Pollinators and Pesticide Risk Mitigation

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Photo: Regina Hirsch (University of Wisconsin)

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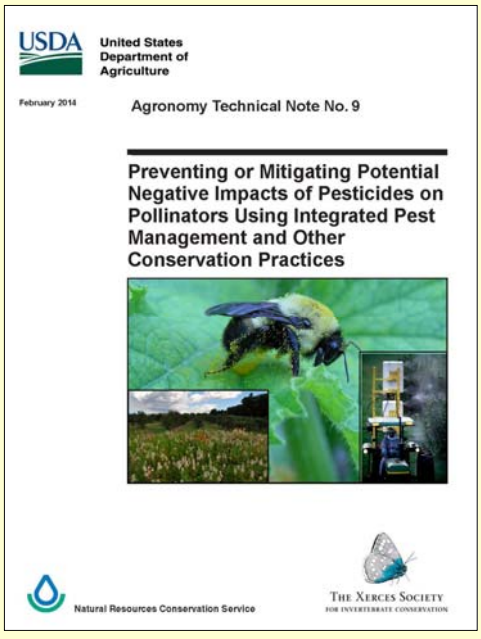
Pollinators and Pesticide Protection

NRCS

Outline of today's webinar:

- Summary of a new NRCS technical note on pesticide risk reduction for bees and other pollinators
- 4 step process incorporating bee protection into integrated pest management and NRCS conservation planning
- Next steps…



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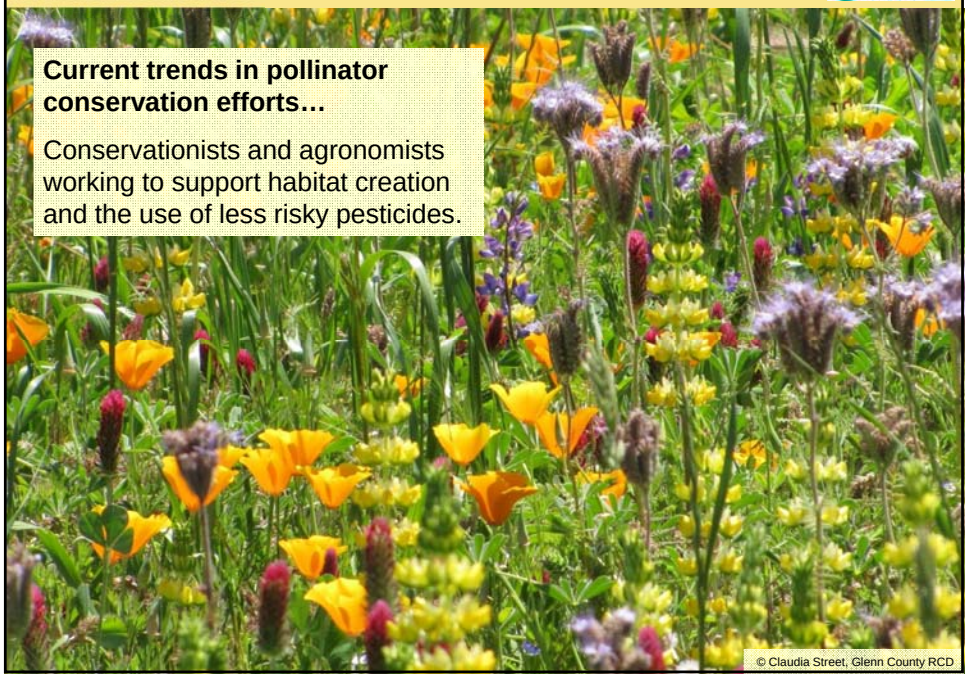
Insecticides and Pollinators

NRCS

Current trends in pollinator conservation efforts…

Conservationists and agronomists working to support habitat creation and the use of less risky pesticides.



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Insecticides and Pollinators

NRCS

…as well as, best management practices for insecticide use:

- Minimize their use (IPM)
- Use active ingredients with least impact on bees
- Least harmful formulations
- Don't spray on plants in bloom
- Spray at night and when dry
- Reduce drift
- Follow label guidelines
- Communicate with nearby beekeepers

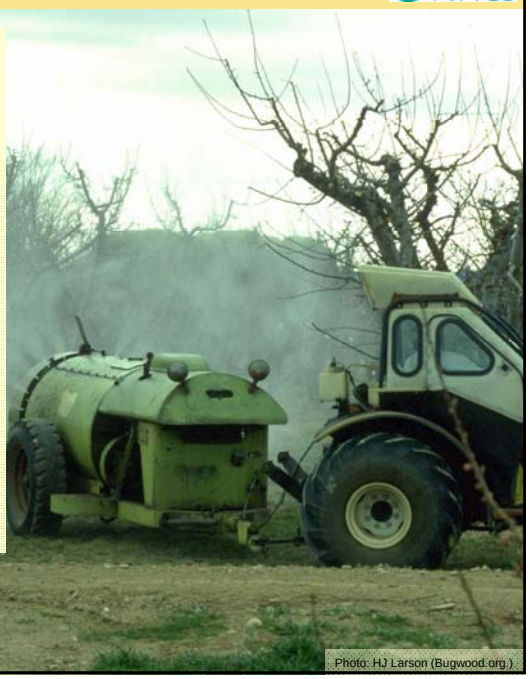

Photo: HJ Larson (Bugwood.org)

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NRCS and Pesticide Protection

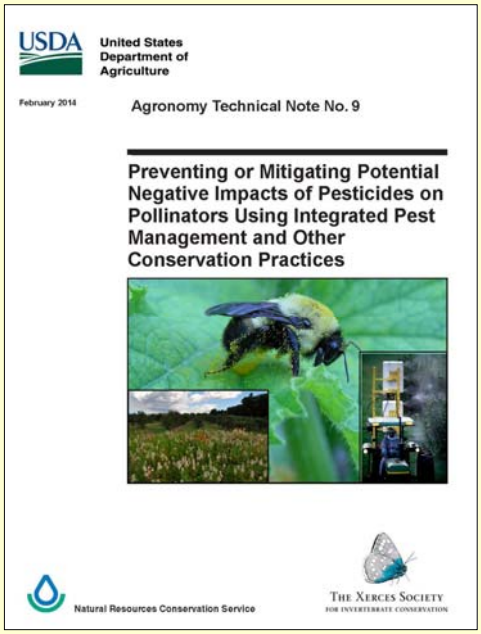
NRCS

NRCS Technical Note: Pesticide Risk Prevention or Mitigation

Guide to help NRCS state technical staff and field planners address potential risk to honey bees and wild native bees.

Focus on bees that are on-site:
- honey bees are hard to move,
- native bees can't be moved.

A conservative framework protective of many pollinators



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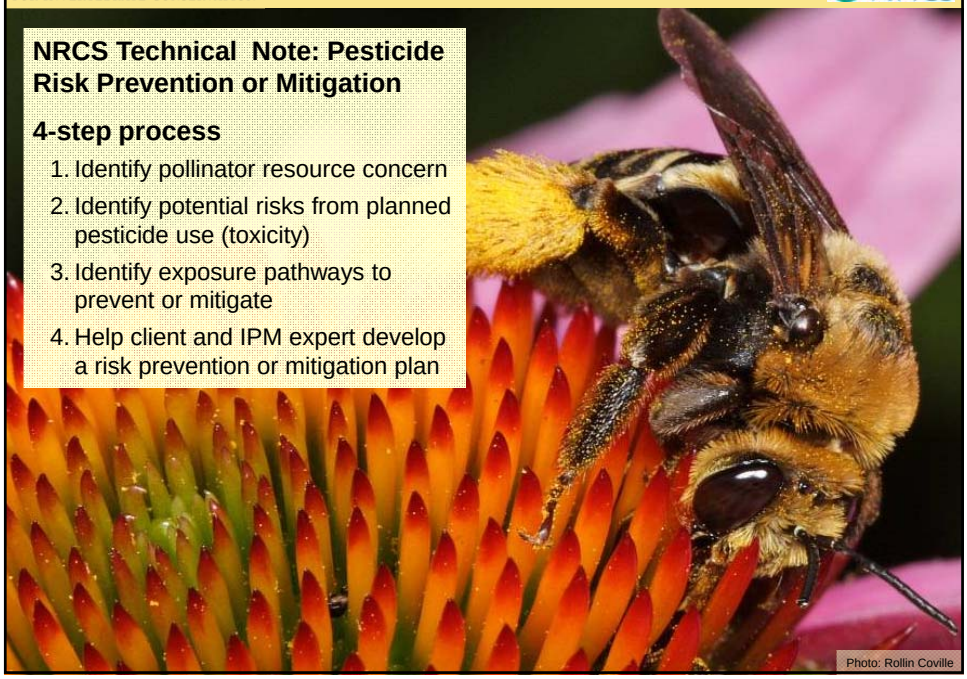
NRCS and Pesticide Protection

NRCS

NRCS Technical Note: Pesticide Risk Prevention or Mitigation

4-step process

1. Identify pollinator resource concern
2. Identify potential risks from planned pesticide use (toxicity)
3. Identify exposure pathways to prevent or mitigate
4. Help client and IPM expert develop a risk prevention or mitigation plan



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1. Identify Pollinator Resource Concern

NRCS

Pollinators are critically important and present on farms so long as wildflowers, crops visited by bees, cover crops, flowering weeds, etc. are present in or adjacent to crop fields

Photos (clockwise from top right): Rollin Coville, Nancy Lee Adamson Xerces Society), Tim Dring (WA NRCS), and Mace Vaughan (Xerces Society)

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1. Identify Pollinator Resource Concern

NRCS

Don't forget crops that don't require pollinator, but which are visited by bees:

- Corn, Soybean, Cotton, Potatoes, Sunflower, etc.

Photos: Nancy Lee Adamson (Xerces Society), Adam Varenhorst

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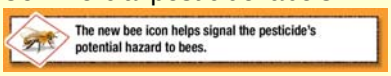
2. Identify Bee Toxicity and Persistence

NRCS

Determine pesticide toxicity to bees.

Commercial pesticide labels



Extension Toxicity Network: http://pmep.cce.cornell.edu/profiles/extoxnet/index.html

Good information available in PNW 591 *How to Reduce Bee Poisoning from Pesticides.* http://extension.oregonstate.edu/catalog/pdf/pnw/pnw591.pdf

- Currently being revised and updated: due out fall 2013.

