

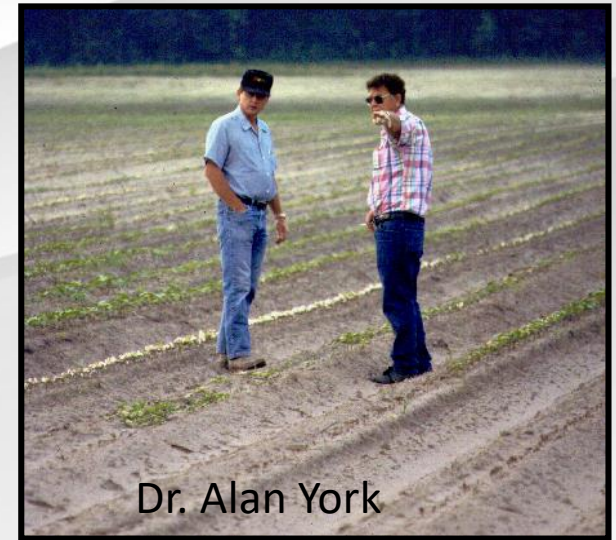
# Critical Role of Crop Consultants: Helping Farmers Overcome ESA Challenges



Woodland, NC



*Stanley Culpepper*  
*University of Georgia*  
*Tifton, Georgia*



Dr. Alan York



# Proposed Herbicide Strategy – July 2023

**Draft Herbicide Strategy Framework  
to Reduce Exposure of Federally Listed Endangered and  
Threatened Species and Designated Critical Habitats from  
the Use of Conventional Agricultural Herbicides**

July 2023

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



**GAME OVER**

**INSERT COINS  
TO CONTINUE**

**Proposed strategy = likely  
game over for many of us**



# Enormous Effort = Game Changer

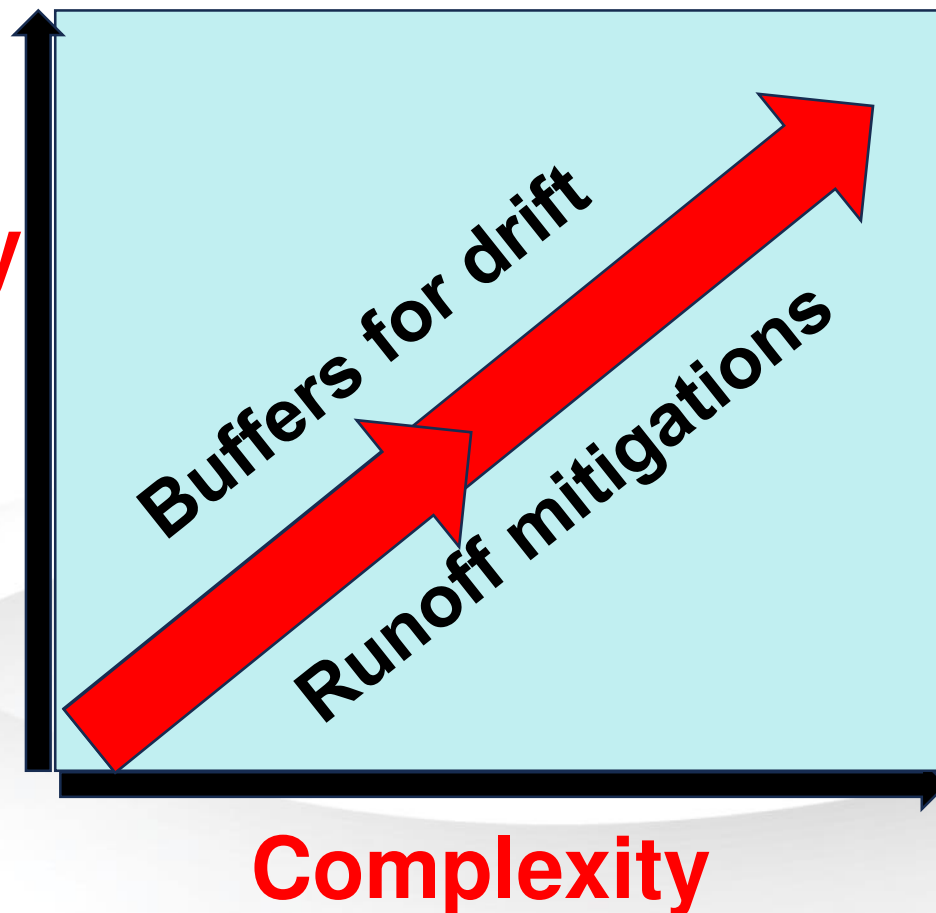


**Farmers**



# Herbicide Strategy Evolves – Mitigation Measures

**Flexibility  
for the  
farm**



- Decision by field (not farm)
- Decision by product
- Decision by crop
- Provides an opportunity to do our own risk assessment at the field

