Weed Science Updates

Stephen L. Meyers

Southern IN Grower Meeting

January 17, 2025

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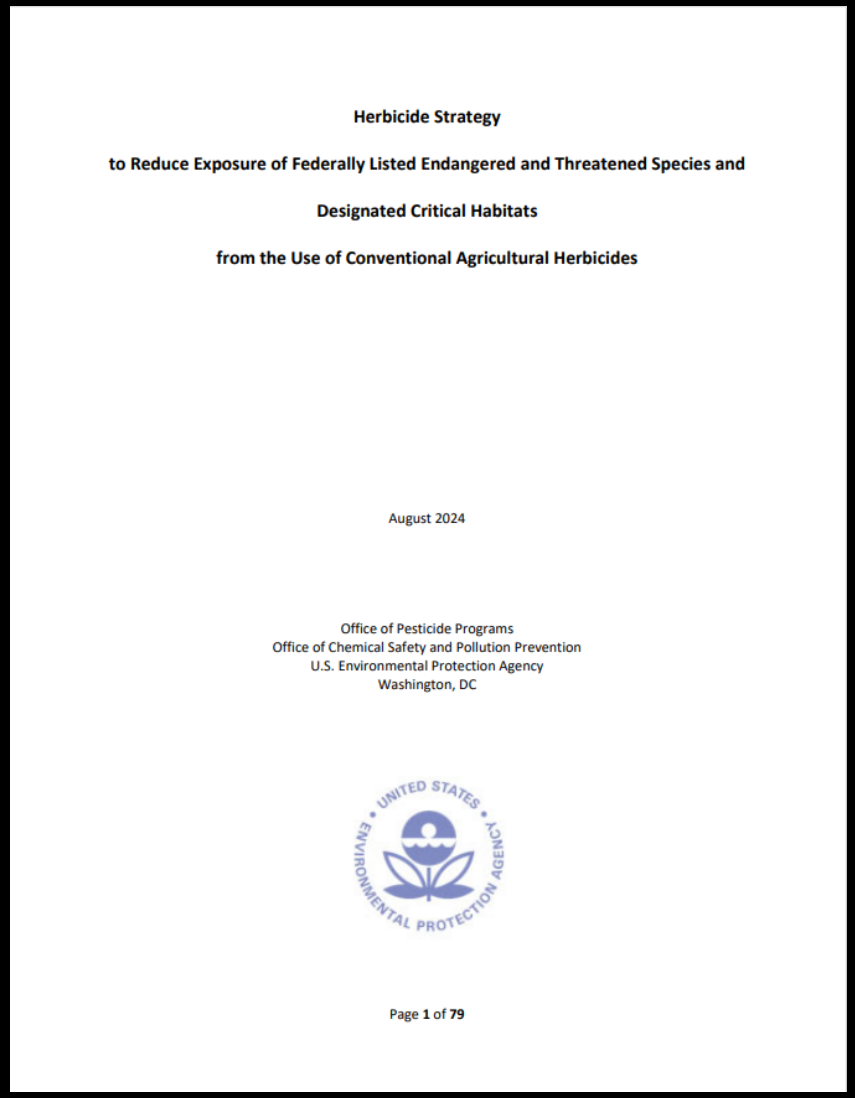
Outline

- Endangered Species Act (Herbicide Rule)
- Atrazine regulatory updates & pick-list proposal
- Herbicide registration status
  - Dicamba
  - Dacthal
  - Dual Magnum
  - Rely

Endangered Species Act (ESA)

- Courts determined that EPA was not meeting its obligation to the ESA when registering pesticides under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)
- 2022: EPA released work plan (April) and revised workplan (Nov.)
- Chose Herbicide Strategy first because most used pesticide class.
- Focused only on conventional herbicides and agricultural uses.



Herbicide Strategy

to Reduce Exposure of Federally Listed Endangered and Threatened Species and

Designated Critical Habitats

from the Use of Conventional Agricultural Herbicides

August 2024

Office of Pesticide Programs
Office of Chemical Safety and Pollution Prevention
U.S. Environmental Protection Agency
Washington, DC

Page 1 of 79

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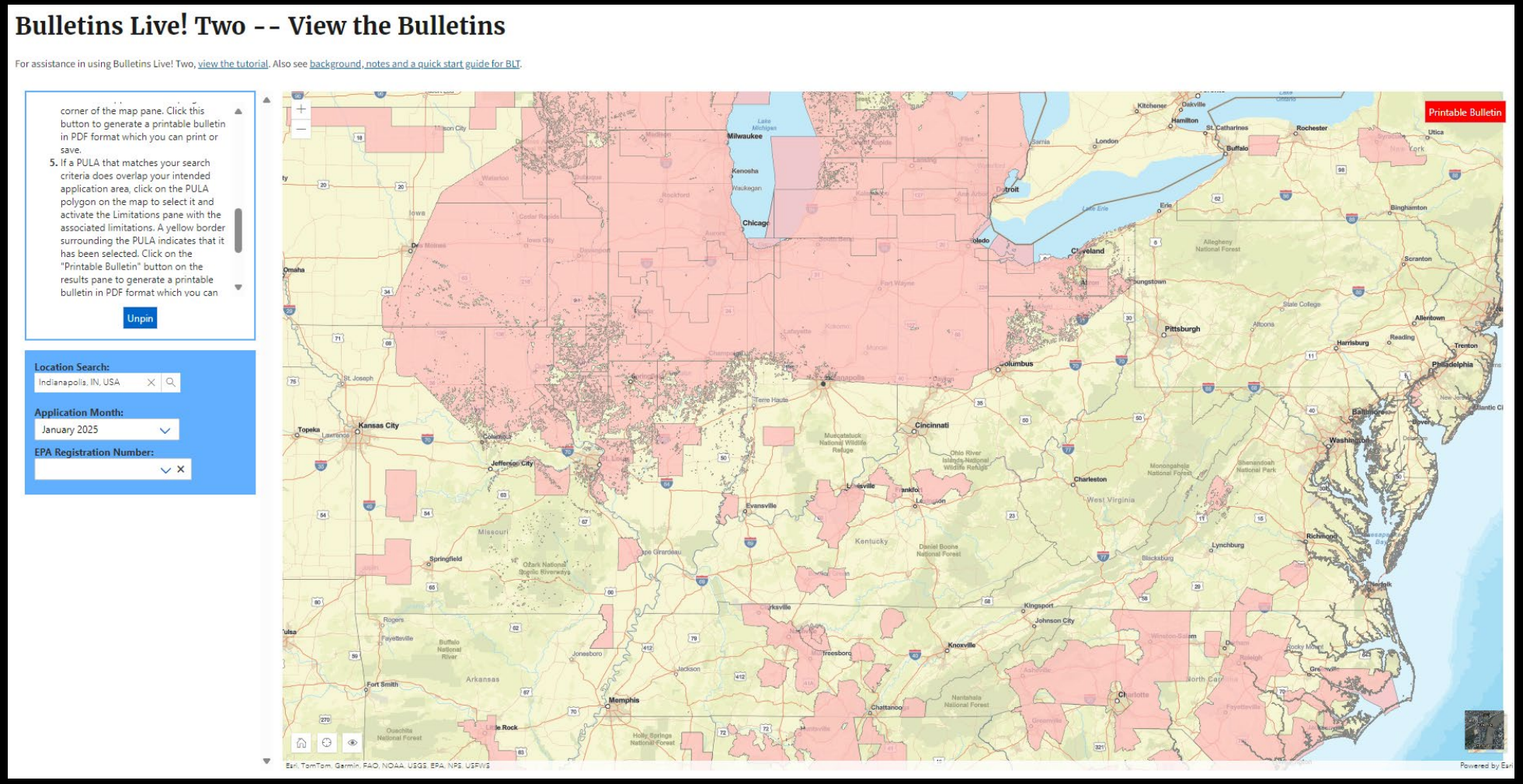
Three Step Process

