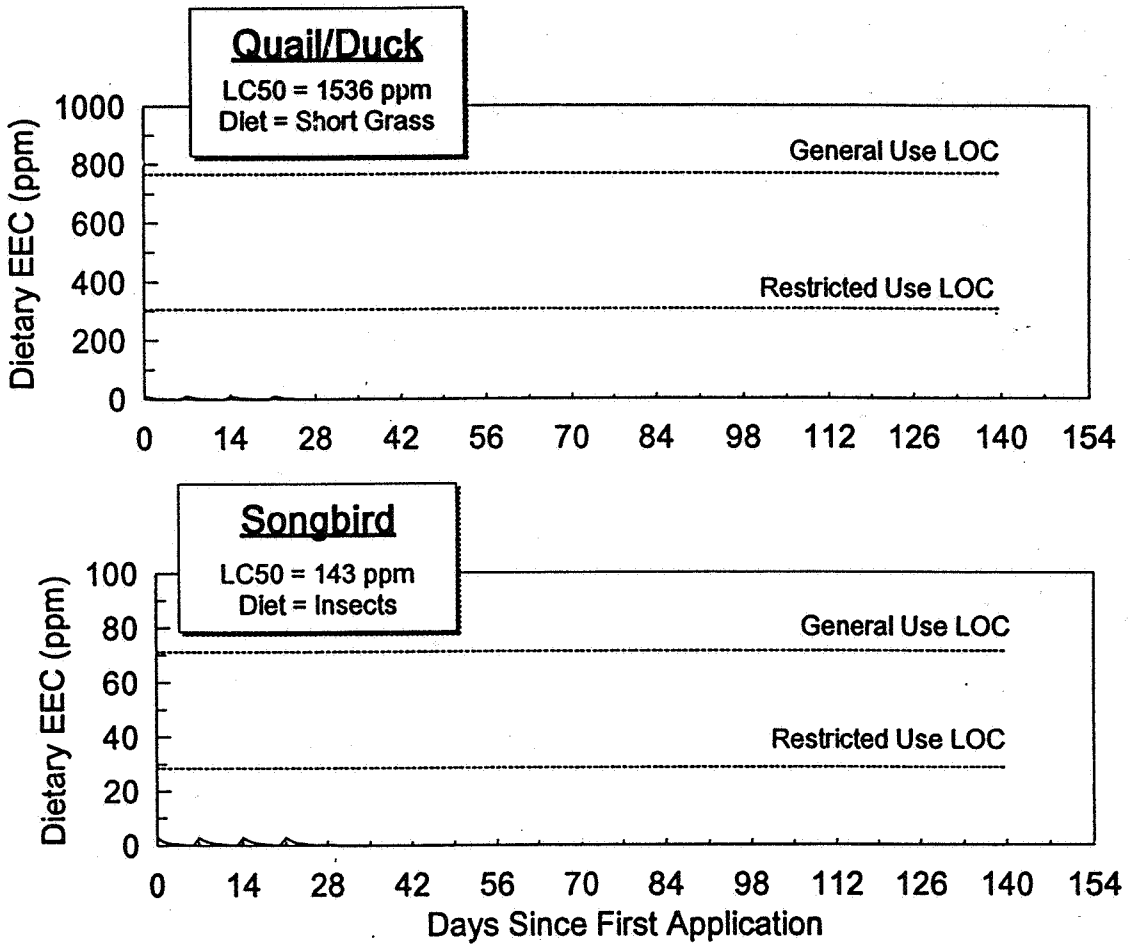
DAILY ACCUMULATED PESTICIDE RESIDUES

	Short grass	Leafy Plants	Forage/ Insects
Kenaga RUD Values	240	125	58
Single Application Rate (lbs/A)		0.05	
Initial Conc (Rate x RUD)	12	6.25	2.9
Number of Applications		10	
Application Interval		7	
Assumed Half-Life		1.2	

Admire 2F (Imidacloprid)
Use Pattern = Cotton (foliar)

	Short grass PPM	Leafy Plants PPM	Forage/ Insects PPM
Max. Instant. EEC	12.2	6.4	3.0
Max. 21-day Avg. EEC	3.9	2.0	0.9
Max. 42-day Avg. EEC	3.9	2.0	0.9
Max. 70-day Avg. EEC	3.9	2.0	0.9

ADMIRE 2F: Avian Acute EECs and Regulatory LOCs
Use Pattern = Potatoes, Assumed Half-Life = 1.2 Days



DAILY ACCUMULATED PESTICIDE RESIDUES

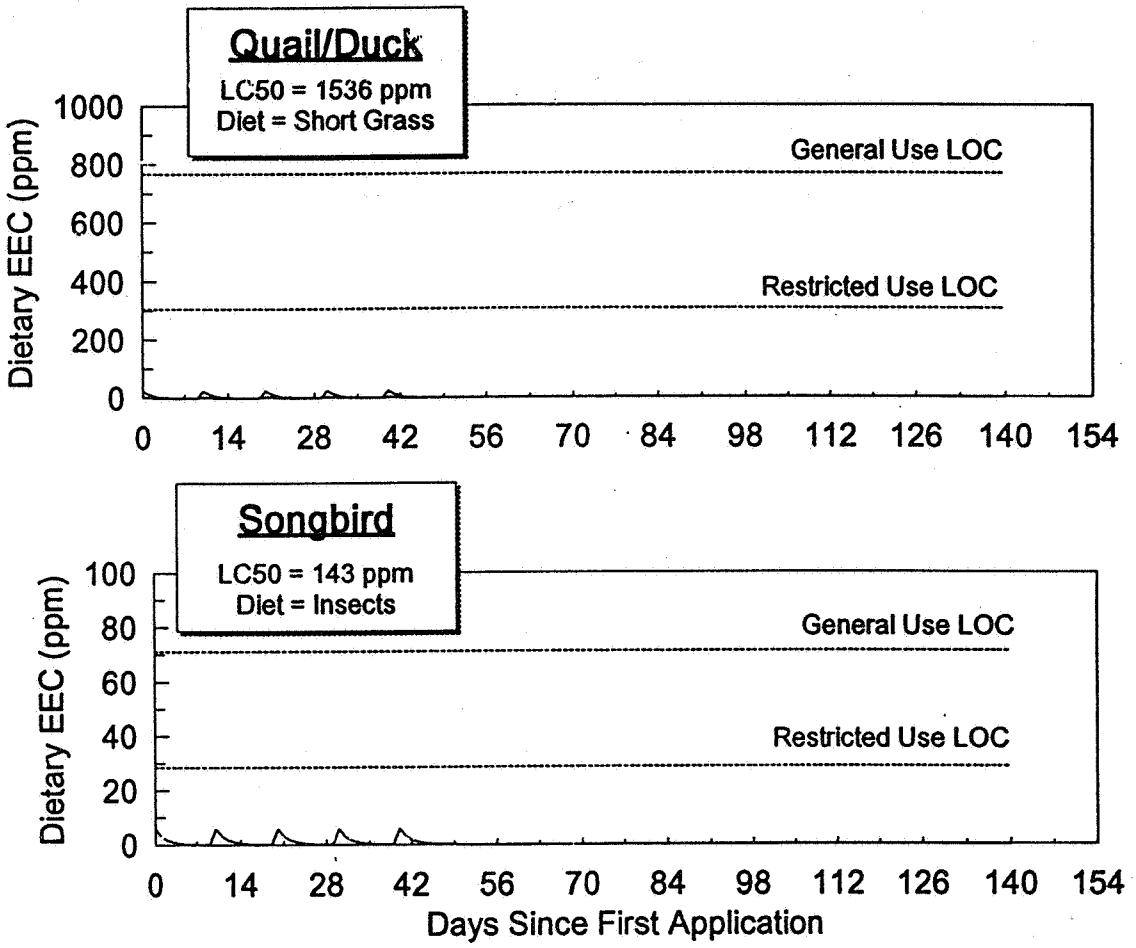
	Short grass	Leafy Plants	Forage/ Insects
Kenaga RUD Values	240	125	58
Single Application Rate (lbs/A)		0.05	
Initial Conc (Rate x RUD)	12	6.25	2.9
Number of Applications		4	
Application Interval		7	
Assumed Half-Life		1.2	

