Pesticide Safety and Considerations

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Pesticides Toxicologist

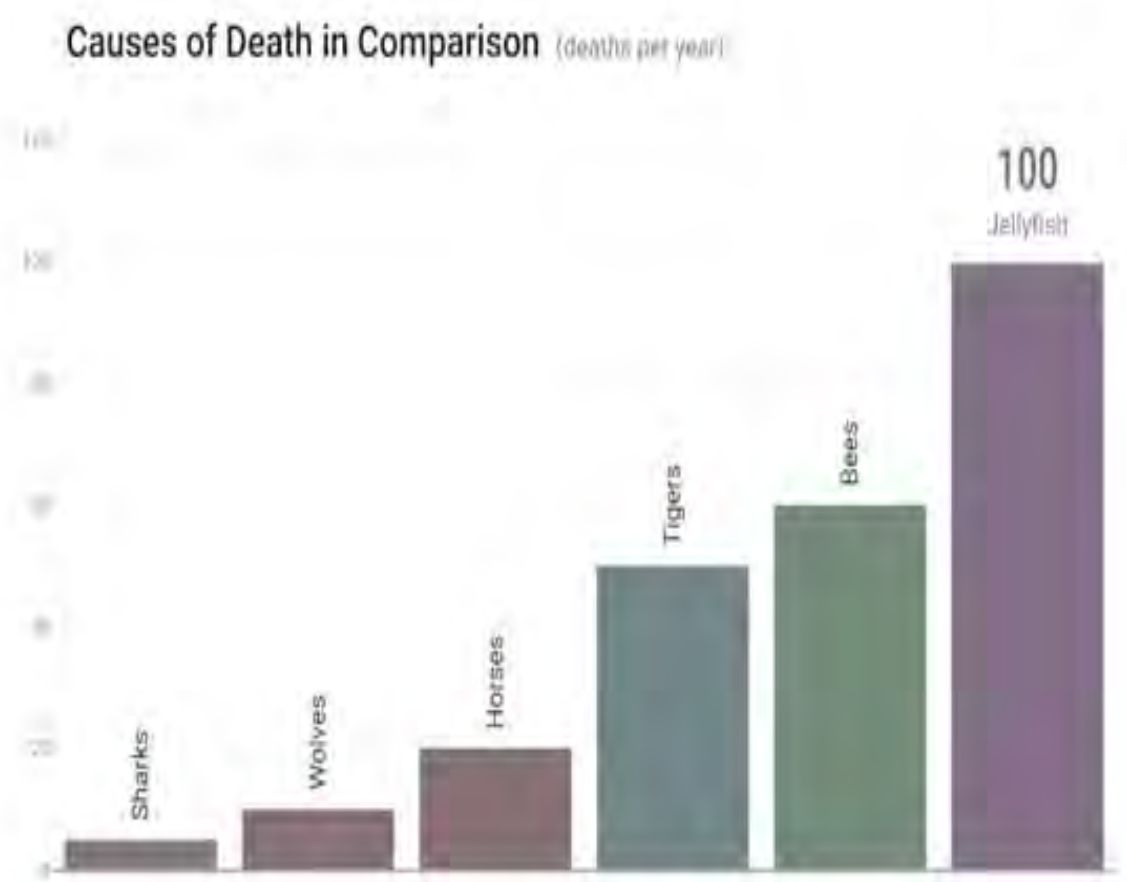
Board of Pesticides Control

Maine Department of Agriculture, Conservation, & Forestry

About me

Overview

- Risk 101
- How pesticides are evaluated
  - Tox tests
  - Exposure
- Label is law
  - PPE
  - Details of buffers etc
- Important training and procedures
  - 911, NNEPC, NPIC, know symptoms of product, avoid exposure
- Details of variances


Causes of Death in Comparison (deaths per year)
100
Jellyfish
Bees
Tigers
Horses
Wolves
Sharks

Risk in Five Minutes

How hazardous materials can be used with minimum harm.

Risk = Exposure x Hazard

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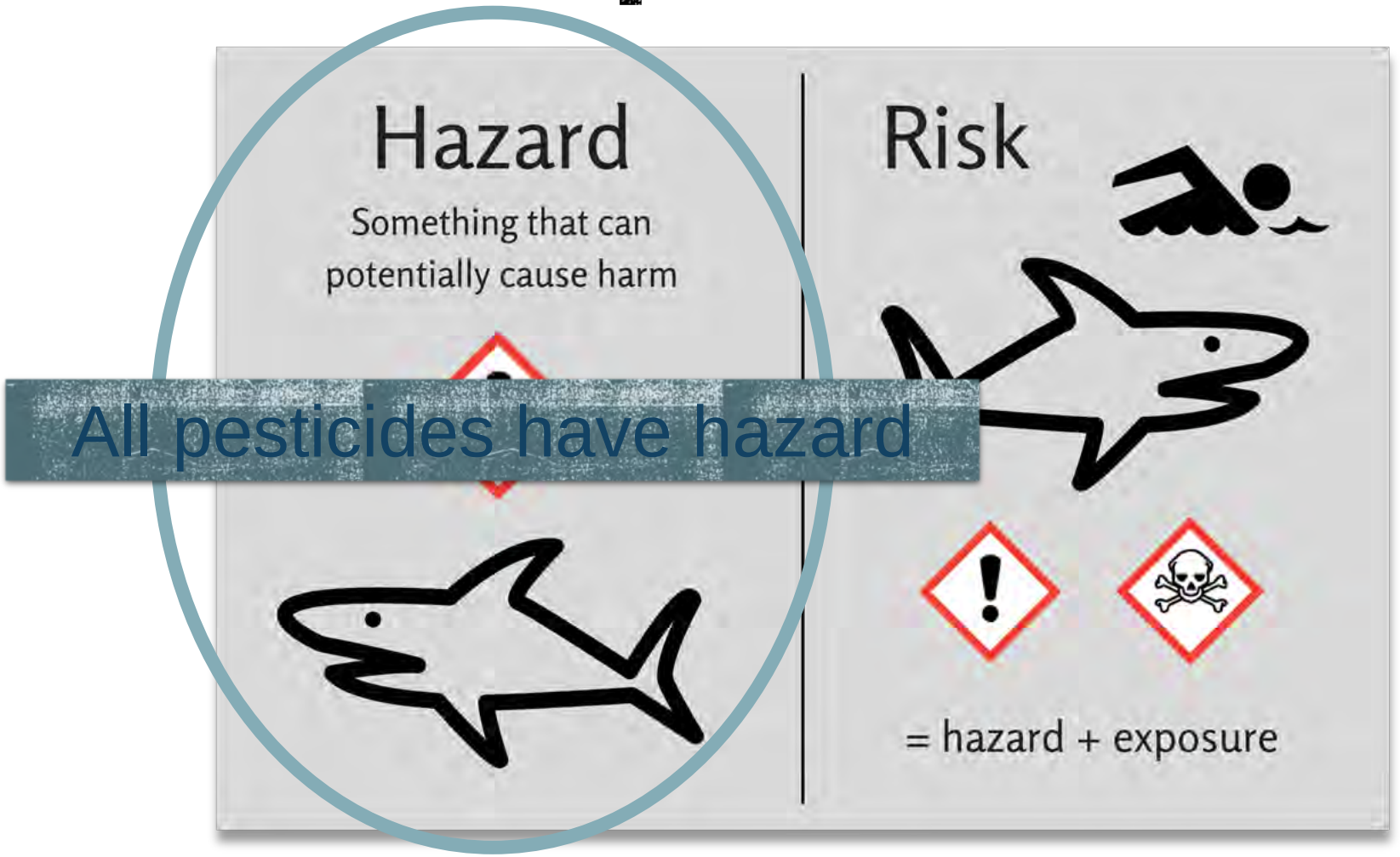
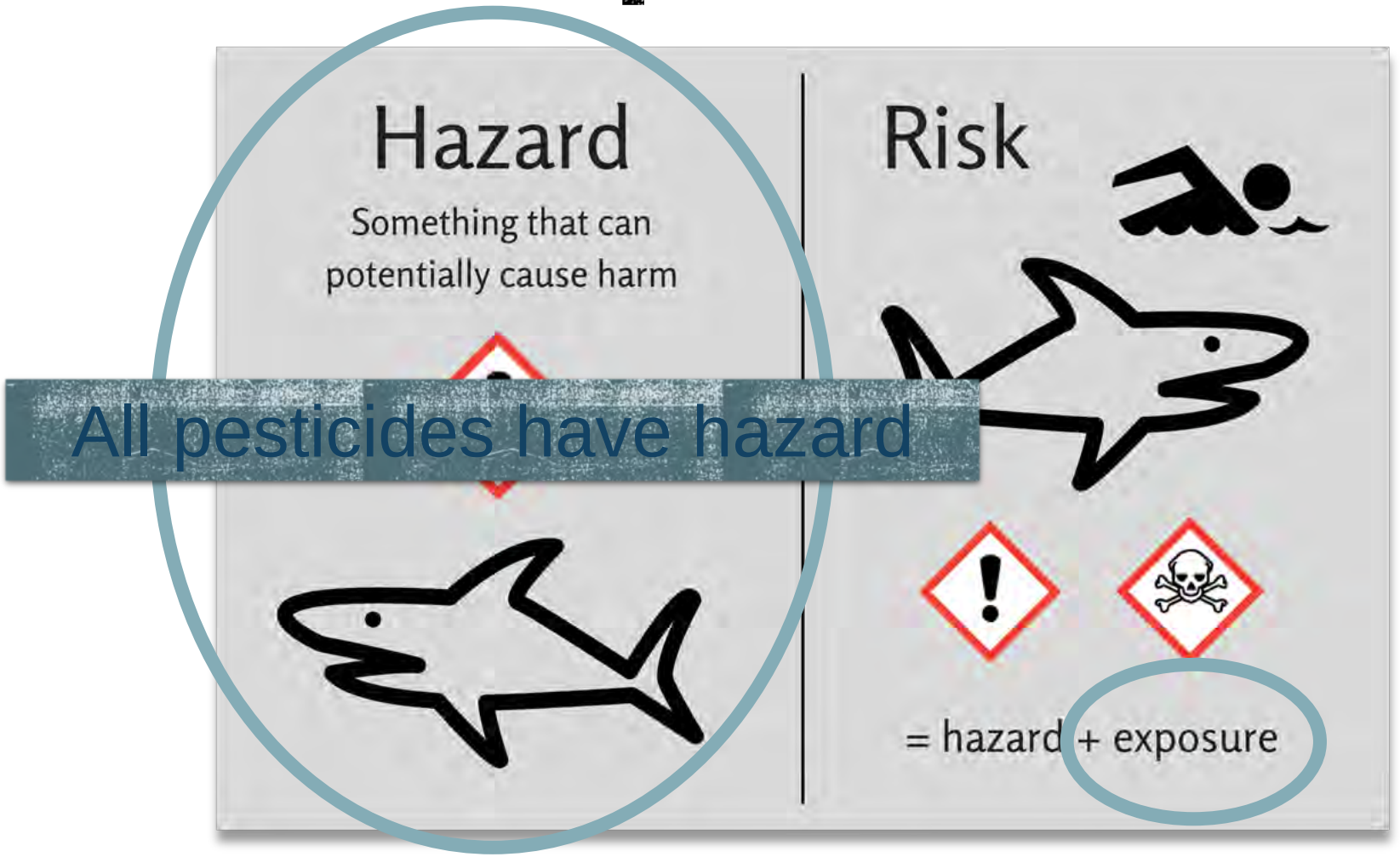
Risk = Exposure x Hazard



All pesticides have hazard

Risk = Exposure x Hazard



All pesticides have hazard

We must reduce exposure to avoid potential risk.

Hazard

WATER

- Symptoms:
  - Convulsions
  - Gastrointestinal hypermobility
  - Diarrhea
  - Tremor
  - Muscle contraction/spasticity
  - Pupil dilation
  - Nausea
  - Vomiting
  - Death

Hazard

World’s most toxic substance:

- Botulinum toxin LD_{50} 1 ng/kg part per trillion

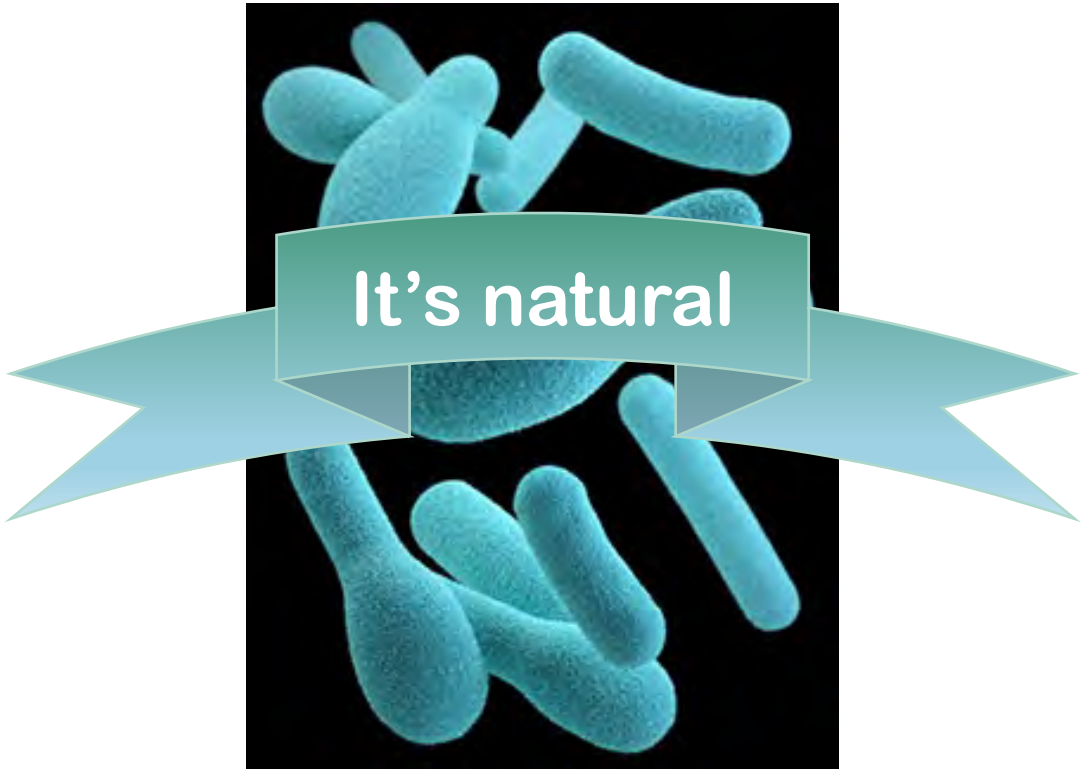
1/1,000,000 of this

- Causes muscle paralysis

Hazard

World’s most toxic substance:

- 200 hospitalized annually
- ~5 die annually in US



Clostridium botulinum

Hazard

When is something too dangerous?

Applied and stays in localized area:

-doesn't run off to heart/lungs

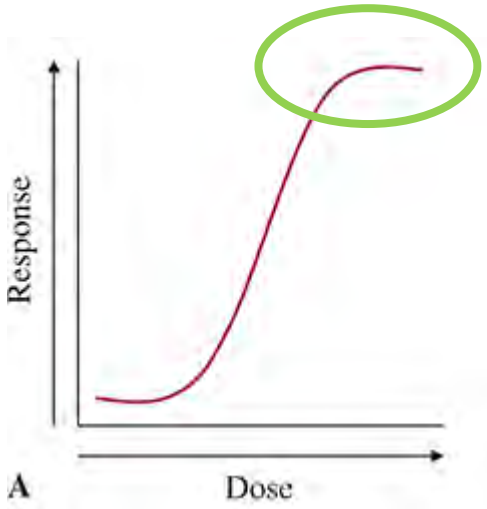
-doesn't persist or build up

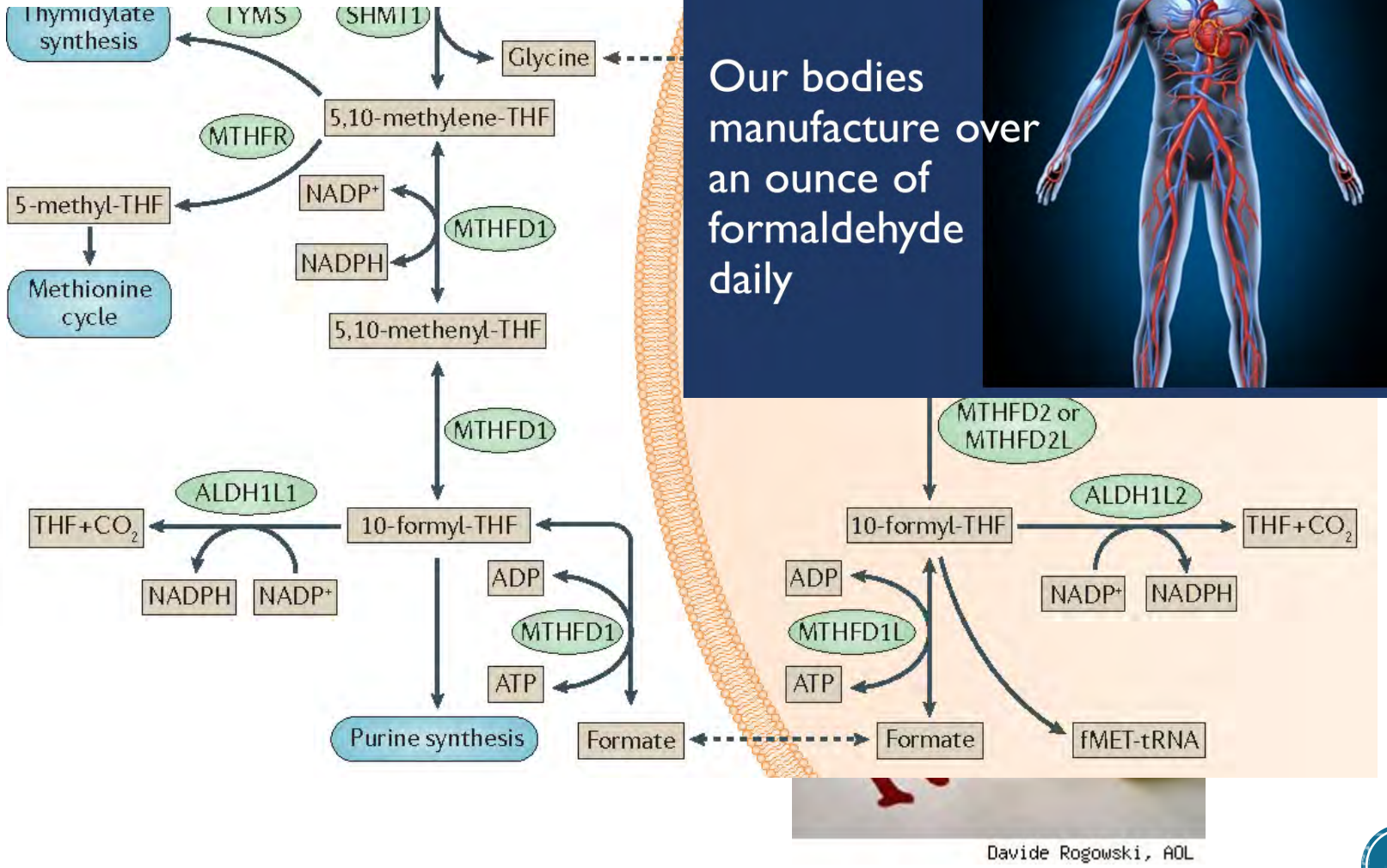
Chemical fate is tightly controlled

This is Botox.