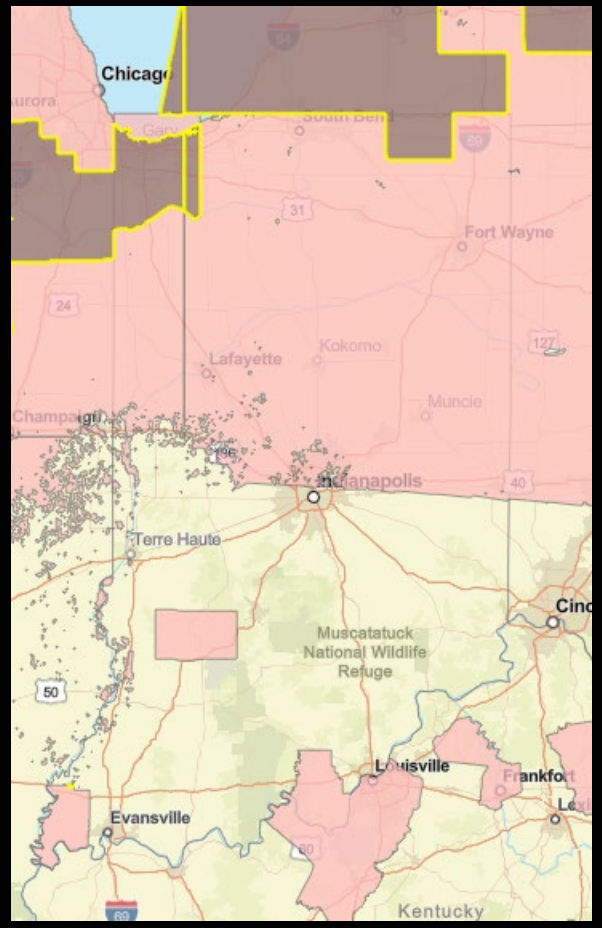
- Occurs at registration or registration review
- Step 1: Establish potential population impact to listed species as low, medium, high.
- Step 2: Identify levels of mitigation needed to reduce impact.
  - Herbicide drift, runoff/erosion
- Step 3: Determine if the mitigation(s) is needed universally or in designated Pesticide Use Limitation Areas (“PULAs”)
  - Label language will direct the applicator to Bulletins Live! Two (BLT) website

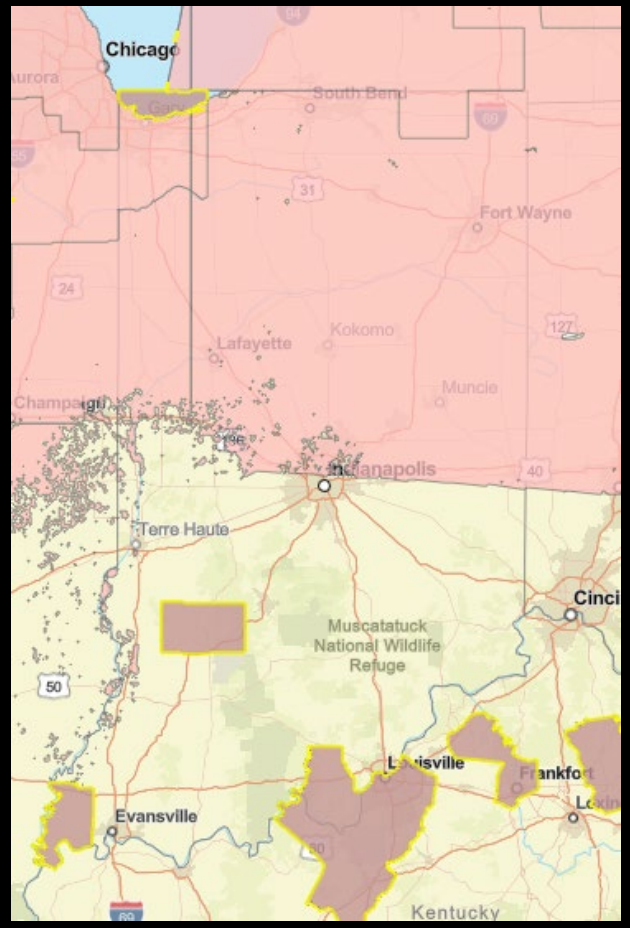
BLT = Bulletins Live! Two



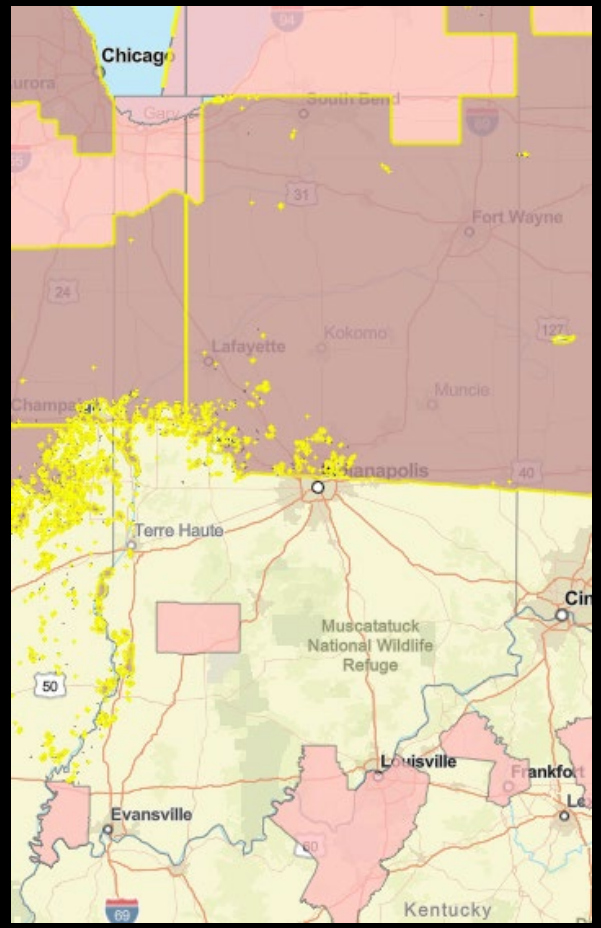
PULAs in Indiana (so far)

Over-the-top dicamba products.





Cyantraniliprole-containing insecticides.



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  - Rely
- Current Research Efforts (if time allows)

Potential changes for atrazine use:

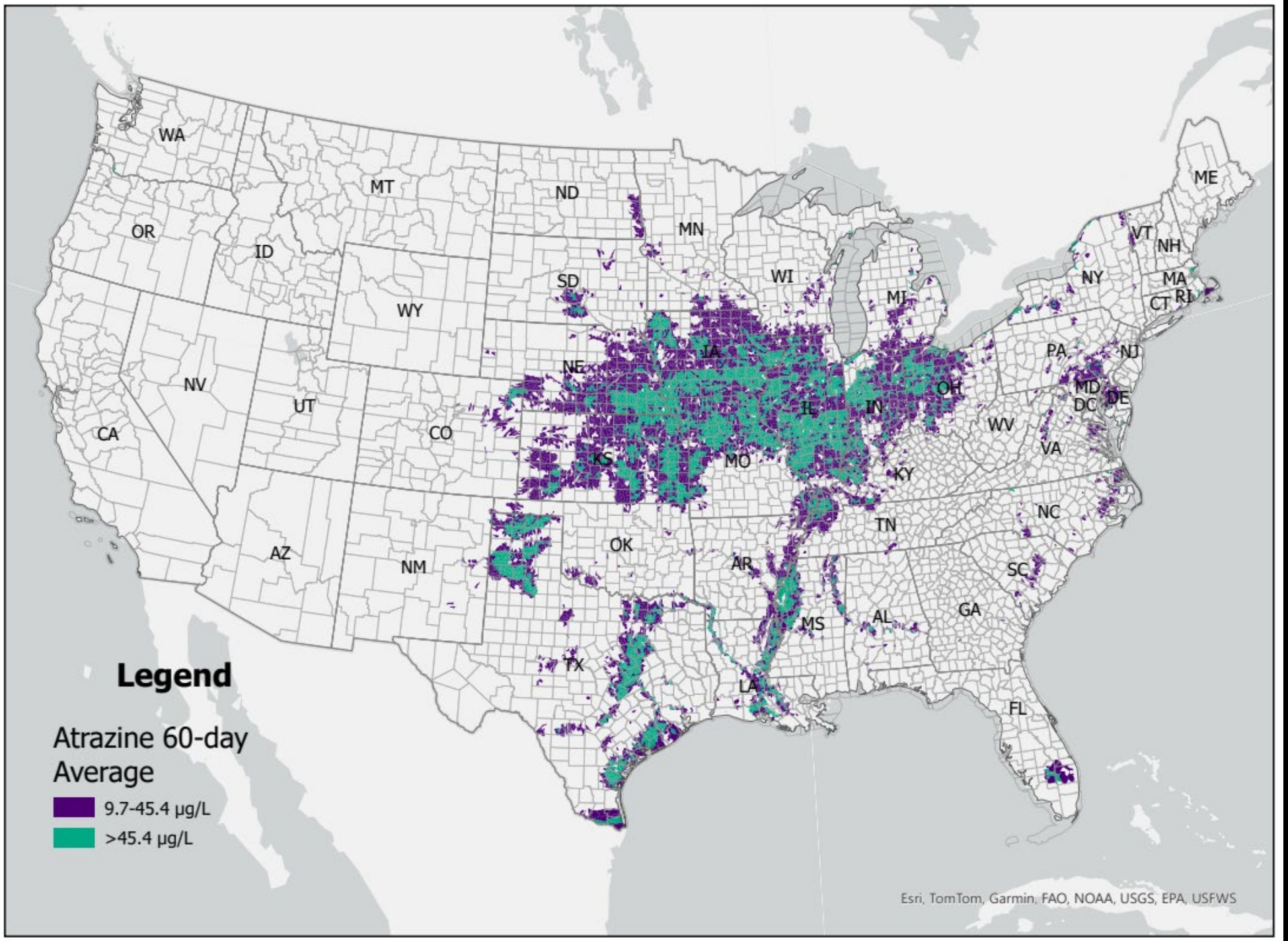
- CE-LOC (concentration equivalent level of concern): 60-day average concentration of atrazine that, when exceeded, presents greater than a 50% chance of negatively affecting the productivity, structure, and/or function of an aquatic plant community.
- June 2022:
  - 70 studies were considered between 2002 and 2016.
  - The CE-LOC was changed from 15 µg/L (“not scientifically derived”) to 3.4 µg/L.