Admire 2F (Imidacloprid)
Use Pattern = Potatoes (foliar)

	Short grass PPM	Leafy Plants PPM	Forage/ Insects PPM
Max. Instant. EEC	12.2	6.4	3.0
Max. 21-day Avg. EEC	3.9	2.0	0.9
Max. 42-day Avg. EEC	2.6	1.4	0.6
Max. 70-day Avg. EEC	1.6	0.8	0.4

ADMIRE 2F: Avian Acute EECs and Regulatory LOCs

Use Pattern = Apples, Assumed Half-Life = 1.2 Days



DAILY ACCUMULATED PESTICIDE RESIDUES

	Short grass	Leafy Plants	Forage/ Insects
Kenaga RUD Values	240	125	58
Single Application Rate (lbs/A)		0.1	
Initial Conc (Rate x RUD)	24	12.5	5.8
Number of Applications		5	
Application Interval		10	
Assumed Half-Life		1.2	

Admire 2F (Imidacloprid)
Use Pattern = Apples (foliar)

	Short grass PPM	Leafy Plants PPM	Forage/ Insects PPM
Max. Instant. EEC	24.1	12.5	5.8
Max. 21-day Avg. EEC	6.4	3.3	1.5
Max. 42-day Avg. EEC	6.1	3.2	1.5
Max. 70-day Avg. EEC	3.9	2.0	0.9

Attached are photocopies of two pages from the Ecological Risk Assessment Standard Evaluation Procedure (SEP) (Urban and Cook, 1986) addressing the Restricted Use Criteria of LD50 < 50 mg/kg for granular products.

TABLE 1 Regulatory Risk Criteria [A/]

		Presumption of No Risk	Presumption of Risk that may be Mitigated by Restricted Use [B/]	Presumption of Unacceptable Risk	
				Non-Endangered Species	Endangered Species [C/]
I.	Acute Toxicity				
	1) Mammals	EEC < 1/5 LC_{50} mg/kg/day < 1/5 LD_{50} LD_{50} > 50 mg/kg *	EEC ≥ 1/5 LC_{50} mg/kg/day > 1/5 LD_{50} LD_{50} ≤ 50 mg/kg *	EEC ≥ LC_{50}	EEC ≥ 1/10 LC_{50} OR EEC ≥ 1/5 LC_{10}
	2) Birds	EEC < 1/5 LC_{50} LD_{50} > 50 mg/kg *	1/5 LC_{50} ≤ EEC < LC_{50} LD_{50} ≤ 50 mg/kg *	EEC ≥ LC_{50}	EEC ≥ 1/10 LC_{50} OR EEC ≥ 1/5 LC_{10}
	3) Aquatic Organisms	EEC < 1/10 LC_{50}	1/10 LC_{50} ≤ EEC < 1/2 LC_{50} EEC ≥ 1/10 LC_{50}	EEC ≥ 1/2 LC_{50}	EEC > 1/20 LC_{50} OR EEC > 1/10 LC_{10}
II.	Chronic Toxicity	EEC < Chronic No Effect Level	N/A	EEC ≥ Chronic Effect Levels Including Reproductive Effects	EEC ≥ Chronic Effect Levels Including Reproductive Effects; Also any Adverse Habitat Modification

A/ Source: Part 162 - Regulations for the Enforcement of the FIFRA (FR 40 (129): 28260-28265; 28281-28284; Thursday, July 3, 1975).
Source: Proposed Change in Section 3 Regulations - Restricted Use Criteria (See Attachment B).
Source: Parts 154, 162 and 172 Special Reviews of Pesticides; Criteria and Procedures; Final Rule (40 CFR(229): 49005; 49007; 40016; Wednesday, November 27, 1985).

B/ Restricted Use is a classification of a pesticide whereby its use is limited to applicators who have been certified by EPA through EPA approved training programs.

C/ Interagency agreement between EPA/OPP, U.S. Department of Interior (USDI), Office of Endangered Species (OES), and U.S. Department of Commerce (USDC), National Marine Fisheries Service (NMFS), 1980.

* For granular products only.

From: EPA Standard Evaluation Procedure for Ecological Risk Assessment. (Urban + Cook, 1986)

From: EPA Standard Evaluation Procedure for Ecological Risk Assessment. (Urban + Cook, 1986)

ATTACHMENT B: Proposed Restricted Use Criteria for Hazard to Non-Target Organisms

(c)(1) All Products. A pesticide product intended for outdoor use will be considered for restricted use classification if:

(i) When used as according to label directions, application results in residues in the diet of exposed mammalian wildlife, immediately after application, such that:

(A) The level of residues equals or exceeds 1/5th of the acute dietary LC_{50}; or

(B) The amount of pesticide consumed in one feeding day (mg/kg/day) equals or exceeds 1/5th of the mammalian acute oral LD_{50};

(ii) When used according to label directions, application results, immediately after application, in residues in the diet of exposed birds at levels that equal or exceed 1/5th of the avian subacute dietary LC_{50};

(iii) When used according to label directions, application results in residues in water that equal or exceed 1/10th of the acute LC_{50} for non-target aquatic organisms likely to be exposed; or

(iv) Under conditions of label use or widespread and commonly recognized practice, the pesticide may cause discernible adverse effects on non-target organisms, such as significant mortality or effects on the physiology, growth, population levels or reproduction rates of such organisms, resulting from direct or indirect exposure to the product ingredients or residues.

(2) Granular Products. In addition to the criteria of (c)(1) of this section, a pesticide intended for outdoor use and formulated as a granular product will be considered for restricted use classification if:

(i) The formulated product has an acute avian or mammalian oral LD_{50} of 50 mg/kg or less as determined by extrapolation from tests conducted with technical material or directly with the formulated product; and

(ii) It is intended to be applied in such a manner that significant exposure to birds or mammals may occur.

(d) Other Evidence. The Agency may also consider evidence such as field studies, use history, accident data, monitoring data, or other pertinent evidence in deciding whether the product or use may pose a serious hazard to man or the environment that can reasonably be mitigated by restriction to use by certified applicators.