# Decisions by Field – Product – Crop for Mitigations<sup>^</sup>

Particle drift



Runoff

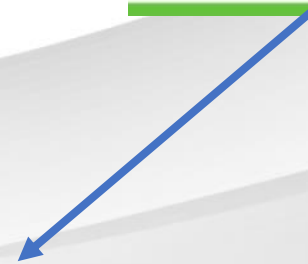
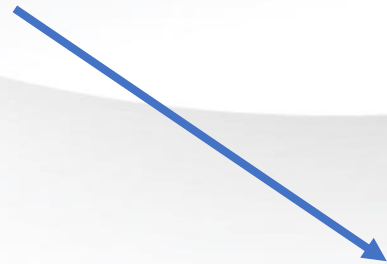


- **Culpepper Farm 2024, NC (small farm)**
  - 5 agronomic crops, 40 fields
  - 30 pesticide active ingredients
  - 372 runoff & 372 drift buffer calculations<sup>^</sup>
- **SC-LTF 2024, GA (dynamic farm)**
  - 26 unique vegetable & agronomic crops
  - 16 agronomic fields,
  - 372 vegetable “fields” (3 crops/yr)
  - 78 pesticide active ingredients
  - 4344 runoff & 4344 drift buffer calculations<sup>^</sup>

*<sup>^</sup>Calculations are BEFORE WE GET CREATIVE using the flexibility offered by the final herbicide strategy*

<sup>^</sup>Assumes insecticide/fungicide strategy follow final herbicide strategy approach.

# Who the heck can do that on the farm?



Must simplify greatly.....



# *We Have Time and Can Simplify for Farmers*

## Advisors

- **Extension**
- **Consultants**
- **Retailers**
- **Manufacturers**
- **Department of Agriculture**



# #1

## Runoff



# Must Understand To Get Started

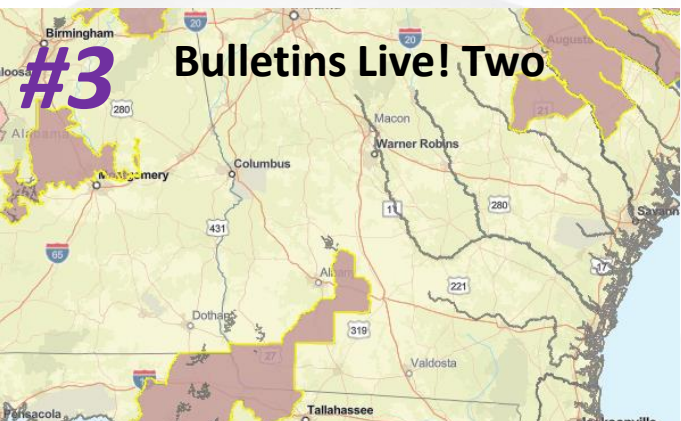
**1. Runoff:** each pesticide will be assigned a value (0-9); must implement appropriate mitigation measures.

# #2

## Particle drift



**2. Particle Drift:** each pesticide will be given a buffer drift requirement as influenced by application method (*ground 0-230 feet, airblast, airplane, etc.*)



# #3

## Bulletins Live! Two

**3. BLT:** Website identifies if your field is in a pesticide use limitation area.

# Extension Approach To Overcome Herbicide Strategy!

#1

Runoff



Real Life Solutions™

UEXTENSION  
INSTITUTE OF AGRICULTURE

***Objective 1:*** Get growers to 9 points for all fields overcoming runoff mitigations.

***Objective 2:*** Help growers take 230-foot drift buffer down to near 0 (ground application).

#2

Particle drift



***Objective 3:*** Get input from growers helping us understand any barriers to meet these objectives.

# ***Runoff Mitigation Approach – By Production Practice***

**Raised Large Bed Plasticulture**



**Bareground – Tilled  
Center Pivot Veggies**



**Agronomic Production**



- **Advisor must understand production at the local level**
- **Start with one field and expand**