Dose Response Assessment

Formaldehyde





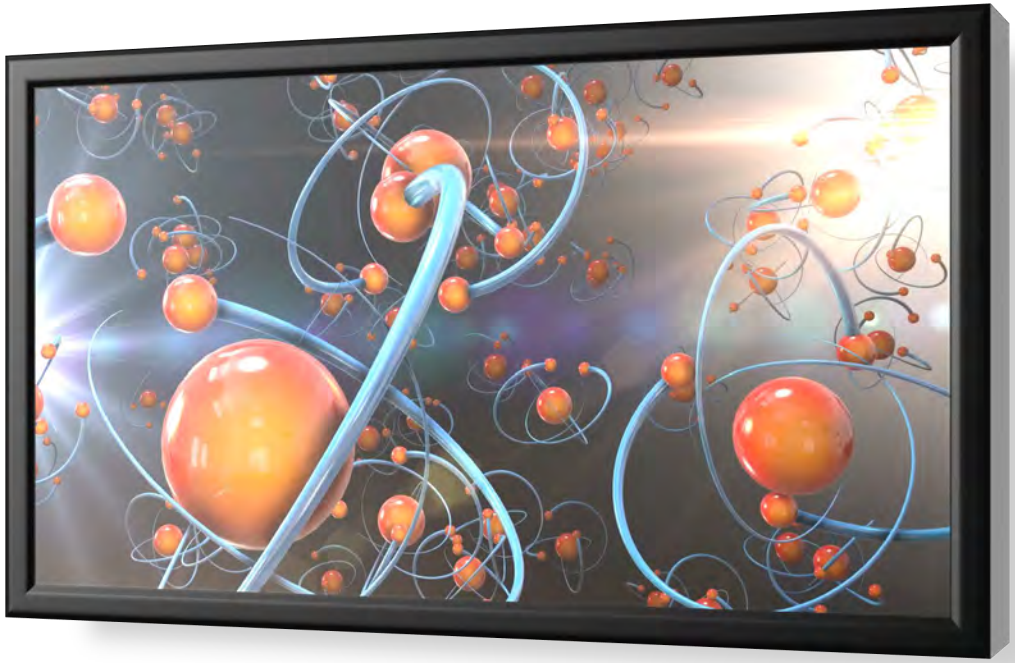
Risk = Exposure x Hazard

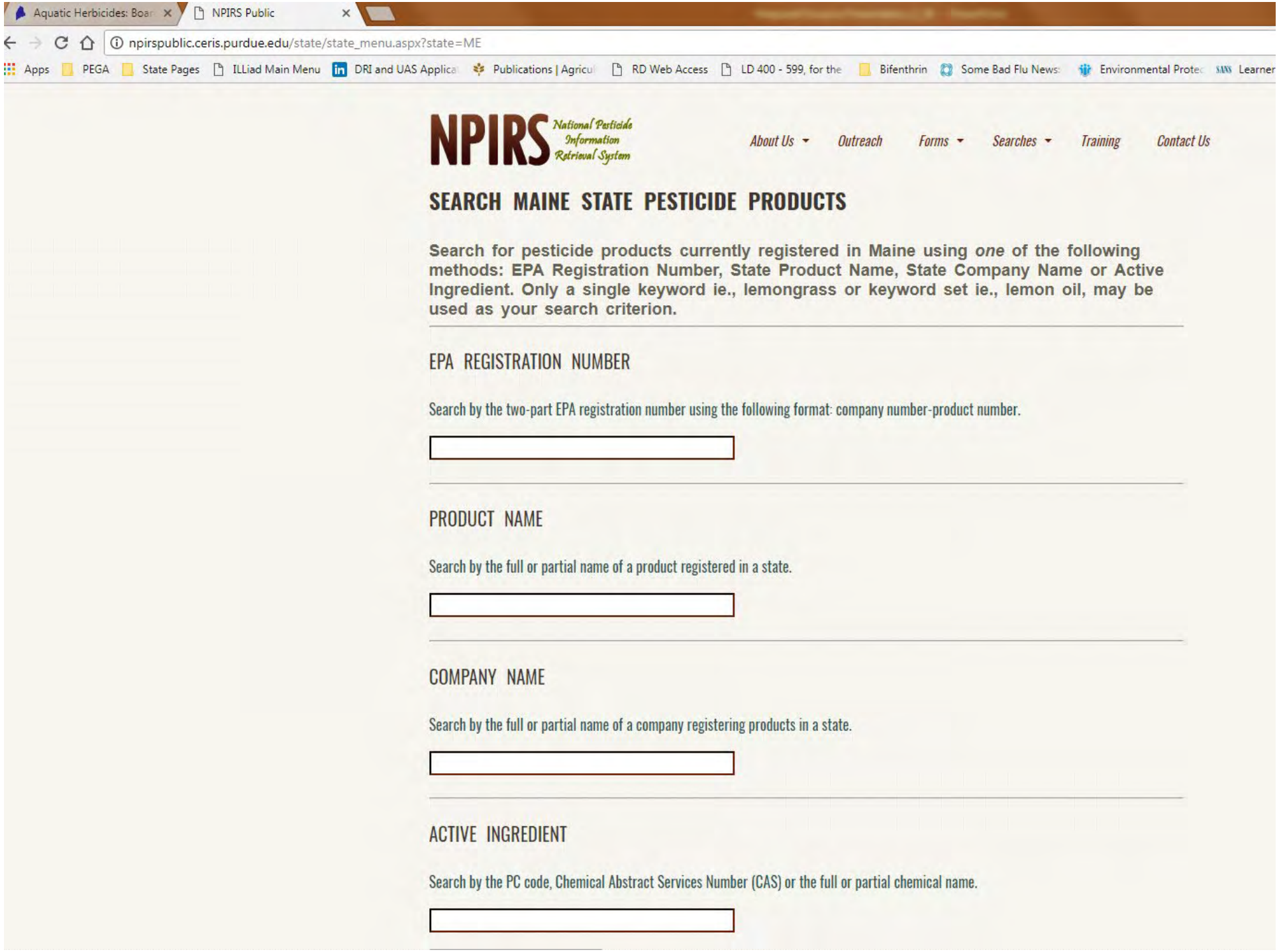
How pesticides are brought to market in the US

All chemicals regulations are not the same.

- 15 years
- Registrations
- Human health risk assessment
- Ecological risk assessment
- Economic analysis
- Transparent

(licensure too)




Aquatic Herbicides: Boar
NPIRS Public
npirspublic.ceris.purdue.edu/state/state_menu.aspx?state=ME
Apps
PEGA
State Pages
ILLiad Main Menu
DRI and UAS Applica
Publications | Agricu
RD Web Access
LD 400 - 599, for the
Bifenthrin
Some Bad Flu News
Environmental Protec
SANS Learner
NPIRS National Pesticide Information Retrieval System
About Us
Outreach
Forms
Searches
Training
Contact Us
SEARCH MAINE STATE PESTICIDE PRODUCTS
Search for pesticide products currently registered in Maine using one of the following methods: EPA Registration Number, State Product Name, State Company Name or Active Ingredient. Only a single keyword ie., lemongrass or keyword set ie., lemon oil, may be used as your search criterion.
EPA REGISTRATION NUMBER
Search by the two-part EPA registration number using the following format: company number-product number.
PRODUCT NAME
Search by the full or partial name of a product registered in a state.
COMPANY NAME
Search by the full or partial name of a company registering products in a state.
ACTIVE INGREDIENT
Search by the PC code, Chemical Abstract Services Number (CAS) or the full or partial chemical name.

Acute testing

"Six pack"

Table B.1. Toxicological Data Requirements for Glyphosate.

Study		Technical	
		Required	Satisfied
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870.1200	Acute Dermal Toxicity	yes	yes
870.1300	Acute Inhalation Toxicity	yes	no[1]
870.2400	Primary Eye Irritation	yes	yes
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870.2600	Dermal Sensitization	yes	yes
870.3100	Oral Subchronic (rodent)	yes	yes
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870.3200	21-Day Dermal	yes	yes
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870.3700a	Developmental Toxicity (rodent)	yes	yes
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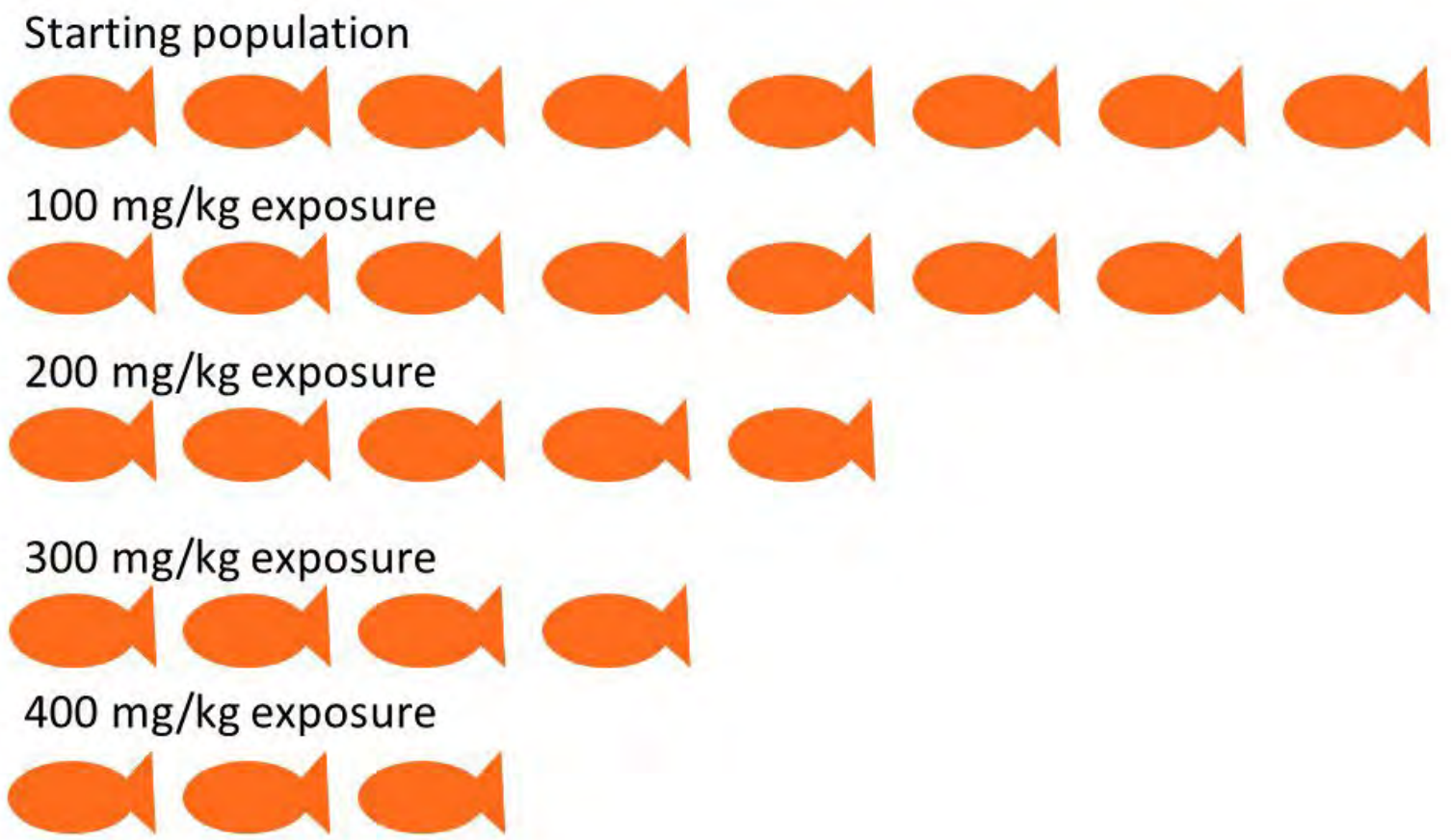
870.3800	Reproduction	yes	yes
870.4100a	Chronic Toxicity (rodent)	yes	yes
870.4100b	Chronic Toxicity (nonrodent)	yes	yes
870.4200b	Oncogenicity (mouse)	yes	yes
870.4300	Chronic/Oncogenicity	yes	yes
870.5100	Mutagenicity—Gene Mutation - bacterial	yes	yes
870.5300	Mutagenicity—Gene Mutation - mammalian	yes	yes
870.5xxx	Mutagenicity—Structural Chromosomal Aberrations	yes	yes
870.5xxx	Mutagenicity—Other Genotoxic Effects	yes	yes
870.6100a	Acute Delayed Neurotoxicity (hen)	no	no
870.6100b	90-Day Neurotoxicity (hen)	no	no
870.6200a	Acute Neurotoxicity Screening Battery (rat)	yes	yes
870.6200b	90-Day Neurotoxicity Screening Battery (rat)	yes	yes
870.7485	General Metabolism	yes	yes
870.7600	Dermal Penetration	no	no
870.7800	Immunotoxicity	yes	yes

[1] The requirement for an acute inhalation LC_{50} study was waived.

[2] This is not considered a data gap because there is a chronic dog study in the database.

Acute testing

- LD_{50}
  - Oral
  - Dermal
  - Inhalation



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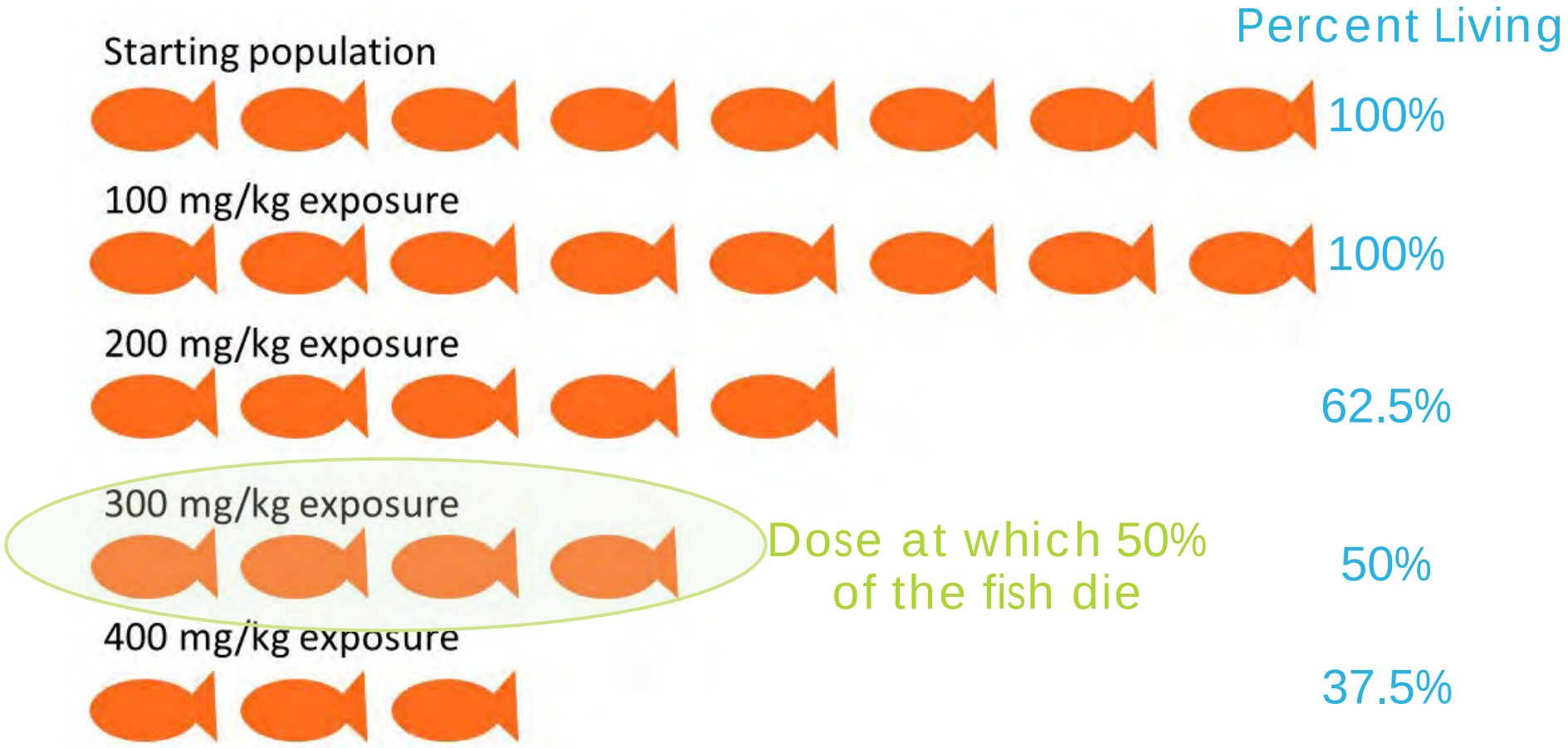

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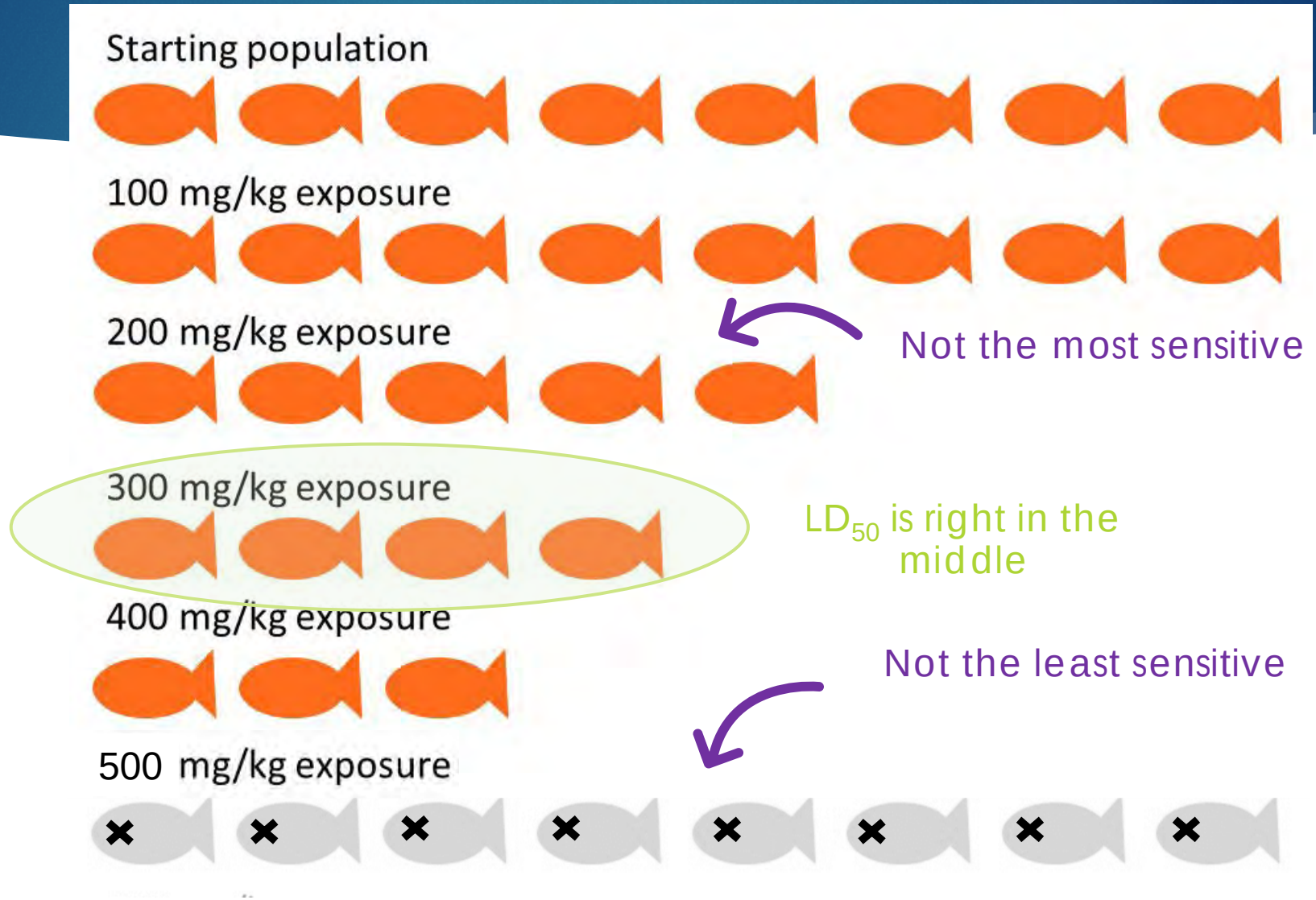

Acute testing

- LD_{50}
  - Oral
  - Dermal
  - Inhalation

V-Hold restraint of rat for passage of metal gavage needle. Gavage needle is inserted into the left side of the animal's mouth and directed along the hard palate of the mouth to the back of the throat.

Gentle scruff of mouse for passage of the metal gavage needle. Gavage needle is inserted into the left side of the animal's mouth and directed along the hard palate of the mouth to the back of the throat.