Attachment 1: Endangered Species Evaluation Preliminary Report

ENDANGERED SPECIES ADMIRE -2 FLOWABLE (IMIDACLOPRID) PRELIMINARY EVALUATION - MAY 13, 1994

A total of fifteen species were listed in the EEB review (Table 1). Eleven of these species are listed only in California and one species (the Karner blue butterfly) is listed in Illinois, Wisconsin, Michigan, New York, and New Hampshire. The remaining three species are listed in single counties in Florida, Alabama, and Virginia. The approach for evaluating a specific endangered species will vary depending on the species of concern and state and federal agencies involved, as well as the level of resolution for available land use information. The California Environmental Protection Agency (Cal EPA) is very advanced in their endangered species and crop land use databases. The information supplied by the Cal EPA allowed for a quicker and more refined analysis of crop-species associations than was able to be obtained for species in other states. Land use information and habitat site location for other states have not been identified at this time. This information may prove difficult to obtain in many instances. As a result, the progress is reported by state for the California endangered species and by species for the endangered species not located in California. The following is a summary of the progress to date (May 13, 1994) on resolving potential concerns for endangered species for Admire -2 Flowable uses on cotton, potatoes, and apples:

CALIFORNIA

The principal contact for endangered species of concern for California was Rich Marovich, Associate Pesticide Review Scientist (Biology) with the State of California Environmental Protection Agency. Mr. Marovich agreed to provide information on habitat locations and land use, and also offered to assist in identifying potential areas of concern. A list of the species identified in the EEB review, including counties, was sent to Mr. Marovich. He confirmed that they had data on the location/distribution for all but two of the species: the California Linderiella and the Conservancy Fairy Shrimp. Both species are recent listings and are not yet in their database.

Species/habitat locations

The database for species locations used by the Cal EPA is the State of California Department of Fish and Game (DFG) Natural Diversity Database (NDDB). There were a total of 96 habitat sites identified for the endangered species of concern in California, excluding the California Linderiella and the Conservancy Fairy Shrimp (Appendix I). Habitat sites are recorded in the NDDB database from location reports (Appendix II), with habitat descriptions and locations to the county, township, and range level on all locations, with some locations to the section and subsection level. As an example, the Shasta Crayfish is located in one county in California (Shasta). In that county there are there are 12 separate habitat locations. One location is located from meridian M (Mount Diablo) in township 35N, range 04E, section 09, and quarter section S (Appendix I).

Crop locations

Data on crop locations for cotton, potatoes, and apples come from the 1991 California pesticide use report and California Department of Water Resources land use maps (Appendix III). Crop locations are reported to the section level. For instance, the first crop listing (apples) for Contra Costa county is located from meridian M in township 01N, range 02E, and section 03.

Comparison of Species and Crops

By comparing the species habitat location database with the crop location database, Mr. Marovich was able to determine whether habitats do or do not occur in the same county, township, and range (i.e., 36 mi^2 blocks) as crops of concern (apples, potatoes, and cotton). For instance, taking the Longhorn Fairy Shrimp as an example, Appendix III contains the cotton, potato, and apple crop locations for two of the three counties listed for this species: Contra Costa and San Luis Obispo (Alameda had no listings). Appendix I documents five locations of the shrimp in San Luis Obispo county and one location each in Alameda and Contra Costa counties. No cotton, potatoes or apples are grown in Alameda county so this concern is resolved. All five locations for the Longhorn Fairy Shrimp in San Luis Obispo county occur in townships 30S and 31S, range 19E. No apples are grown in townships 30S and 31S, range 19E , so this concern is resolved. The habitat listing in Contra Costa county (Appendix I) occurs in township 01S, range 02E. Comparing with the crop locations (Appendix III), three different apple crop locations are located in township 01S, range 02E. As no section data is given for the habitat location, this site cannot be removed from concern. Greater resolution (i.e., section information) on site specific data may alleviate this concern.

The process outlined above for the Longhorn Fairy Shrimp was conducted for all endangered species locations. Of the 96 original endangered species habitat locations, only 28 occurred in the same county, township, range as a crop of concern (Appendix IV). No species occurred in conjunction with cotton or potatoes; all potential species-crop occurrences involved apples. Seven of these 28 habitat sites were eliminated by comparing to crop use at the section level (i.e., 1 mi^2 blocks), as some habitat locations included section information. All seven habitat sites eliminated involved the Valley Elderberry Longhorn Beetle. These sites included both habitat sites in Merced and San Joaquin counties, the site in Stanislaus county, and two sites in Sacramento county (township 07N, range 07E, section 03 and township 09N, range 05E, section 01).

Based on the original habitat location list, this analysis reduced the list of species potentially exposed to proposed uses of imidacloprid to three: the California Freshwater Shrimp, the Longhorn Fairy Shrimp, and the Valley Elderberry Longhorn Beetle, in addition to the California Linderiella and the Conservancy Fairy Shrimp for which no data was available (Table 2). There are seven counties for these three species where potential concerns still exist: Napa, Sonoma, Contra Costa, Glenn, Sacramento, Sutter, and Tehema. Mr. Marovich felt that the probability of occurrence of apples near habitats occupied by endangered species would be low, as there are only about 26,000 acres of apples in California (Appendix V). Six of the seven counties, excluding the two species for which no data was available, where potential species-crop (apple) occurrences exist are in counties with less than 1000 acres in apple production.

Action Plan

To address concerns for the California Linderiella and the Conservancy Fairy Shrimp, Mr. Marovich suggested we obtain assistance from alternative sources. The State of California Department of Fish and Game Natural Diversity Database has some site records available for the California Linderiella (these were not available in the last Cal EPA update). He also suggested contacting aquatic invertebrate experts in the DFG and The Nature Conservancy.

To address concerns for the California Freshwater Shrimp, the Longhorn Fairy Shrimp, and the Valley Elderberry Longhorn Beetle, Mr. Marovich suggested identifying land use in habitat areas on land use maps or in their geographic information system (GIS). They are in the process of digitizing land use for the state and already have land use digitized for some counties, while land use in other counties will need to be identified on actual land use maps. Habitat locations are already digitized. With a more refined level of analysis (GIS) we will probably be able to significantly reduce the remaining concerns.

Potential issues still exist with the Vernal Pool Fairy Shrimp and the Vernal Pool Tadpole Shrimp, and in some additional counties for the Valley Elderberry Longhorn Beetle. Not all counties listed for these species had habitat locations. In fact, for the two shrimp species most counties did not have a site listing. The California EPA supplied us with what it believes to be the most comprehensive listing of species locations available. Since this database was the most recent and comprehensive available, it appears to be the correct database to use in this situation, but follow-up is required. Based on the results of this analysis it clear that the chances of occurrence of these species near cotton or potatoes is very small, as all species occurred in conjunction with apples. Therefore, if any concerns do exist, they will most likely be in relation to apple crops.

In an attempt to resolve the remaining endangered species issues, the USFWS was contacted and verbally refused to release any information on these endangered species. Miles will contact them in writing to request any habitat locations. If they refuse to release this information, a serious problem exists relative to Miles ability to adequately address the Agency's endangered species concerns.

A conservative estimate of the time required for Miles to complete the evaluation of the California endangered species concerns is 12 months.