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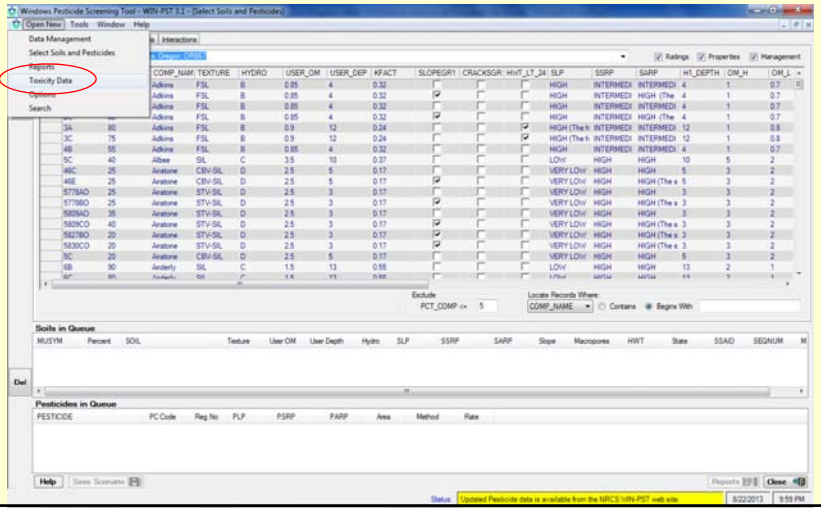
2. Identify Bee Toxicity and Persistence

NRCS

Assess pesticide toxicity to bees

NRCS, however, has its own tool:
WIN-PST honey bee toxicity output



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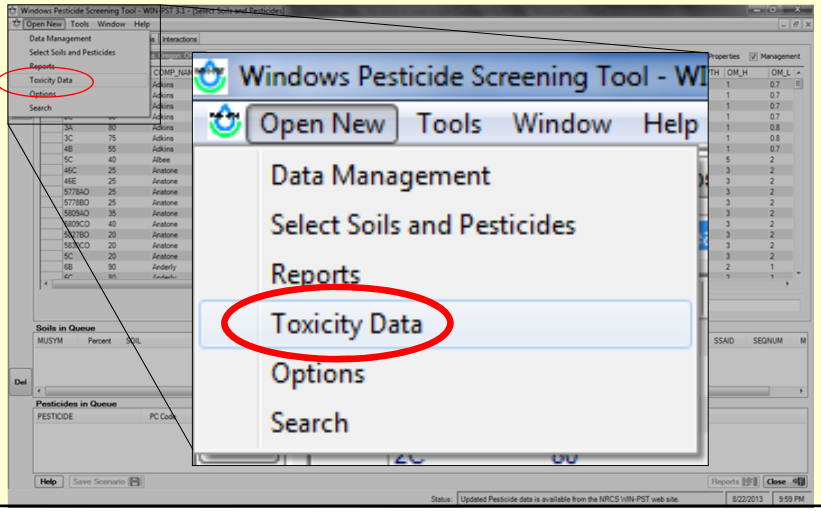

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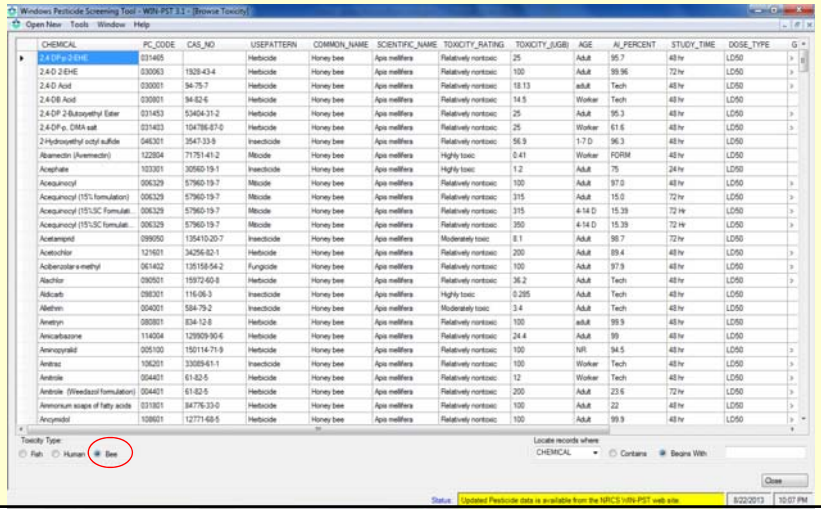

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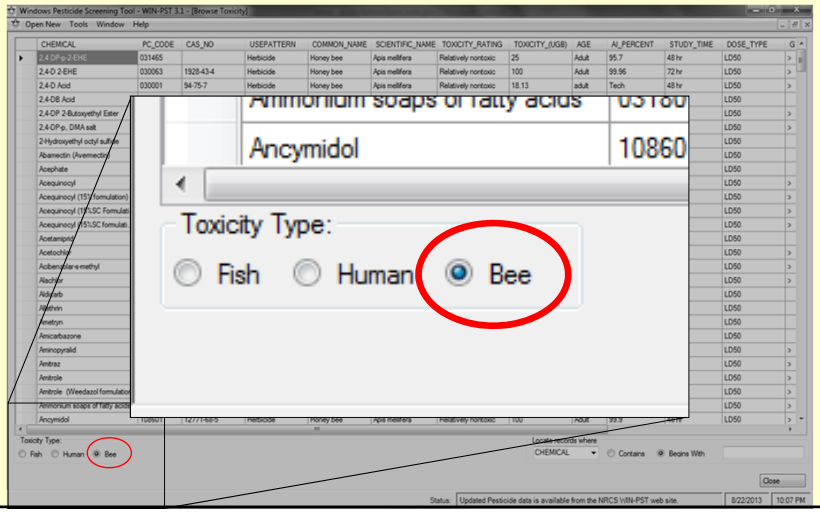

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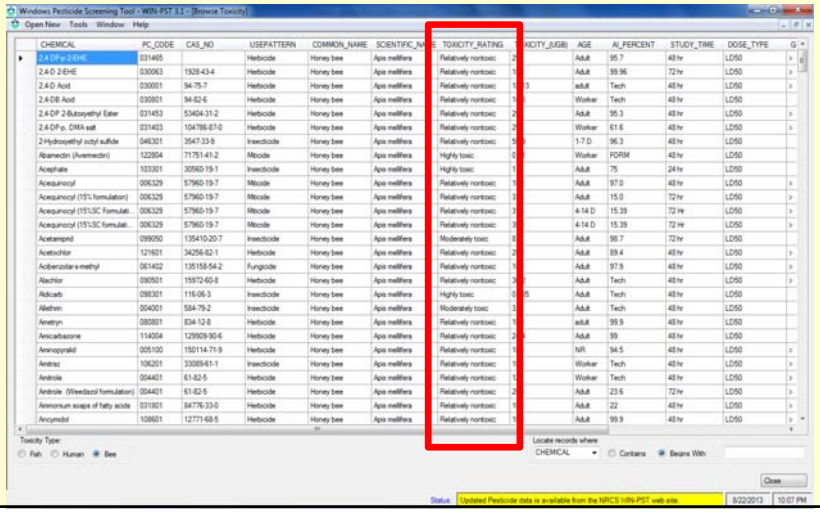

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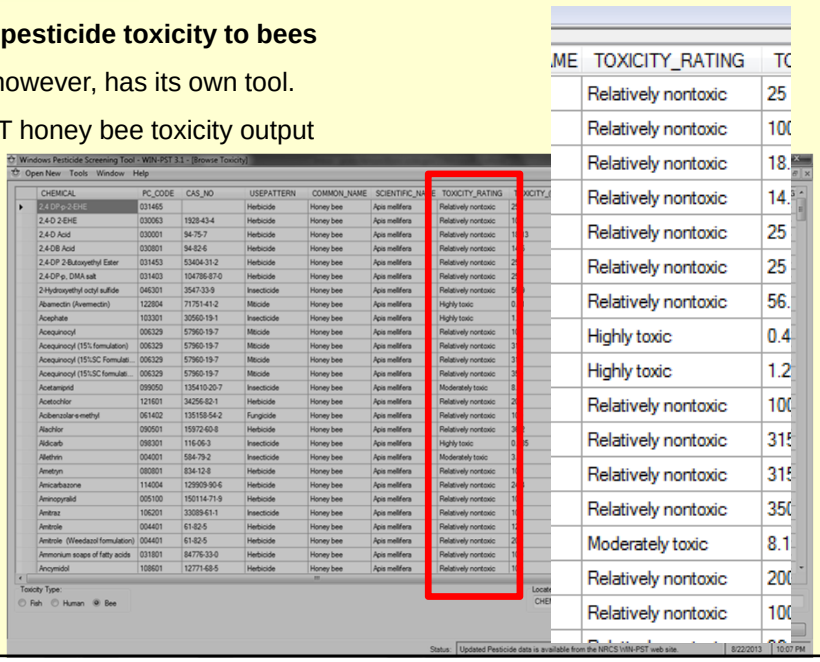
2. Identify Bee Toxicity and Persistence

NRCS

Assess pesticide toxicity to bees

NRCS, however, has its own tool.