Acute testing

- LD_{50}
  - Oral
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Acute testing

- LD_{50}
  - Oral
  - Dermal
  - Inhalation

Acute testing

- Eye damage assays

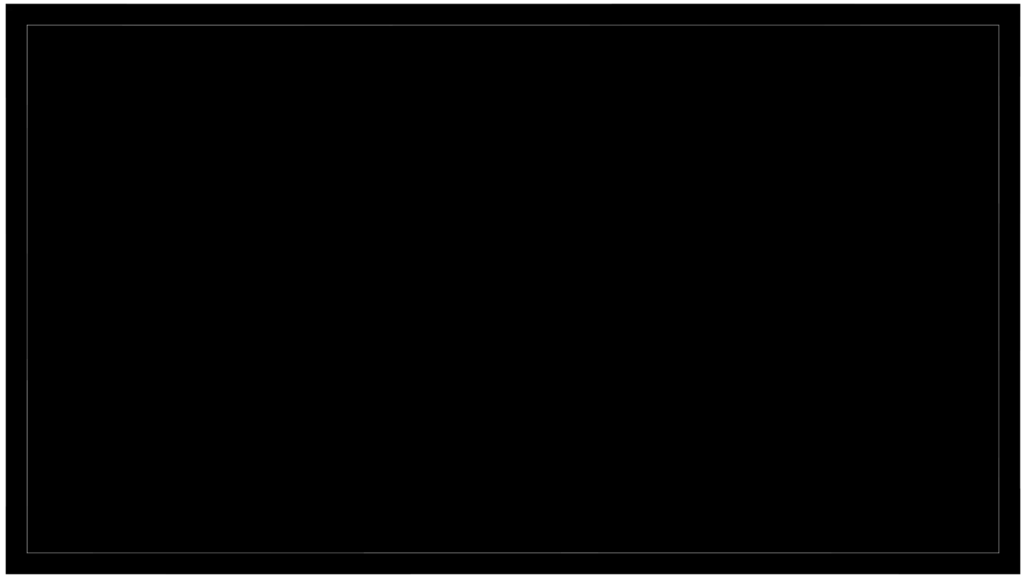
Acute testing

- Hypersensitivity testing

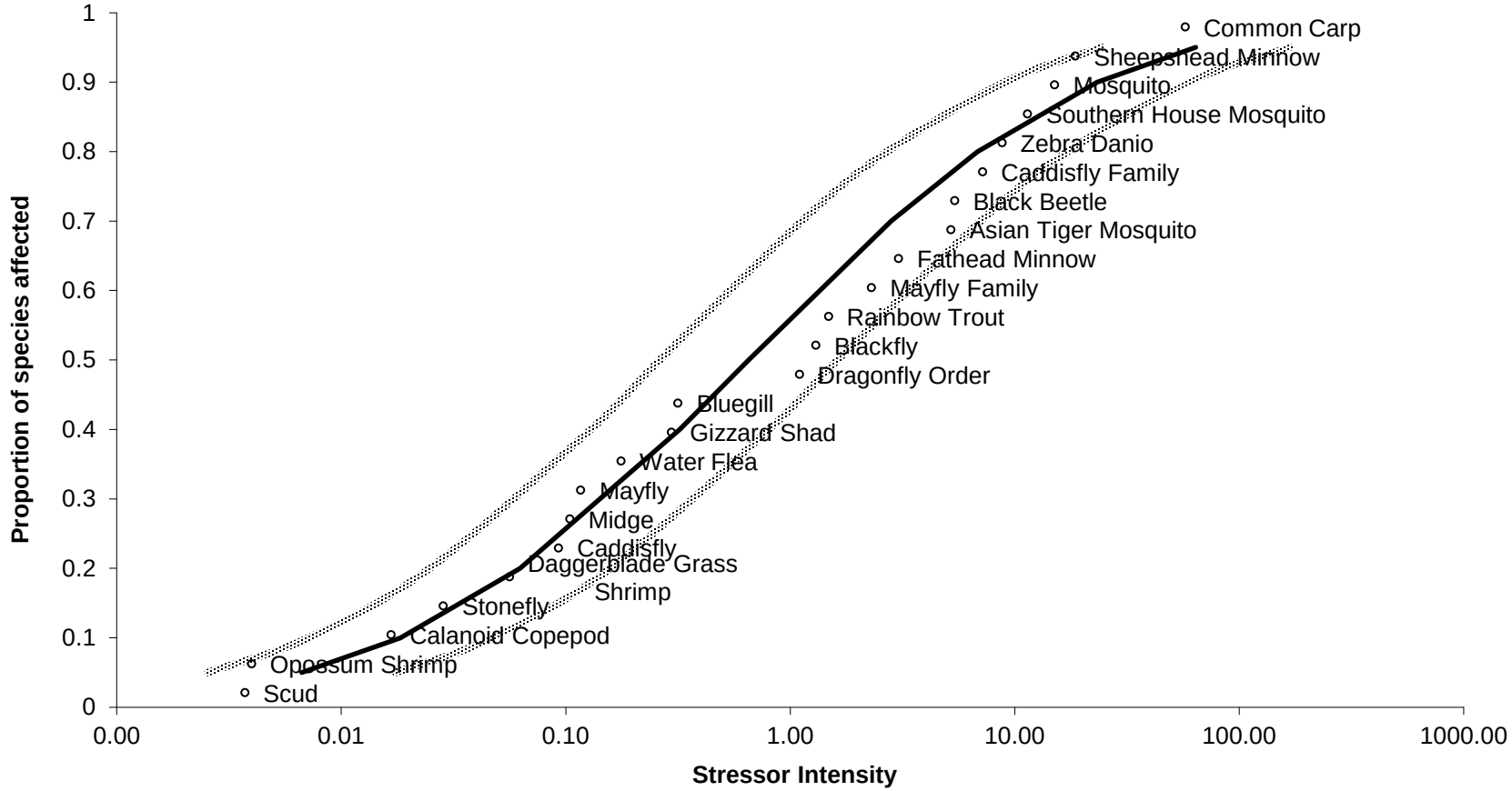
Acute data also collected for ecological effects

Standard test species

- Honeybee
- Birds (duck & quail)
- Fish (bluegill & rainbow trout)
- Aquatic invertebrates (water flea, midge, shrimp)
  - some saltwater species
- Vascular, non-vascular plants

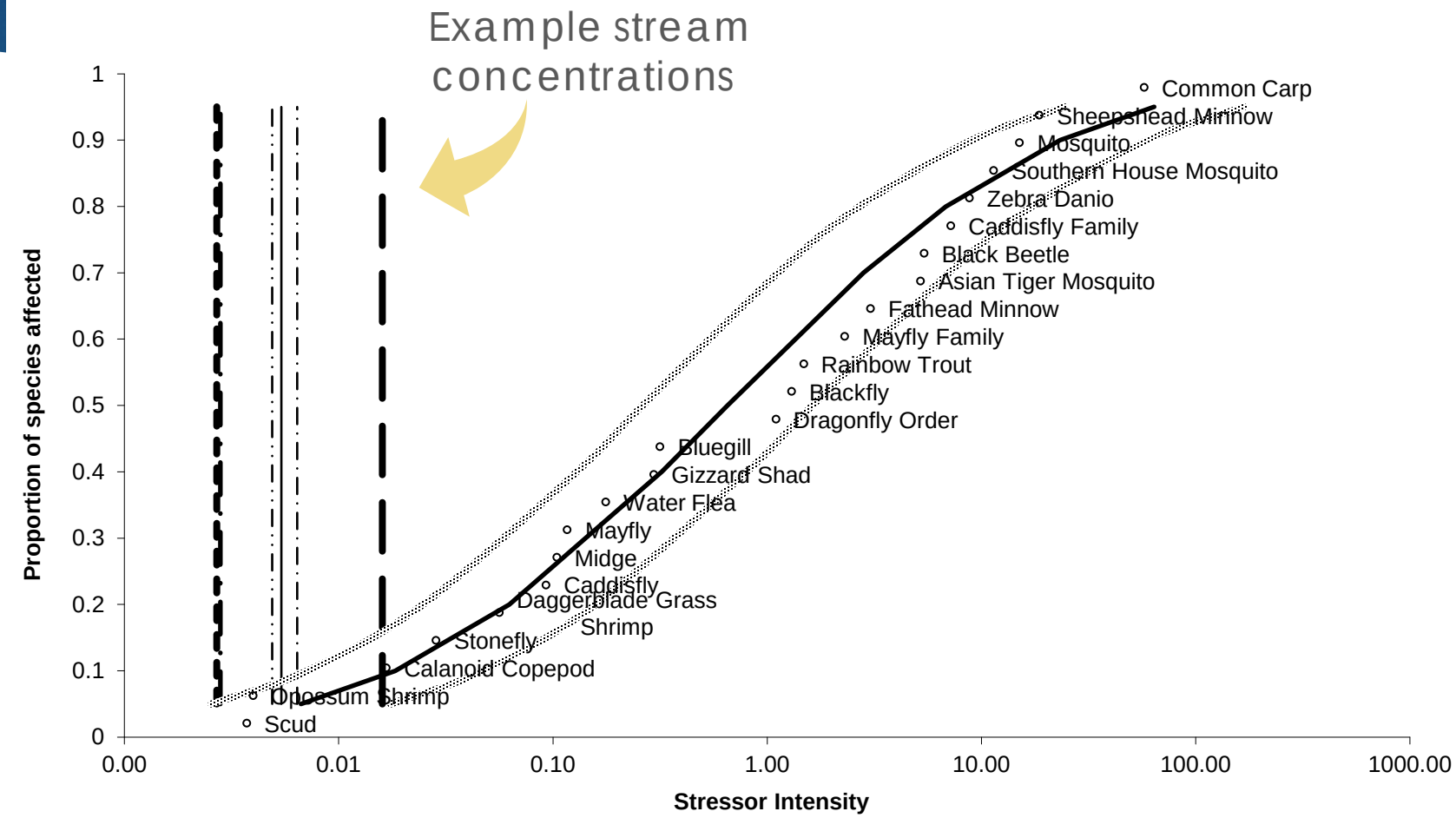


Acute testing -LD_{50} data uses



SSD for bifenthrin

Acute testing -LD_{50} data uses



SSD for bifenthrin

Chronic testing

- Exposures over long time frames

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Exposures in-between acute and chronic time periods

Chronic testing

- Exposures over long time frames

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How well babies grow

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Chronic testing

- Exposures over long time frames

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870.7800	Immunotoxicity	yes	yes

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Growth Rodent & Non-rodent

Chronic testing

- Exposures over long time frames

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870.6200a	Acute Neurotoxicity Screening Battery (rat)	yes	yes
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Pregnancy outcomes

Chronic testing

- Exposures over long time frames

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Life-long exposures & whole-animal outcomes (organs, blood, tumors, etc)

Chronic testing

- Exposures over long time frames

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Neurotoxicity tests
2 species

Chronic testing

- Exposures over long time frames

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870.2600	Dermal Sensitization	yes	yes
870.3100	Oral Subchronic (rodent)	yes	yes
870.3150	Oral Subchronic (nonrodent)	yes	no[2]
870.3200	21-Day Dermal	yes	yes
870.3465	90-Day Inhalation	yes	yes
870.3700a	Developmental Toxicity (rodent)	yes	yes
870.3700b	Developmental Toxicity (nonrodent)	yes	yes
870.3800	Reproduction	yes	yes
870.4100a	Chronic Toxicity (rodent)	yes	yes
870.4100b	Chronic Toxicity (nonrodent)	yes	yes
870.4200b	Oncogenicity (mouse)	yes	yes
870.4300	Chronic/Oncogenicity	yes	yes
870.5100	Mutagenicity—Gene Mutation - bacterial	yes	yes
870.5300	Mutagenicity—Gene Mutation - mammalian	yes	yes
870.5xxx	Mutagenicity—Structural Chromosomal Aberrations	yes	yes
870.5xxx	Mutagenicity—Other Genotoxic Effects	yes	yes
870.6100a	Acute Delayed Neurotoxicity (hen)		
870.6100b	90-Day Neurotoxicity (hen)		
870.6200a	Acute Neurotoxicity Screening Battery (rat)		
870.6200b	90-Day Neurotoxicity Screening Battery (rat)		
870.7485	General Metabolism		
870.7600	Dermal Penetration		
870.7800	Immunotoxicity		

[1] The requirement for an acute inhalation LC_{50} study was waived.

[2] This is not considered a data gap because there is a chronic dog study in the database.

How it gets into/leaves the body & immune system effects

Chronic testing

- Exposures over long time frames

Endocrine effects?

Table B.1. Toxicological Data Requirements for Glyphosate.

Study		Technical	
		Required	Satisfied
870.1100	Acute Oral Toxicity	yes	yes
870.1200	Acute Dermal Toxicity	yes	yes
870.1300	Acute Inhalation Toxicity	yes	no[1]
870.2400	Primary Eye Irritation	yes	yes
870.2500	Primary Dermal Irritation	yes	yes
870.2600	Dermal Sensitization	yes	yes
870.3100	Oral Subchronic (rodent)	yes	yes
870.3150	Oral Subchronic (nonrodent)	yes	no[2]
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870.5xxx	Mutagenicity—Structural Chromosomal Aberrations	yes	yes
870.5xxx	Mutagenicity—Other Genotoxic Effects	yes	yes
870.6100a	Acute Delayed Neurotoxicity (hen)	no	no
870.6100b	90-Day Neurotoxicity (hen)	no	no
870.6200a	Acute Neurotoxicity Screening Battery (rat)	yes	yes
870.6200b	90-Day Neurotoxicity Screening Battery (rat)	yes	yes
870.7485	General Metabolism	yes	yes
870.7600	Dermal Penetration	no	no
870.7800	Immunotoxicity	yes	yes

[1] The requirement for an acute inhalation LC_{50} study was waived.

[2] This is not considered a data gap because there is a chronic dog study in the database.

Chronic testing

- Cancer assays

Table B.1. Toxicological Data Requirements for Glyphosate.

Study		Technical	
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870.1100	Acute Oral Toxicity	yes	yes
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870.6100a	Acute Delayed Neurotoxicity (hen)	no	no
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870.6200a	Acute Neurotoxicity Screening Battery (rat)	yes	yes
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870.7485	General Metabolism	yes	yes
870.7600	Dermal Penetration	no	no
870.7800	Immunotoxicity	yes	yes

[1] The requirement for an acute inhalation LC_{50} study was waived.

[2] This is not considered a data gap because there is a chronic dog study in the database.

Is glyphosate considered to cause cancer?

2015 IARC placed glyphosate into their Group 2A category.

US EPA, EU, Japan, Australia, New Zealand, Canada, WHO, and many other governments do not classify glyphosate as carcinogenic to humans.

Hazard vs Risk

https://www.compoundchem.com/2015/10/26/carcinogens/

Is glyphosate considered to cause cancer?

2015 IARC pla
their Group 2

US EPA, EU, Ja
Zealand, Canada, WHO, and many other governments do not classify glyphosate as carcinogenic to humans.

Hazard vs Risk

https://www.compoundchem.com/2015/10/26/carcinogens/

Is glyphosate considered to cause cancer?

2015 IARC placed glyphosate into their Group 2A category.

US EPA, EU, Japan, Australia, New Zealand, Canada, WHO, and many other governments do not classify glyphosate as carcinogenic to humans.

Hazard vs Risk

Bacon

Red meat

Coffee

Hot tea

https://www.compoundchem.com/2015/10/26/carcinogens/

All of these tests are done until effects are seen

Table B.1. Toxicological Data Requirements for Glyphosate.

Study		Technical	
		Required	Satisfied
870.1100	Acute Oral Toxicity	yes	yes
870.1200	Acute Dermal Toxicity	yes	yes
870.1300	Acute Inhalation Toxicity	yes	no[1]
870.7800	Immunotoxicity	yes	yes

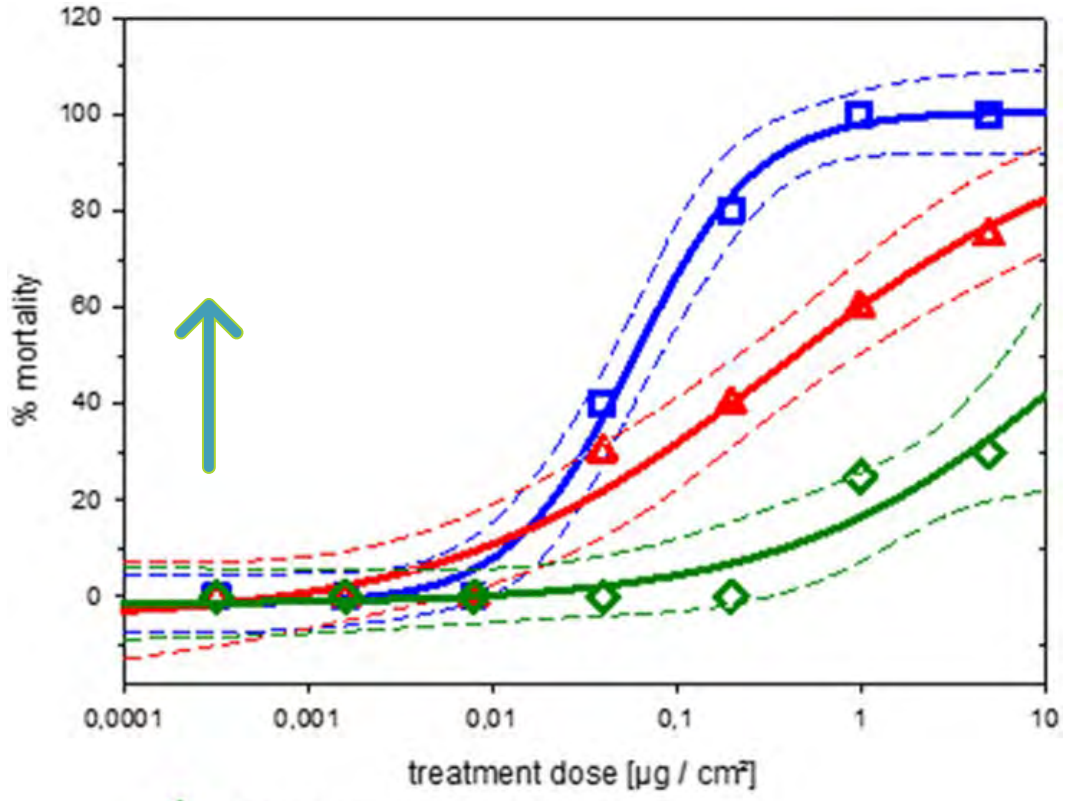
[1] The requirement for an acute inhalation LC_{50} study was waived.
[2] This is not considered a data gap because there is a chronic dog study in the database.

Not all tests are required for each product

Tally of which tests have been submitted to EPA

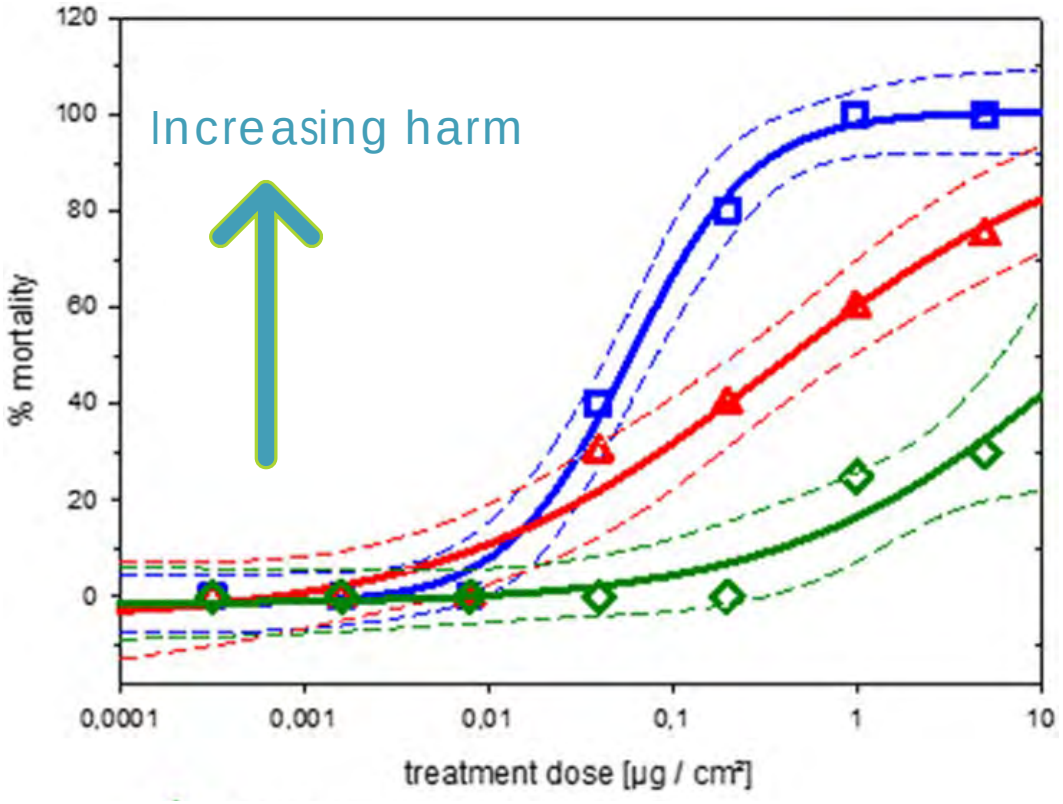
Risk = Exposure x Hazard

- Dose response assessment
- Role of EPA is to find the uses and protective measures that allow us to use a product without effects.