SPECIES OF CONCERN OUTSIDE OF CALIFORNIA

Karner Blue Butterfly

The primary contact for this species is Catherine Carnes, Endangered Species Coordinator, USFWS, Green Bay Field Office, Green Bay, Wisconsin. Ms. Carnes supplied a copy of the final rule in the Federal Register determining the Karner Blue Butterfly (KBB) as an endangered species. She also supplied USFWS facts sheets on the KBB from the Midwest and New England areas, as well as a copy of a communication from the Wisconsin DNR outlining Wisconsin's action plan for the KBB. Seventeen counties in five states were listed as areas of concern in the EEB review (Table 1).

Species/habitat locations

No site specific data on the KBB could be obtained, only general habitat information from the final rule in the federal register and the USFWS fact sheets, which are available to the public. Information from these sources is summarized and presented in this update as follows:

> The KBB (*Lycaeides melissa samuelis*) is considered to be a subspecies of the more common Melissa Blue Butterfly (*Lycaeides melissa*). The primary threat to this subspecies is habitat modification and destruction due to development, succession in the absence of natural disturbance, silviculture, and habitat fragmentation. Habitat is characterized by the presence of wild lupine (*Lupinus perennis*) , a member of the pea family. Habitat in eastern New York and New Hampshire typically includes sandplain communities and grassy openings within very dry, sandy pitch pine/scrub oak barrens. In the Midwest, habitat is dry and sandy, including oak savanna and jack pine areas, and dune/sandplain communities. Periodic disturbance is necessary to maintain openings in the canopy for wild lupine to thrive. Typically two broods hatch per year. The first hatch is in April from eggs laid the previous summer and these pupate and emerge in late May. These adults breed and eggs hatch in June and these pupate and emerge in mid-July. By mid August there are no adults left.

Locations:

- New York ⇒ Approx. 50 individual sites in 10 clusters, all found in area known as the Albany Pine Bush and at scattered locations about 40 miles to the north.

- New Hampshire ⇒ The only remaining occurrence in New England is in the Concord Pine Barrens along the Merimack River. The sole population is extremely low in numbers and occurs on a privately owned, two to three acre site within a power line right-of-way bordering an industrial park, and on the grounds of a nearby airport.

- Wisconsin ⇒ Located at 131 sites in 1991 survey. Over 3/4 of the sites are on publicly administered lands. Wisconsin holds the largest remaining population.

- Michigan ⇒ Occurs in six of seven historic counties. The Michigan Natural Features Inventory includes over 2 dozen historical locations.

- Illinois ⇒ Seven individuals were seen at one site in northern Illinois in 1992.

Crop locations

Land use data identifying specific crop locations could not be acquired in this time period.

Action plan

Information is still needed on habitat locations in conjunction with crops. This information may be hard to obtain, as there is a problem with illegal take on KBBs and the USFWS may be reluctant to release this information. It has not yet been determined to what level of resolution we can expect to find in land use data for these states. Ms. Carnes supplied me with the name of a contact person in the Wisconsin Department of Agriculture, Trade, and Consumer Protection who is working on pesticide guidelines and is at this time working on a project dealing with the illegal take of KBBs.

Lee County Cave Isopod

Initial contact for the Lee County Cave Isopod is Cindy Schultz, USFWS, White Marsh, Virginia. Ms. Schultz supplied a copy of the final rule in the Federal Register determining the Lee County Cave Isopod to be an endangered species. The Virginia Division of Natural Heritage, Department of Conservation and Recreation in Richmond, Virginia was contacted as the next step. Sarah Holbrook, Information Management Assistant, was the contact person. We requested site information (to the greatest degree they could supply) on the locations for the Lee County Cave Isopod. Ms. Holbrook did not know what level (i.e. how specific of site information) of information they could reveal, as this was a small population located in one cave system. She said that she would mention the request at their next committee meeting and notify us as soon as possible. This species is listed in only one county in Virginia (Table 1).

Species/habitat locations
No site specific data on the Lee County Cave Isopod could be attained, only general habitat information from the final rule in the federal register, which is available to the public. Information from this source is summarized and presented in this update as follows:

> The Lee County Cave Isopod is a freshwater isopod crustacean. It is an obligate cave dweller that has no eyes or pigmentation. The species was known historically from two cave systems, located approximately 10 kilometers apart in Lee County, Virginia. The caves are developed in a band of limestone that is riddled with caves, sinks, and ravines, typical for this water-soluble, limestone substrate (karst).

Crop locations
Land use data identifying specific crop locations could not be acquired in this time period.

Action plan
Information is still needed on habitat locations in conjunction with crops. This information may be hard to obtain, as this is a very small, isolated population and the USFWS and Virginia Division of Natural Heritage may be reluctant to release this information. It has not yet been determined to what level of resolution we can expect to find in land use data for these states.

Squirrel Chimney Cave Shrimp

Information has been requested from the USFWS field office in Jacksonville, Florida. The information sent will be the final rule published in the federal register and has not arrived at this time. This species is listed in only one county in Florida (Table 1).

Species/habitat locations
No site specific data on the Squirrel Chimney Cave Shrimp could be attained. From the information en route only general habitat information will be available.

Crop locations
Land use data identifying specific crop locations could not be acquired in this time period.

Action plan
Information is still needed on habitat locations in conjunction with crops. This information may be hard to obtain, as this is a small, isolated population, and various agencies may be reluctant to release this information. It has not yet been determined to what level of resolution we can expect to find in land use data for this area.

Alabama Cave Shrimp

Information on this species has been requested from the USFWS field office in Daphne, Alabama. They required that a request for this information be in written form as all requests need to be properly documented. They requested that a map of the area, an explanation of how the request is tied to the endangered species act (they informed Miles that they look at all other endangered species in the area), and a deadline for the information be included. The Alabama Natural Heritage Section, Department of Conservation and Natural Resources in Montgomery, Alabama was contacted and information on habitat and habitat locations was requested.

Species/habitat locations

No site specific data or habitat information on the Alabama Cave Shrimp could be attained. The Alabama Natural Heritage had no information on habitat other than it is endemic to caves, and they will not provide habitat locations.

Crop locations

Land use data identifying specific crop locations could not be acquired in this time period.

Action plan

Information is still needed on habitat locations in conjunction with crops. This information will be hard to obtain, if at all, as this is a very small, isolated population and a reluctance to release this information has already been demonstrated. It has not yet been determined to what level of resolution we can expect to find in land use data for this area.

Table 1. Endangered Insects and Aquatic Invertebrates of Concern for Admire -2 Flowable.