Potential changes for atrazine use:

- August 2023:
  - EPA convened a Scientific Advisory Panel meting and review for “Examination of Mesocosm and Microcosm Studies for Evaluating the Effects of Atrazine on Aquatic Plant Communities”.
- July 2024:
  - CE-LOC changed from 3.4 to 9.7 µg/L

Potential changes for atrazine use:

- December 2024:
  - EPA provided an updated mitigation proposal.
    - Comments due by February 3, 2025.
  - Expect an interim decision in 2025 with a comment period to follow.



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Pending changes to atrazine labels:

Appendix A: Updated Mitigation Proposal for Labeling on Atrazine Products

Table 1. Proposed Updated Mitigation Labeling for All Atrazine Technical Products

Description	Proposed Labeling for All Atrazine Technical Labels	Placement on Label
Soil Saturation Restriction	For all formulations, add the following restriction: "Do not apply atrazine products when soils are saturated or above field capacity."	Directions for Use
Precipitation Restriction	For all formulations, add the following restrictions: • "Do not apply atrazine containing products during rain."	Directions for Use
Use Restrictions for Sorghum; Field Corn; Sweet Corn	For all formulations, add the following restriction: "Do not apply more than 2.0 lbs ai/A/year"	Directions for Use

How many mitigations to "pick" (2023 version):

Description	Proposed Label Changes for All Atrazine Sweet Corn End-Use Labels	Placement on Label
All States	• Do not apply more than 2.0 lbs ai/A/year.	Directions for Use
For Watersheds Included in Atrazine Concentration List 1 if Applying to Highly Erodible Lands[13]	• If applying 1.0 lb ai/A/year or less, **one** runoff reduction practice must be present from **Table A.** • If applying more than 1.0 lb ai/A/year, **two** runoff reduction practices must be present from **Table A.**	Directions for Use
For Watersheds Included in Atrazine Concentration List 1 if Applying to Non-Highly Erodible Lands	• If applying 1.0 lb ai/A/year or less, no additional runoff reduction practices must be present from **Table A.** • If applying more than 1.0 lb ai/A/year, **one** runoff reduction practice must be present from **Table A.**	Directions for Use
For Watersheds Included in Atrazine Concentration List 2 if Applying to Highly Erodible Lands	• If applying 0.625 lbs ai /A/year or less, **one** runoff reduction practice must be present from **Table A.** • If applying more than 0.625 lbs ai/A/year, **two** runoff reduction practices must be present from **Table A.**	Directions for Use
For Watersheds Included in Atrazine Concentration List 2 if Applying to Non-Highly Erodible Lands	• If applying 0.625 lbs ai/A/year or less, no additional runoff reduction practices must be present from **Table A.** • If applying more than 0.625 lbs ai/A/year, **one** runoff reduction practice must be present from **Table A.**	Directions for Use

How many mitigations to "pick" (2024 version):

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Table 2. Proposed Updated Mitigation Labeling for All Atrazine End-Use Products

Applications to Field Corn, Sweet Corn, Sorghum and Sugarcane

Description	Proposed Labeling for All Atrazine End-Use Labels	Placement on Label
Runoff/Erosion Mitigation	"MANDATORY RUNOFF MITIGATION Before using this product, access [website] and determine if the application site is located in Atrazine Watershed Bin 1 or 2.[18] If your application site is in Atrazine Watershed Bin 1 or 2, runoff mitigation is required for this product unless certain field/application parameters are present at the time of application (i.e., subsurface or tile drains with controlled outlet, perimeter berm systems, irrigation tailwater return systems, spot treatment, etc). Access EPA's Mitigation Menu Website at www.epa.gov/pesticides/mitigation-menu for a full list of field/application parameters to evaluate whether your field is subject to runoff mitigation. If the application does not meet the specified field/application parameters, you must achieve, at a minimum, the points specified in the table below for Atrazine Watershed Bins 1 and 2 for the crop uses listed on this label: Minimum Mitigation Points to Achieve for Labeled Crop Uses Atrazine Watershed Bin: Minimum Points to Achieve 1: 3 points 2: 6 points The applicator must choose among the mitigation and/or mitigation relief measures on EPA's Mitigation Menu	Directions for Use

Proposed "picklist" for sweet corn (2023 version):

Applications to Sweet Corn
Table A. Picklist for Sweet Corn
No pre-emergence applications
Utilize ≥ **30 ft** (Hydrological Soil Groups A & B) **or** ≥**100 ft** (Hydrological Soil Groups C & D) vegetative filter strip
Cover crop
Contour buffer strips
Terrace farming
Field border
Grassed waterway
Irrigation water management
Contour farming
Strip cropping
Soil incorporation to a depth of 2.5 cm
No tillage or reduced tillage

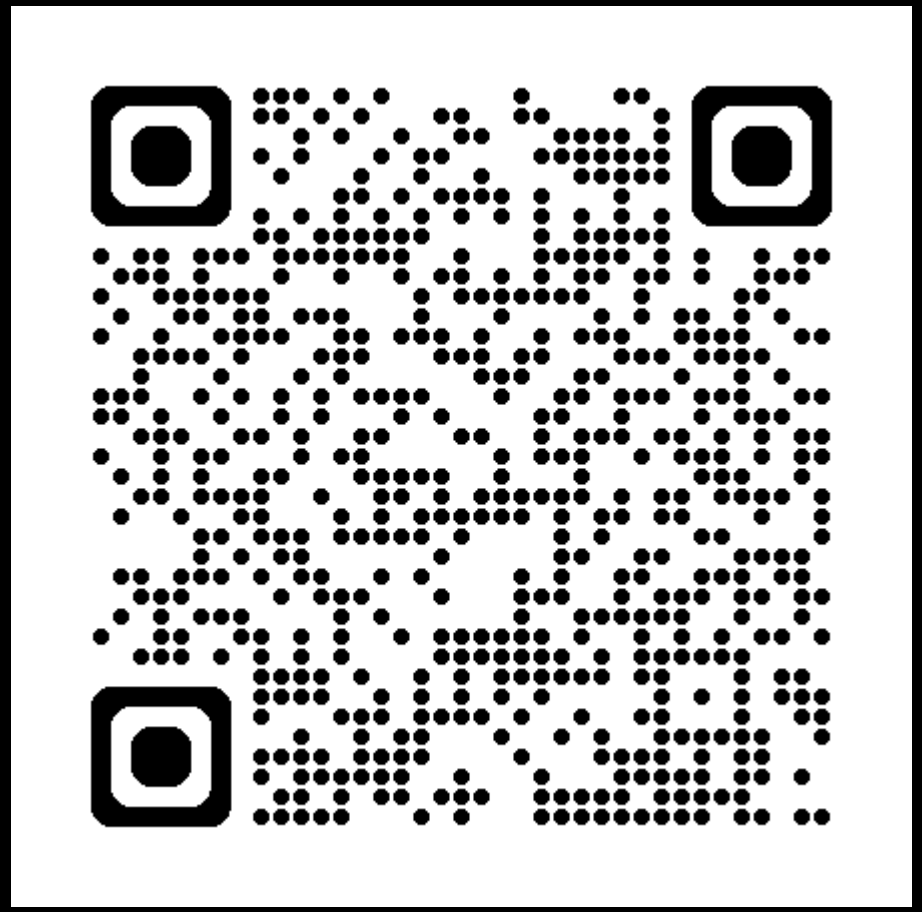
Examples of mitigation types:

Table B.0-1. EPA Runoff/Erosion Mitigation Measures

EPA Mitigation Measure Title[1]	Conditions that Qualify[1,2]	Points for Mitigation Measure on Mitigation Menu
Application Parameters		
Annual Application Rate Reduction	Any application 10% to <30% less than the maximum labeled annual application rate	1
	Any application 30% to <60% less than the maximum labeled annual application rate	2
	Any application ≥60% less than the maximum labeled annual application rate	3
Reduction in Proportion of Field Treated	10 to <30% of Field Area treated (Banded application, partial treatment, precision sprayers)	2
	30 to <60% of Field Area treated (Banded application, partial treatment, precision sprayers)	3
	≥60% of Field Area treated (Banded application, partial treatment, precision sprayers)	4
Soil Incorporation	Watering-in or mechanical incorporation before runoff producing rain event	1

Field Characteristics[3]		
Field with slope ≤ 3%	Naturally low slope or flat fields; flat laser leveled fields	2
Predominantly Sandy Soils[4]	Fields with sand, loamy sand, or sandy loam soil without a restrictive layer that impedes the movement of water through the soil	2
In-Field Mitigation Measures[3]		
Reduced Tillage Management	Reduced tillage, mulch tillage, strip till, ridge tillage	2
	No-till	3
Reservoir Tillage	Reservoir tillage, furrow diking, basin tillage	3
Contour Farming	Contour farming, contour tillage, contour orchard and perennial crops	2
In-field Vegetative Strips	Inter-row vegetated strips, strip cropping, alley cropping, prairie strips, contour buffer strips, contour strip cropping, prairie strip, alley cropping, vegetative barrier (occurring in a contoured field)	2
Terrace Farming	Terrace farming, terracing, field terracing	2
Cover Crop/Continuous Ground Cover	Cover crop, double cropping, relay cropping	1 (tillage used)
		2 (no tillage, short term)
		3 (no tillage, long term)

Full Mitigation Proposal Here:



A history of atrazine use limits its persistence:

Table 1. Effect of previous atrazine use history and soil pH on degradation half-lives under field and laboratory conditions from a long-term, no-tillage field study in Tennessee.

Previous atrazine exposure[a]	Soil pH[b]	Lab DT_{50}[c]	No. of experiment units in lab data	Field DT_{50}[d]
		days		days
No	5.9	16.9 (1.3)	18	—
Yes	5.2 (0.1)	11.2 (1.5)	48	7.1 (0.5)
Yes	6.1 (0.4)	3.4 (0.24)	48	5.5 (0.8)
Yes	7.0 (0.4)	2.7 (0.18)	192	4.5 (0.5)

[a] Atrazine exposure each year consisted of 2.2 kg ha^{-1} PRE and 0.56 kg ha^{-1} EPOST, with data pooled from 2, 4, 6, and 8 total exposures and across main plots as appropriate.
[b] pH data are means ± standard error of triplicate soil samples from each plot used in lab studies, and then pooled across main plot.
[c] Lab degradation data based on first order regression of six data points from 0 to 16 d after atrazine fortification. Data presented are mean ± standard deviation.
[d] Field dissipation data based on first order regression of four points from the field site in 2008, and samples were collected 0, 9, 16, and 32 d after PRE atrazine application.

Mueller, Steckel, and Radosevich 2010.

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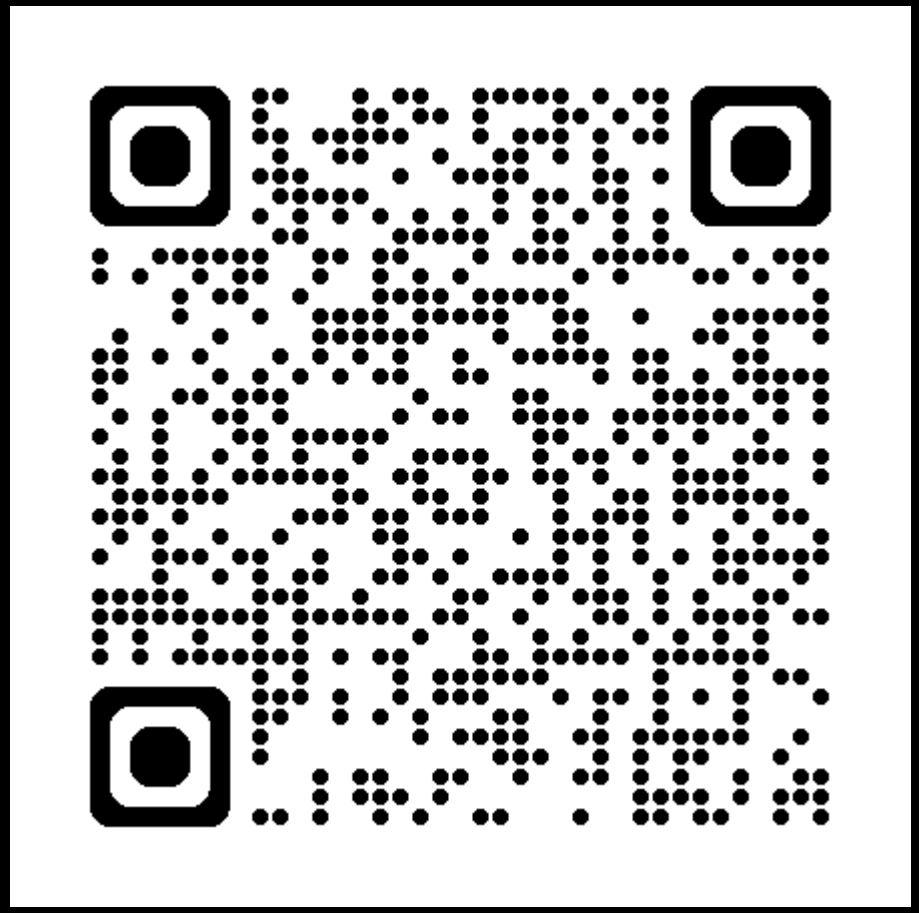
  - Anthem Flex

Dicamba (OTT)

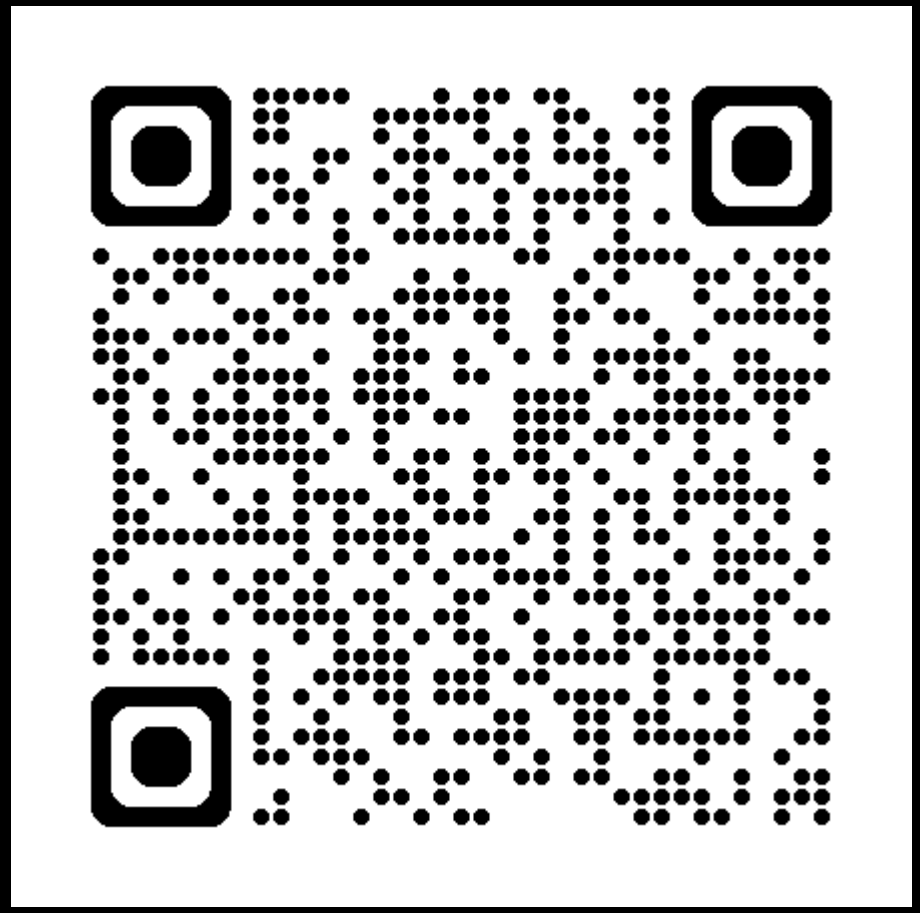
- 2016: Over-the-top dicamba formulations registered for use in dicamba-resistant soybeans and cotton
- 2017 and 2018: Registrations amended
- 2020: US Court of Appeals vacated 2018 registrations
  - EPA understated/failed to acknowledge the risks of OTT dicamba.
- 2020: New OTT registrations- late summer cutoff date, increased buffers for counties with listed species
- 2023: New labels for Indiana (and other states)
- 2024: US Court of Appeals vacates 2020 registrations
  - Existing stock at with dealers/applicators allowed to be used through June 12, 2024