Risk = Exposure x Hazard

- Dose response assessment
- Role of EPA is to find the uses and protective measures that allow us to use a product without effects.



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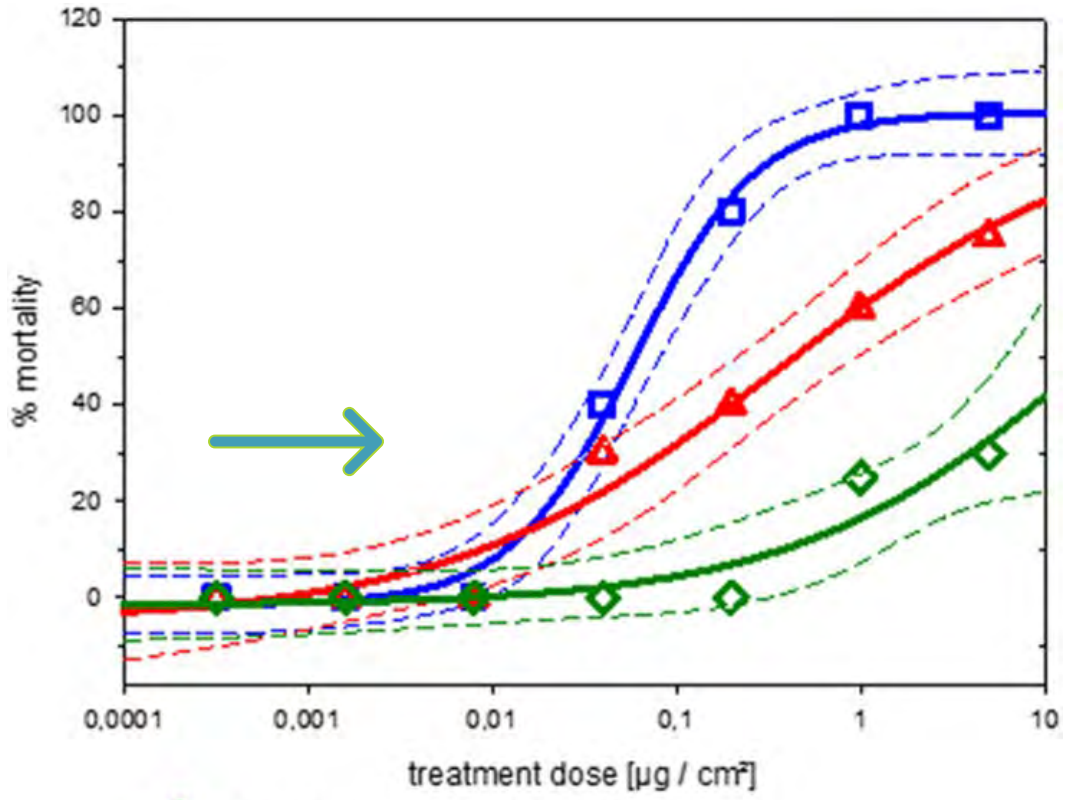
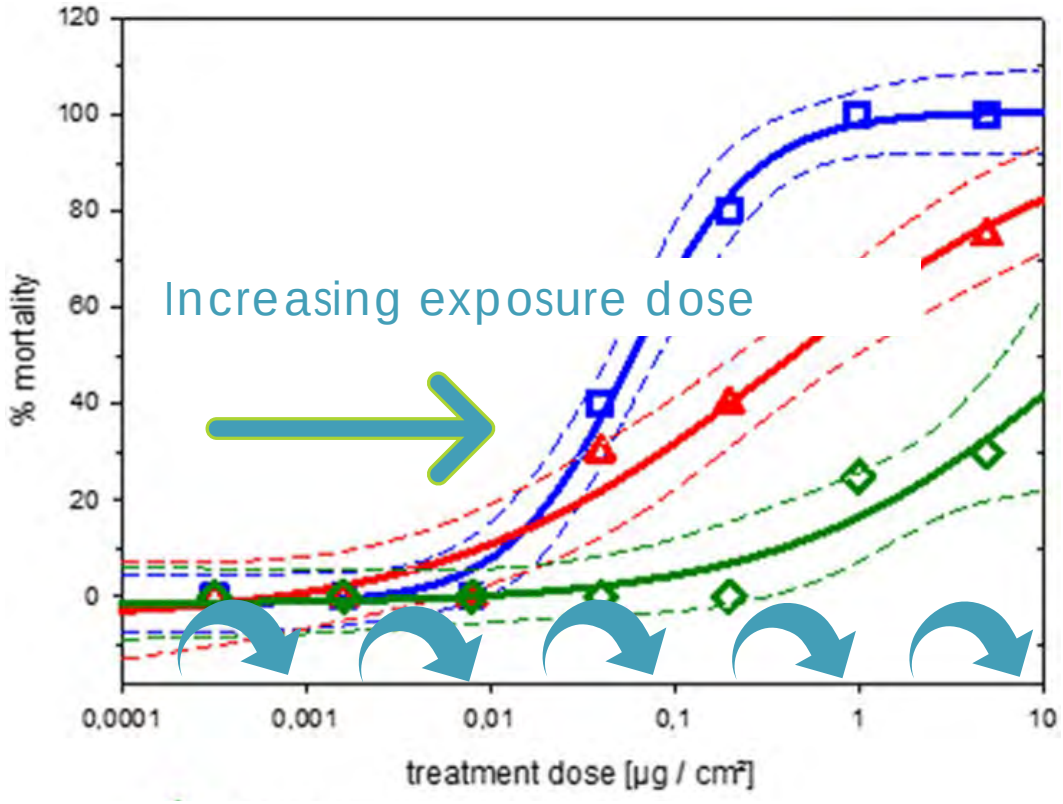


Risk = Exposure x Hazard

- Dose response assessment
- Role of EPA is to find the uses and protective measures that allow us to use a product without effects.



Risk = Exposure x Hazard

- Dose response assessment
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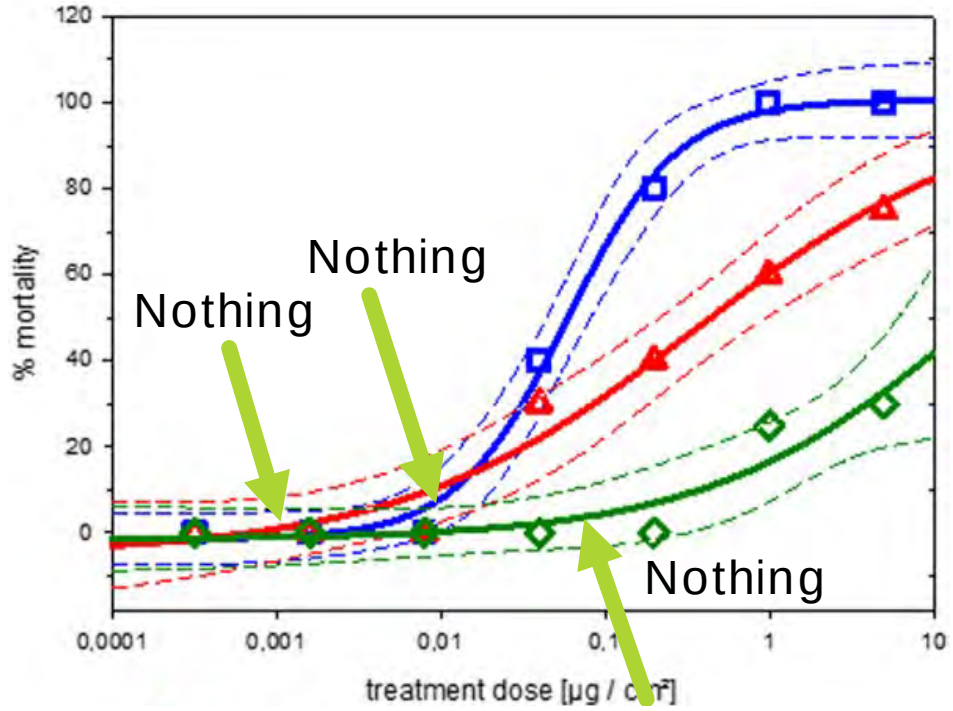
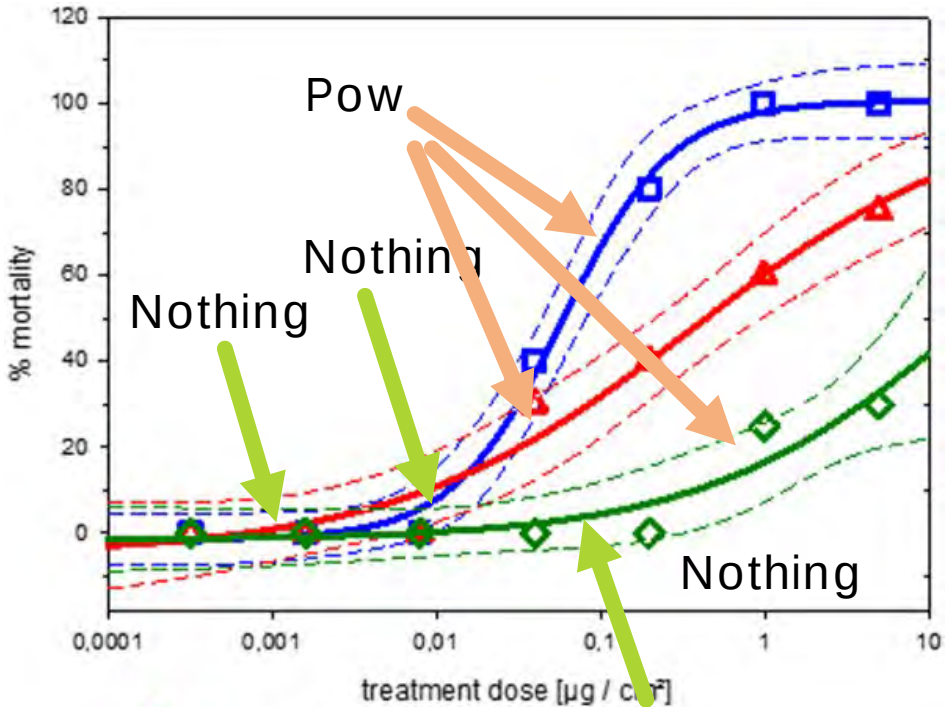


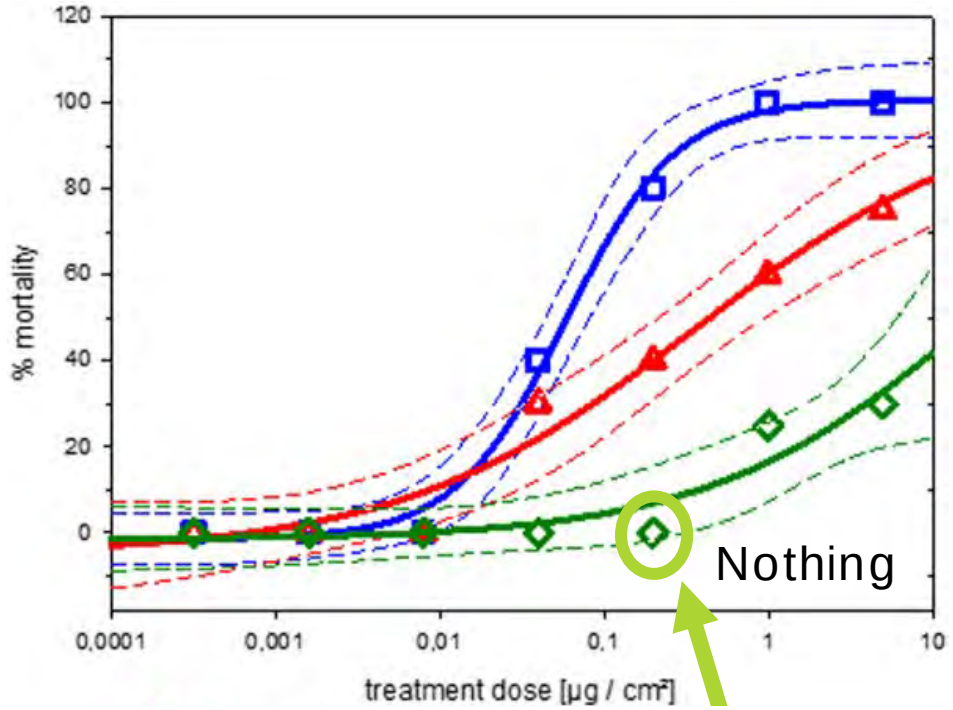
Risk = Exposure x Hazard

- Dose response assessment
- Role of EPA is to find the uses and protective measures that allow us to use a product without effects.

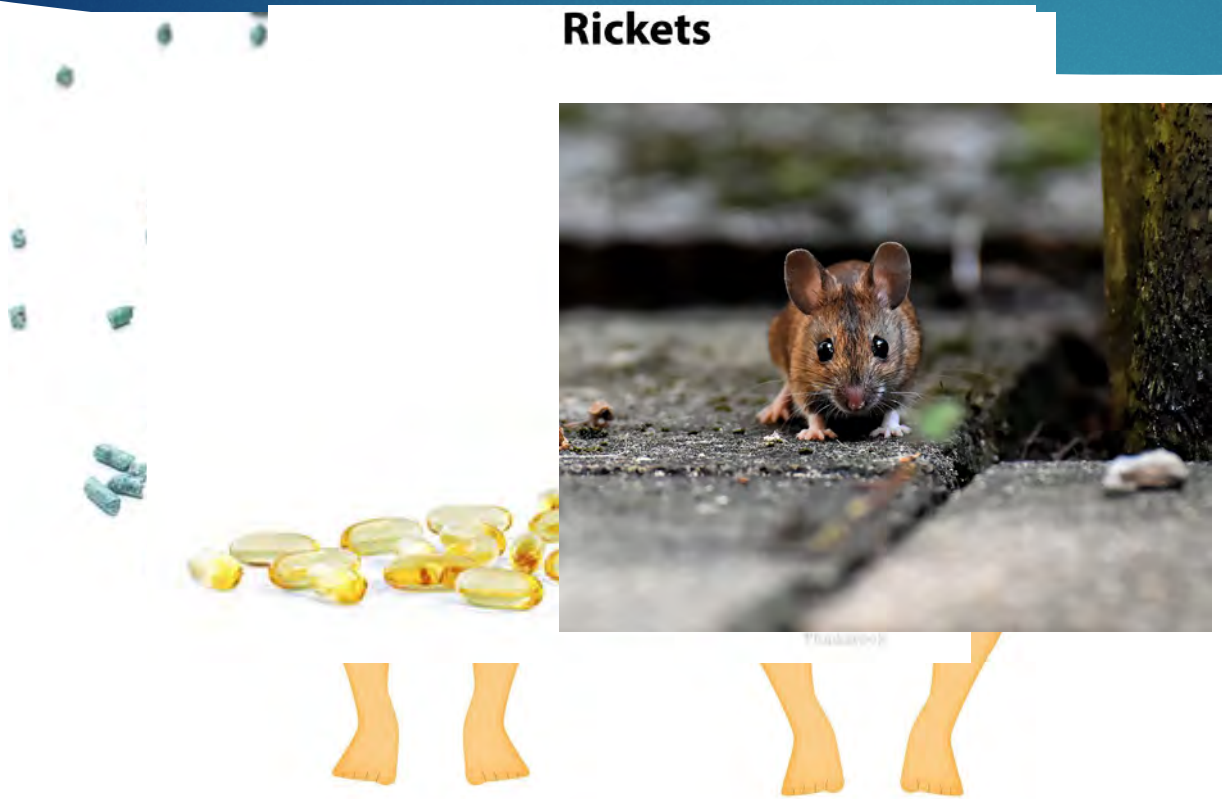


Risk = Exposure x Hazard

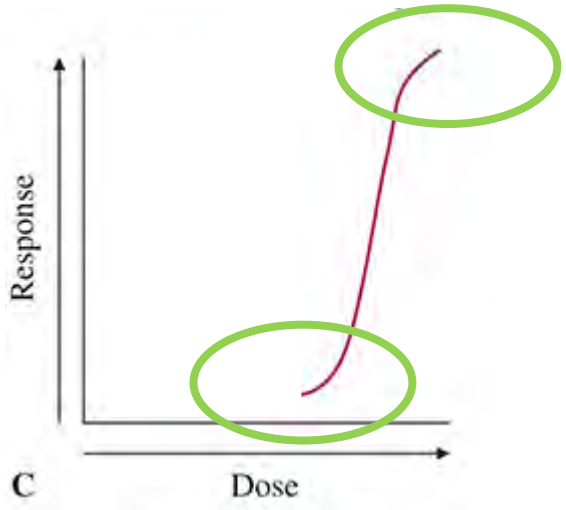
- Dose response assessment
- Role of EPA is to find the uses and protective measures that allow us to use a product without effects.