WIN-PST honey bee toxicity output



ME	TOXICITY_RATING	TC
	Relatively nontoxic	25
	Relatively nontoxic	100
	Relatively nontoxic	18.
	Relatively nontoxic	14.
	Relatively nontoxic	25
	Relatively nontoxic	25
	Relatively nontoxic	56.
	Highly toxic	0.4
	Highly toxic	1.2
	Relatively nontoxic	100
	Relatively nontoxic	315
	Relatively nontoxic	315
	Relatively nontoxic	350
	Moderately toxic	8.1
	Relatively nontoxic	200
	Relatively nontoxic	100

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2. Identify Bee Toxicity and Persistence

NRCS

Residual toxicity (persistence)

Some information is available, but harder to find:

- Pesticide labels
- *How to Reduce Bee Poisoning*
- Land Grant University IPM and/or Cooperative Extension websites
- EPA RT25 database. http://www2.epa.gov/pollinator-protection/residual-time-25-bee-mortality-rt25-data

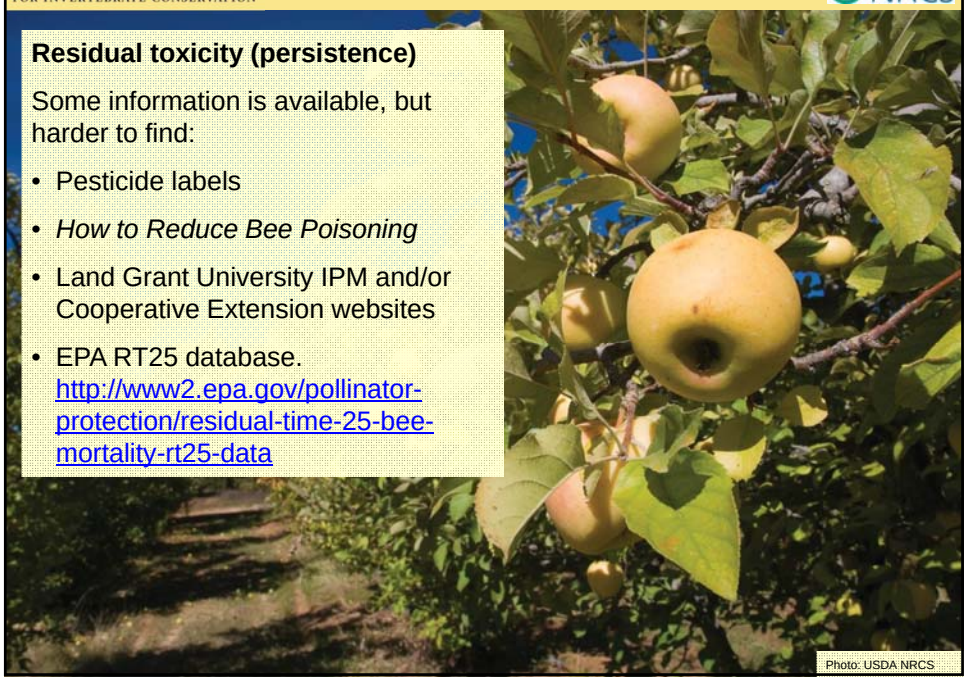
Photo: USDA NRCS

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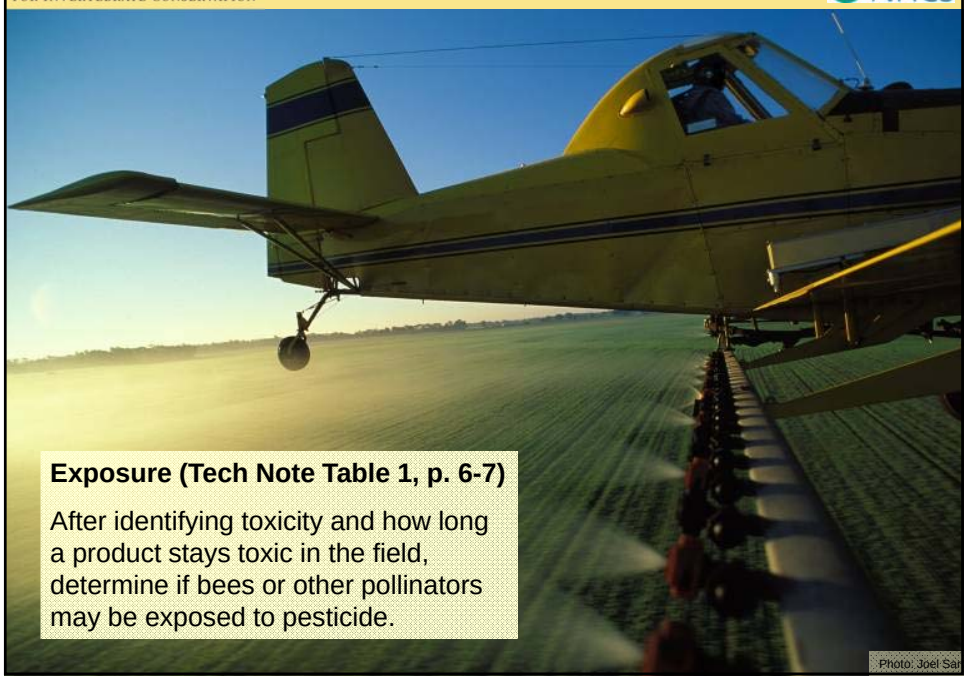
3. Identify Potential Routes of Exposure

NRCS



Exposure (Tech Note Table 1, p. 6-7)

After identifying toxicity and how long a product stays toxic in the field, determine if bees or other pollinators may be exposed to pesticide.

Photo: Joel Sar

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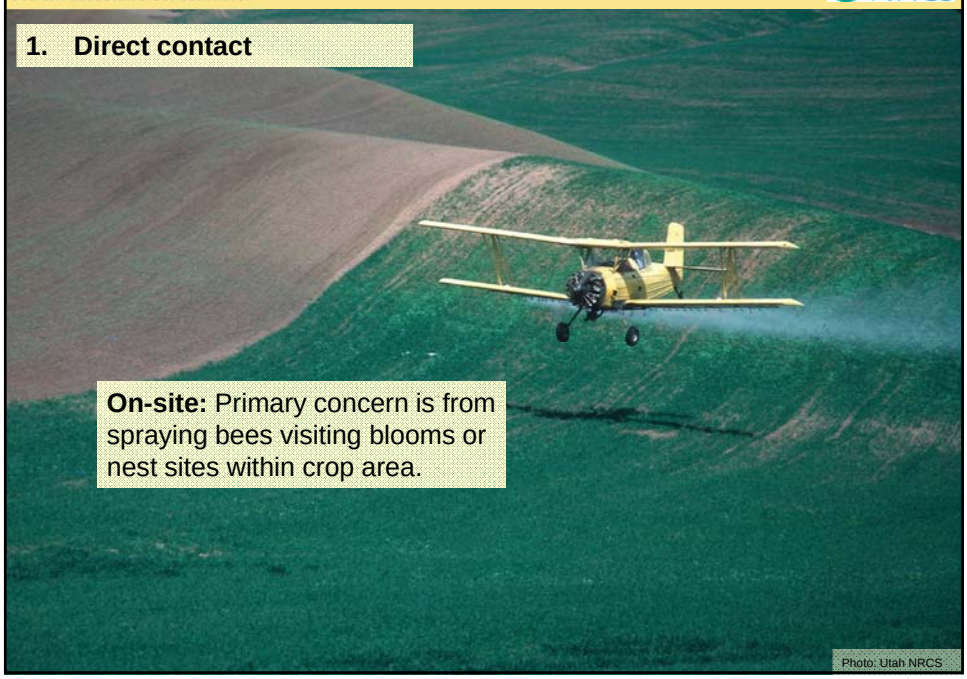
3. Identify Potential Routes of Exposure

NRCS

1. Direct contact



On-site: Primary concern is from spraying bees visiting blooms or nest sites within crop area.

Photo: Utah NRCS

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3. Identify Potential Routes of Exposure

NRCS

1. **Direct contact**

Off-site: Primary concern is from drift from application area onto adjacent habitat or blooming plants.

Photo: Don Keirstead (NH NRCS)

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3. Identify Potential Routes of Exposure

NRCS

1. Direct contact
2. **Residue contact**

On-site and **off-site** concerns are the same as from Direct Contact.

Photos: Mace Vaughan (Xerces Society) and Hannah Gaines (University of Wisconsin)

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3. Identify Potential Routes of Exposure

NRCS

1. Direct contact
2. Residue contact
3. **Pollen and nectar contaminated by systemic insecticides**

Photo: Nancy Adamson (Xerces Society)

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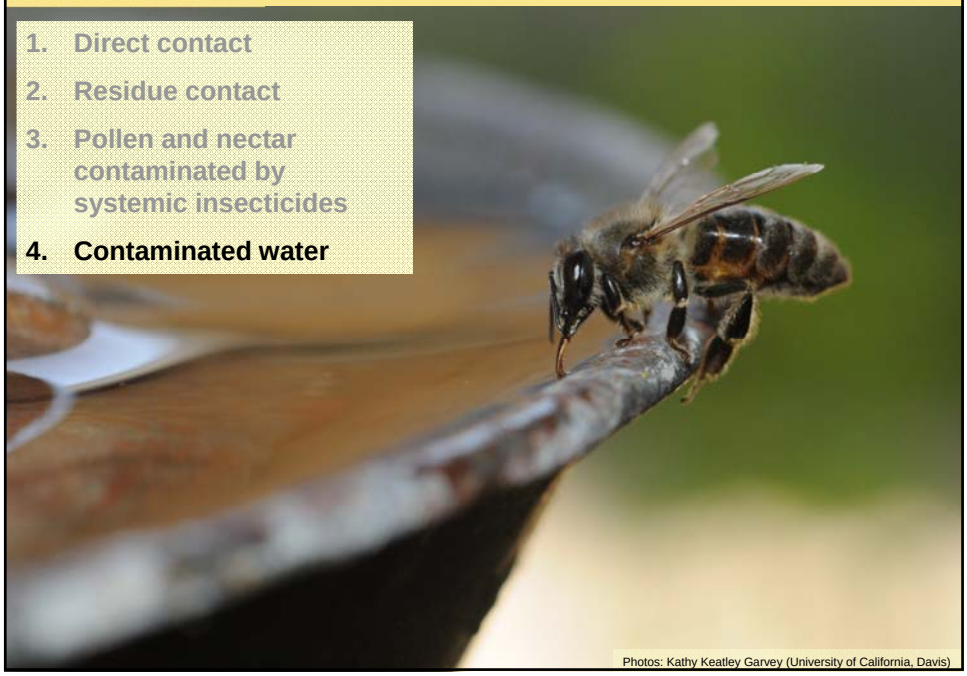
3. Identify Potential Routes of Exposure

NRCS

1. Direct contact
2. Residue contact
3. Pollen and nectar contaminated by systemic insecticides
4. **Contaminated water**



Photos: Kathy Keatley Garvey (University of California, Davis)

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3. Identify Potential Routes of Exposure

NRCS

1. Direct contact
2. Residue contact
3. Pollen and nectar contaminated by systemic insecticides
4. Contaminated water
5. **Contaminated nesting material**
6. **Dust released from pesticide seed coatings**
7. **Pollen-like formulations**

Photos: Eric Mader and Nancy Adamson (Xerces Society) and Tom McNemar (123RF)

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3. Identify Potential Routes of Exposure

NRCS

1. Direct contact
2. Residue contact
3. Pollen and nectar contaminated by systemic insecticides
4. Contaminated water
5. Contaminated nesting material
6. Dust released from pesticide seed coatings
7. Pollen-like formulations
8. **Contaminated nesting areas**
9. **Guttation fluid**
10. **Aphid honeydew**

Photos: Eric Mader and Mace Vaughan (xerces), Kathy Keatley Garvey (UC Davis)

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4. IPM or Mitigation Plans to Reduce Risk

NRCS

The final phase: developing a plan!