# Information Available To Help = EPA Resource Toolbox?

1. Mitigation Menu
2. Mitigation Calculator Guide
3. Calculator is Key
  - Advisor.....KEY
  - Farmer...not so much

## EPA'S RUNOFF POINTS CALCULATOR

12	Category	Select Value	Number of points
	Systems that Capture Runoff and Discharge (water retention pond, sediment control basin, irrigation tailwater return system, perimeter berm system (present at the time of application and throughout the cropping season), subsurface or tile drainage with a controlled outlet or without a controlled outlet)	make selection	0
13			
14			
15	Pesticide Runoff Vulnerability		
16	Select State	Select County	Number of points
17	Georgia	Berrien County	2
18			
19	Conservation Program and Runoff/Erosion Specialists/Mitigation Tracking		
20	Category	Select Value	Number of points
21	Mitigation Tracking	make selection	0
22	Follow Recommendations from a Runoff/Erosion Specialist or Participate in a Qualifying Conservation Program	make selection	0
23			
24			
25	Field Characteristics	Select Value	Number of points
26	Field with Slope < 3% (neutral, low slope, or flat fields; flat laser leveled fields)	make selection	0
27	Predominantly Sandy Soils (fields with sand, loamy sand, or sandy loam soil without a restrictive layer that impedes the movement of water through the soil - e.g., "hard pan"). This option can only be used if the product label does not prohibit application on sandy soils.	make selection	0
28			
29	In-Field Mitigation Measures		
30	Category	Select Value	Number of points
31	Conservation Tillage (no-till, perennial crop (e.g., orchards that are not tilled), reduced tillage, strip tillage, ridge tillage, mulch tillage)	make selection	0
32	Reservoir Tillage (reservoir tillage, furrow diking, basin tillage)	make selection	0
33	Contour Farming (contour farming, contour tillage, contour orchard and perennial crops)	make selection	0
34	Vegetative Strips - In-Field (inter-row vegetated strips, strip cropping or intercropping, alley cropping, prairie strips, contour buffer strips, contour strip cropping, vegetative barrier (occurring in a contoured field))	make selection	0
35	Terrace Farming (terrace farming, terracing, field terracing)	make selection	0
36	Cover Crop or Continuous Ground Cover (cover crop, double cropping, relay cropping)	make selection	0
37	Irrigation Water Management (use of soil moisture sensors/evapotranspiration meters with center pivots & sprinklers; above ground drip tape, drip emitters; micro-sprinklers; use of below tarp irrigation, below ground drip tape; dry farming, non-irrigated lands)	make selection	0
	Mulching with Natural and Artificial Materials (mulching with permeable artificial materials (e.g., landscape fabric, synthetic mulches), mulching	make selection	0

<https://www.epa.gov/pesticides/mitigation-menu>

<https://www.epa.gov/endangered-species/pesticides-and-endangered-species-educational-resources-toolbox>