STATE	GROUP	SPECIES	COUNTY	MILES EVALUATION
CA	Crustacean	Shasta Crayfish	Shasta	Concern resolved*
CA	Crustacean	California Linderiella	Alameda	Not in CA EPA database**
			Contra Costa	Not in CA EPA database
			Merced	Not in CA EPA database
			Monterey	Not in CA EPA database
			Napa	Not in CA EPA database
			Placer	Not in CA EPA database
			Riverside	Not in CA EPA database
			Sacramento	Not in CA EPA database
			San Joaquin	Not in CA EPA database
			San Luis Obispo	Not in CA EPA database
			San Mateo	Not in CA EPA database
			Santa Barbara	Not in CA EPA database
			Solano	Not in CA EPA database
			Sonoma	Not in CA EPA database
			Yuba	Not in CA EPA database
CA	Crustacean	California Freshwater Shrimp	Napa	Concern unresolved***
			Sonoma	Concern unresolved
CA	Crustacean	Conservancy Fairy Shrimp	Butte	Not in CA EPA database
			Merced	Not in CA EPA database
CA	Crustacean	Longhorn Fairy Shrimp	Alameda	Concern resolved
			Contra Costa	Concern unresolved
			San Luis Obispo	Concern resolved
CA	Crustacean	Riverside Fairy Shrimp	Riverside	Concern resolved
CA	Crustacean	Vernal Pool Fairy Shrimp	Alameda	Concern resolved
			Contra Costa	No site data available****
			Merced	No site data available
			Monterey	No site data available
			Placer	No site data available
			Riverside	No site data available
			Sacramento	Concern resolved
			San Joaquin	No site data available
			Solano	Concern resolved
			Yuba	No site data available
CA	Crustacean	Vernal Pool Tadpole Shrimp	Butte	No site data available
			Placer	No site data available
			Sacramento	No site data available
			San Joaquin	No site data available
			San Luis Obispo	No site data available
			Shasta	No site data available
			Solano	Concern resolved
			Stanislaus	No site data available
			Sutter	No site data available
			Tehama	No site data available
			Yolo	No site data available
			Yuba	No site data available

*Concerns are resolved when, based on CA EPA database comparison, it was determined that no crop-species associations occur.

**These species are new listings and are not yet in CA EPA database (as of 12/93)

***Concerns are unresolved when, based on CA EPA database comparison, crop-species associations cannot yet be ruled out.

****CA EPA's database, which is the most comprehensive available, does not include habitat site locations in these counties.

Table 1 cont.

STATE	GROUP	SPECIES	COUNTY	STATUS BASED ON MILES EVALUATION
CA	Insect	Valley Elderberry Longhorn Beetle	Butte	Concern resolved
			Colusa	Concern resolved
			El Dorado	No site data available
			Fresno	No site data available
			Glenn	Concern unresolved
			Madera	No site data available
			Mariposa	Concern resolved
			Merced	Concern resolved
			Placer	No site data available
			Sacramento	Concern unresolved
			San Joaquin	Concern resolved
			Solano	Concern resolved
			Stanislaus	Concern resolved
			Sutter	Concern unresolved
			Tehama	Concern unresolved
			Yolo	Concern resolved
			Yuba	Concern resolved
	Insect	Lotus Blue Butterfly	Mendocino	Concern resolved
	Insect	Delhi Sands Flower-Loving Fly	San Bernardino	Concern resolved
FL	Crustacean	Squirrel Chimney Cave Shrimp	Alachua	Concern unresolved
AL	Crustacean	Alabama Cave Shrimp	Madison	Concern unresolved
VA	Crustacean	Lee County Cave Isopod	Lee	Concern unresolved
IL	Insect	Karner Blue Butterfly	Lake	Concern unresolved
WI	Insect	Karner Blue Butterfly	Clark	Concern unresolved
			Green Lake	Concern unresolved
			Jackson	Concern unresolved
			Juneau	Concern unresolved
			Sauk	Concern unresolved
			Waupaca	Concern unresolved
			Waushara	Concern unresolved
MI	Insect	Karner Blue Butterfly	Allegan	Concern unresolved
			Lake	Concern unresolved
			Monroe	Concern unresolved
			Muskegon	Concern unresolved
			Newaygo	Concern unresolved
			Oceana	Concern unresolved
NY	Insect	Karner Blue Butterfly	Saratoga	Concern unresolved
			Schenectady	Concern unresolved
NH	Insect	Karner Blue Butterfly	Merrimack	Concern unresolved

Table 2. California Endangered Species of Concern for Admire -2 Flowable After Habitat-Crop Analysis Based on California EPA Database Analysis.

STATE	GROUP	SPECIES	COUNTY
CA	Crustacean	California Freshwater Shrimp	Napa Sonoma
CA	Crustacean	Longhorn Fairy Shrimp	Contra Costa
CA	Insect	Valley Elderberry Longhorn Beetle	Glenn Sacramento Sutter Tehama
CA	Crustacean	California Linderiella*	Alameda Contra Costa Merced Monterey Napa Placer Riverside Sacramento San Joaquin San Luis Obispo San Mateo Santa Barbara Solano Sonoma Yuba
CA	Crustacean	Conservancy Fairy Shrimp*	Butte Merced

***No information on these species was available at the present time**

Attachment 1: Miles Imidacloprid Endangered Species Evaluation

Appendix I

Listing of habitat locations for endangered species of concern
in California as provided by the California EPA

Index of Column Definitions:

Column 1 = Meridian (M=Mount Diablo, S=San Bernardino, H=Humboldt)

Column 2 = Township

Column 3 = Range

Column 4 = Section

Column 5 = Quarter Section

Column 6 = Endangered Species Common Name

Column 7 = Occurrences

Column 8 = County

Distribution of Certain Federally Listed Species by Meridian, Township, Range and Section

M	T	R	S	QS	Common name	Occ	County
M	01S	02E	U	X	LONGHORN FAIRY SHRIMP	2	CONTRA COSTA
M	02N	10E	06	X	VERNAL POOL FAIRY SHRIMP	1	STANISLAUS
M	02S	03E	U	X	LONGHORN FAIRY SHRIMP	3	ALAMEDA
M	03S	07E	03	N	VALLEY ELDERBERRY LONGHORN BEETLE	45	SAN JOAQUIN
M	03S	07E	03	N	VALLEY ELDERBERRY LONGHORN BEETLE	45	STANISLAUS
M	04N	09	06	X	CALIFORNIA FRESHWATER SHRIMP	6	MARIN
M	05N	05E	01	S	VALLEY ELDERBERRY LONGHORN BEETLE	53	SACRAMENTO
M	05N	05	U	X	CALIFORNIA FRESHWATER SHRIMP	5	NAPA
M	05N	09	19	X	CALIFORNIA FRESHWATER SHRIMP	13	MARIN
M	06N	06	08	X	CALIFORNIA FRESHWATER SHRIMP	1	SONOMA
M	06N	09	U	X	CALIFORNIA FRESHWATER SHRIMP	9	SONOMA
M	06N	09	U	X	CALIFORNIA FRESHWATER SHRIMP	10	SONOMA
M	06N	10	U	X	CALIFORNIA FRESHWATER SHRIMP	3	SONOMA
M	06S	11E	13	NE	VALLEY ELDERBERRY LONGHORN BEETLE	31	MERCED
M	06S	11E	22	NE	VALLEY ELDERBERRY LONGHORN BEETLE	47	MERCED
M	07N	02	01	NE	VALLEY ELDERBERRY LONGHORN BEETLE	14	SOLANO
M	07N	02	01	NE	VALLEY ELDERBERRY LONGHORN BEETLE	14	YOLO
M	07N	07E	03	X	VALLEY ELDERBERRY LONGHORN BEETLE	16	SACRAMENTO
M	07N	07E	U	X	VALLEY ELDERBERRY LONGHORN BEETLE	17	SACRAMENTO