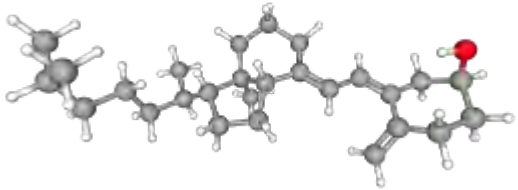


Dose Response Assessment



Cholecalciferol



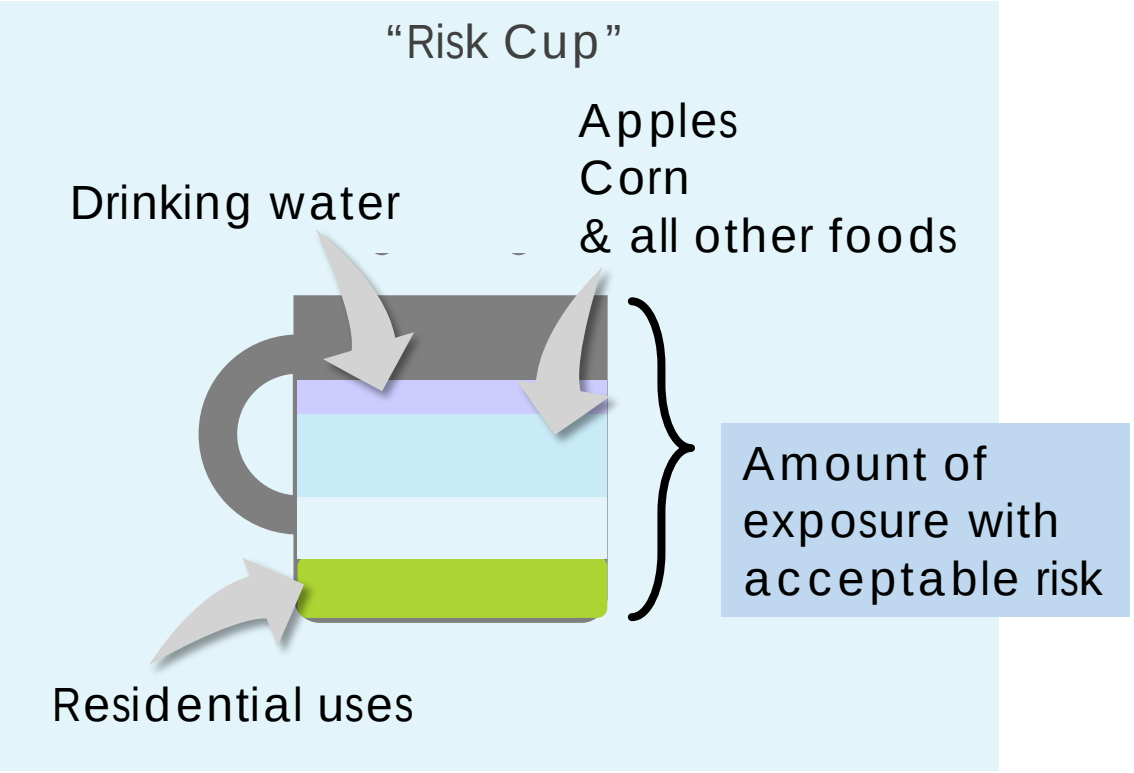


Exposure Assessment

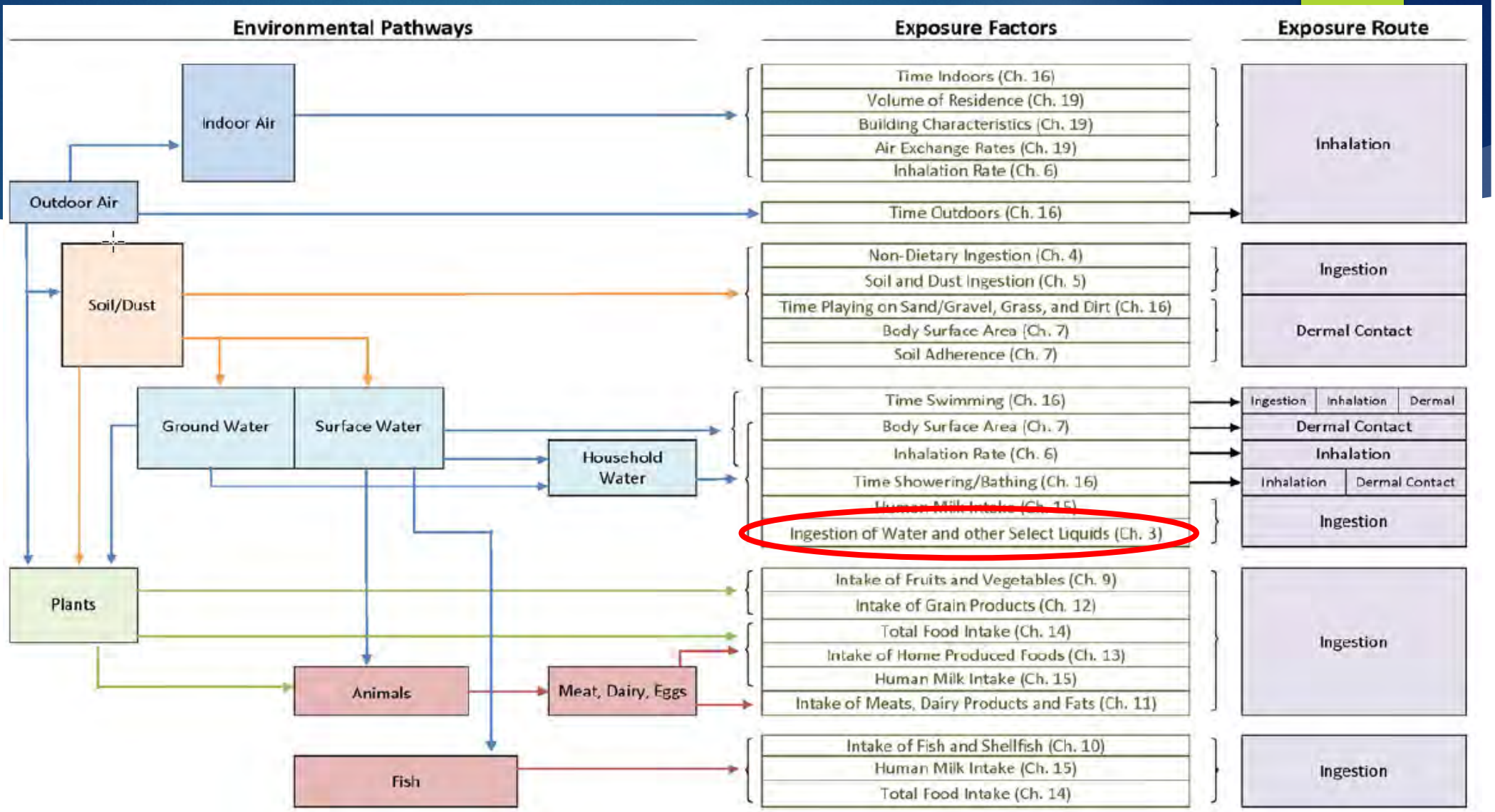
Human health:

- Applicator exposures
- Bystander exposures
- Food exposures
- Drinking water exposures
- A few random exposures

All tallied up for children & adults across our life span



E X P O S U R E


Environmental Pathways
Exposure Factors
Exposure Route
Indoor Air
Outdoor Air
Soil/Dust
Ground Water
Surface Water
Household Water
Plants
Animals
Meat, Dairy, Eggs
Fish
Time Indoors (Ch. 16)
Volume of Residence (Ch. 19)
Building Characteristics (Ch. 19)
Air Exchange Rates (Ch. 19)
Inhalation Rate (Ch. 6)
Time Outdoors (Ch. 16)
Non-Dietary Ingestion (Ch. 4)
Soil and Dust Ingestion (Ch. 5)
Time Playing on Sand/Gravel, Grass, and Dirt (Ch. 16)
Body Surface Area (Ch. 7)
Soil Adherence (Ch. 7)
Time Swimming (Ch. 16)
Body Surface Area (Ch. 7)
Inhalation Rate (Ch. 6)
Time Showering/Bathing (Ch. 16)
Ingestion of Water and other Select Liquids (Ch. 3)
Intake of Fruits and Vegetables (Ch. 9)
Intake of Grain Products (Ch. 12)
Total Food Intake (Ch. 14)
Intake of Home Produced Foods (Ch. 13)
Human Milk Intake (Ch. 15)
Intake of Meats, Dairy Products and Fats (Ch. 11)
Intake of Fish and Shellfish (Ch. 10)
Human Milk Intake (Ch. 15)
Total Food Intake (Ch. 14)
Inhalation
Ingestion
Dermal Contact
Ingestion
Inhalation
Dermal
Dermal Contact
Inhalation
Inhalation
Dermal Contact
Ingestion
Ingestion
Ingestion

EXPOSURE

From the Exposure Factor Handbook:

Table 3-23. Per Capita[a] Estimates of Combined Direct and Indirect[b] Water Ingestion Based on NHANES 2003–2006: Community Water (mL/day)

Age	Sample Size	Mean	Percentile						
			10	25	50	75	90	95	99
Birth to <1 month	88	239*	-	-	78*	473*	693*	851*	956*
1 to <3 months	143	282*	-	-	41*	524*	784*	962*	1,102*
3 to <6 months	244	373*	-	-	378*	630*	794*	925*	1,192*
6 to <12 months	466	303	-	46	199	520	757*	866*	1,150*
1 to <2 years	611	223	-	27	134	310	577*	760*	1,206*
2 to <3 years	571	265	-	39	160	387	657*	861*	1,354*
3 to <6 years	1,091	327	-	67	245	465	746	959	1,570*
6 to <11 years	1,601	414	-	64	297	598	1,000	1,316	2,056*
11 to <16 years	2,396	520	-	60	329	688	1,338	1,821	2,953
16 to <18 years	1,087	573	-	59	375	865	1,378	1,783	3,053
18 to <21 years	1,245	681	-	88	355	872	1,808	2,368	3,911
≥21 years	8,673	1,043	-	327	787	1,577	2,414	2,958	4,405
≥65 years	2,287	1,046	-	279	886	1,587	2,272	2,730	4,123
All ages	18,216	869	-	134	560	1,299	2,170	2,717	4,123

[a] Includes all participants whether or not they ingested any water from the source during survey period.
[b] Direct water is defined as water ingested directly as a beverage; indirect water is defined as water added in the preparation of food or beverages.
\- = Zero.
* Estimates are less statistically reliable based on guidance published in the *Joint Policy on Variance Estimation and Statistical Reporting Standards on NHANES III and CSFII Reports: NHIS/NCHS Analytical Working Group Recommendations* (NCHS, 1993).

Source: U.S. EPA analysis of NHANES 2003–2006 data.

Table 3-53. Average Total Tap Water Intake Rate by Sex, Age, and Geographic Area

Group/Subgroup	Number of Respondents	Average Total Tap Water Intake,[a,b] L/day
Total group	5,258	1.39
Sex		
Males	3,892	1.40
Females	1,366	1.35
Age, years		
21 to 44	291	1.30
45 to 64	1,991	1.48
65 to 84	2,976	1.33
Geographic area		
Atlanta	207	1.39
Connecticut	844	1.37
Detroit	429	1.33
Iowa	743	1.61
New Jersey	1,542	1.27
New Mexico	165	1.49
New Orleans	112	1.61
San Francisco	621	1.36
Seattle	316	1.44
Utah	279	1.35

[a] Standard deviations not reported in Cantor et al. (1987).
[b] Total tap water defined as all water and beverages derived from tap water.

Source: Cantor et al. (1987).

Table 3-54. Frequency Distribution of Total Tap Water Intake Rates[a]

Consumption Rate (L/day)	Frequency[b] (%)	Cumulative Frequency[b] (%)
≤0.80	20.6	20.6
0.81–1.12	21.3	41.9
1.13–1.44	20.5	62.4
1.45–1.95	19.5	81.9
≥1.96	18.1	100.0

[a] Represents consumption of tap water and beverages derived from tap water in a "typical" winter week.
[b] Extracted from Table 3 in the article by Cantor et al. (1987).

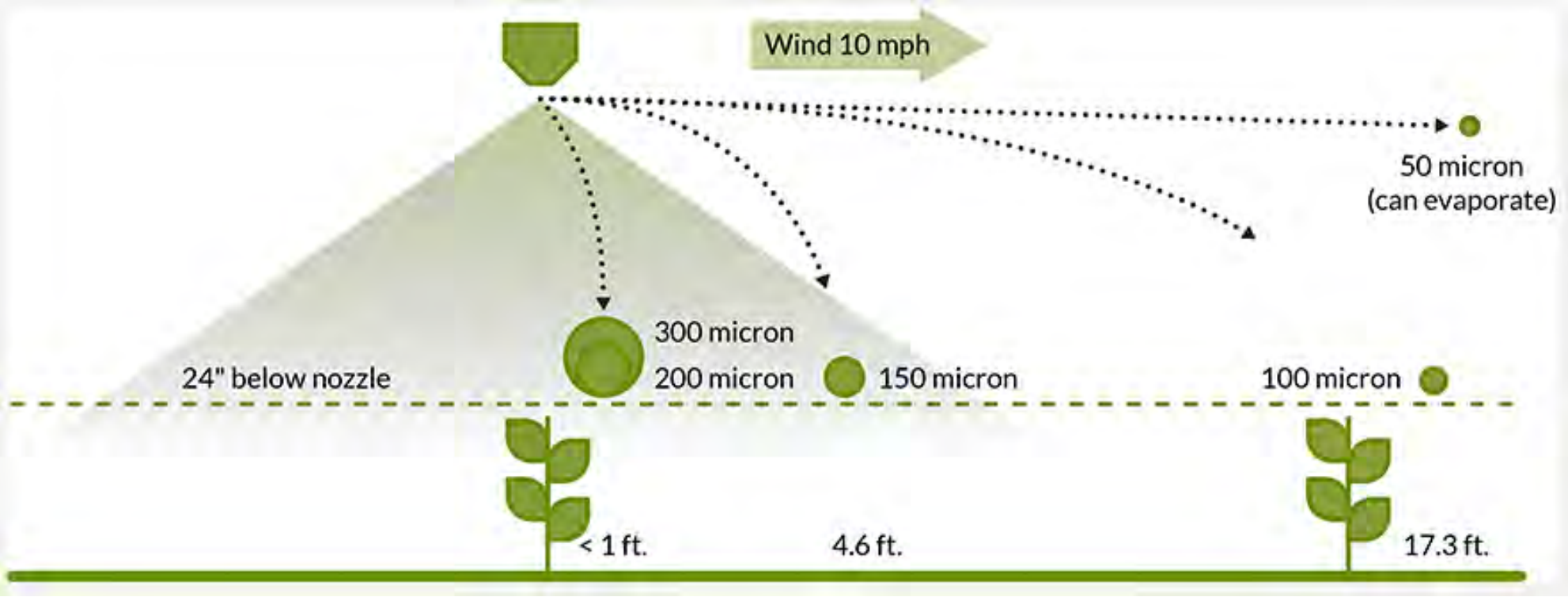
Source: Cantor et al. (1987).

Exposure Assessment

Ecological risk assessment:

- Drift
- Solubility
- Soil movement
- Volatilization
- Breakdown rates
- Ingested/absorbed/breathed
- Accumulated in the body
- Exposure differences across all life stages

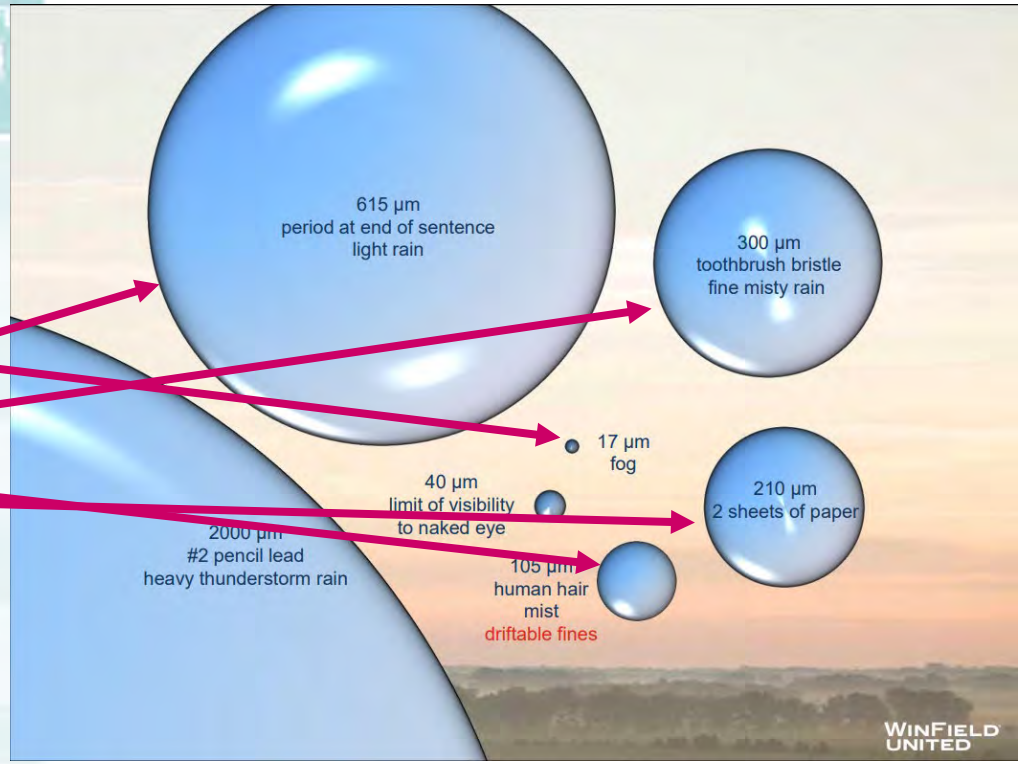
Major route of exposure -drift



How far will particles go?

Droplet	Diameter in microns	Time to fall 10 feet	Travel distance in feet in an 8 MPH wind
Fog	5	66 minutes	15,840 feet
Very Fine	20	4.2 minutes	1,100 feet
Fine	100	10 seconds	44 feet
Medium	240	6 seconds	28 feet
Coarse	400	2 seconds	8.5 feet
Fine Rain	1,000	1 second	4.6 feet

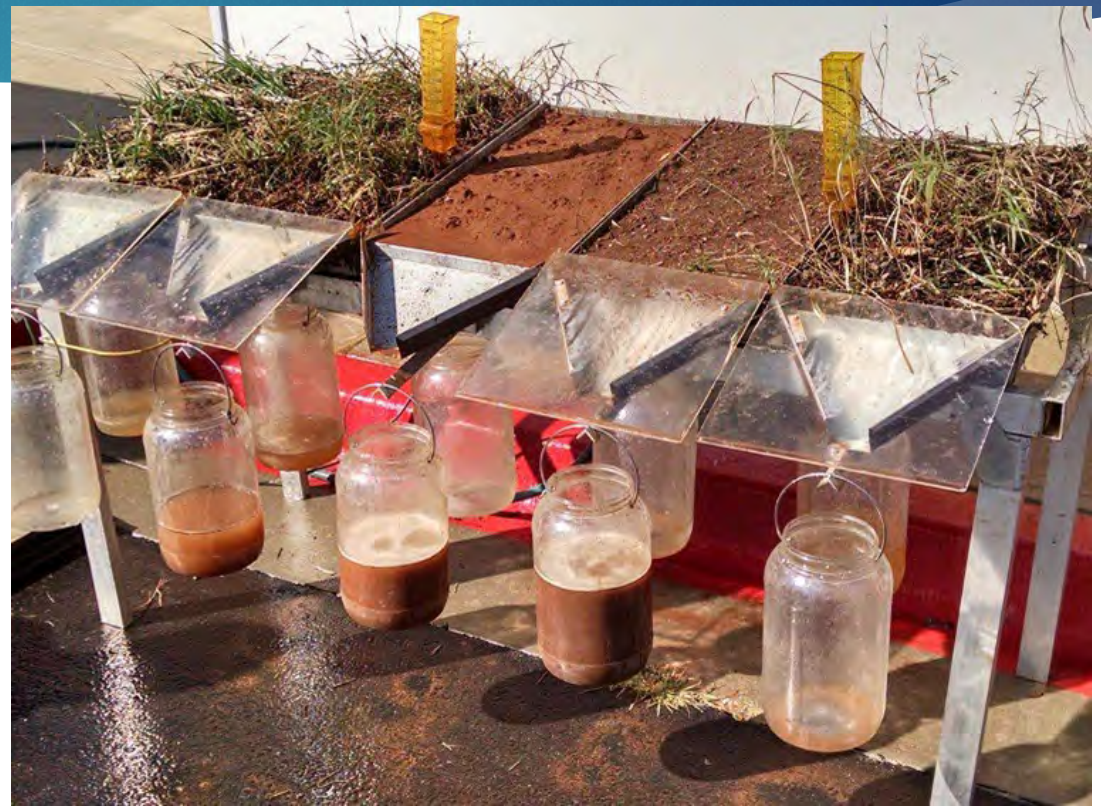
Source: Herbicide Spray Drift, NDSU Extension



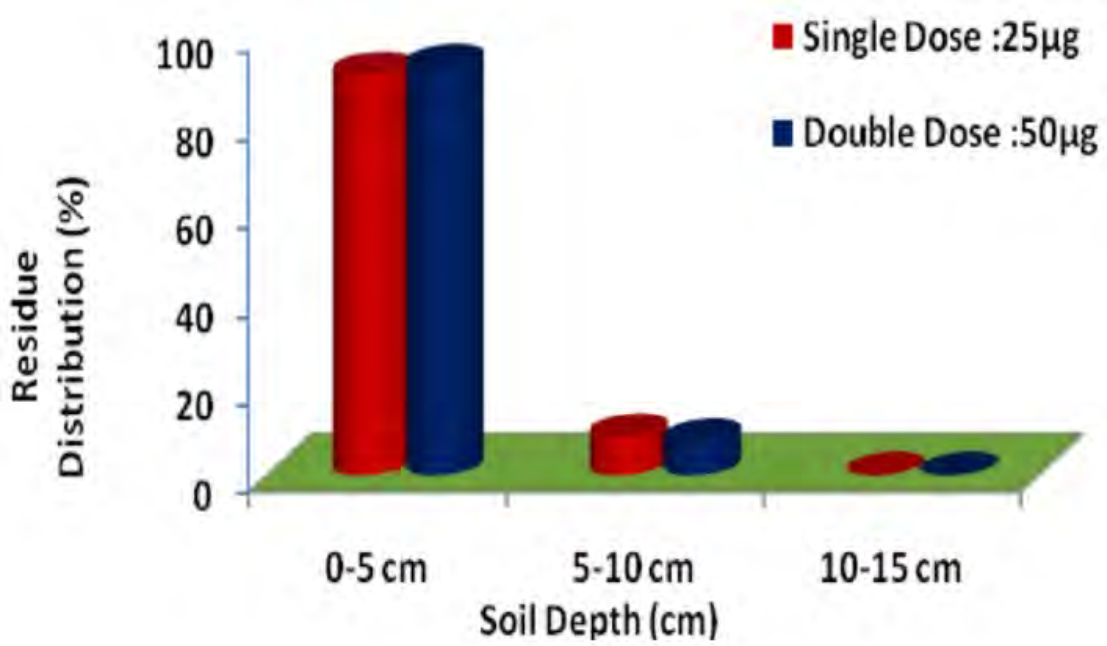
Sometimes it is obvious when drift doesn't happen