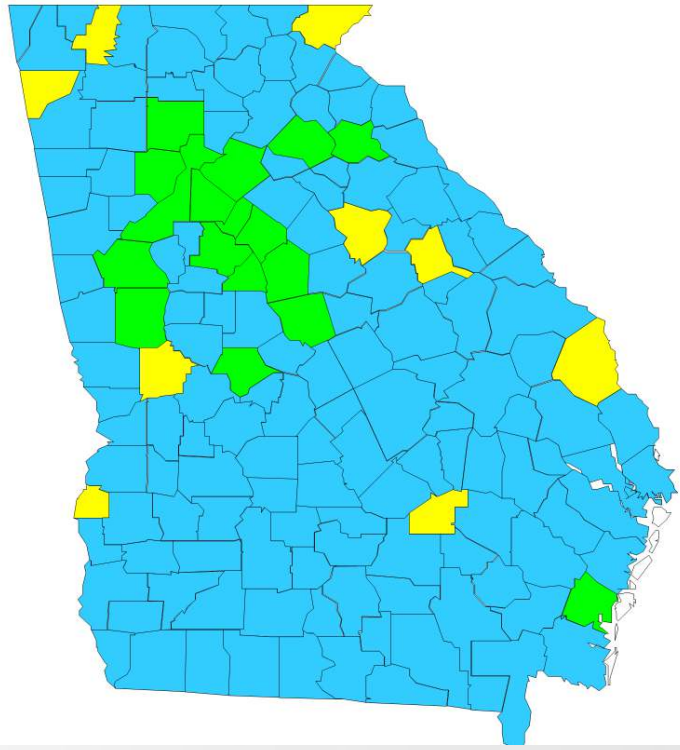
# ***Agronomic Crop in Georgia***

<b>Mitigation</b>	<b>Points</b>	<b>Farmer</b>
<b>Mitigation relief points</b>		
<b>Field with <math>\leq 3\%</math> slope</b>		
<b>Sand, loamy sand or sandy loam (no hard pan)</b>		
<b>Cover crops (no tillage)</b>		
<b>Strip-till production</b>		
<b>Non-irrigated lands</b>		
<b>Incorporation (center pivot activation)</b>		
<b>Grass waterway</b>		
<b>Terraces</b>		
<b>Field border of vegetation (20 ft = 1 pt, etc...)</b>		
<b>Mitigation tracking</b>		

# Agronomic Crop in Georgia

Mitigation	Points	Farmer
Mitigation relief points	2	2

## Runoff & Erosion: Mitigation Relief Points



0 points = yellow  
2 points = blue  
3 points = green

# Agronomic Crop in Georgia

Mitigation	Points	Farmer
Mitigation relief points	2	2
Field with $\leq 3\%$ slope	2	?
Sand, loamy sand or sandy loam (no hard pan)	2	?
Cover crops (no tillage)	3	?

## Cover Crop Options – Points

Tilled cover: terminated using tillage. **POINTS = 1**

Short duration cover: planted in fall but no active growth in spring or planted in spring. **POINTS = 2**

Long duration cover: planted in fall growing into spring, vegetation on field year around. **POINTS = 3**

# Agronomic Crop in Georgia

Mitigation	Points	Farmer
Mitigation relief points	2	2
Field with $\leq 3\%$ slope	2	?
Sand, loamy sand or sandy loam (no hard pan)	2	?
Cover crops (no tillage)	3	?
Strip-till production	2	?
Non-irrigated lands	0	?
Incorporation (center pivot activation)	1	?
Grass waterway	2	?
Terraces	2	?
Field border of vegetation (20 ft = 1	1	?
Mitigation tracking	2	?

Do you have  
at least 9  
points?

# ***Other Options if Needed – Agronomic Crop***

- 1. Exempt – managed areas 1000-foot down gradient**
- 2. Expert (1 point) or conservation program (2 points)**
- 3. Water sensors with center pivot = 2 points**
- 4. Mitigation measures from multiple categories = 1 pt**

**Trying to  
avoid**

- 1. Rate of product applied (annual max)**
- 2. Percent of field treated (new technologies)**

**Trying even  
harder to  
avoid**

# Culpepper Farms: Fields 1- 36

Mitigation	Points
Mitigation relief points – Northampton County	2
Field with less 3% slope	2
Cover crops	3
Strip till	2
Dry Farming	3
Grass waterways	2
Multiple categories of mitigation	1
Mitigation tracking	1