Distribution of Certain Federally Listed Species by Meridian, Township, Range and Section

M	T	R	S	QS	Common name	Occ	County
M	07N	07E	U	X	VALLEY ELDERBERRY LONGHORN BEETLE	46	SACRAMENTO
M	07N	09	19	X	CALIFORNIA FRESHWATER SHRIMP	8	SONOMA
M	07S	10E	32	S	VERNAL POOL TADPOLE SHRIMP	1	MERCED
M	08N	02	26	N	VALLEY ELDERBERRY LONGHORN BEETLE	3	SOLANO
M	08N	02	26	N	VALLEY ELDERBERRY LONGHORN BEETLE	3	YOLO
M	08N	02	32	NE	VALLEY ELDERBERRY LONGHORN BEETLE	12	NAPA
M	08N	02	32	NE	VALLEY ELDERBERRY LONGHORN BEETLE	12	SOLANO
M	08N	05E	U	X	VALLEY ELDERBERRY LONGHORN BEETLE	7	SACRAMENTO
M	08N	11	34	X	CALIFORNIA FRESHWATER SHRIMP	2	SONOMA
M	09N	04E	U	X	VALLEY ELDERBERRY LONGHORN BEETLE	28	SACRAMENTO
M	09N	04E	U	X	VALLEY ELDERBERRY LONGHORN BEETLE	29	SACRAMENTO
M	09N	04E	U	X	VALLEY ELDERBERRY LONGHORN BEETLE	18	YOLO
M	09N	04E	U	X	VALLEY ELDERBERRY LONGHORN BEETLE	19	YOLO
M	09N	04E	U	X	VALLEY ELDERBERRY LONGHORN BEETLE	28	YOLO
M	09N	04E	U	X	VALLEY ELDERBERRY LONGHORN BEETLE	29	YOLO
M	09N	04E	U	X	VALLEY ELDERBERRY LONGHORN BEETLE	56	YOLO
M	09N	05E	01	S	VALLEY ELDERBERRY LONGHORN BEETLE	6	SACRAMENTO
M	09N	05E	U	X	VALLEY ELDERBERRY LONGHORN BEETLE	8	SACRAMENTO
M	09N	05E	U	X	VALLEY ELDERBERRY LONGHORN BEETLE	9	SACRAMENTO

Distribution of Certain Federally Listed Species by Meridian, Township, Range and Section

M	T	R	S	QS	Common name	Occ	County
M	09N	05E	U	X	VALLEY ELDERBERRY LONGHORN BEETLE	10	SACRAMENTO
M	09N	05E	U	X	VALLEY ELDERBERRY LONGHORN BEETLE	11	SACRAMENTO
M	09N	06E	U	X	VALLEY ELDERBERRY LONGHORN BEETLE	1	SACRAMENTO
M	09N	06E	U	X	VALLEY ELDERBERRY LONGHORN BEETLE	30	SACRAMENTO
M	09N	07	U	X	CALIFORNIA FRESHWATER SHRIMP	11	NAPA
M	09N	07	U	X	CALIFORNIA FRESHWATER SHRIMP	12	NAPA
M	10N	04E	24	NE	VERNAL POOL FAIRY SHRIMP	4	SACRAMENTO
M	10N	05E	19	W	VERNAL POOL FAIRY SHRIMP	3	SACRAMENTO
M	11N	03E	U	X	VALLEY ELDERBERRY LONGHORN BEETLE	13	YOLO
M	11S	09E	20	S	VALLEY ELDERBERRY LONGHORN BEETLE	44	MERCED
M	12S	20E	04	SE	VERNAL POOL FAIRY SHRIMP	2	MADERA
M	14N	01E	06	SE	VALLEY ELDERBERRY LONGHORN BEETLE	20	COLUSA
M	14N	01E	06	SE	VALLEY ELDERBERRY LONGHORN BEETLE	20	SUTTER
M	16N	01	35	S	VALLEY ELDERBERRY LONGHORN BEETLE	48	COLUSA
M	16N	03E	U	X	VALLEY ELDERBERRY LONGHORN BEETLE	43	SUTTER
M	16N	03E	U	X	VALLEY ELDERBERRY LONGHORN BEETLE	43	YUBA
M	17N	17	07	X	LOTIS BLUE BUTTERFLY	1	MENDOCINO
M	19N	01	30	X	VALLEY ELDERBERRY LONGHORN BEETLE	49	GLENN
M	19N	01	32	NE	VALLEY ELDERBERRY LONGHORN BEETLE	54	GLENN

Distribution of Certain Federally Listed Species by Meridian, Township, Range and Section

M	T	R	S	QS	Common name	Occ	County
M	20N	01	U	X	VALLEY ELDERBERRY LONGHORN BEETLE	50	BUTTE
M	20N	01	U	X	VALLEY ELDERBERRY LONGHORN BEETLE	51	BUTTE
M	20N	01	U	X	VALLEY ELDERBERRY LONGHORN BEETLE	50	GLENN
M	20N	01	U	X	VALLEY ELDERBERRY LONGHORN BEETLE	51	GLENN
M	23N	02	U	X	VALLEY ELDERBERRY LONGHORN BEETLE	21	TEHAMA
M	24N	02	21	X	VALLEY ELDERBERRY LONGHORN BEETLE	22	TEHAMA
M	24N	02	21	NE	VALLEY ELDERBERRY LONGHORN BEETLE	23	TEHAMA
M	25N	02	U	X	VALLEY ELDERBERRY LONGHORN BEETLE	24	TEHAMA
M	25N	02	U	X	VALLEY ELDERBERRY LONGHORN BEETLE	25	TEHAMA
M	26N	02	U	X	VALLEY ELDERBERRY LONGHORN BEETLE	26	TEHAMA
M	26N	02	U	X	VALLEY ELDERBERRY LONGHORN BEETLE	27	TEHAMA
M	27N	03	17	S	VALLEY ELDERBERRY LONGHORN BEETLE	15	TEHAMA
M	30S	19E	21	X	LONGHORN FAIRY SHRIMP	4	SAN LUIS OBISPO
M	30S	19E	33	X	LONGHORN FAIRY SHRIMP	6	SAN LUIS OBISPO
M	30S	19E	U	X	LONGHORN FAIRY SHRIMP	1	SAN LUIS OBISPO
M	30S	19E	U	X	LONGHORN FAIRY SHRIMP	5	SAN LUIS OBISPO
M	31S	19E	14	X	LONGHORN FAIRY SHRIMP	7	SAN LUIS OBISPO
M	35N	04E	09	S	SHASTA CRAYFISH	6	SHASTA
M	36N	04E	10	NE	SHASTA CRAYFISH	13	SHASTA

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Distribution of Certain Federally Listed Species by Meridian, Township, Range and Section