1. State level
2. Local level

Photo: USDA NRCS

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4. IPM or Mitigation Plans to Reduce Risk

NRCS

Collaborate with IPM professional

1. State level

NRCS state technical staff work with university IPM researchers.

Example: Pennsylvania tree fruit

PENNSTATE 1855

Safer Options:

- Lower risk pesticides
- Fewer applications
- Expanded beneficial mite populations

Photos courtesy of Dave Biddinger (Penn State University)

4. IPM or Mitigation Plans to Reduce Risk

Collaborate with IPM professional

1. State level

IPM systems available

Example: UC IPM

http://www.ipm.ucdavis.edu/index.html

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4. IPM or Mitigation Plans to Reduce Risk

NRCS

Apricot

Relative Toxicities of Insecticides and Miticides Used in Apricots to Natural Enemies and Honey Bees

(Reviewed 11/07, updated 2/09)

In this Guideline:

- Publication
- Glossary

Common name (trade name)	Mode of action [1]	Selectivity [2] (affected groups)	Predatory mites [3]	General predators [4]	Parasites [4]	Honey bees [5]	Duration of impact to natural enemies [6]
Bacillus thuringiensis ssp. *kurstaki*	11.B2	narrow (caterpillars)	L	L	L	IV	short
bifenazate (Acramite)	25	narrow (spider mites)	L	L	L	III	short
carbaryl (Sevin) 50, 80	1A	broad (insects, mites)	L/H	H	H	I	long
carbaryl (Sevin) XLR	1A	broad (insects, mites)	L	H	H	II	long
carbaryl (Sevin) XLR Plus	1A	broad (insects, mites)	L	H	L	I[7]	long
chlorantraniliprole (Altacor)	28	narrow (caterpillars)	—	—	—	—	—
clofentezine (Apollo)	10A	narrow (mites)	L	L	L	IV	short
diazinon	1B	broad (insects, mites)	L	H	H	I	moderate to long
diflubenzuron (Dimilin)	15	—	L	H	L	IV	—
esfenvalerate (Asana)	3	broad (insect, mites)	H	M	H	I[8]	moderate
imidacloprid (Provado)	4A	narrow (sucking insects)	—	—	H	II	short to moderate

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4. IPM or Mitigation Plans to Reduce Risk

NRCS

2. Local (field office) level.

Develop a risk mitigation plan with a landowner (see Tables 2 and 3)

Some practices, can be planned without IPM support (light blue), others require close collaboration with IPM professional (grey).

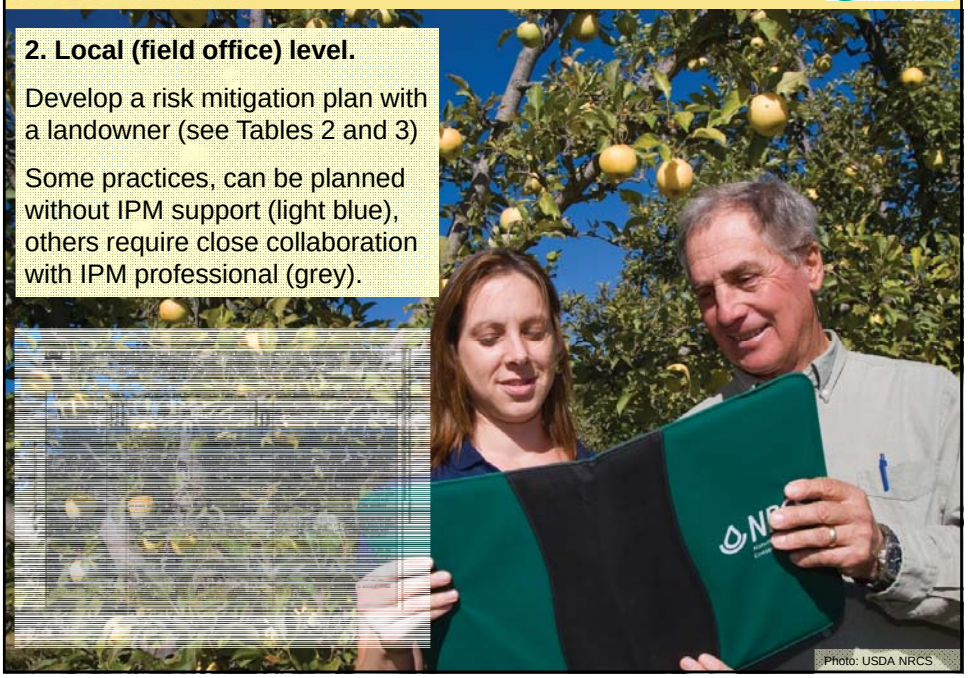

Photo: USDA NRCS

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4. IPM or Mitigation Plans to Reduce Risk

NRCS

Tech Note Tables 2 and 3 (pp. 14 – 21).

Table 2 Risk Mitigation Practices and Techniques for Pollinator Protection **Within Treatment Areas.** If a client, in collaboration with the NRCS or an IPM professional, identifies a pesticide risk to pollinators in a conservation plan, then the practices and techniques in the following table can be used to mitigate the potential impact that the product would have on pollinators within the treated areas. The blue shading indicates practices or techniques that are self-explanatory and can be selected, planned, and implemented by the client or NRCS employee. The grey shading indicates practices or techniques that require the expertise and guidance of an IPM professional in selection, planning, and implementation.

Risk Mitigation Practices and Techniques for Pollinator Protection Within Treatment Areas

Mitigation Practices and Techniques	Exposure Pathways Mitigated[2]	Treatment Requirements	Mitigation Index Value[3]	Comments
CPS Code 327, Conservation Cover	a	Plant predominantly or exclusively grass species on field borders or in orchard and vineyard alleys so as to not attract pollinators during pesticide applications and for a period afterwards.	4	Care should be taken to ensure that the practice is not designed to attract pollinators when pesticides are being applied.
Application at Night: High to Moderate Toxicity and Long Residual Toxicity[4]	a, b	Apply pesticides when pollinators are least active, immediately after dark. **Required records:** record time of pesticide application and pollinator activity.	1	The effectiveness of this technique is based on the toxicity and residue half-life of the pesticide. This effectiveness score applies to the application of pesticides that are highly or moderately toxic to bees and have a residual toxicity greater than 8 hours.
Application at Night: High Toxicity and Short Residual Toxicity[5]	a, b	Apply pesticides when pollinators are least active, immediately after dark. Dewy nights may cause an insecticide to remain wet on the foliage and lengthen its toxic residual. **Required records:** record time of pesticide application and pollinator activity.	5	The effectiveness of this technique is based on the application of pesticides that are highly toxic to bees and have a residual toxicity of less than 8 hours and will be unavailable (and nontoxic) to bees if the product dries before dawn.
Application at Night: Moderately To Low Toxicity and Short Residual Toxicity	a, b	Apply pesticides when pollinators are least active, immediately after dark. Note that dewy nights may cause an insecticide to remain wet on the foliage and lengthen its toxic residual. **Required records:** record time of pesticide application and pollinator activity.	8	The effectiveness of this technique is based on the application of pesticides that are moderately toxic to bees and have a relatively short residue half-life and will be unavailable (and nontoxic) to bees if the product dries before dawn.
Application of Nonsystemic Insecticide When Perennial Crop is Not in Bloom	a, b	Apply pesticides when crops are not in bloom to reduce potential exposure of bees and other pollinators visiting the crop flowers. **Required records:** record time of pesticide application, crop stage, and pollinator activity.	4	The effectiveness of this technique is based on the application of nonsystemic pesticides to perennial crops, where understory weed pressure is typically higher.
Application of Nonsystemic Insecticide When Annual Crop is Not in	a, b	Apply pesticides when crops are not in bloom to reduce potential exposure of bees and other pollinators visiting the crop flowers. **Required records:** record time	8	The effectiveness of this technique is based on the application of nonsystemic pesticides to annual crops with few or no weeds.

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4. IPM or Mitigation Plans to Reduce Risk

NRCS

Risk Mitigation Options

Tech Note Table 2: On-site risk mitigation (Need 10 points total)

Example: Conservation Cover (327). Plant grass in between perennial crop rows. Or only have flowering cover if bloom does not coincide with insecticide sprays. (4 points)

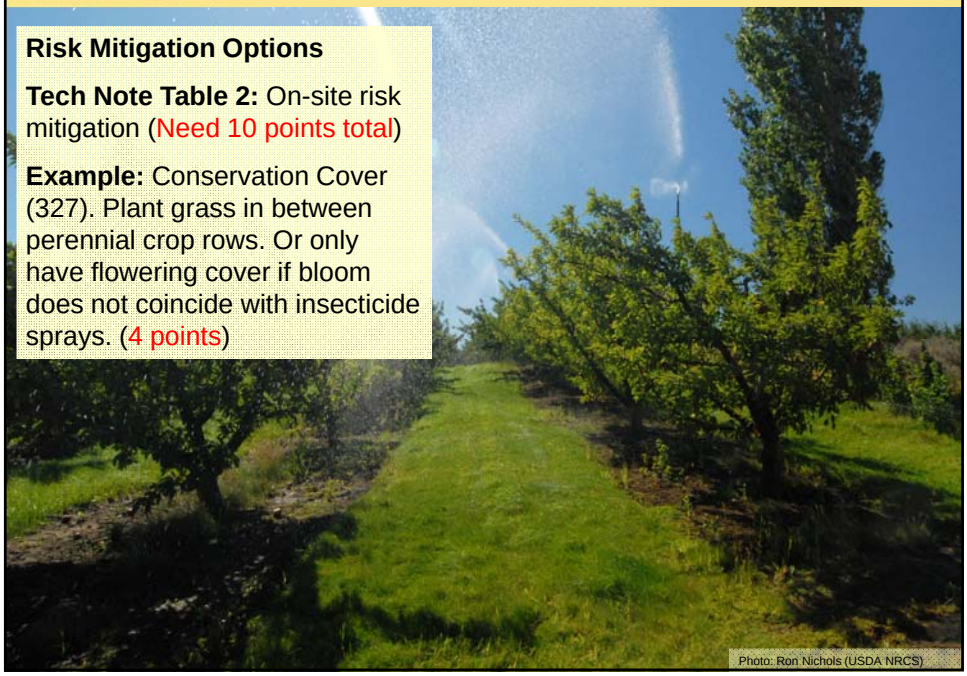

Photo: Ron Nichols (USDA NRCS)

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4. IPM or Mitigation Plans to Reduce Risk

NRCS

Risk Mitigation Options

Tech Note Table 2: On-site risk mitigation (Need 10 points total)

Example: In field bloom removal prior to application of highly-toxic non-systemic insecticide (5 points) or systemic insecticide (3 points).