**16**



# Culpepper Farms: Fields 37-40

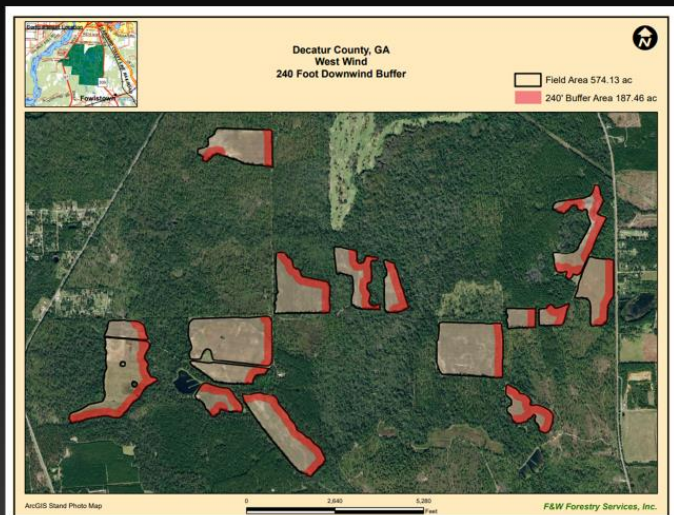
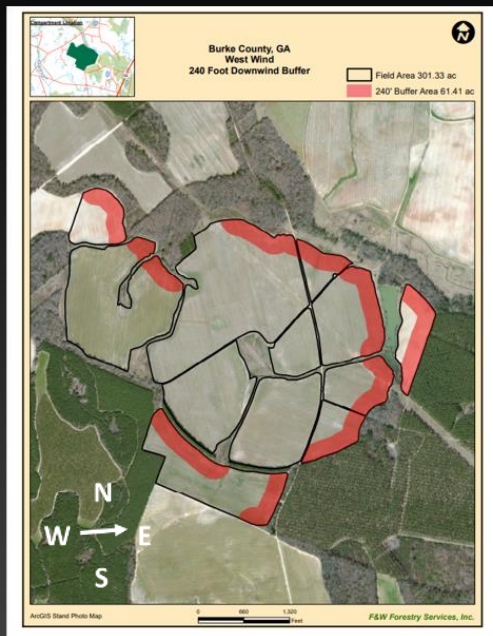
Mitigation	Points
Mitigation relief points – Northampton County	2
Field with less 3% slope	2
Cover crops	3
Strip till	2
Dry farming	3
Mitigation tracking	1

**13**

A few fields do not have grass waterways so when I take that away I lose multiple category mitigation as well

# Impact From In-Field Drift Buffers\*

## Impact from 240-ft Downwind Buffer



Worst case = lose 32.6%

Best case = lose 20.4%

\*Calculation assumes west wind.

**EPA DETERMINED WORST  
CASE FOR GROUND RIG  
WILL BE 230 FEET  
DOWNWIND**

**Calculations are BEFORE  
WE GET CREATIVE using  
the flexibility offered by the  
final herbicide strategy**

\* As interpreted in the Draft Herbicide Strategy

# **Spray Drift Ground Application– (0 to 230 feet)**

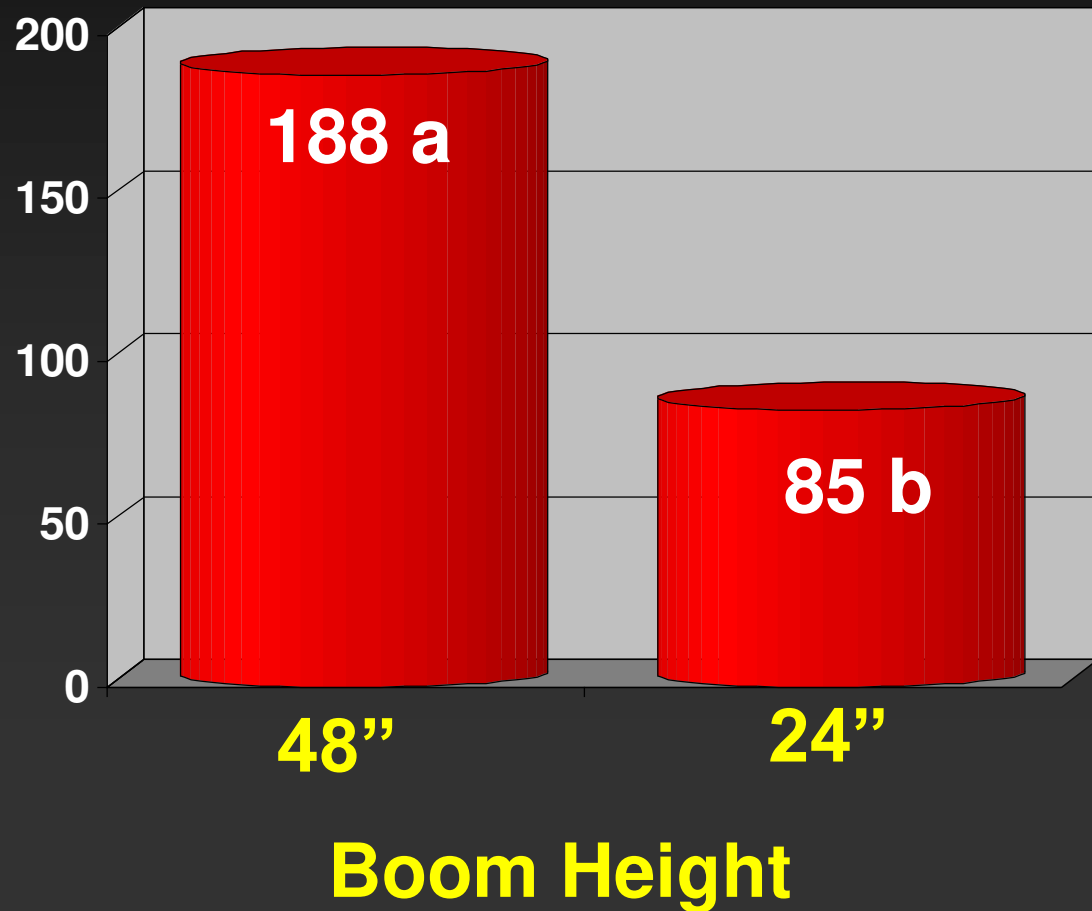
<b>Mitigation Measures</b>	<b>% Reduction</b>
<b>Low boom 24 inch above target, coarse drops</b>	<b>75%</b>
<b>High boom, coarse drops</b>	<b>65%</b>
<b>Low boom, fine to medium</b>	<b>40%</b>