Dicamba (OTT)

- OISC Dicamba Webpage



- EPA Dicamba Webpage



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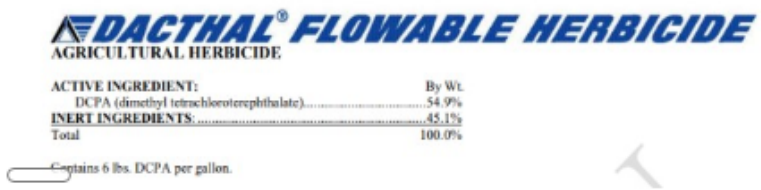
Dacthal (DCPA) Updates:

- August 6: EPA announced emergency suspension citing health risk to fetuses of exposed pregnant mothers.
- All use ceases, return product to supplier or pesticide clean sweep.

EPA Issues Order to Immediately Stop the Use of Dacthal Herbicide

AUGUST 29, 2024 - INCLUDED IN ISSUE: 24-11

BY: STEPHEN MEYERS


DACTHAL® FLOWABLE HERBICIDE
AGRICULTURAL HERBICIDE

ACTIVE INGREDIENT:	By Wt.
DCPA (dimethyl tetrachloroterephthalate)	54.9%
INERT INGREDIENTS:	45.1%
Total	100.0%

Contains 6 lbs. DCPA per gallon.

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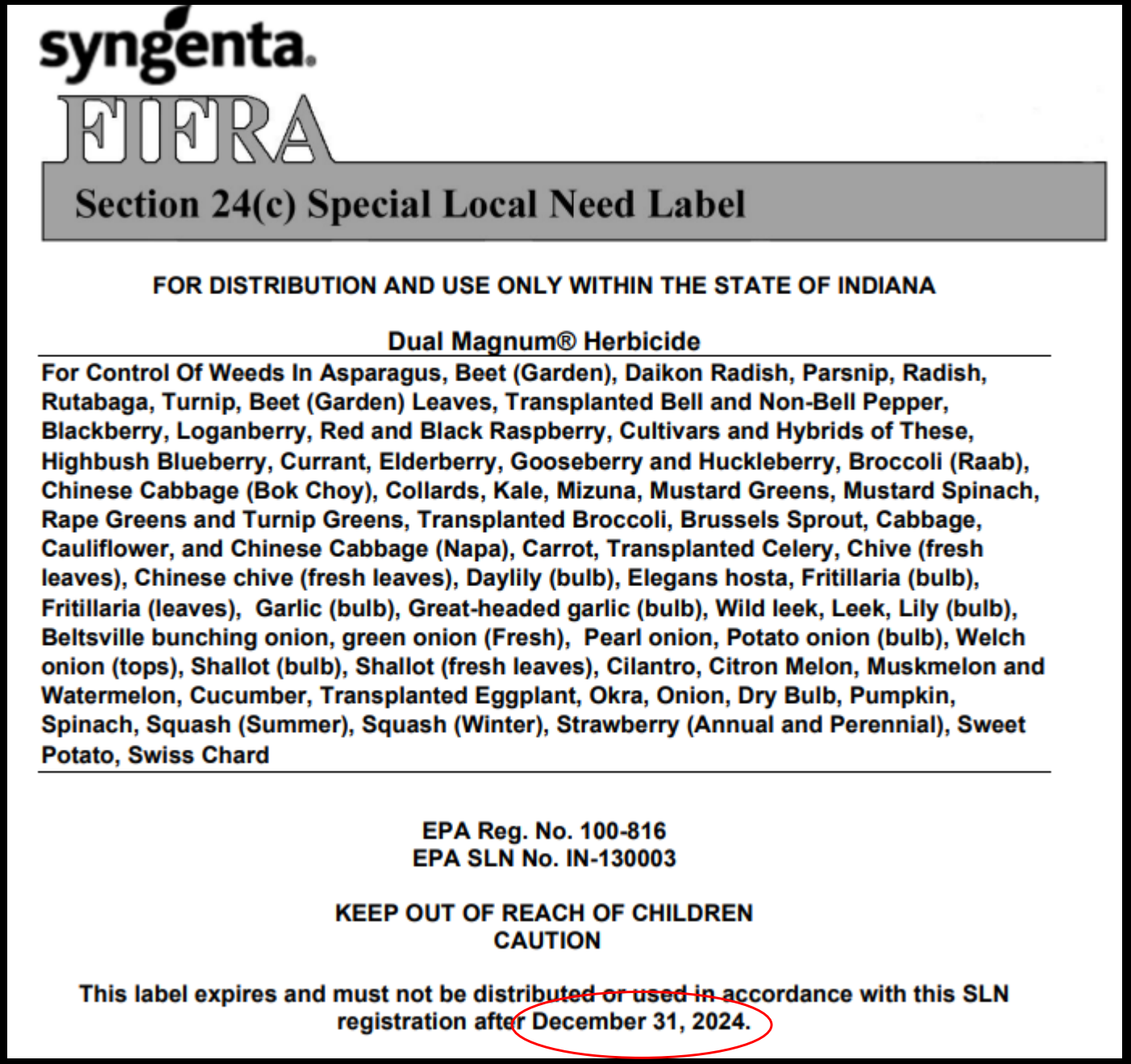

syngenta

FIFRA

Section 24(c) Special Local Need Label

FOR DISTRIBUTION AND USE ONLY WITHIN THE STATE OF INDIANA

Dual Magnum® Herbicide

For Control Of Weeds In Asparagus, Beet (Garden), Daikon Radish, Parsnip, Radish, Rutabaga, Turnip, Beet (Garden) Leaves, Transplanted Bell and Non-Bell Pepper, Blackberry, Loganberry, Red and Black Raspberry, Cultivars and Hybrids of These, Highbush Blueberry, Currant, Elderberry, Gooseberry and Huckleberry, Broccoli (Raab), Chinese Cabbage (Bok Choy), Collards, Kale, Mizuna, Mustard Greens, Mustard Spinach, Rape Greens and Turnip Greens, Transplanted Broccoli, Brussels Sprout, Cabbage, Cauliflower, and Chinese Cabbage (Napa), Carrot, Transplanted Celery, Chive (fresh leaves), Chinese chive (fresh leaves), Daylily (bulb), Elegans hosta, Fritillaria (bulb), Fritillaria (leaves), Garlic (bulb), Great-headed garlic (bulb), Wild leek, Leek, Lily (bulb), Beltsville bunching onion, green onion (Fresh), Pearl onion, Potato onion (bulb), Welch onion (tops), Shallot (bulb), Shallot (fresh leaves), Cilantro, Citron Melon, Muskmelon and Watermelon, Cucumber, Transplanted Eggplant, Okra, Onion, Dry Bulb, Pumpkin, Spinach, Squash (Summer), Squash (Winter), Strawberry (Annual and Perennial), Sweet Potato, Swiss Chard

EPA Reg. No. 100-816
EPA SLN No. IN-130003

KEEP OUT OF REACH OF CHILDREN
CAUTION

This label expires and must not be distributed or used in accordance with this SLN registration after December 31, 2024.