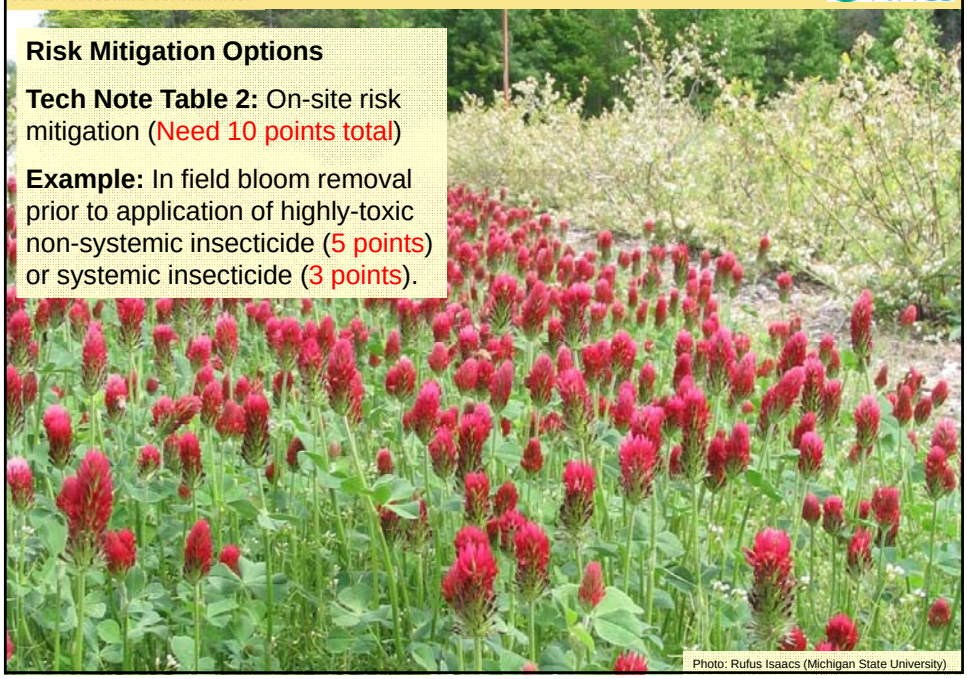

Photo: Rufus Isaacs (Michigan State University)

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4. IPM or Mitigation Plans to Reduce Risk

NRCS

Risk Mitigation Options

Tech Note Table 2: On-site risk mitigation (Need 10 points total)

Example: Application of non-systemic insecticide when PERENNIAL crop is NOT in bloom (4 points)

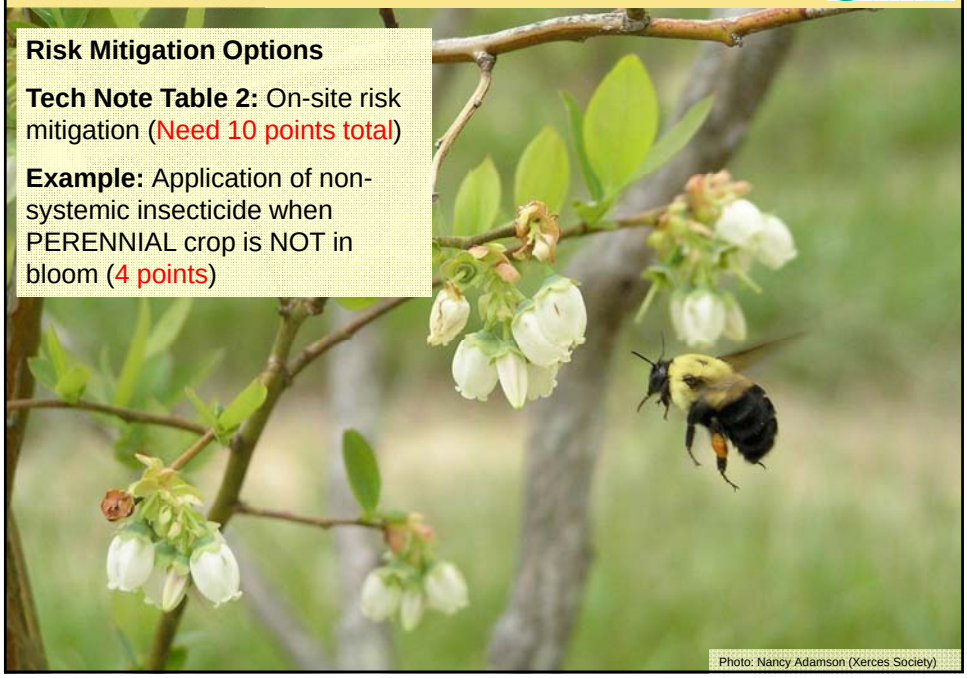

Photo: Nancy Adamson (Xerces Society)

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4. IPM or Mitigation Plans to Reduce Risk

NRCS

Risk Mitigation Options

Tech Note Table 2: On-site risk mitigation (Need 10 points total)

Example: Application of non-systemic insecticide when ANNUAL crop is NOT in bloom (8 points)

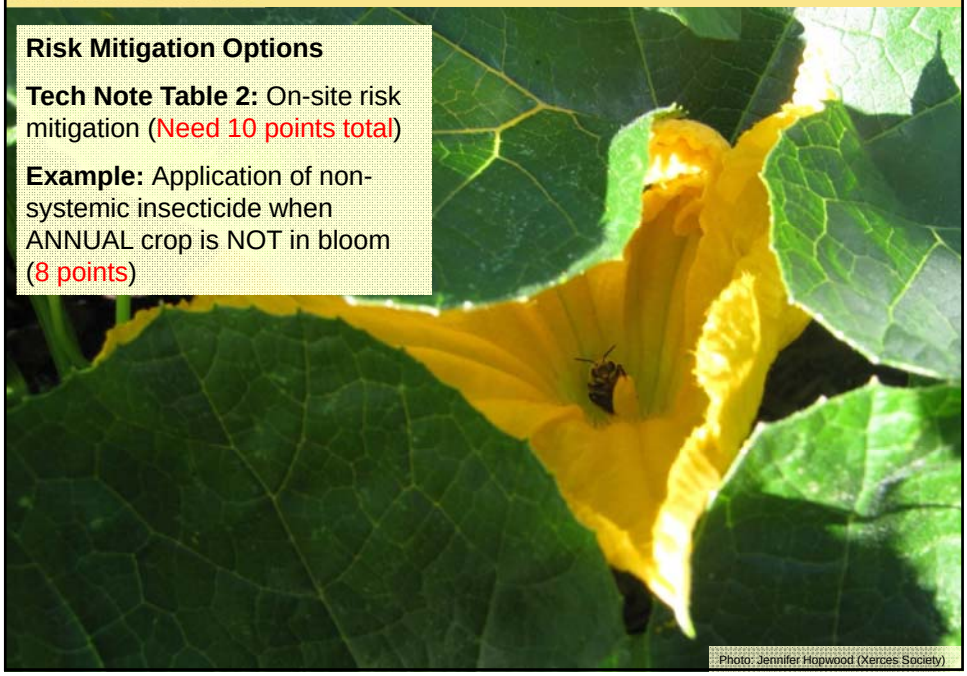

Photo: Jennifer Hopwood (Xerces Society)

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4. IPM or Mitigation Plans to Reduce Risk

NRCS

Risk Mitigation Options

Tech Note Table 2: On-site risk mitigation (Need 10 points total)

Example: Application of highly toxic systemic insecticide after PERENNIAL crop bloom. (7 points)

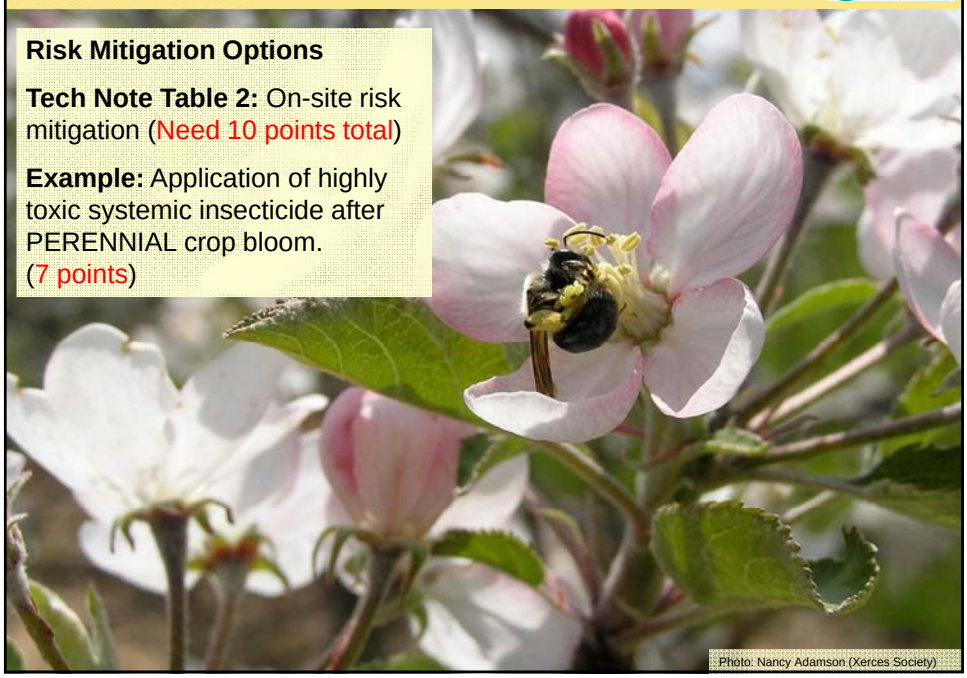

Photo: Nancy Adamson (Xerces Society)

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4. IPM or Mitigation Plans to Reduce Risk

NRCS

Risk Mitigation Options

Tech Note Table 2: On-site risk mitigation (Need 10 points total)

Example: Application of highly toxic systemic insecticide after ANNUAL crop bloom. (8 points)