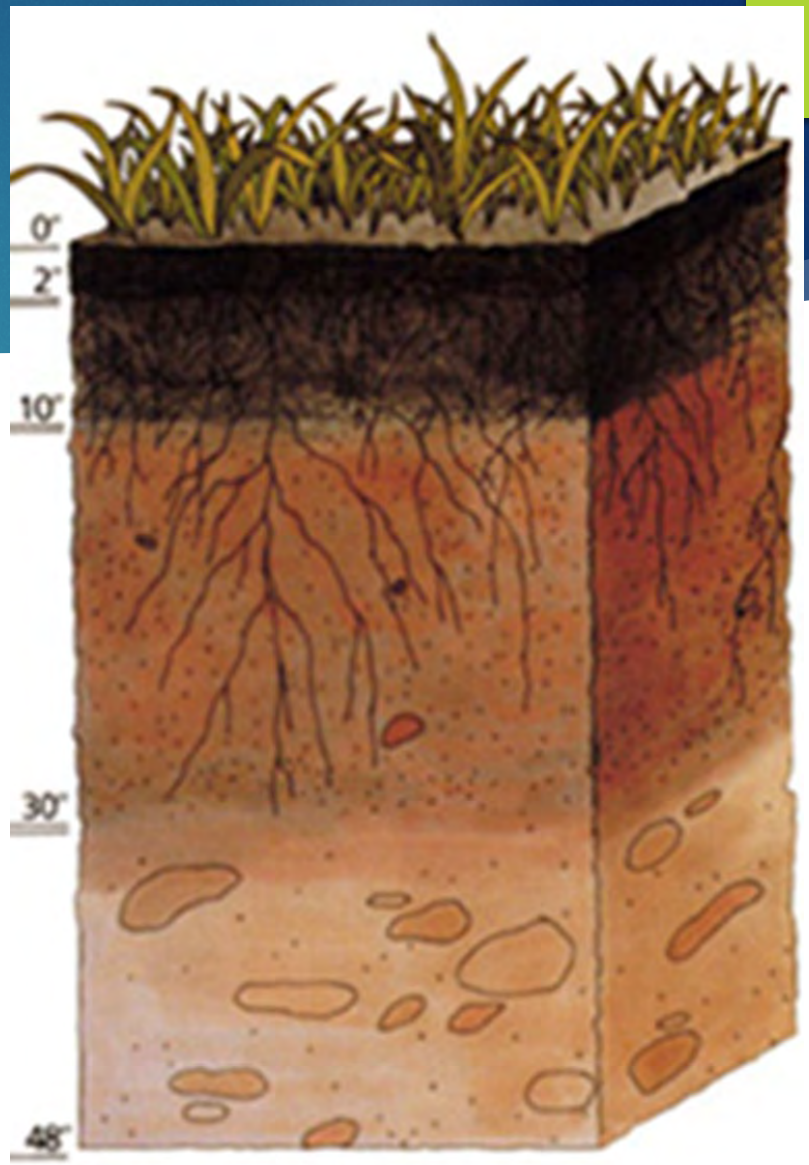
Run off and leaching

- Runoff is the over-the-surface movement of water.
- Pesticide movement in runoff is dependent on the chemical nature of the chemical, but…
- Surface characteristics are important.



Run off and leaching





Offsite movement

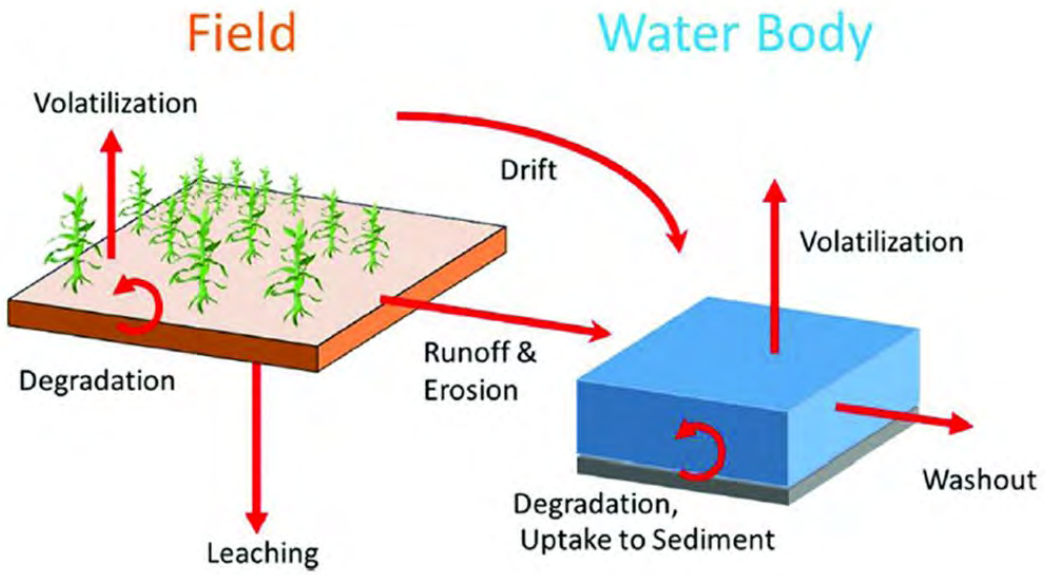
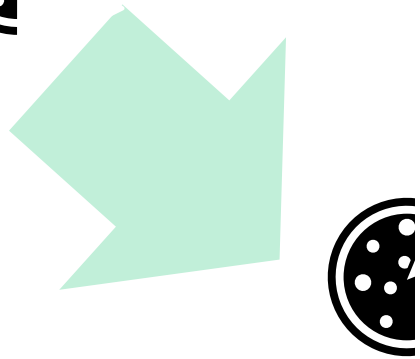
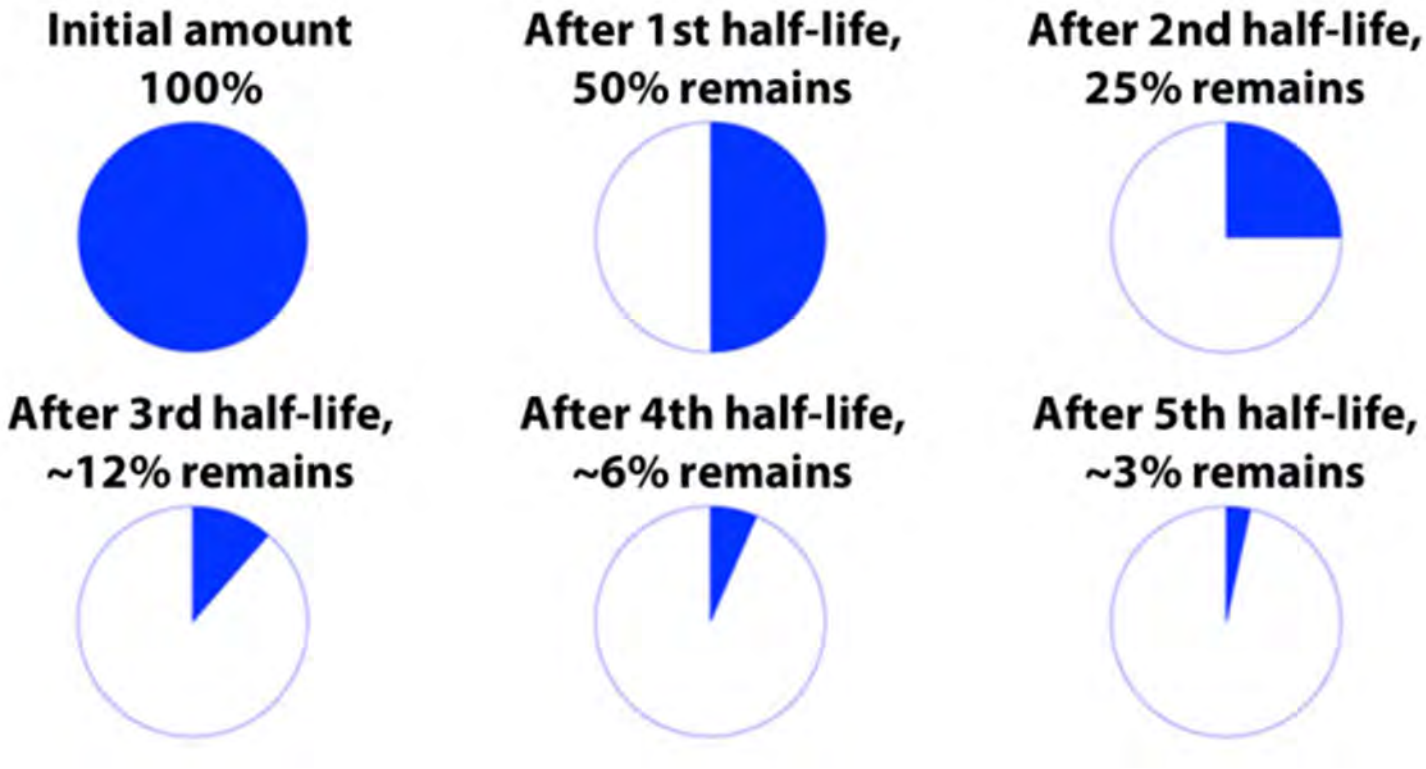


Figure 1. The USEPA conceptual model for pesticide fate and transport to surface water.

Persistence / degradation

Measured in <u>half-lives</u>
-or-
amount of time it takes ½ of the volume to disappear





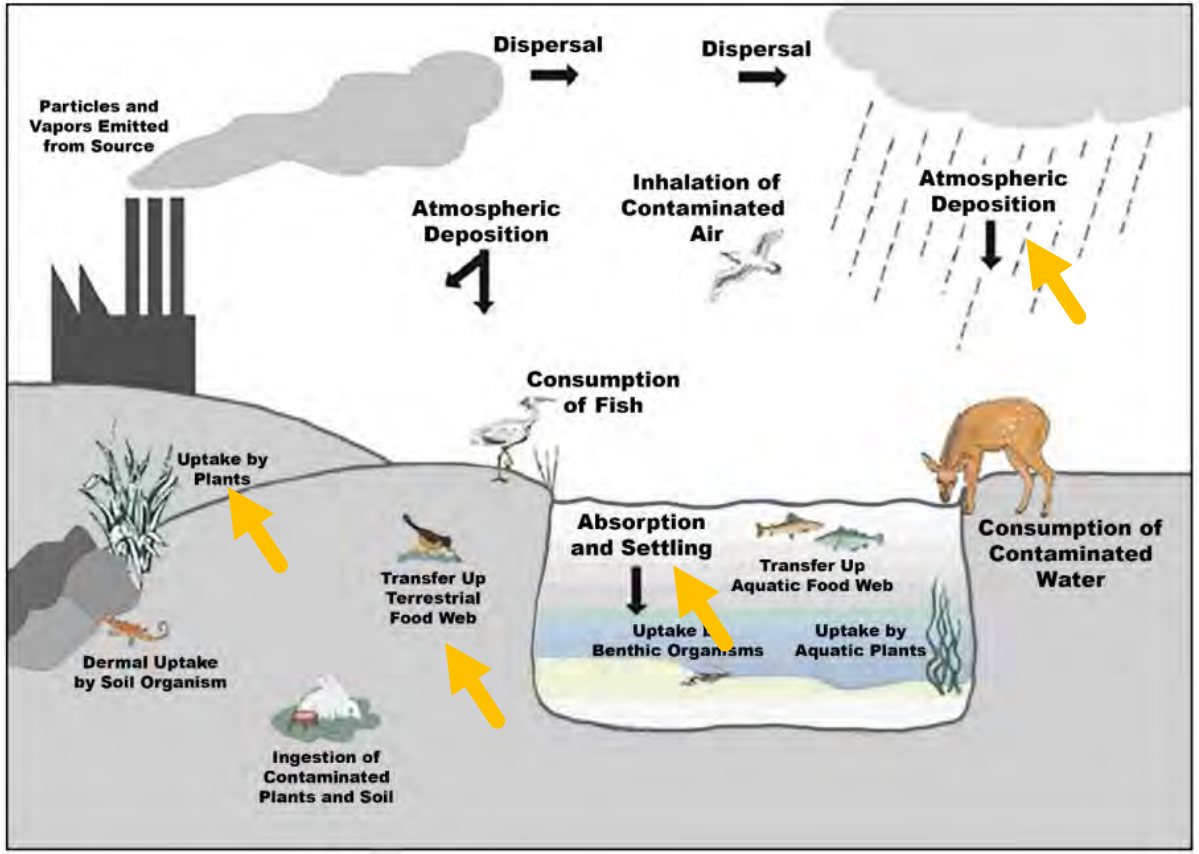
Persistence in the environment

Chemical half-life

- Large spectrum of half-lives
  - Acephate 3 days
  - DDT 50 years
- Differs between
  - Soil - on plant - in plant – water
- Doesn't match the period of time where the pesticide is working
- Half-life times five 97.5% gone

Active Ingredient	Half-life (days)
Azadiractin	5
Bifenthrin	26 - 102
Chlorantraniliprole	204 - 597
Glyphosate	1 - 68
Pyrethrins	2 - 12
Trichlofon (Dylox)	18

Ecological risk assessment looks at:



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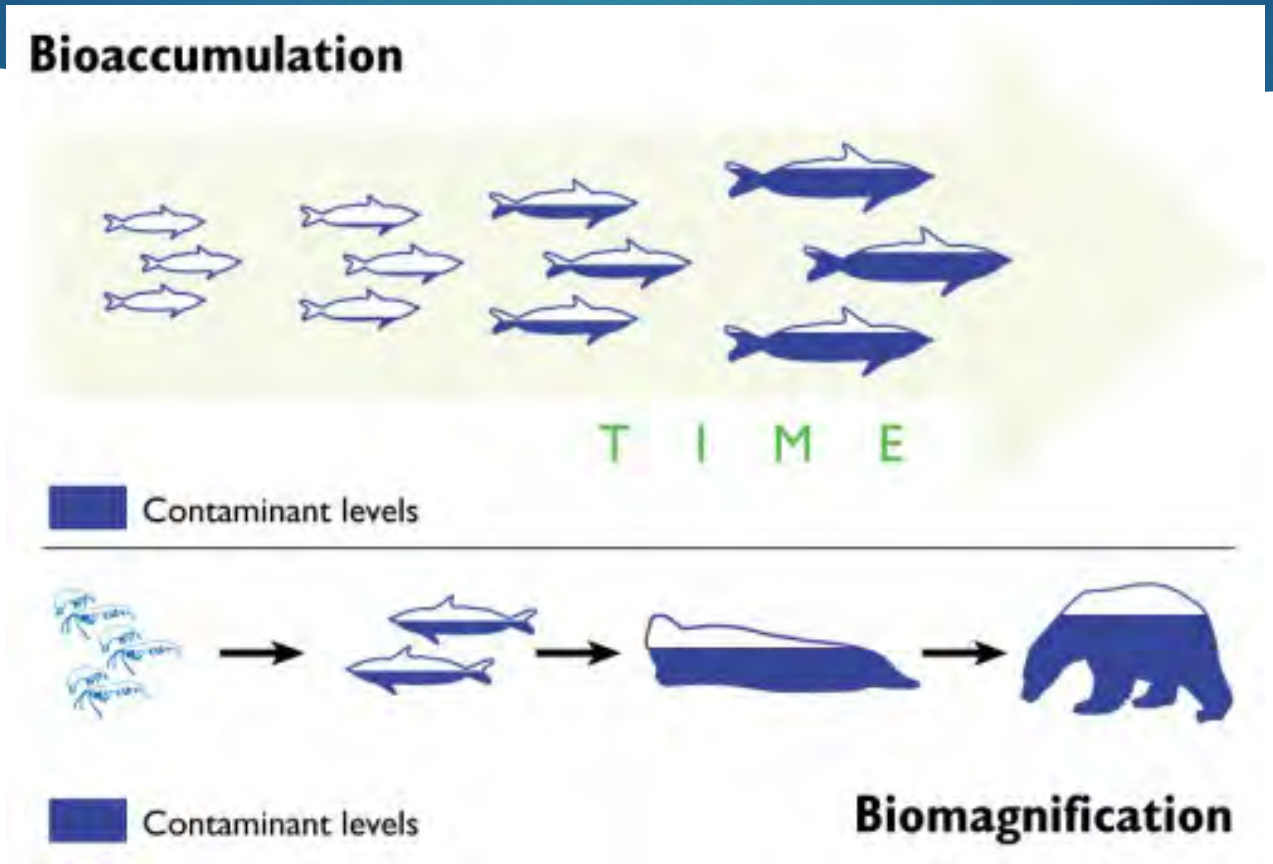


Label is the law

Read It

- Microscope?
- 50+ pages

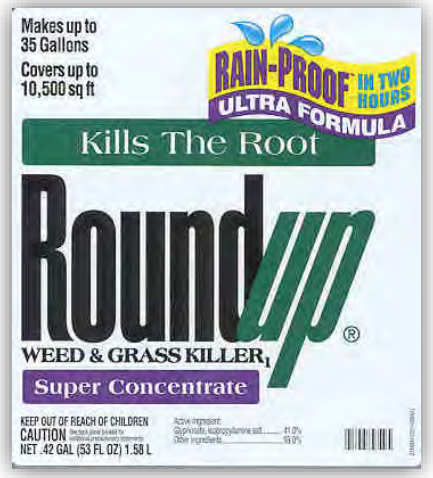
Drift Regulations

- Access weather conditions
  - wind speed
  - inversion
  - wind direction
  - temperature
- Cannot spray if wind exceeds

Drift Regulation

- Record all sensitive areas within 500 feet of the target area
- Applicator must minimize exposure to humans and animals
- Application must stop if unprotected persons may be exposed
- Neighbors can consent to drift
- Label must always be followed where more restrictive
- Drift management plans can help

- Variances allowed



Specimen Label

Dow AgroSciences

Rodeo®

Herbicide

For control of annual and perennial weeds and woody plants in forests, non-crop sites, and in and around aquatic sites; also for use in wildlife habitat areas, for perennial grass release, and grass growth suppression and grazed areas on these sites.

Avoid contact of herbicide with foliage, green stems, exposed non-woody roots or fruit of crops, desirable plants and trees, because severe injury or destruction may result.

Active Ingredient(s):	
glyphosate[1] N-(phosphonomethyl)glycine, isopropylamine salt	53.8%
Inert Ingredients	46.2%
Total Ingredients	100.0%

[1]Contains 5.4 pounds per gallon glyphosate, isopropylamine salt (4 pounds per gallon glyphosate acid).

EPA Reg. No. 62719-324

Keep Out of Reach of Children

CAUTION PRECAUCION

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.)

Precautionary Statements

Hazards to Humans and Domestic Animals

Harmful If Inhaled

Avoid breathing spray mist. Remove contaminated clothing and wash before reuse. Wash thoroughly with soap and water after handling.

Personal Protective Equipment (PPE)

Applicators and other handlers must wear:

- Long-sleeved shirt and long pants
- Shoes plus socks.

Follow manufacturer's instructions for cleaning/maintaining PPE (Personal Protective Equipment). If no such instructions for washables, use detergent and hot water. Keep and wash PPE separately from other laundry.

Engineering Controls

When handlers use closed systems, enclosed cabs, or aircraft in a manner that meets the requirements listed in Worker Protection Standard (WPS) for agricultural pesticides [40 CFR 170.240 (d) (4-6)], the handler PPE requirements may be reduced or modified as specified in the WPS.

User Safety Recommendations

Users should:

- Wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet.
- Remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.

First Aid

If inhaled: Move person to fresh air. If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably mouth-to-mouth if possible. Call a poison control center or doctor for further treatment advice.

Have the product container or label with you when calling a poison control center or doctor, or going for treatment. You may also contact 1-800-992-5994 for emergency medical treatment information.