Low boom, coarse drops = 75% or 58 feet for worst case

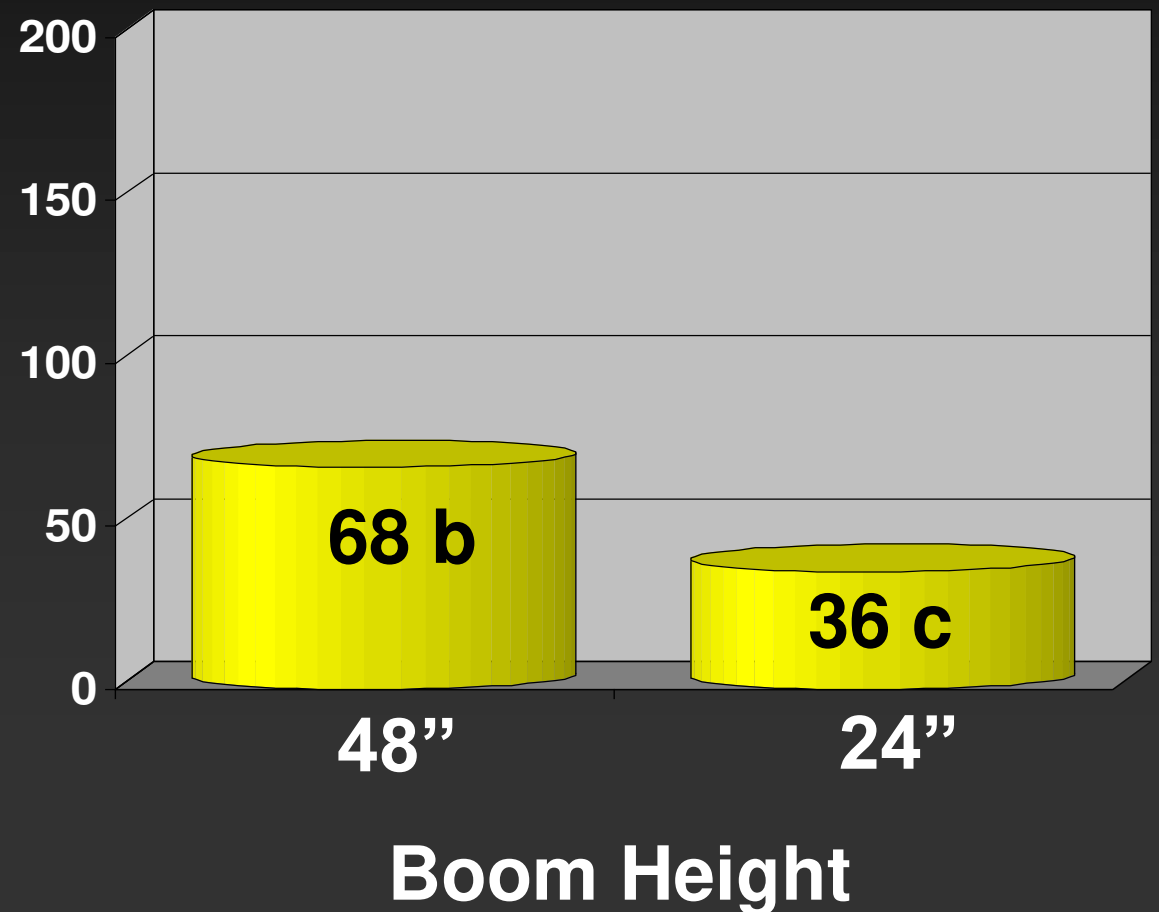


# Boom Height and Spray Droplet Size Impacts Pesticide Drift Distance (feet) to COTTON

## Medium droplet



## Ultra Coarse droplet



# **Spray Drift Ground Application– (0 to 230 feet)**

Mitigation Measures	% Reduction
Low boom, coarse drops	75%
Relative humidity $\geq$ 60%	10%
DRA as influenced by droplet	15-30%

Low boom - coarse drops, DRA, RH = 75 + 15 + 10 = 100% or 0 feet



# Additional Methods to Reduce Buffer



Broadcast Hooded: 50%



Layby Rig: 50%

Downwind Measures	% Reduction
Rate of product (single ap)	% below max
Windbreak – 4 foot wide, height of boom	50%
Windbreak – 8 foot wide, 2X boom height	75%
<b>Forest/shrubland <math>\geq</math> 60 ft, 2X boom height</b>	<b>100%</b>



Hooded: 75%

# ***Managed Areas Adjacent To Treated Field Downwind Can Represent Spray Drift Buffers***

**Approved Out of Field Buffers Downwind - Relevant to Georgia\***

**Ag fields**

**Roads, grassy areas, bareground**

**Field borders, hedgerows, CRP**

**On-farm contained irrigation water sources (irrigation ponds)**

*From Herbicide Strategy*

# How Does the Liberty Ultra Label Use Drift Mitigation Options from Herbicide Strategy?

1. Require 24-inch boom height
2. Require medium or coarser droplet
3. Downwind approved buffer exceptions (ag fields, roads etc.)
4. Can further reduce buffer to 0 feet
  - Specific DRA
  - Hood sprayer, layby etc..
  - Windbreaks



**BASF** Glufosinate-P-Ammonium Group 10 Herbicide  
We create chemistry

**Liberty® ULTRA**  
Herbicide – Powered by **Glu-L™** Technology