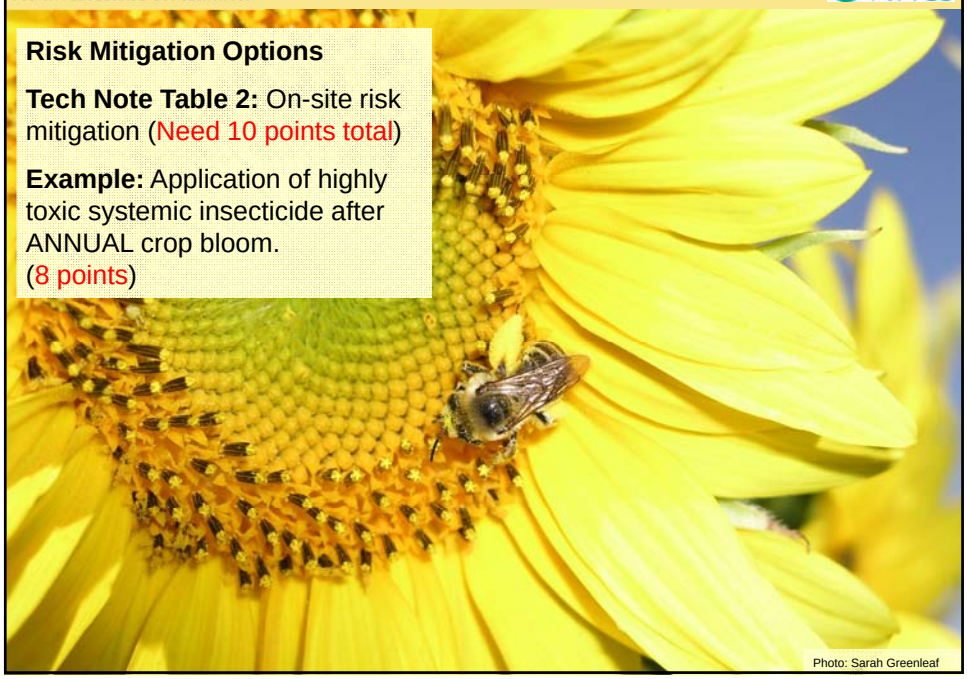

Photo: Sarah Greenleaf

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4. IPM or Mitigation Plans to Reduce Risk

NRCS

Risk Mitigation Options

Tech Note Table 2: On-site risk mitigation (Need 10 points total)

Example: Monitoring and economic pest thresholds: pesticide with long residual toxicity (3 points)

Photo: USDA NRCS

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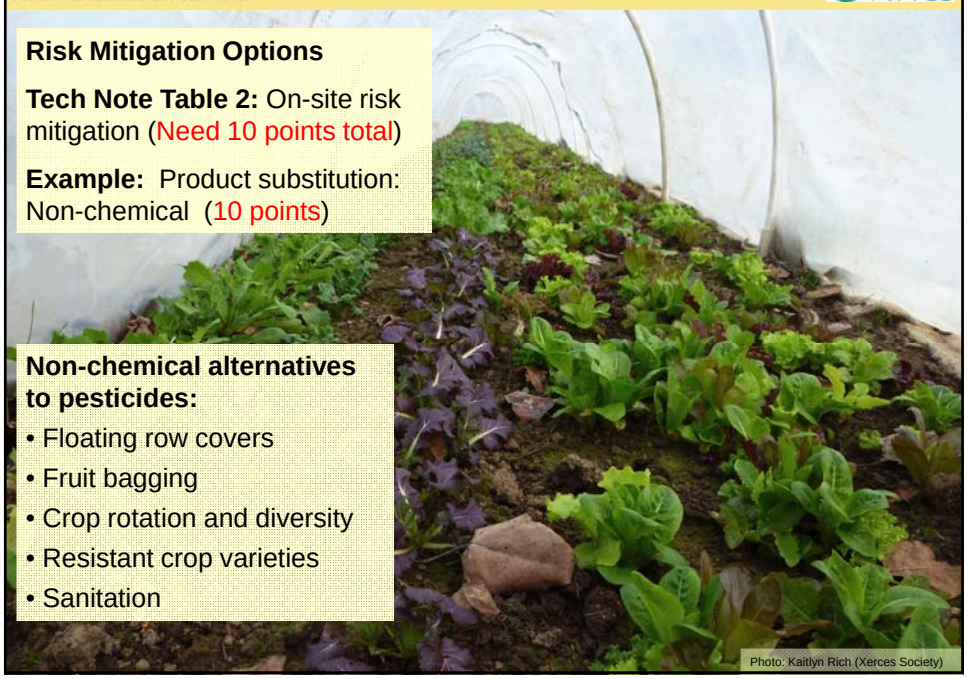
4. IPM or Mitigation Plans to Reduce Risk

NRCS



Risk Mitigation Options

Tech Note Table 2: On-site risk mitigation (Need 10 points total)

Example: Product substitution: Non-chemical (10 points)

Non-chemical alternatives to pesticides:

- Floating row covers
- Fruit bagging
- Crop rotation and diversity
- Resistant crop varieties
- Sanitation

Photo: Kaitlyn Rich (Xerces Society)

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Aside: Related Practices

NRCS

Pollinator Habitat Refuges

Conservation Cover (327) or Hedgerows (422): Create areas of dense bloom (especially during periods of pesticide applications) protected from drift.

Photo: Jim Kairns (USDA NRCS California)

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Aside: Related Practices

NRCS

Conservation Biological Control

Conservation Cover (327) or Hedgerows (422): Many of the flowering plants that support pollinators also support predatory and parasitic insects.

Soldier beetle

Parasitoid wasp

Ladybird beetle

Syrphid fly drinking raspberry nectar

Photos: Mace Vaughan, Paul Jepson, Mario Ambrosino

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4. IPM or Mitigation Plans to Reduce Risk

NRCS

Reduce Off-Site Drift…

Photo: USDA ARS

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4. IPM or Mitigation Plans to Reduce Risk

NRCS

Risk Mitigation Options

Tech Note Table 3: Off-site risk (drift) mitigation (Need 20 points total)

Example: Field border (386) with no blooming plants during bee-toxic insecticide applications. (5 points*)

* Depends upon design.

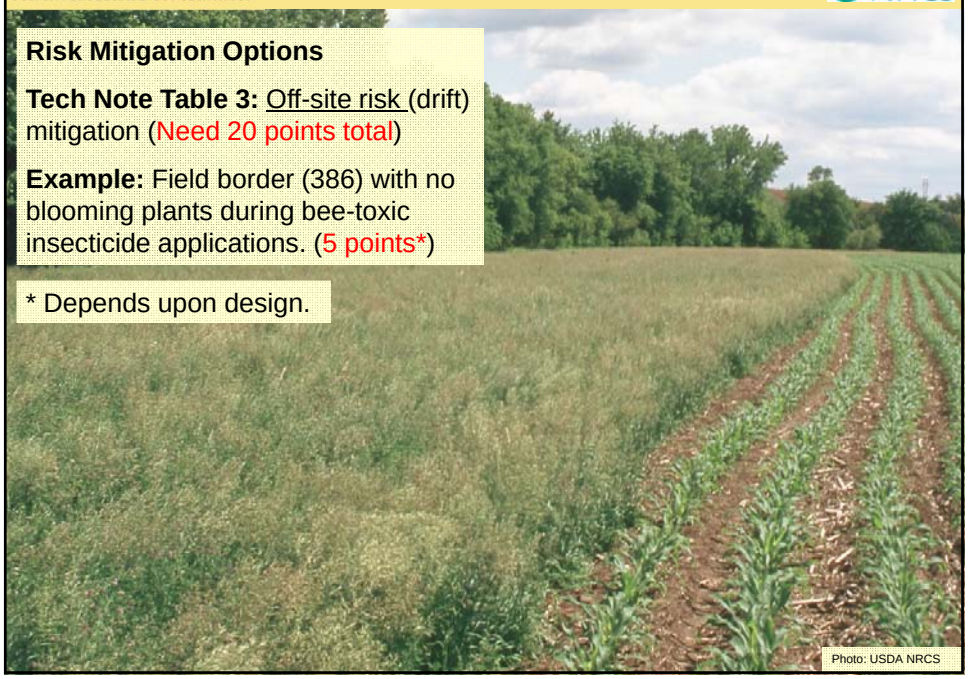

Photo: USDA NRCS

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4. IPM or Mitigation Plans to Reduce Risk

NRCS

Risk Mitigation Options

Tech Note Table 3: Off-site risk (drift) mitigation (Need 20 points total)

Example: Windbreak (380). Small-needled conifers (spruce, cedar, cypress, arborvitae, etc.) with 40% porosity at maturity (10 points)

Pines are NOT recommended: less dense growth habit and too open over time

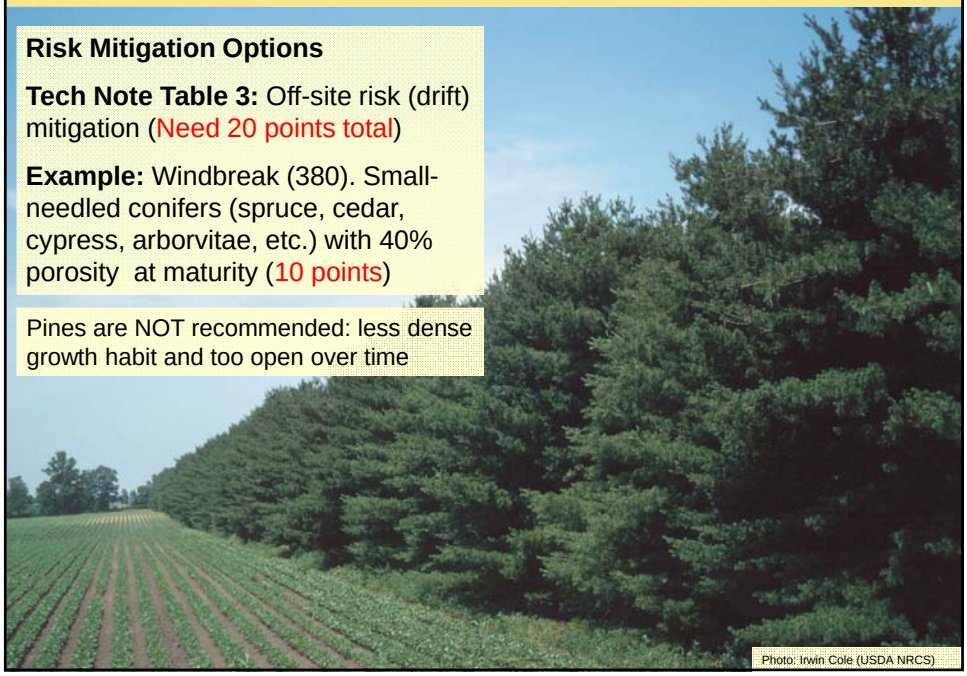

Photo: Irwin Cole (USDA NRCS)