Environmental Hazards

Do not contaminate water when cleaning equipment or disposing of equipment washwaters. Treatment of aquatic weeds can result in oxygen depletion or loss due to decomposition of dead plants. This oxygen loss can cause fish suffocation.

In case of leak or spill, soak up and remove to a landfill.

Physical or Chemical Hazards

Spray solutions of this product should be mixed, stored and applied using only stainless steel, aluminum, fiberglass, plastic or plastic-lined steel containers.

Do not mix, store or apply this product or spray solutions of this product in galvanized steel or unlined steel (except stainless steel) containers or spray tanks. This product or spray solutions of this product react with such containers and tanks to produce hydrogen gas, which may form a highly combustible gas mixture. This gas mixture could flash or explode, causing serious personal injury, if ignited by open flame, spark, welder's torch, lighted cigarette or other ignition source.

Notice: Read the entire label. Use only according to label directions. **Before using this product, read Terms and Conditions of Use, Warranty Disclaimer, Inherent Risks of Use, and Limitation of Remedies elsewhere on this label. If terms are unacceptable, return at once unopened.**

Trade Name
(Refers to this specific formulation of herbicide)

Chemical Name
(Shows what active ingredients are in the formulation)

Active Ingredient Concentration
(Important to know this to determine rates and solutions for application)

EPA Registration Number
(kind of like a social security number for herbicides. Each specific formulation must be registered with the EPA)

RODEO – Page 1

Specimen Label

Dow AgroSciences

Rodeo®

Herbicide

For control of annual and perennial weeds and woody plants in forests, non-crop sites, and in and around aquatic sites; also for use in wildlife habitat areas, for perennial grass release, and grass growth suppression and grazed areas on these sites.

Avoid contact of herbicide with foliage, green stems, exposed non-woody roots or fruit of crops, desirable plants and trees, because severe injury or destruction may result.

Active Ingredient(s):	
glyphosate[1] N-(phosphonomethyl)glycine, isopropylamine salt	53.8%
Inert Ingredients	46.2%
Total Ingredients	100.0%

[1]Contains 5.4 pounds per gallon glyphosate, isopropylamine salt (4 pounds per gallon glyphosate acid).

EPA Reg. No. 62719-324

Keep Out of Reach of Children

CAUTION PRECAUCION

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.)

Precautionary Statements

Hazards to Humans and Domestic Animals

Harmful If Inhaled

Avoid breathing spray mist. Remove contaminated clothing and wash before reuse. Wash thoroughly with soap and water after handling.

Personal Protective Equipment (PPE)

Applicators and other handlers must wear:

- Long-sleeved shirt and long pants
- Shoes plus socks.

Follow manufacturer's instructions for cleaning/maintaining PPE (Personal Protective Equipment). If no such instructions for washables, use detergent and hot water. Keep and wash PPE separately from other laundry.

Engineering Controls

When handlers use closed systems, enclosed cabs, or aircraft in a manner that meets the requirements listed in Worker Protection Standard (WPS) for agricultural pesticides [40 CFR 170.240 (d) (4-6)], the handler PPE requirements may be reduced or modified as specified in the WPS.

User Safety Recommendations

Users should:

- Wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet.
- Remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.

First Aid

If inhaled: Move person to fresh air. If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably mouth-to-mouth if possible. Call a poison control center or doctor for further treatment advice.

Have the product container or label with you when calling a poison control center or doctor, or going for treatment. You may also contact 1-800-992-5994 for emergency medical treatment information.

Environmental Hazards

Do not contaminate water when cleaning equipment or disposing of equipment washwaters. Treatment of aquatic weeds can result in oxygen depletion or loss due to decomposition of dead plants. This oxygen loss can cause fish suffocation.

In case of leak or spill, soak up and remove to a landfill.

Physical or Chemical Hazards

Spray solutions of this product should be mixed, stored and applied using only stainless steel, aluminum, fiberglass, plastic or plastic-lined steel containers.

Do not mix, store or apply this product or spray solutions of this product in galvanized steel or unlined steel (except stainless steel) containers or spray tanks. This product or spray solutions of this product react with such containers and tanks to produce hydrogen gas, which may form a highly combustible gas mixture. This gas mixture could flash or explode, causing serious personal injury, if ignited by open flame, spark, welder's torch, lighted cigarette or other ignition source.

Notice: Read the entire label. Use only according to label directions. **Before using this product, read Terms and Conditions of Use, Warranty Disclaimer, Inherent Risks of Use, and Limitation of Remedies elsewhere on this label. If terms are unacceptable, return at once unopened.**

PPE Requirements
(You must follow these requirements when applying this particular herbicide)

Description of Herbicide Use
(Tells you what type of species and what locations it is legal to apply this herbicide)

Hazard Statement
(Volunteers can only apply herbicides labeled as 'Caution')

RODEO – Page 1

In case of emergency endangering health or the environment involving this product, call 1-800-992-5994. If you wish to obtain additional product information, visit our web site at www.dowagro.com.

Agricultural Chemical: Do not ship or store with food, feeds, drugs or clothing.

Directions for Use

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.
Read all Directions for Use carefully before applying.

This is an end-use product. Dow AgroSciences does not intend and has not registered it for reformulation. See individual container label for repackaging limitations.

Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. For any requirements specific to your state or tribe, consult the agency responsible for pesticide regulation.

Agricultural Use Requirements

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR part 170. This Standard contains requirements for the protection of agricultural workers on farms, forests, nurseries, and greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification, and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about personal protective equipment (PPE), and restricted entry interval. The requirements in this box only apply to uses of this product that are covered by the Worker Protection Standard.

Do not enter or allow worker entry into treated areas during the restricted entry interval (REI) of 4 hours.

PPE required for early entry to treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil, or water, is:

- Coveralls
- Chemical-resistant gloves made of any waterproof material
- Shoes plus socks

Storage and Disposal

Do not contaminate water, food, feed or seed by storage or disposal.
Pesticide Storage: Store above 10°F (-12°C) to keep product from crystallizing. Crystals will settle to the bottom. If allowed to crystallize, place in a warm room 68°F (20°C) for several days to redissolve and roll or shake container or recirculate in mini-bulk containers to mix well before using.

General Information
(How this product works)

This product is a water-soluble liquid, which mixes readily with water and nonionic surfactant to be applied as a foliar spray for the control or destruction of many herbaceous and woody plants. This product is intended for control of annual and perennial weeds and woody plants in forests, pine straw plantations, non-crop sites such as utility rights-of-way and in and around aquatic sites; also for use in wildlife habitat areas, for perennial grass release, and grass growth suppression and grazed areas on these sites.

The active ingredient in this product moves through the plant from the point of foliage contact to and into the root system. Visible effects on most annual weeds occur within 2 to 4 days, 7 days or more on most perennial weeds, and 30 days or more on most woody plants. Extremely cool or cloudy weather following treatment may slow the activity of this product and delay visual effects of control. Visible effects include gradual wilting and yellowing of the plant which advances to complete browning of above-ground growth and deterioration of underground plant parts.

Unless otherwise directed on this label, delay application until vegetation has emerged and reached the stages described for control of such vegetation under the "Weeds Controlled" section of this label.

Unemerged plants arising from unattached underground rhizomes or root stocks of perennials or brush will not be affected by the spray and will continue to grow. For this reason best control of most perennial weeds or brush is obtained when treatment is made at late growth stages approaching maturity.

Always use the higher rate of this product and surfactant within the recommended range when vegetation is heavy or dense, when treating dense multi-canopied sites or woody vegetation or difficult-to-control herbaceous or woody plants.

Do not treat weeds, brush or trees under poor growing conditions such as drought stress, disease or insect damage, as reduced control may result. Reduced control of target vegetation may also occur if foliage is heavily covered with dust at the time of treatment.

Reduced control may result when applications are made to woody plants or weeds following site disturbance or plant top growth removal from grazing, mowing, logging or mechanical brush control. For best results, delay treatment of such areas until resprouting and foliar growth has restored the target vegetation to the recommended stage of growth for optimum herbicide exposure and control.

Rainfall or irrigation occurring within 6 hours after application may reduce effectiveness. Heavy rainfall or irrigation within 2 hours after application

Contact information for Manufacturer
(In case of health of environment emergency)

General information
(Basic information on how the herbicide works, how long it takes to see visible signs of effects, and conditions to treat)

RODEO – Page 2

Note: The maximum rates stated throughout this product's labeling apply to this product combined with the use of all other herbicides containing glyphosate or sulfosate as the active ingredient, whether applied as mixtures or separately. Calculate the application rates and ensure that the total use of this and other glyphosate or sulfosate containing products does not exceed the maximum use rates.

Grazing Restrictions: This product may be used to treat undesirable vegetation in utility rights-of-way that pass through pastures, rangeland, and forestry sites that are being grazed. For tank mix applications, comply with all restrictions appearing on the tank mix product label.

Except for lactating dairy animals there are no grazing restrictions following the labeled applications of this product.

- For lactating dairy animals there are no grazing restrictions for the following labeled applications of this product:
  - Where the spray can be directed onto undesirable woody brush and trees, such as in handgun spray-to-wet or low volume directed spray treatments.
  - For tree injection of frill applications and for cut stump treatments
- For broadcast applications, observe the following restrictions for lactating dairy animals:
  - For application rates of greater than 4.5 but not to exceed 7.5 quarts per acre, no more than 15 percent of the available grazing area may be treated.
  - For application rates that do not exceed 4.5 quarts per acre, no more than 25 percent of the available grazing area may be treated.
- These restrictions do not apply to pastures, rangeland or forestry sites outside of utility rights-of-way.

NOTE: Use of this product in any manner not consistent with this label may result in injury to persons, animals or crops, or other unintended consequences. When not in use, keep container closed to prevent spills and contamination.

Buyer and all users are responsible for all loss or damage in connection with the use or handling of [illegible] this product or other materials that are not expressly recommended in this label. Mixing this product with herbicides or other materials not recommended in this label may result in reduced performance.

ATTENTION: Avoid drift. Extreme care must be used when applying this product to prevent injury to desirable plants and crops.

Do not allow the herbicide solution to mist, drip, drift or splash onto desirable vegetation since minute quantities of this product can cause severe damage or destruction to the crop, plants or other areas on which treatment was not intended. The likelihood of plant or crop injury occurring from the use of this product is greatest when winds are gusty or in excess of 5 miles per hour or when other conditions, including lesser wind velocities, will allow spray drift to occur. When spraying, avoid combinations of pressure and nozzle type that will result in splatter or fine particles (mist) which are likely to drift. **Avoid applying at excessive speed or pressure.**

Spray Drift Management

Avoiding spray drift at the application site is the responsibility of the applicator. The interaction of many equipment-and-weather-related factors determine the potential for spray drift. The applicator and the grower are responsible for considering all these factors when making decisions. The following drift management requirements must be followed to avoid off-target drift movement from aerial applications to agricultural field crops. These requirements do not apply to forestry applications, public health uses or to applications using dry formulations.

1. The distance of the outer most nozzles on the boom must not exceed 3/4 the length of the wingspan or rotor.
2. Nozzles must always point backward parallel with the air stream and never be pointed downwards more than 45 degrees. Where states have more stringent regulations, they should be observed.

The applicator should be familiar with and take into account the information covered in the following **Aerial Drift Reduction Advisory Information**:

Importance of Droplet Size: The most effective way to reduce drift potential is to apply large droplets. The best drift management strategy is to apply the largest droplets that provide sufficient coverage and control. Applying larger droplets reduces drift potential, but will not prevent drift if applications are made improperly, or under unfavorable environmental conditions (see Wind, Temperature and Humidity, and Temperature Inversion section of this label).

Controlling Droplet Size: Volume-Use high flow rate nozzles to apply the highest practical spray volume. Nozzles with higher rated flows product larger droplets.

Pressure-Use the lower spray pressures recommended for the nozzle. Higher pressure reduces droplet size and does not improve canopy penetration. When higher flow rates are needed, use higher flow rate nozzles instead of increasing pressure.

Number of nozzles-Use the minimum number of nozzles that provide uniform coverage.

Nozzle Orientation-Orienting nozzles so that the spray is released backwards, parallel to the airstream will produce larger droplets than other orientations. Significant deflection from the horizontal will reduce droplet size and increase drift potential.

Nozzle Type-Use a nozzle type that is designed for the intended application. With most nozzle types, narrower spray angles produce larger droplets. Consider using low-drift nozzles. Solid stream nozzles oriented straight back produce larger droplets than other nozzle types.

Boom Length-For some use patterns, reducing the effective boom length to less than 3/4 of the wingspan or rotor length may further reduce drift without reducing swath width.

Application-Applications should not be made at a height greater than 10 feet above the top of the largest plants unless a greater height is required for aircraft safety. Making applications at the lowest height that is safe reduces exposure of droplets to evaporation and wind.

Cautionary statements
(To avoid unintended injury to desirable plants)

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Spray Solution

Desired Volume	Amount of this product							
	3/4%	1%	1 1/4%	1 1/2%	2%	5%	8%	10%
1 gal	1 fl oz	1 1/3 fl oz	1 2/3 fl oz	2 fl oz	2 2/3 fl oz	6 1/2 fl oz	10 1/4 fl oz	12 3/4 fl oz
25 gal	1 1/2 pt	1 qt	1 1/4 qt	1 1/2 qt	2 qt	5 qt	2 gal	2.5 gal
100 gal	3 qt	1 gal	1 1/4 gal	1 1/2 gal	2 gal	5 gal	8 gal	10 gal

2 tablespoons = 1 fluid ounce

For use in knapsack sprayers, it is suggested that the recommended amount of this product be mixed with water in a larger container. Fill the knapsack sprayer with the mixed solution and add the correct amount of surfactant.

Selective Equipment

This product may be applied through shielded sprayers or wiper application equipment. This equipment may be used to selectively control undesirable vegetation without harming desirable vegetation.

Shielded sprayers direct the herbicide solution onto weeds while shielding desirable vegetation from the spray solution. Any recommended rate or tank mixture of this product may be used employing this equipment.

Wiper applicators physically wipe product directly onto undesirable vegetation. Care should be taken to avoid wiping desirable vegetation. Use a 33 to 100 percent solution of this product, diluted in water for wiper applications. Use a 33 percent solution for wick or gravity feed systems. Higher concentrations may be used in pressurized systems that are capable of handling thicker solutions. Addition of a nonionic surfactant at a rate of 10 percent by volume of total herbicide solution is recommended.

Weeds Controlled

Annual Weeds

Apply to actively growing annual grasses and broadleaf weeds.

Allow at least 3 days after application before disturbing treated vegetation. After this period the weeds may be mowed, tilled or burned. See "Directions for Use," "General Information" and "Mixing and Application Instructions" for labeled uses and specific application instructions.

Broadcast Application Rates: For weeds less than 6 inches tall, use 1 1/2 pints of this product per acre plus a surfactant such as a non-ionic surfactant containing 80% or greater active ingredient. If weeds are greater than 6 inches tall, use 2 1/2 pints of this product per acre plus a non-ionic surfactant containing 80% or greater active ingredient..

Hand-Held, High-Volume Application Rates: Use a 3/4 percent solution of this product in water plus a surfactant such as a non-ionic surfactant containing 80% or greater active ingredient. Apply to foliage of vegetation to be controlled.

When applied as directed, this product **plus a surfactant such as a non-ionic surfactant containing 80% or greater active ingredient will control the following annual weeds:**

Common Name	Scientific Name
Balsamapple [1]	*Momordica charantia*
Barley	*Hordeum vulgare*
Barnyardgrass	*Echinochloa crus-galli*
Bassia, fivehook	*Bassia hyssopifolia*
Bluegrass, annual	*Poa annua*
Bluegrass, bulbous	*Poa bulbosa*
Brome	*Bromus spp.*
Buttercup	*Ranunculus spp.*
Cheat	*Bromus secalinus*
Chickweed, mouseear	*Cerastium vulgatum*
Cocklebur	*Xanthium strumarium*
Corn, volunteer	*Zea mays*
Crabgrass	*Digitaria spp.*
Dwarfdandelion	*Krigia cespitosa*
Falseflax, smallseed	*Camelina microcarpa*
Fiddleneck	*Amsinckia spp.*
Flaxleaf fleabane	*Conyza bonariensis*
Fleabane	*Erigeron spp.*
Foxtail	*Setaria spp.*
Foxtail, Carolina	*Alopecurus carolinianus*
Groundsel, common	*Senecio vulgaris*
Horseweed/Marestail	*Conyza canadensis*
Kochia	*Kochia scoparia*
Lambsquarters, common	*Chenopodium album*
Lettuce, prickly	*Lactuca serriola*
Morningglory	*Ipomoea spp.*
Mustard, blue	*Chorispora tenella*
Mustard, tansy	*Descurainia pinnata*
Mustard, tumble	*Sisymbrium altissimum*
Mustard, wild	*Sinapis arvensis*
Oats, wild	*Avena fatua*
Panicum	*Panicum spp.*
Pennycress, field	*Thlaspi arvense*
Pigweed, redroot	*Amaranthus retroflexus*
Pigweed, smooth	*Amaranthus hybridus*
Ragweed, common	*Ambrosia artemisiifolia*
Ragweed, giant	*Ambrosia trifida*
Rocket, London	*Sisymbrium irio*
Rye	*Secale cereale*
Ryegrass, Italian [1]	*Lolium multiflorum*
Sandbur, field	*Cenchrus spp.*
Shattercane	*Sorghum bicolor*
Shepherd's-purse	*Capsella bursa-pastoris*
Signalgrass, broadleaf	*Brachiaria platyphylla*
Smartweed, Pennsylvania	*Polygonum pensylvanicum*

Spray solution chart
(Used by mixer to determine amount needed for different solution strengths)

Control recommendations
(Specific recommendations for control of different categories of weeds)

RODEO – Page 6

Common Name	Scientific Name
Sowthistle, annual	*Sonchus oleraceus*
Spanishneedles [††]	*Bidens bipinnata*
Stinkgrass	*Eragrostis cilianensis*
Sunflower	*Helianthus annuus*
Thistle, Russian	*Salsola kali*
Spurry, umbrella	*Holosteum umbellatum*
Velvetleaf	*Abutilon theophrasti*
Wheat	*Triticum aestivum*
Witchgrass	*Panicum capillare*

[†] Apply with hand-held equipment only.
[††] Apply 3 pints of this product per acre.

Annual weeds will generally continue to germinate from seed throughout the growing season. Repeat treatments will be necessary to control later germinating weeds.

Perennial Weeds

Apply this product to control most vigorously growing perennial weeds. Unless otherwise directed, apply when target plants are actively growing and most have reached early head or early bud stage of growth. Unless otherwise directed, allow at least 7 days after application before disturbing vegetation.

NOTE: If weeds have been mowed or tilled, do not treat until regrowth has reached the recommended stages. Fall treatments must be applied before a killing frost.

Repeat treatments may be necessary to control weeds regenerating from underground parts or seed.

Specific Weed Control Recommendations: For perennial weeds, apply the recommended rate plus a surfactant such as a non-ionic surfactant containing 80% or greater active ingredient.. Use of this product without surfactant will result in reduced herbicide performance. Refer to the "Mixing and Application Instructions" section of this label and the surfactant manufacturer label for more information. .
When applied as directed, this product plus a surfactant such as a non-ionic surfactant containing 80% or greater active ingredient will control the following perennial weeds: (Numbers in parentheses "(-)" following common name of a listed weed species refer to "Specific Perennial Weed Control Recommendations" for that weed which follow the species listing.)