Liberty® ULTRA herbicide – Powered by Glu-L™ Technology is a nonselective herbicide that provides control of a broad spectrum of broadleaf and grassy weeds in LibertyLink or glufosinate-resistant crops.

Active Ingredient: Glufosinate-P-Ammonium\* 18.7%\*\*  
Other Ingredients: 81.3%  
Total: 100.0%

\* CAS Number 73777-50-1  
\*\* Equivalent to 1.76 pounds of active ingredient per U.S. gallon; equivalent to 1.61 pounds per U.S. gallon acid equivalent, as glufosinate-P.

EPA Reg. No. 7969-500 EPA Est. No.

KEEP OUT OF REACH OF CHILDREN  
DANGER/PELIGRO

Si usted no entiende la etiqueta, busque a alguien para que se la explique a usted en detalle. (If you do not understand the label, find someone to explain it to you in detail.)

See full label for complete First Aid, Precautionary Statements, Directions For Use, Conditions of Sale and Warranty, and state-specific crop and/or use site restrictions.  
In case of an emergency endangering life or property involving this product,

# Take Home Messages



- **Advisors are key to overcome ESA; runoff calculator is key for advisor.....  
Calculator will continue to improve**
- **Drift calculator being developed**
- **Help us identify issues, challenges, errors**
- **We have time...herbicides for 2025  
Liberty Ultra, Enlist One, Enlist Duo**
- **Remember pesticide applicators must do their part, be accountable!**



# Science, Cooperation, & Communication

**Farmers**



THE UNIVERSITY OF GEORGIA  
**COOPERATIVE  
EXTENSION**



PLANT  
INDUSTRY



**Industry  
Partners**

**Consultants**



Cotton  
Incorporated