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4. IPM or Mitigation Plans to Reduce Risk

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Risk Mitigation Options

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Example: Windbreak (380). Small-needled conifers (spruce, cedar, cypress, arborvitae, etc.) with 40% porosity at maturity (10 points)

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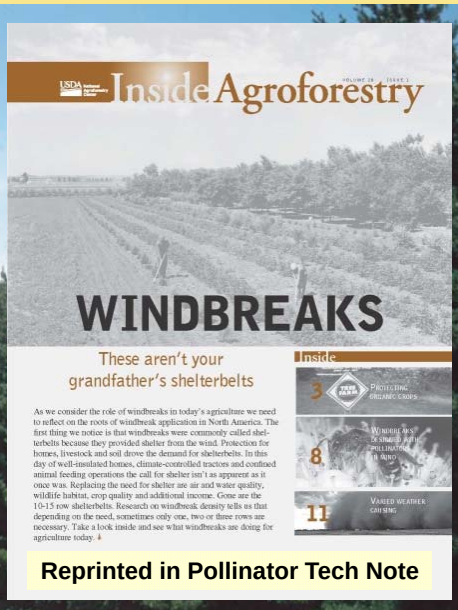

Reprinted in Pollinator Tech Note

Photo: Irwin Cole (USDA NRCS)

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4. IPM or Mitigation Plans to Reduce Risk

NRCS

Risk Mitigation Options

Tech Note Table 3: Off-site risk (drift) mitigation (Need 20 points total)

Example: Setback of 30 feet from field edge (10 points)

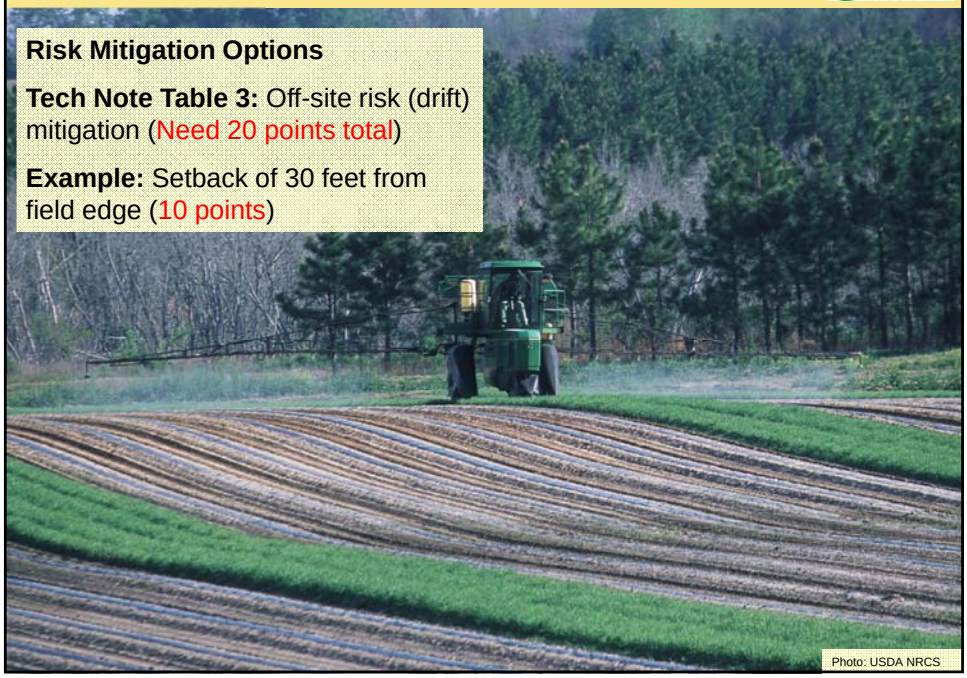

Photo: USDA NRCS

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4. IPM or Mitigation Plans to Reduce Risk

NRCS

Risk Mitigation Options

Tech Note Table 3: Off-site risk (drift) mitigation (Need 20 points total)

Example: Spray curtain or hooded sprayers (10 points)

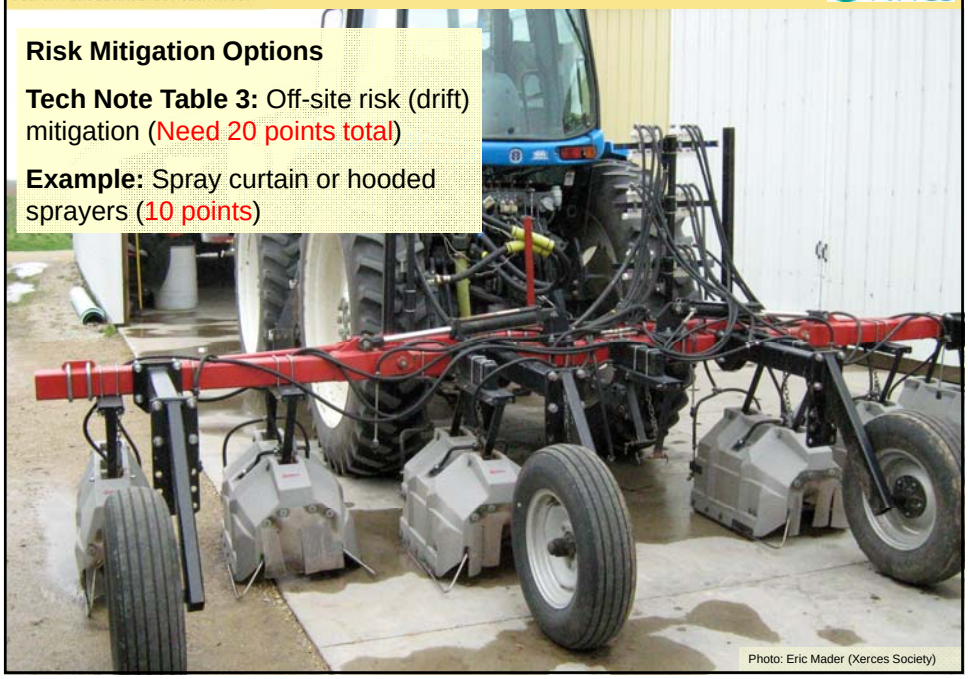

Photo: Eric Mader (Xerces Society)

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4. IPM or Mitigation Plans to Reduce Risk

NRCS

Risk Mitigation Options

Tech Note Table 3: Off-site risk (drift) mitigation (Need 20 points total)

Example: Spray nozzle selection, maintenance, and operation to reduce drift (10 points)

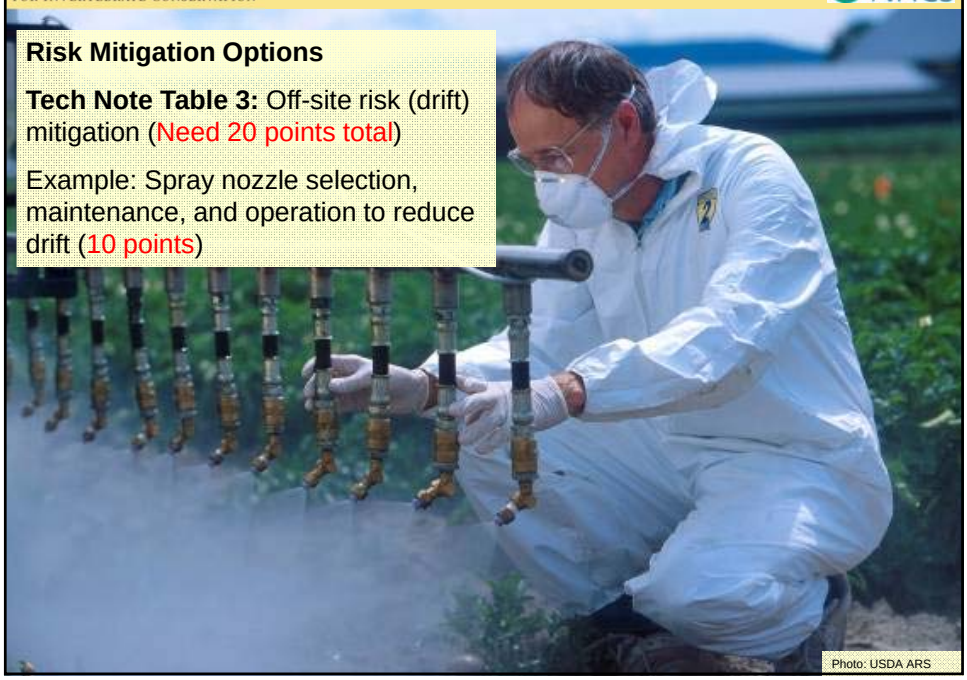

Photo: USDA ARS

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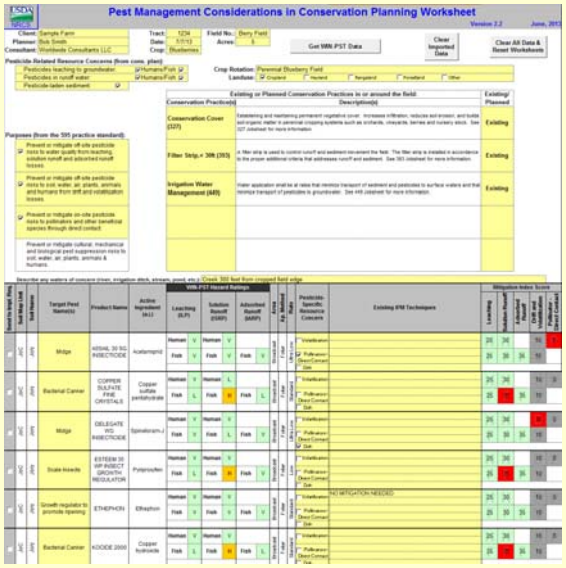
4. IPM or Mitigation Plans to Reduce Risk

NRCS

Bring it all together:

Use the Pest Management Considerations in Conservation Planning Worksheet (see Tech Note Appendix A)



Pest Management Considerations in Conservation Planning Worksheet

Scoring mitigation points:

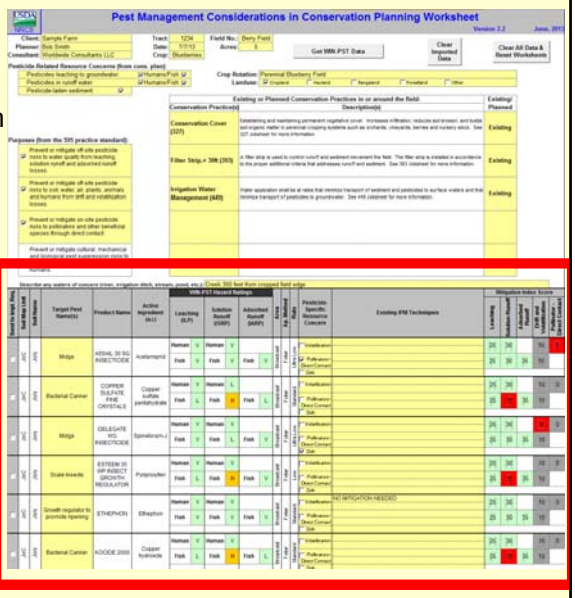
On-site mitigation (tech note table 2): Need 10 points total

Off-site (drift) mitigation (tech note table 3): Need 20 points

4. IPM or Mitigation Plans to Reduce Risk

Bring it all together:

Use the Pest Management Considerations in Conservation Planning Worksheet (see Tech Note Appendix A)



Scoring mitigation points:

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Off-site (drift) mitigation (tech note table 3): Need 20 points

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4. IPM or Mitigation Plans to Reduce Risk

NRCS

Describe any waters of concern (river, irrigation ditch, stream, pond, etc.): Creek 300 feet from cropped field edge

Send to Impl. Req.	Soil Map Unit	Soil Name	Target Pest Name(s)	Product Name	Active Ingredient (a.i.)	WIN-PST Hazard Ratings: Leaching (ILP)	Solution Runoff (ISRP)	Adsorbed Runoff (IARP)	Ap. Method: Area	Ap. Method: Rate	Pesticide-Specific Resource Concern	Existing IPM Techniques	Mitigation Index Score: Leaching	Solution Runoff	Adsorbed Runoff	Drift and Volatilization	Pollinator - Direct Contact
☐	JoC	Jory	Midge	ASSAIL 30 SG INSECTICIDE	Acetamiprid	Human V / Fish V	Human V / Fish V	Fish V	Broadcast	Foliar / Ultra Low	☐ Volatilization; ☑ Pollinators-Direct Contact; ☐ Drift		25 / 25	30 / 30		10 / 10	10
☐	JoC	Jory	Bacterial Canker	COPPER SULFATE FINE CRYSTALS	Copper sulfate pentahydrate	Human V / Fish L	Human L / Fish H	Fish L	Broadcast	Foliar / Standard	☐ Volatilization; ☐ Pollinators-Direct Contact; ☐ Drift		25 / 25	30 / 10	35	10 / 10	0
☐	JoC	Jory	Midge	DELEGATE WG INSECTICIDE	Spinetoram-J	Human V / Fish V	Human V / Fish L	Fish V	Broadcast	Foliar / Ultra Low	☐ Volatilization; ☐ Pollinators-Direct Contact; ☑ Drift		25 / 25	30 / 30	35	10 / 10	0
☐	JoC	Jory	Scale Insects	ESTEEM 35 WP INSECT GROWTH REGULATOR	Pyriproxyfen	Human V / Fish L	Human V / Fish H	Fish V	Broadcast	Foliar / Low	☐ Volatilization; ☐ Pollinators-Direct Contact; ☐ Drift		25 / 25	30 / 10	35	10 / 10	0
☐	JoC	Jory	Growth regulator to promote ripening	ETHEPHON	Ethephon	Human V / Fish V	Human V / Fish V	Fish V	Broadcast	Foliar / Standard	☐ Volatilization; ☐ Pollinators-Direct Contact; ☐ Drift	NO MITIGATION NEEDED	25 / 25	30 / 30	35	10 / 10	0
☐	JoC	Jory	Bacterial Canker	KOCIDE 2000	Copper hydroxide	Human V / Fish L	Human V / Fish H	Fish L	Broadcast	Foliar / Standard	☐ Volatilization; ☐ Pollinators-Direct Contact; ☐ Drift		25 / 25	30 / 10	35	10 / 10	0

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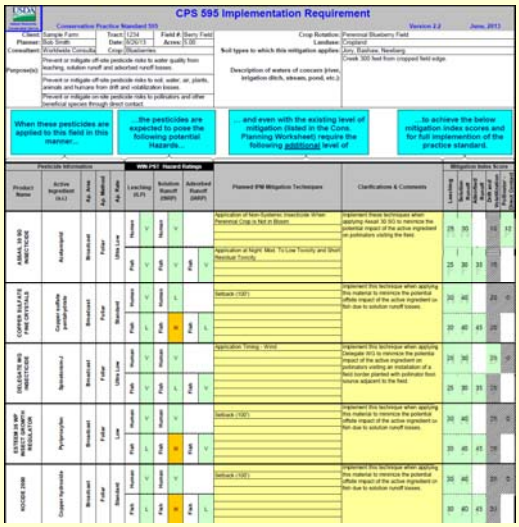
4. IPM or Mitigation Plans to Reduce Risk

NRCS

Bring it all together:

Use 595 Implementation Requirement Worksheet (see Tech Note Appendix A)



Scoring mitigation points:

On-site mitigation (tech note table 2): Need 10 points total

Off-site (drift) mitigation (tech note table 3): Need 20 points

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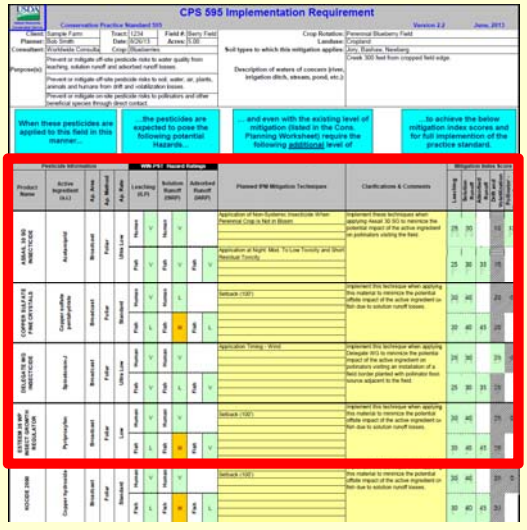
4. IPM or Mitigation Plans to Reduce Risk

NRCS

Bring it all together:

Use 595 Implementation Requirement Worksheet (see Tech Note Appendix A)



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4. IPM or Mitigation Plans to Reduce Risk

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Pesticide Information					WIN-PST Hazard Ratings						Planned IPM Mitigation Techniques	Clarifications & Comments	Mitigation Index Score				
Product Name	Active Ingredient (a.i.)	Ap. Area	Ap. Method	Ap. Rate	Leaching (ILP)		Solution Runoff (ISRP)		Adsorbed Runoff (IARP)				Leaching	Solution Runoff	Adsorbed Runoff	Drift and Volatilization	Pollinator - Direct Contact
ASSAIL 30 SG INSECTICIDE	Acetamiprid	Broadcast	Foliar	Ultra Low	Human	V	Human	V			Application of Non-Systemic Insecticide When Perennial Crop is Not in Bloom	Implement these techniques when applying Assail 30 SG to minimize the potential impact of the active ingredient on pollinators visiting the field.	25	30		10	12
					Fish	V	Fish	V	Fish	V	Application at Night: Mod. To Low Toxicity and Short Residual Toxicity		25	30	35	10	
COPPER SULFATE FINE CRYSTALS	Copper sulfate pentahydrate	Broadcast	Foliar	Standard	Human	V	Human	L			Setback (100')	Implement this technique when applying this material to minimize the potential offsite impact of the active ingredient on fish due to solution runoff losses.	30	40		20	0
					Fish	L	Fish	H	Fish	L			30	40	45	20	
DELEGATE WG INSECTICIDE	Spinetoram-J	Broadcast	Foliar	Ultra Low	Human	V	Human	V			Application Timing - Wind	Implement this technique when applying Delegate WG to minimize the potential impact of the active ingredient on pollinators visiting an installation of a field border planted with pollinator food source adjacent to the field.	25	30		20	0
					Fish	V	Fish	L	Fish	V			25	30	35	20	
ESTEEM 35 WP INSECT GROWTH REGULATOR	Pyriproxyfen	Broadcast	Foliar	Low	Human	V	Human	V			Setback (100')	Implement this technique when applying this material to minimize the potential offsite impact of the active ingredient on fish due to solution runoff losses.	30	40		20	0
					Fish	L	Fish	H	Fish	V			30	40	45	20	
CIDE 2000	er hydroxide	Broadcast	Foliar	Standard	Human	V	Human	V			Setback (100')	Implement this technique when applying this material to minimize the potential offsite impact of the active ingredient on fish due to solution runoff losses.	30	40		20	0
					h		h		h								

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Contracting Safer IPM for Pollinators

NRCS

Using EQIP payments for delivering 595 to protect bees

After planning sufficient mitigation (to meet the standard's criteria):

1. Review payment scenarios to find appropriate match for an IPM plan with pollinator protection
2. Pick the closest scenario to the amount of work you are asking the client to perform
3. Request additional scenarios if they are needed for pollinator protection

Photos: USDA-ARS

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Conclusions

NRCS

Remember the Four Steps!

4-step process

1. Identify pollinator resource concern
2. Identify potential risks from planned pesticide use (toxicity)
3. Identify exposure pathways to prevent or mitigate
4. Help client and IPM expert develop a risk prevention or mitigation plan

Photo: Rollin Coville

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Conclusions

NRCS

Collaboration: Local Level

Conservation planners working with landowners and IPM specialists

Photo: Lynda Richardson (USDA NRCS Virginia)

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Conclusions

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Collaboration: State Level

We need land grant university and other IPM specialists to work closely with NRCS state agronomists to develop and support IPM plans that minimize risk to pollinators.

Xerces is increasing capacity to help over next year.

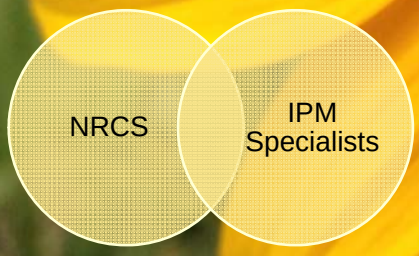

Photo: Mace Vaughan (Xerces Society)

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More Information: Other Links

NRCS

Links and other resources

- www.conservationwebinars.net