M	T	R	S	QS	Common name	Occ	County
M	36N	04E	32	X	SHASTA CRAYFISH	4	SHASTA
M	36N	04E	32	W	SHASTA CRAYFISH	5	SHASTA
M	37N	04E	31	N	SHASTA CRAYFISH	11	SHASTA
M	38N	04E	19	N	SHASTA CRAYFISH	8	SHASTA
M	38N	04E	19	S	SHASTA CRAYFISH	9	SHASTA
M	38N	04E	21	N	SHASTA CRAYFISH	3	SHASTA
M	38N	04E	22	X	SHASTA CRAYFISH	2	SHASTA
M	38N	04E	U	X	SHASTA CRAYFISH	10	SHASTA
M	38N	04E	U	X	SHASTA CRAYFISH	12	SHASTA
M	38N	05E	17	NE	SHASTA CRAYFISH	1	SHASTA
M	???	???	U	X	CALIFORNIA FRESHWATER SHRIMP	4	MARIN
S	01S	05	13	NE	DELHI SANDS FLOWER-LOVING FLY	1	SAN BERNARDINO
S	01S	05	24	N	DELHI SANDS FLOWER-LOVING FLY	2	SAN BERNARDINO
S	01S	05	25	X	DELHI SANDS FLOWER-LOVING FLY	3	SAN BERNARDINO
S	01S	05	26	SE	DELHI SANDS FLOWER-LOVING FLY	4	SAN BERNARDINO
S	02S	09E	17	SE	VALLEY ELDERBERRY LONGHORN BEETLE	55	SAN JOAQUIN
S	02S	09E	17	SE	VALLEY ELDERBERRY LONGHORN BEETLE	55	STANISLAUS
S	07S	02	17	SE	RIVERSIDE FAIRY SHRIMP	3	RIVERSIDE
S	15S	02	05	S	RIVERSIDE FAIRY SHRIMP	1	SAN DIEGO

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Distribution of Certain Federally Listed Species by Meridian, Township, Range and Section

M	T	R	S	QS	Common name	Occ	County
S	18S	01	23	S	RIVERSIDE FAIRY SHRIMP	2	SAN DIEGO

Appendix II

Example location report for endangered species of concern in California as provided by the California EPA. A total of 96 of these reports were obtained. Each of these reports is summarized as a single line in table in Appendix I. The form attached is summarized in the second to last line on page 4 of Appendix I.

Appendix III

Sample apple, cotton, and potato locations for endangered species of concern in California as provided by the California EPA. This information in this sample supports the Longhorn Fairy Shrimp example in the comparison of species and crop in the California section. No cotton listings occurred in these example counties. There were a total of 6,269 crop locations for apples, cotton, and potatoes obtained from the California EPA.

Index of Column Definitions:

Column 1 = County

Column 2 = Township

Column 3 = Range

Column 4 = Section

Column 5 = Meridian (M=Mount Diablo, S=San Bernardino, H=Humboldt)

Column 6 = Commodity (Apples, Cotton, or Potatoes)

Locations of Apples, Cotton and Potato Acreage in California by Township, Range and Section (from the 1991 Pesticide Use Report)

County	Township	Range	Section	Meridian	Commodity
Calaveras	03N	10E	05	M	Apples
	03N	10E	06	M	Apples
	03N	10E	22	M	Apples
	03N	14E	07	M	Apples
	03N	14E	30	M	Apples
	04N	10E	21	M	Apples
	04N	10E	35	M	Apples
	04N	12E	16	M	Apples
	04N	14E	24	M	Apples
	06N	13E	02	M	Apples
	06N	13E	12	M	Apples
	07N	14E	30	M	Apples
Colusa	17N	03W	28	M	Apples
Contra Costa	01N	02E	03	M	Apples
	01N	02E	14	M	Apples
	01N	02E	24	M	Apples
	01N	02E	25	M	Apples
	01N	02E	26	M	Apples
	01N	02E	32	M	Apples
	01N	02E	36	M	Apples
	01N	02W	01	M	Apples
	01N	02W	03	M	Apples
	01N	02W	14	M	Apples
	01N	02W	24	M	Apples
	01N	02W	25	M	Apples
	01N	02W	36	M	Apples
	01N	03E	02	M	Apples
	01N	03E	03	M	Apples
	01N	03E	05	M	Apples
	01N	03E	06	M	Apples
	01N	03E	07	M	Apples
	01N	03E	08	M	Apples
	01N	03E	10	M	Apples
	01N	03E	16	M	Apples
	01N	03E	17	M	Apples
	01N	03E	19	M	Apples
	01N	03E	20	M	Apples
	01N	03E	21	M	Apples
	01N	03E	23	M	Apples
	01N	03E	25	M	Apples
	01N	03E	26	M	Apples
	01N	03E	30	M	Apples
	01N	03W	07	M	Apples

Locations of Apples, Cotton and Potato Acreage in California by Township, Range and Section (from the 1991 Pesticide Use Report)

County	Township	Range	Section	Meridian	Commodity
Contra Costa	01N	03W	08	M	Apples
	01N	03W	17	M	Apples
	01N	03W	20	M	Apples
	01N	03W	23	M	Apples
	01N	03W	25	M	Apples
	01N	04E	12	M	Potatoes
	01S	02E	01	M	Apples
	01S	02E	03	M	Apples
	01S	02E	25	M	Apples
	01S	03E	04	M	Apples
	01S	03E	07	M	Apples
	02N	02E	28	M	Apples
	02N	02E	34	M	Apples
	02N	02E	35	M	Apples
	02N	02W	21	M	Apples
	02N	02W	34	M	Apples
	02N	02W	35	M	Apples
El Dorado	09N	10E	03	M	Apples
	09N	10E	19	M	Apples
	09N	11E	08	M	Apples
	10N	09E	05	M	Apples
	10N	09E	24	M	Apples
	10N	10E	01	M	Apples
	10N	10E	23	M	Apples
	10N	11E	01	M	Apples
	10N	11E	02	M	Apples
	10N	11E	03	M	Apples
	10N	11E	04	M	Apples
	10N	11E	09	M	Apples
	10N	11E	10	M	Apples
	10N	11E	11	M	Apples
	10N	11E	12	M	Apples
	10N	11E	14	M	Apples
	10N	11E	17	M	Apples
	10N	12E	04	M	Apples
	10N	12E	05	M	Apples
	10N	12E	06	M	Apples
	10N	12E	07	M	Apples
	10N	12E	08	M	Apples
	10N	12E	33	M	Apples
	10N	14E	04	M	Apples
	11N	10E	26	M	Apples
	11N	10E	31	M	Apples

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Locations of Apples, Cotton and Potato Acreage in California by Township, Range and Section (from the 1991 Pesticide Use Report)

County	Township	Range	Section	Meridian	Commodity
San Joaquin	03N	08E	06	M	Apples
	03N	08E	22	M	Apples
	03N	08E	25	M	Apples
	03N	08E	32	M	Apples
	03N	08E	33	M	Apples
	03N	09E	33	M	Apples
	03N	09E	36	M	Apples
	03S	07E	03	M	Apples
	04N	05E	10	M	Apples
	04N	06E	10	M	Apples
	04N	06E	22	M	Apples
	04N	06E	35	M	Apples
	04N	07E	07	M	Apples
	04N	07E	16	M	Apples
	04N	07E	22	M	Apples
	04N	07E	31	M	Apples
	04N	08E	07	M	Apples
	04N	08E	21	M	Apples
	04N	08E	25	M	Apples
San Luis Obispo	10N	25W	16	S	Apples
	10N	25W	27	S	Apples
	10N	25W	28	S	Apples
	10N	25W	34	S	Apples
	10N	25W	35	S	Apples
	25S	11E	36	M	Apples
	25S	13E	21	M	Apples
	25S	13E	31	M	Apples
	26S	11E	12	M	Apples
	26S	11E	34	M	Apples
	26S	12E	06	M	Apples
	26S	13E	04	M	Apples
	26S	13E	05	M	Apples
	26S	13E	06	M	Apples
	26S	13E	12	M	Apples
	26S	13E	13	M	Apples
	26S	13E	30	M	Apples
	26S	15E	20	M	Apples
	27S	09E	16	M	Apples
	27S	11E	31	M	Apples
	27S	12E	31	M	Apples
	28S	11E	25	M	Apples
	28S	12E	12	M	Apples
	28S	14E	14	M	Apples