- Worked with OISC to request a request a new 24C.
- Approved by Syngenta.
- Should last 4-5 years.

- Also requested additions:
  - Pumpkins delayed PRE (after crop emergence)
  - Dormant/post-cut mint
  - Awaiting decision.

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Glufosinate | Group 10 | Herbicide

Supplemental Label

Rely 280® Herbicide

For weed control in cucurbits

This supplemental label expires [month] [date], [year], and must not be used or distributed after this date.

Active Ingredient:
glufosinate-ammonium* 24.5%**
Other Ingredients: 75.5%
Total: 100.0%

* CAS Number 77182-82-2
** Equivalent to 2.34 pounds of active ingredient per U.S.gallon.

EPA Reg. No. 7969-448
WARNING/AVISO

Directions for Use

- It is a violation of federal law to use this product in a manner inconsistent with its labeling.
- The supplemental labeling and the entire **Rely® 280 herbicide** container label, EPA Reg. No. 7969-448, must be in possession of the user at the time of application.
- Read the label affixed to the container for **Rely 280** before applying.
- Use of **Rely 280** according to this labeling is subject to the use precautions and limitations imposed by the label affixed to the container for **Rely 280**.

Product Information

Rely 280 is a water-soluble nonselective herbicide for application as foliar spray for the control of a broad spectrum of emerged broadleaf and grassy weeds. Refer to the **Rely 280** container label for a complete list of weeds controlled.

For best results, apply **Rely 280** to emerged, young, actively growing weeds. Warm temperatures, high humidity, and bright sunlight improve the performance of **Rely 280**. Uniform, thorough spray coverage of weeds is required to achieve consistent weed control.

Weed control may be reduced when applications are made to weeds under stress such as drought or cool temperatures. Weeds under stress or in dense populations will require application at the highest specified label use rate. Stressed conditions also include prior treatments of other contact or systemic herbicides. Regrowth of weeds may occur due to the weed stage of growth at application, low use rate, or environmental conditions at the time of application.

Rate of Rely 280 (fl ozs/A)	Glufosinate Rate Equivalency (lbs ai/A)
29	0.53
43	0.79
64	1.17
87	1.59

BASF Corporation
26 Davis Drive, Research Triangle Park, NC 27709

BASF
We create chemistry

Glufosinate | Group 10 | Herbicide

Supplemental Label

Rely 280® Herbicide

For weed control in cantaloupe, cucumber, summer squash, and watermelon

This supplemental label expires December 1, 2025, and must not be used or distributed after this date.

Active Ingredient:
glufosinate-ammonium*: 2-amino-4-(hydroxymethylphosphinyl) butanoic acid-monoammonium salt 24.5%**
Other Ingredients: 75.5%
Total: 100.0%

* CAS Number 77182-82-2
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Weed control may be reduced when applications are made to weeds under stress including drought or cool temperatures. Weeds under stress or in dense populations will require application at the highest specified label use rate. Stressed conditions also include prior treatments of other contact or systemic herbicides. Regrowth of weeds may occur due to the weed stage of growth at application, low use rate, or environmental conditions at the time of application.

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Glufosinate	Group	10	Herbicide

Supplemental Label

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Herbicide

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Active Ingredient:

glufosinate-ammonium*: 2-amino-4-(hydroxymethylphosphinyl) butanoic acid-monoammonium salt	24.5%**
Other Ingredients:	75.5%
Total:	100.0%

* CAS Number 77182-82-2

** Equivalent to 2.34 pounds of acti

EPA Reg. No. 7969-44

WARNING/AVISO

Allow 3 days and ≥½" precipitation
OR 27 day with <½" precipitation.

Directions

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43	0.79
62	1.17
64	1.24
87	1.59

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Application Information

Rely® 280 herbicide may be applied to the following cucurbit crops:

Cantaloupe, cucumber, summer squash, and watermelon

Application Rate and Timing

Rely 280 may be applied in sequential applications.

Preplant Burndown Application to Plastic Mulch Covered Beds. (prior to transplanting)

For burndown of emerged weeds prior to planting, apply **Rely 280** at 29 to 43 fl ozs/A to pre-formed beds covered with plastic mulch and shaped such that water and herbicide run off between the rows.

Make a single application or multiple applications (up to 2) before planting. The maximum total amount of **Rely 280** applied preplant burndown is 64 fl ozs/A.

Planting Interval. When applied prior to transplanting over the top of plastic mulch, **Rely 280** may damage cucurbits which come in direct contact with herbicide remaining on the plastic. Allow at least 3 days between application of **Rely 280** and transplanting. Additionally, ensure that at least 1/2 inch of precipitation (either rainfall or overhead irrigation) has occurred prior to transplanting. Precipitation is needed to wash **Rely 280** off the plastic and prevent damage to the crop. If less than 1/2 inch of precipitation occurs, **DO NOT** transplant within 27 days after the application of **Rely 280**. Regardless of precipitation occurring, **DO NOT** transplant into or within 6 inches of holes in the plastic mulch that exist at the time of application.

Hooded Postemergence Row Middles Application (banded between crop rows)

For postemergence control of emerged weeds present between rows of established cucurbits, apply **Rely 280** at 29 to 62 fl ozs/A up to 14 to 30 days before harvest (see crop-specific **PHI** statements in **Crop-specific Restrictions**). **DO NOT** concentrate **Rely 280** in the treated band in row middles. The use rate specified is for treated area.

Make a single or multiple (up to 2) hooded postemergence row middles application(s) before harvest. The maximum total amount of **Rely 280** applied hooded postemergence row middles is 62 fl ozs/A.

Rely 280 must be applied by hooded sprayer in a directed band between rows to protect the crop from spray contact. **DO NOT** allow spray solution or spray drift to contact the crop foliage or fruit or severe crop injury will occur.

Hooded sprayers must be designed, adjusted, and operated in such a manner to totally enclose the spray pattern and prevent any spray deposition onto crop foliage, blooms, or fruit. Sprayers must be operated slowly to minimize bouncing of the boom and hoods. Hoods must be positioned so their height runs along the soil surface or no higher than the shoulder of beds. **DO NOT** apply this product if spray drift can not be controlled or if spray contact with crop foliage can not be avoided.

When crop is grown on flat beds, **DO NOT** spray within 6 inches of running vines.

Note: in geographies were hooded sprayers are not available, use precision directed spray application equipment with nozzles adjusted to prevent spray contact with crop plants. **DO NOT** apply this product if spray drift can not be controlled or if spray contact with crop foliage can not be avoided.

Sequential Application

Rely 280 may be applied sequentially in a combination of applications made either pre-plant burndown (prior to transplanting to plastic mulch) or hooded postemergence row middles (banded between rows), or a combination of both timings. Apply up to 3 times per year but **DO NOT** exceed a total amount of 87 fl ozs/A of **Rely 280** per year from sequential applications. Allow a minimum of 14 days between sequential applications.

Crop-specific Restrictions

- **DO NOT** apply more than 62 fl ozs/A of **Rely 280** (1.17 lbs ai/A of glufosinate) in a single application.
- **DO NOT** apply more than a maximum cumulative amount of 87 fl ozs/A of **Rely 280** (1.59 lbs ai/A of glufosinate) from sequential applications in cucurbits per year.
- Maximum number of applications per crop cycle: 3 when using reduced rates
- Separate sequential applications by at least 14 days.
- For postemergence applications, **DO NOT** apply this product aerially to cucurbits.
- **Pre-Harvest Interval (PHI)** in melons - 30 days.
- **Pre-Harvest Interval (PHI)** in cucumbers and squash - 14 days.

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Glufosinate	Group	10	Herbicide

Supplemental Label

Rely 280®
Herbicide

For weed control in tomato and peppers (bell and nonbell)

This supplemental label expires December 1, 2025, and must not be used or distributed after this date.

Active Ingredient:

glufosinate-ammonium*: 2-amino-4-(hydroxymethylphosphinyl) butanoic acid-monoammonium salt	24.5%**
Other Ingredients:	75.5%
Total:	100.0%

* CAS Number 77182-82-2

** Equivalent to 2.34 pounds of active ingredient per U.S.gallon.

EPA Reg. No. 7969-448
WARNING/AVISO

Directions For Use

- It is a violation of federal law to use this product in a manner inconsistent with its labeling.
- The supplemental labeling and the entire **Rely® 280 herbicide** container label, EPA Reg. No. 7969-448, must be in possession of the user at the time of application.
- Read the label affixed to the container for **Rely 280** before applying.
- Use of **Rely 280** according to this labeling is subject to the use precautions and limitations imposed by the label affixed to the container for **Rely 280**.

Product Information

Rely 280 is a water-soluble nonselective herbicide for application as foliar spray for the control of a broad spectrum of emerged broadleaf and grassy weeds. Refer to the **Rely 280** container label for a complete list of weeds controlled.

For best results, apply **Rely 280** to emerged, young, actively growing weeds. Warm temperatures, high humidity, and bright sunlight improve the performance of **Rely 280**. Uniform, thorough spray coverage of weeds is required to achieve consistent weed control.

Weed control may be reduced when applications are made to weeds under stress including drought or cool temperatures. Weeds under stress or in dense populations will require application at the highest specified label use rate. Stressed conditions also include prior treatments of other contact or systemic herbicides. Regrowth of weeds may occur due to the weed stage of growth at application, low use rate, or environmental conditions at the time of application.

Rate of Rely 280 (fl ozs/A)	**Glufosinate Rate Equivalency** (lbs ai/A)
29	0.53
43	0.79
62	1.17
64	1.24
87	1.59

BASF Corporation
26 Davis Drive, Research Triangle Park, NC 27709

BASF
We create chemistry

Bare ground:
Allow 14 days with ≥½" precipitation
OR 21 day with <½" precipitation.

Plastic:
Allow 3 days and ≥½" precipitation
OR 27 day with <½" precipitation.

Application Information

Rely® 280 herbicide may be applied to the following fruiting vegetable crops:

Tomato and peppers (bell and nonbell)

Application Rate and Timing

Rely 280 may be applied in sequential applications.

Preplant Burndown Application to Bare Soil Surface (prior to transplanting)

For burndown of emerged weeds prior to planting, apply **Rely 280** at 29 to 43 fl ozs/A to the bare soil surface.

Make a single application or multiple applications (up to 3) before planting. The maximum total amount of **Rely 280** applied preplant burndown is 87 fl ozs/A.

Planting Interval. Depending on amount of precipitation after application, an interval between **Rely 280** application and planting of fruiting vegetables is required or crop injury may occur. See **Table 1** for transplanted fruiting vegetables.

Table 1. Minimum Planting Intervals Transplanting

Minimum Planting Interval (days) Required between Rely 280 Application and Transplanting of Fruiting Vegetables		
Soil Texture[1]	Amount of Precipitation[2]	
	≥ 0.5 inch	< 0.5 inch
All Soils	14	21

[1] Soil texture groups defined as **Coarse** (sand, loamy sand, sandy loam), **Medium** (silt, silt loam, loam, sandy clay loam), and **Fine** (sandy clay, silty clay, silty clay loam, clay loam, and clay).
[2] Precipitation defined as either rainfall or overhead irrigation occurring after **Rely 280** application

Preplant Burndown Application to Plastic Mulch Covered Beds. (prior to transplanting)

For burndown of emerged weeds prior to planting, apply **Rely 280** at 29 to 43 fl ozs/A to pre-formed beds covered with plastic mulch and shaped such that water and herbicide run off between the rows.

Make a single application or multiple applications (up to 2) before planting. The maximum total amount of **Rely 280** applied preplant burndown is 64 fl ozs/A.

Planting Interval. When applied prior to transplanting over the top of plastic mulch, **Rely 280** may damage fruiting vegetables which come in direct contact with herbicide remaining on the plastic. Allow at least 3 days between application of **Rely 280** and transplanting. Additionally, ensure that at least 1/2 inch of precipitation (either rainfall or overhead irrigation) has occurred prior to transplanting. Precipitation is needed to wash **Rely 280** off the plastic and prevent damage to the crop. If less than 1/2 inch of precipitation occurs, **DO NOT** transplant within 27 days after the application of **Rely 280**. Regardless of precipitation occurring, **DO NOT** transplant into or within 6 inches of holes in the plastic mulch that exist at the time of application.

Hooded Postemergence Row Middles Application (banded between crop rows)

For postemergence control of weeds present between rows of established fruiting vegetables, apply **Rely 280** at 29 to 62 fl ozs/A up to 30 days before harvest. **DO NOT** concentrate **Rely 280** in the treated band in row middles. The use rate specified is for treated area.

Make a single or multiple (up to 2) hooded postemergence row middles application(s) before harvest. The maximum total amount of **Rely 280** applied hooded postemergence row middles is 62 fl ozs/A.

Rely 280 must be applied by hooded sprayer in a directed band between rows to protect the crop from spray contact. **DO NOT** allow spray solution or spray drift to contact the crop foliage or fruit or severe crop injury will occur.

Hooded sprayers must be designed, adjusted, and operated in such a manner to totally enclose the spray pattern and prevent any spray deposition onto crop foliage, blooms, or fruit. Sprayers must be operated slowly to minimize bouncing of the boom and hoods. Hoods must be positioned so their height runs along the soil surface or no higher than the shoulder of beds. **DO NOT** apply this product if spray drift can not be controlled or if spray contact with crop foliage can not be avoided.

When crop is grown on flat beds, **DO NOT** spray within 6 inches of running vines.

Note: in geographies where hooded sprayers are not available, use precision directed spray application equipment with nozzles adjusted to prevent spray contact with crop plants. **DO NOT** allow spray solution or spray drift to contact the crop foliage or fruit or severe crop injury will occur.

Sequential Application

Rely® 280 herbicide may be applied sequentially in a combination of applications made either pre-plant burndown (prior to transplanting to bare soil or plastic mulch) or hooded postemergence row middles (banded between rows), or a combination of both timings. Apply up to 3 times per crop cycle but **DO NOT** exceed a total amount of 87 fl ozs/A of **Rely 280** per crop cycle from sequential applications. Allow a minimum of 14 days between sequential applications.

Crop-specific Restrictions

- **DO NOT** apply more than 62 fl ozs/A of **Rely 280** (1.17 lbs ai/A of glufosinate) in a single application.
- **DO NOT** apply more than a maximum cumulative amount of 87 ozs/A of **Rely 280** (1.59 lbs ai/A of glufosinate) equential applications in fruiti vegetables
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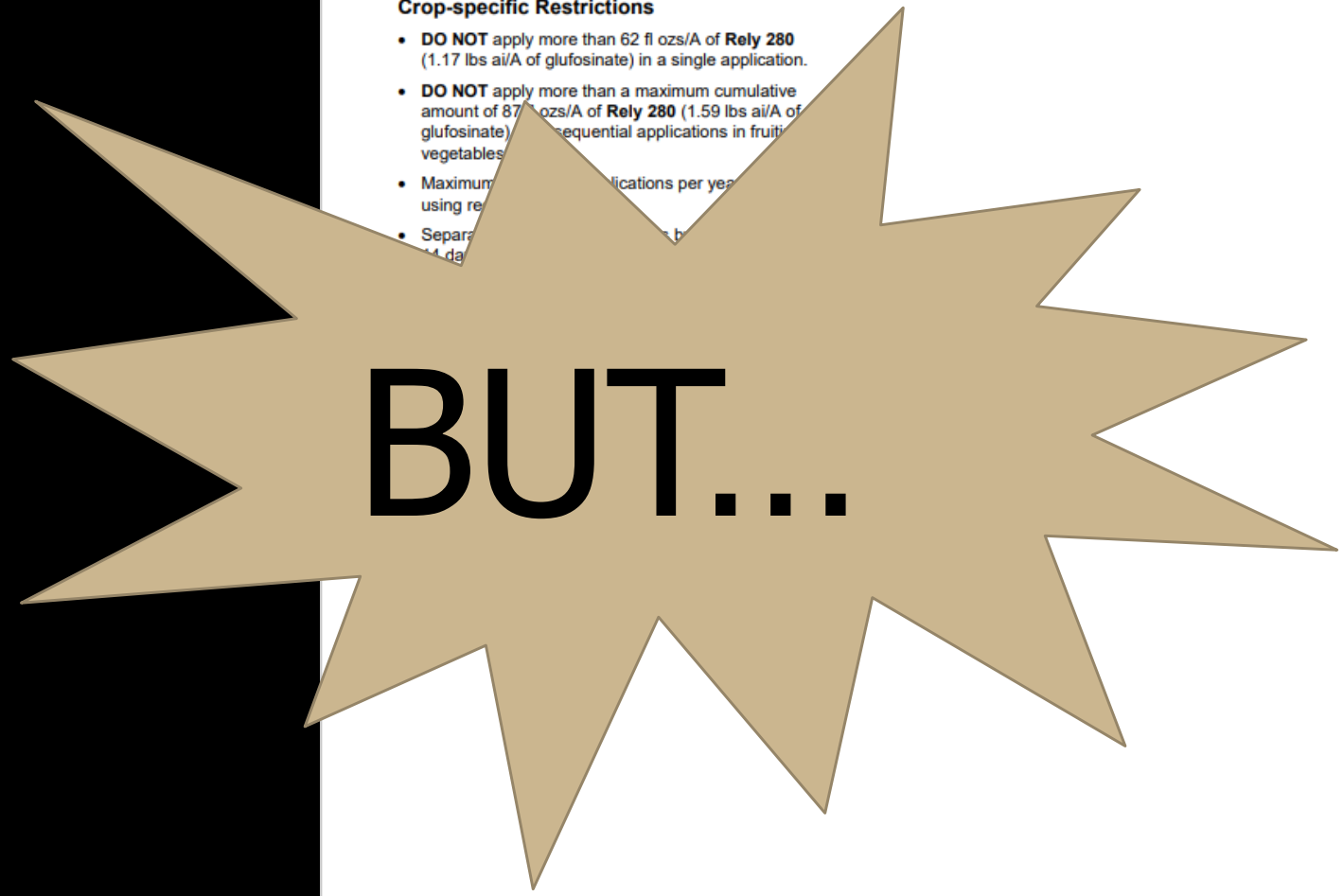