Locations of Apples, Cotton and Potato Acreage in California by Township, Range and Section (from the 1991 Pesticide Use Report)

County	Township	Range	Section	Meridian	Commodity
San Luis Obispo	30S	12E	22	M	Apples
	31S	12E	18	M	Apples
	31S	12E	19	M	Apples
	31S	13E	19	M	Apples
San Mateo	05S	05W	14	M	Potatoes
	05S	05W	30	M	Potatoes
Santa Barbara	04N	26W	11	S	Apples
	06N	30W	07	S	Apples
	06N	31W	02	S	Apples
	06N	31W	11	S	Apples
	06N	31W	35	S	Apples
	06N	32W	07	S	Apples
	07N	30W	13	S	Apples
	07N	31W	26	S	Apples
	07N	31W	35	S	Apples
	09N	33W	01	S	Potatoes
	09N	33W	02	S	Potatoes
	10N	26W	24	S	Potatoes
	10N	33W	17	S	Potatoes
	10N	33W	18	S	Potatoes
	10N	33W	19	S	Potatoes
	10N	33W	20	S	Potatoes
	10N	33W	21	S	Potatoes
	10N	33W	22	S	Potatoes
	10N	33W	24	S	Potatoes
	10N	33W	27	S	Potatoes
	10N	33W	28	S	Potatoes
	10N	33W	29	S	Potatoes
	10N	33W	32	S	Apples
	10N	33W	34	S	Potatoes
	10N	34W	13	S	Potatoes
	10N	34W	28	S	Potatoes
	10N	35W	21	S	Potatoes
	10N	35W	27	S	Potatoes
	10N	35W	28	S	Potatoes
	11N	33W	28	S	Potatoes
Santa Clara	09S	01E	16	M	Apples
	09S	01W	16	M	Apples
	09S	02E	02	M	Apples
Santa Cruz	09S	01E	35	M	Apples
	09S	01W	35	M	Apples
	09S	01W	36	M	Apples
	09S	03W	11	M	Apples

Appendix IV

List of 28 Potential Habitat-Crop Occurrence Sites Resulting from Comparison of Habitat Location Database and Crop Location Database to the County-Township-Range Level as Provided by the California EPA

Index of Column Definitions:

Column 1 = County, township, range

Column 2 = Section

Column 3 = Quarter Section

Column 4 = County

Column 5 = Endangered Species Common Name

Column 6 = Occurrences

Column 7 = Commodity

0701S02E	UN	XX	CONTRA COSTA	LONGHORN FAIRY SHRIMP	2	APPLES
1120N01W	UN	XX	GLENN	VALLEY ELDERBERRY LONGHORN BEETLE	50	APPLES
1120N01W	UN	XX	GLENN	VALLEY ELDERBERRY LONGHORN BEETLE	51	APPLES
2406S11E	13	NE	MERCED	VALLEY ELDERBERRY LONGHORN BEETLE	31	APPLES
2406S11E	22	NE	MERCED	VALLEY ELDERBERRY LONGHORN BEETLE	47	APPLES
2809N07W	UN	XX	NAPA	CALIFORNIA FRESHWATER SHRIMP	11	APPLES
2809N07W	UN	XX	NAPA	CALIFORNIA FRESHWATER SHRIMP	12	APPLES
3407N07E	03	XX	SACRAMENTO	VALLEY ELDERBERRY LONGHORN BEETLE	16	APPLES
3407N07E	UN	XX	SACRAMENTO	VALLEY ELDERBERRY LONGHORN BEETLE	17	APPLES
3407N07E	UN	XX	SACRAMENTO	VALLEY ELDERBERRY LONGHORN BEETLE	46	APPLES
3409N04E	UN	XX	SACRAMENTO	VALLEY ELDERBERRY LONGHORN BEETLE	28	APPLES
3409N04E	UN	XX	SACRAMENTO	VALLEY ELDERBERRY LONGHORN BEETLE	29	APPLES
3409N05E	01	SW	SACRAMENTO	VALLEY ELDERBERRY LONGHORN BEETLE	6	APPLES
3409N05E	UN	XX	SACRAMENTO	VALLEY ELDERBERRY LONGHORN BEETLE	8	APPLES
3409N05E	UN	XX	SACRAMENTO	VALLEY ELDERBERRY LONGHORN BEETLE	9	APPLES
3409N05E	UN	XX	SACRAMENTO	VALLEY ELDERBERRY LONGHORN BEETLE	10	APPLES
3409N05E	UN	XX	SACRAMENTO	VALLEY ELDERBERRY LONGHORN BEETLE	11	APPLES
3902S09E	17	SE	SAN JOAQUIN	VALLEY ELDERBERRY LONGHORN BEETLE	55	APPLES
3903S07E	03	NW	SAN JOAQUIN	VALLEY ELDERBERRY LONGHORN BEETLE	45	APPLES
4906N09W	UN	XX	SONOMA	CALIFORNIA FRESHWATER SHRIMP	9	APPLES
4906N09W	UN	XX	SONOMA	CALIFORNIA FRESHWATER SHRIMP	10	APPLES
4906N10W	UN	XX	SONOMA	CALIFORNIA FRESHWATER SHRIMP	3	APPLES
4907N09W	19	XX	SONOMA	CALIFORNIA FRESHWATER SHRIMP	8	APPLES
5002S09E	17	SE	STANISLAUS	VALLEY ELDERBERRY LONGHORN BEETLE	55	APPLES
5116N03E	UN	XX	SUTTER	VALLEY ELDERBERRY LONGHORN BEETLE	43	APPLES
5223N02W	UN	XX	TEHAMA	VALLEY ELDERBERRY LONGHORN BEETLE	21	APPLES
5226N02W	UN	XX	TEHAMA	VALLEY ELDERBERRY LONGHORN BEETLE	26	APPLES
5226N02W	UN	XX	TEHAMA	VALLEY ELDERBERRY LONGHORN BEETLE	27	APPLES

28 rows selected.

Appendix V

Approximate apple acreage in California by county as provided by the California EPA. Counties containing less than 1000 acres of apples were not included as 1000 acres was the limit of resolution for the USDA.

Approximate Apple Acreage in California by County

(1990 Crop Report)

County	Acres
Contra Costa	1000
El Dorado	1000
Kern	5000
Madera	2000
Mendocino	1000
San Benito	1000
San Diego	1000
San Joaquin	2000
Santa Cruz	5000
Sonoma	5000
Stanislaus	1000
Tulare	1000