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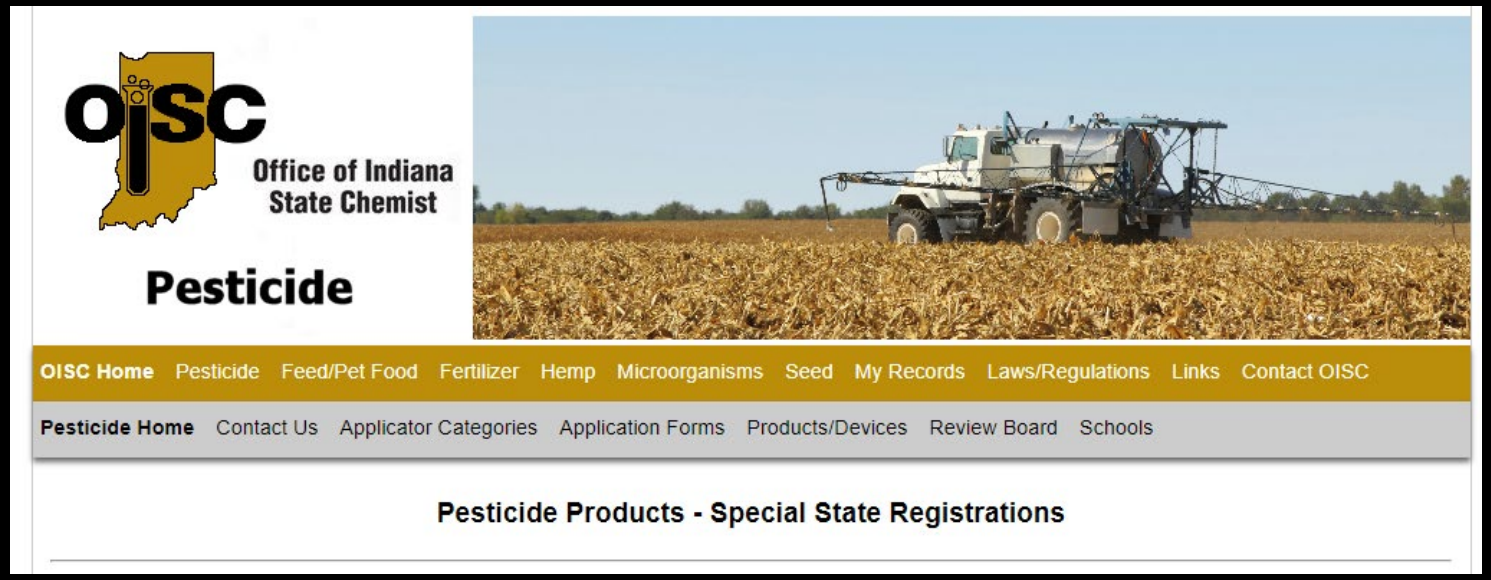

Outline

- Endangered Species Act (Herbicide Rule)
- Atrazine regulatory updates & pick-list proposal
- Herbicide registration status
  - Dicamba
  - Dacthal
  - Dual Magnum
  - Rely
  - Anthem Flex

ANTHEM® FLEX HERBICIDE

POTATOES

ANTHEM FLEX herbicide may be applied preemergence for residual preemergence weed control. Use ANTHEM FLEX herbicide as part of a weed management program in potatoes with other residual and Post herbicides for a broader spectrum of weeds.

Applications Rates in Potatoes

Apply ANTHEM FLEX herbicide alone, in tank mix combination, or sequentially at the rates provided in Table 15.

Table 15. Use rates of ANTHEM FLEX herbicide **in Potatoes**

Application Timing	Use Rate for ANTHEM FLEX herbicide (fl oz/A) by Soil Texture[1,2]		
	Coarse	Medium	Fine
Preemergence	3.5	3.5 – 5.0	4.5 – 6.0

[1]Refer to Table 3 for definitions of soil texture groups
[2]Refer to Table 5 for ai use rate equivalents

Crop Specific Precautions

The use of ANTHEM FLEX herbicide may result in growth suppression of potatoes if extreme conditions of heavy rain and extended periods of water saturated soil occur during potato emergence. Before using, verify the selectivity of ANTHEM FLEX herbicide with your local county extension agent to avoid potential injury.

Crop Specific Restrictions

- **DO NOT** apply more than 6.0 fl oz/A of ANTHEM FLEX herbicide (containing 0.175 lb ai/A of pyroxasulfone and 0.013 lb ai/A of carfentrazone-ethyl) in a single application.
- **DO NOT** apply more than 9.12 fl oz/A of ANTHEM FLEX herbicide (containing 0.266 lb ai/A of pyroxasulfone and 0.019 lb ai/A of carfentrazone-ethyl) per year.
- **DO NOT** apply more than three applications of ANTHEM FLEX herbicide to potatoes per year when using at reduced rates.
- **DO NOT** apply more than 0.266 lb ai/A pyroxasulfone containing products in a year.
- **DO NOT** apply more than 0.181 lb ai/A of carfentrazone-ethyl containing products in a year.
- **Pre Harvest Interval (PHI):** There is no required preharvest interval between a preemergence application of ANTHEM FLEX herbicide and the harvest of potatoes.
- **Re-Treatment Interval (RTI):** 14 days.
- **DO NOT** apply ANTHEM FLEX herbicide prior to planting potatoes.
- **DO NOT** apply to soils with less than 1% organic matter.

Preemergence Applications

Apply as a broadcast spray to the soil surface after planting or drag off of potatoes prior to weed emergence. ANTHEM FLEX herbicide may be applied after hilling. Apply prior to emergence of potatoes, ensuring that there is a minimum of 2 inches of soil covering the vegetative portion of the potato plants. Care must be taken that drag-off implements do not injure emerging shoots and they do not move soil off of hills exposing plants to herbicide. Efficacy will be reduced if later cultural practices expose untreated soil.

ANTHEM FLEX herbicide may be tank mixed or applied sequentially with other herbicide products registered for use in potatoes for a broader spectrum of control and/or control of emerged weeds. Refer to the tank mix product labels to confirm that the respective tank mix products are registered for use in potatoes. Follow the adjuvant directions for ANTHEM FLEX herbicide.

PURDUE UNIVERSITY Extension

Zidua® SC Herbicide

PRE activity only.
After planting, before crop emergence.

+

Aim® EC HERBICIDE

POST activity only.
Preplant burndown, harvest aid.

=

ANTHEM® FLEX HERBICIDE

PRE and POST weed activity.
After planting, before crop emergence.

Like with Aim, include:
Non-ionic surfactant (NIS) or
Crop oil concentrate (COC) or
Methylated seed oil (MSO) or

Ammonium sulfate (AMS)

PURDUE UNIVERSITY Extension

Purdue Weed Control Technology Survey

-Capture a snap shot of weed management across row crops and hort crops.
-Gain insights into producer thoughts on future weed control technologies.

Contact information

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Associate Professor

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