Common Name	Scientific Name
Alfalfa (31)	*Medicago sativa*
Alligatorweed [†] (1)	*Alternanthera philoxeroides*
Anise/Fennel (31)	*Foeniculum vulgare*
Artichoke, Jerusalem (31)	*Helianthus tuberosus*
Bahiagrass (31)	*Paspalum notatum*
Bermudagrass (2)	*Cynodon dactylon*
Bindweed, field (3)	*Convolvulus arvensis*
Bluegrass, Kentucky (12)	*Poa pratensis*
Blueweed, Texas (3)	*Helianthus ciliaris*
Brackenfern (4)	*Pteridium spp.*
Bromegrass, smooth (12)	*Bromus inermis*
Canarygrass, reed (12)	*Phalaris arundinacea*
Cattail (5)	*Typha spp.*
Clover, red (31)	*Trifolium pratense*
Clover, white (31)	*Trifolium repens*
Cogongrass (6)	*Imperata clylindrica*
Cordgrass (7)	*Spartina spp.*
Cutgrass, giant [†] (8)	*Zizaniopsis miliacea*
Dallisgrass (31)	*Paspalum dilatatum*
Dandelion (31)	*Taraxacum officinale*
Dock, curly (31)	*Rumex crispus*
Dogbane, hemp (9)	*Apocynum cannabinum*
Fescue (31)	*Festuca spp.*
Fescue, tall (10)	*Festuca arundinacea*
Guineagrass (11)	*Panicum maximum*
Hemlock, poison (31)	*Conium maculatum*
Horsenettle (31)	*Solanum carolinense*
Horseradish (9)	*Armoracia rusticana*
Ice Plant (22)	*Mesembryanthemum crystallinum*
Johnsongrass (12)	*Sorghum halepense*
Kikuyugrass (21)	*Pennisetum clandestinum*
Knapweed (9)	*Centaurea repens*
Lantana (13)	*Lantana camara*
Lespedeza, common (31)	*Lespedeza striata*
Lespedeza, sericea (31)	*Lespedeza cuneata*
Loosestrife, purple (14)	*Lythrum salicaria*
Lotus, American (15)	*Nelumbo lutea*
Maidencane (16)	*Panicum hematomon*
Milkweed (17)	*Asclepias spp.*
Muhly, wirestem (21)	*Muhlenbergia frondosa*
Mullein, common (31)	*Verbascum thapsus*
Napiergrass (31)	*Pennisetum purpureum*
Nightshade, silverleaf (3)	*Solanum elaeagnifolium*
Nutsedge, purple (18)	*Cyperus rotundus*
Nutsedge, yellow (18)	*Cyperus esculentus*
Orchardgrass (12)	*Dactylis glomerata*
Pampasgrass (19)	*Cortaderia jubata*
Paragrass (16)	*Brachiaria mutica*
Phragmites [††] (20)	*Phragmites spp.*
Quackgrass (21)	*Agropyron repens*
Reed, giant (22)	*Arundo donax*
Ryegrass, perennial (12)	*Lolium perenne*
Smartweed, swamp (31)	*Polygonum coccineum*
Spatterdock (23)	*Nuphar luteum*
Starthistle, yellow (31)	*Centaurea solstitialis*
Sweet potato, wild [†] (24)	*Ipomoea pandurata*
Thistle, artichoke (25)	*Cynara cardunculus*
Thistle, Canada (25)	*Cirsium arvense*
Timothy (12)	*Phleum pratense*
Torpedograss [†] (26)	*Panicum repens*
Tules, common (27)	*Scirpus acutus*
Vaseygrass (31)	*Paspalum urvillei*
Velvetgrass (31)	*Holcus spp.*
Waterhyacinth (28)	*Eichornia crassipes*
Waterlettuce (29)	*Pistia stratiotes*
Waterprimrose (30)	*Ludwigia spp.*
Wheatgrass, western (12)	*Agropyron smithii*

[†] Partial control.
[††] Partial control in southeastern states. See "Specific Weed Control Recommendations" below.

Specific Perennial Weed Control Recommendations:

1. **Alligatorweed:** Apply 6 pints of this product per acre as a broadcast spray or as a 1 1/4 percent solution with hand-held equipment to provide partial control of alligatorweed. Apply when most of the target plants are in bloom. Repeat applications will be required to maintain such control.

Species specific control recommendations chart
(Label gives specific control recommendations for certain species)

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Noncrop Sites

This product may be used to control the listed weeds in and around aquatic sites and on noncrop sites such as:

Airports
Golf Courses
Habitat Restoration & Management Areas
Highways & Roadsides
Industrial Plant Sites
Lumberyards
Parking Areas
Parks
Petroleum Tank Farms
Pipeline, Power, Telephone & Utility Rights-of-Way
Pumping Installations
Railroads
Schools
Storage Areas
Similar Sites

- Floating mats of vegetation may require retreatment. Avoid wash-off of sprayed foliage by spray boat or recreational boat backwash or by rainfall within 6 hours of application. Do not re-treat within 24 hours following the initial treatment.
- Applications made to moving bodies of water must be made while traveling upstream to prevent concentration of this herbicide in water. When making any bankside applications, do not overlap more than 1 foot into open water. Do not spray in bodies of water where weeds do not exist. The maximum application rate of 7 1/2 pints per acre must not be exceeded in any single broadcast application that is being made over water.
- When emerged infestations require treatment of the total surface area of impounded water, treating the area in strips may avoid oxygen depletion due to decaying vegetation. Oxygen depletion may result in fish kill.

Aquatic Sites

This product may be applied to emerged weeds in all bodies of fresh and brackish water which may be flowing, nonflowing or transient. This includes lakes, rivers, streams, ponds, estuaries, rice levees, seeps, irrigation and drainage ditches, canals, reservoirs, wastewater treatment facilities, wildlife habitat restoration and management areas and similar sites.

If aquatic sites are present in the noncrop area and are part of the intended treatment, read and observe the following directions:

- **This product does not control plants which are completely submerged or have a majority of their foliage under water.**
- There is no restriction on the use of treated water for irrigation, recreation or domestic purposes.
- Consult local state fish and game agency and water control authorities before applying this product to public water. Permits may be required to treat such water.
- **NOTE:** Do not apply this product directly to water within 1/2 mile up-stream of an active potable water intake in flowing water (i.e., river, stream, etc.) or within 1/2 mile of an active potable water intake in a standing body of water such as lake, pond or reservoir. To make aquatic applications around and within 1/2 mile of active potable water intakes, the water intake must be turned off for a minimum period of 48 hours after the application. The water intake may be turned on prior to 48 hours if the glyphosate level in the intake water is below 0.7 parts per million as determined by laboratory analysis. These aquatic applications may be made **only** in those cases where there are alternative water sources or holding ponds which would permit the turning off of an active potable water intake for a minimum period of 48 hours after the applications. This restriction does not apply to intermittent inadvertent overspray of water in terrestrial use sites.
- For treatments after drawdown of water or in dry ditches, allow 7 or more days after treatment before reintroduction of water to achieve maximum weed control. Apply this product within 1 day after drawdown to ensure application to actively growing weeds.

Forestry Sites and Utility Rights-of-Way

In forest and utility sites, this product is recommended for the control or partial control of woody brush, trees, and annual and perennial herbaceous weeds. This product is also recommended for use in preparing or establishing wildlife openings within these sites, in pine straw plantations for maintaining logging roads, and for side trimming along utility rights-of-way.

In forestry sites, this product is recommended for use in site preparation prior to planting any tree species, including Christmas trees and silvicultural nursery sites.

In utility sites, this product is recommended for use along electrical power, pipeline, and telephone rights-of-way, and in other utility sites associated with these rights-of-way, such as substations.

Application Rates [†]:

Method of Application	Application Rate	Spray Volume (gal/acre)
Broadcast		
Aerial	1.5 to 7.5 qt/acre	5 to 30
Ground	1.5 to 7.5 qt/acre	10 to 60
Spray-to-Wet		
Handgun, Backpack Mistblower	0.75 to 2% by volume	spray-to-wet
Low Volume Directed Spray [††]		
Handgun, Backpack Mistblower	5% to 10% by volume	partial coverage

[†] Where repeat applications are necessary, do not exceed 8.0 quarts per acre per year.

[††] For low volume directed spray applications, coverage should be uniform with at least 50 percent of the foliage contacted. For best results, coverage of the top one-half of the plant is important.

In forestry site preparation and utility rights-of-way applications, this product requires use with a surfactant such as a non-ionic surfactant containing greater than 80 percent active ingredient. Use of this product without surfactant will result in reduced herbicideperformance. Refer to the "Mixing and Application Instructions" section of this label and the surfactant manufacturer label for more information.

Wetland/aquatic information
(If you herbicides in or near water, it is crucial that you use a product labeled for use in aquatic areas. This section gives specific information about this type of application)

Sites specific control recommendations chart
(Label gives specific control recommendations for certain sites)

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Use higher rates of this product within the recommended rate ranges for control or partial control of woody brush, trees and hard-to-control perennial herbaceous weeds. For best results, apply to actively growing woody brush and trees after full leaf expansion and before fall color and leaf drop. Use increased rates within the recommended rate range to control of perennial herbaceous weeds from emergence up to the appearance of seedheads, flowers or berries appear. Use lower rates within the recommended rate range to control annual herbaceous weeds and actively growing perennial herbaceous weeds after seedheads, flowers or berries appear. Apply to foliage of actively growing annual herbaceous weeds anytime after emergence.

Tank Mixtures

This product may be used in tank mix combination with other herbicide products to broaden the spectrum of vegetation controlled. When tank mixing, read and observe applicable use directions, precautions and limitations on the respective product labels. Use according to the most restrictive precautionary statements for each product on the mixture. Any recommended rate of this product may be used in a tank mix.

Note: For forestry site preparation, make sure the tank mix product is approved for use prior to planting the desired species. Observe planting interval restrictions. For side trimming treatments in utility rights-of-way, tank mixtures with Arsenal 2WSL herbicide are not recommended. For side trimming treatments, it is recommended that this product be used alone as recommended, or as a tank mix with Garlon.

Product	Broadcast Rate	Use Sites
Arsenal Applicators Concentrate	2 to 16 fl oz/acre	Forestry site preparation
Oust	1 to 4 oz/acre	Forestry site preparation, utility sites
Garlon 3A [1]	1 to 4 qt/acre	Forestry site preparation, utility sites
Garlon 4	1 to 4 qt/acre	Forestry site preparation, utility sites
Arsenal 2WSL	2 to 32 fl oz/acre	Utility sites
	Spray-to-Wet Rates	
Arsenal Applicators Concentrate	1/32% to 1/2% by volume	Forestry site preparation
Arsenal 2WSL	1/32% to 1/2% by volume	Utility sites
	Low Volume Directed Spray Rates	
Arsenal Applicators Concentrate	1/8% to 1/2% by volume	Forestry site preparation
Arsenal 2WSL	1/8% to 1/2% by volume	Utility sites

[1] Ensure that Garlon 3A is thoroughly mixed with water before adding this product. Agitation is required while mixing this product with Garlon 3A to avoid compatibility problems.

For control of herbaceous weeds, use the lower recommended tank mixture rates. For control of dense stands or difficult-to-control woody brush and trees, use the higher recommended rates.

Forestry Conifer and Hardwood Release

Directed Sprays and Selective Equipment

This product may be applied as a directed spray or by using selective equipment in forestry conifer and hardwood sites, including Christmas tree plantations and silvicultural nurseries. This product requires use with a surfactant. Use only surfactants that are approved for conifer release and specified on the surfactant label as safe for use in conifer release (pine release). Use of this product without surfactant will result in reduced herbicide performance. Refer to the "Mixing and Application Instructions" section of this label and the surfactant manufacturer label for more information.

Tank Mixing: In hardwood plantations, tank mixtures with Oust may be used. In pine plantations, tank mixtures with Garlon 4 or Arsenal AC may be used. Comply with all site restrictions, forestry species limitations, and precautions on the tank mix product labels.

Avoid contact of spray drift, mist or drips with foliage, green bark or non-woody surface roots of desirable plant species. See "Application Equipment and Techniques" section of this label for specific recommendations and precautions.

Spray-to-Wet Applications: Use a 2 percent spray solution to control undesirable woody brush and trees. To control herbaceous weeds, use a 1 to 2 percent spray solution.

Low Volume Directed Spray Applications: Use a 5 to 10 percent spray solution. Coverage should be uniform with at least 50 percent of the foliage contacted. Coverage of the top one-half of the unwanted vegetation is important.

Broadcast Applications: For equipment calibrated for broadcast applications, use 1 1/2 to 7 1/2 quarts of this product per acre. Apply in 10 to 60 gallons of clean water per acre. Shielded application equipment may be used to avoid contact of the spray solution with desirable plants. Shields should be adjusted to prevent spray contact with the foliage of green bark of desirable vegetation.

Wiper Application Equipment: See the "Selective Equipment" section of this label for equipment and application rate recommendations.

Broadcast Application

Note: Except where specifically recommended below, make broadcast applications of this product only where conifers have been established for more than one year.

Broadcast application must be made after formation of final conifer resting buds in the fall or prior to initial bud swelling in the spring.

Injury may occur to conifers treated for release, especially where spray patterns overlap or the higher rates are applied. Damage can be accentuated if applications are made when conifers are actively growing, or are under stress from drought, flood water, improper planting, insects, animal damage or diseases.

Accord Concentrate requires use with a surfactant. Use a surfactant that is labeled/recommended for use in over-the-top release applications. Use of this product without a surfactant will result in reduced herbicide performance. Refer to the "Mixing and Application Instructions" section of this label and the surfactant manufacturer label for more information.

Mixing Information
(Important information on which other herbicides are compatible with this specific herbicide and what rates to use and how to mix them correctly)

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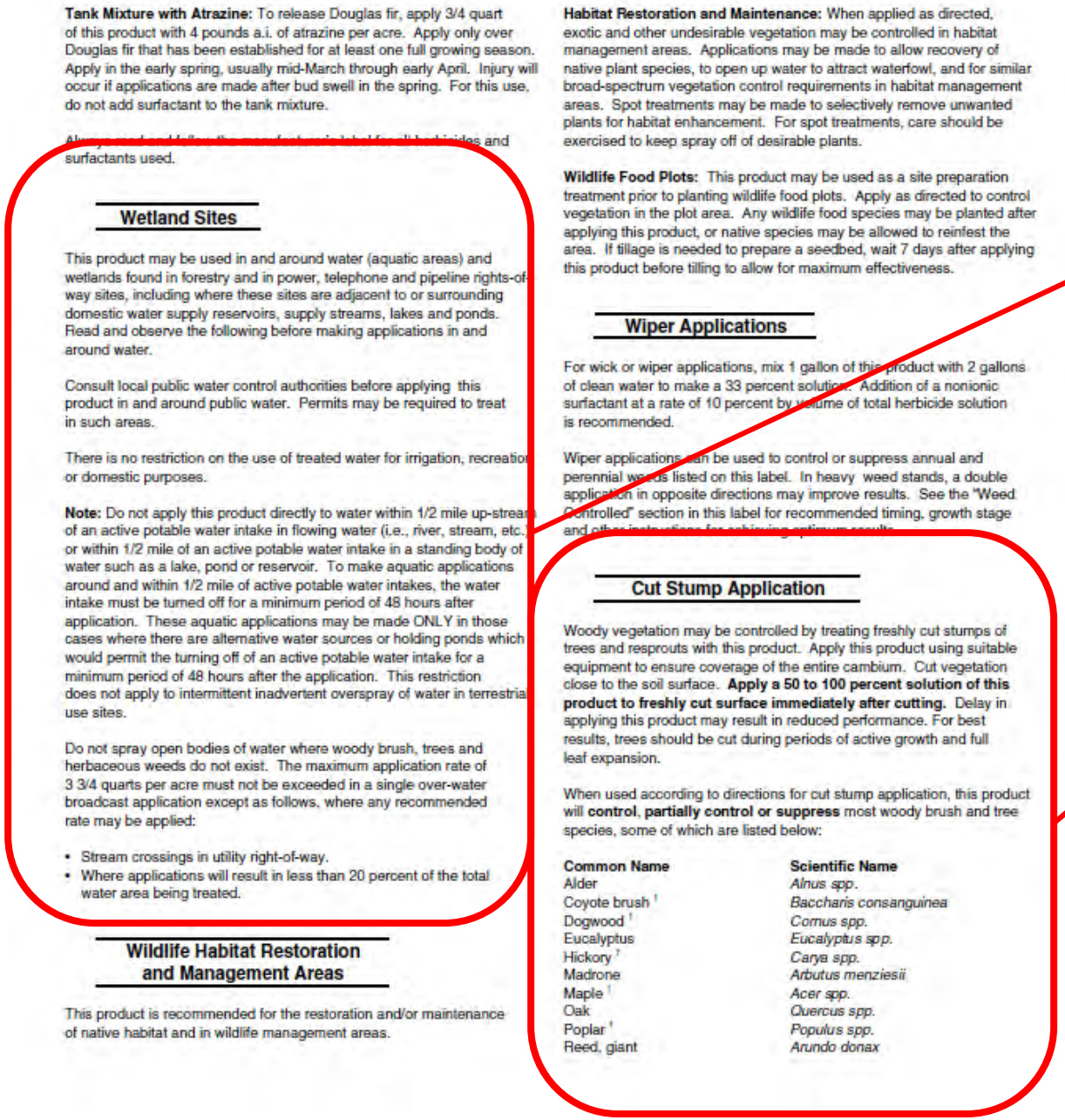

Tank Mixture with Atrazine: To release Douglas fir, apply 3/4 quart of this product with 4 pounds a.i. of atrazine per acre. Apply only over Douglas fir that has been established for at least one full growing season. Apply in the early spring, usually mid-March through early April. Injury will occur if applications are made after bud swell in the spring. For this use, do not add surfactant to the tank mixture.

surfactants used.

Wetland Sites

This product may be used in and around water (aquatic areas) and wetlands found in forestry and in power, telephone and pipeline rights-of-way sites, including where these sites are adjacent to or surrounding domestic water supply reservoirs, supply streams, lakes and ponds. Read and observe the following before making applications in and around water.

Consult local public water control authorities before applying this product in and around public water. Permits may be required to treat in such areas.

There is no restriction on the use of treated water for irrigation, recreation or domestic purposes.

Note: Do not apply this product directly to water within 1/2 mile up-stream of an active potable water intake in flowing water (i.e., river, stream, etc.) or within 1/2 mile of an active potable water intake in a standing body of water such as a lake, pond or reservoir. To make aquatic applications around and within 1/2 mile of active potable water intakes, the water intake must be turned off for a minimum period of 48 hours after application. These aquatic applications may be made ONLY in those cases where there are alternative water sources or holding ponds which would permit the turning off of an active potable water intake for a minimum period of 48 hours after the application. This restriction does not apply to intermittent inadvertent overspray of water in terrestrial use sites.

Do not spray open bodies of water where woody brush, trees and herbaceous weeds do not exist. The maximum application rate of 3 3/4 quarts per acre must not be exceeded in a single over-water broadcast application except as follows, where any recommended rate may be applied:

- Stream crossings in utility right-of-way.
- Where applications will result in less than 20 percent of the total water area being treated.

Wildlife Habitat Restoration and Management Areas

This product is recommended for the restoration and/or maintenance of native habitat and in wildlife management areas.

Habitat Restoration and Maintenance: When applied as directed, exotic and other undesirable vegetation may be controlled in habitat management areas. Applications may be made to allow recovery of native plant species, to open up water to attract waterfowl, and for similar broad-spectrum vegetation control requirements in habitat management areas. Spot treatments may be made to selectively remove unwanted plants for habitat enhancement. For spot treatments, care should be exercised to keep spray off of desirable plants.

Wildlife Food Plots: This product may be used as a site preparation treatment prior to planting wildlife food plots. Apply as directed to control vegetation in the plot area. Any wildlife food species may be planted after applying this product, or native species may be allowed to reinfest the area. If tillage is needed to prepare a seedbed, wait 7 days after applying this product before tilling to allow for maximum effectiveness.

Wiper Applications

For wick or wiper applications, mix 1 gallon of this product with 2 gallons of clean water to make a 33 percent solution. Addition of a nonionic surfactant at a rate of 10 percent by volume of total herbicide solution is recommended.

Wiper applications can be used to control or suppress annual and perennial weeds listed on this label. In heavy weed stands, a double application in opposite directions may improve results. See the "Weed Controlled" section in this label for recommended timing, growth stage and other instructions for obtaining optimum results.

Cut Stump Application

Woody vegetation may be controlled by treating freshly cut stumps of trees and resprouts with this product. Apply this product using suitable equipment to ensure coverage of the entire cambium. Cut vegetation close to the soil surface. **Apply a 50 to 100 percent solution of this product to freshly cut surface immediately after cutting.** Delay in applying this product may result in reduced performance. For best results, trees should be cut during periods of active growth and full leaf expansion.

When used according to directions for cut stump application, this product will **control**, **partially control or suppress** most woody brush and tree species, some of which are listed below:

Common Name	Scientific Name
Alder	*Alnus spp.*
Coyote brush †	*Baccharis consanguinea*
Dogwood †	*Cornus spp.*
Eucalyptus	*Eucalyptus spp.*
Hickory †	*Carya spp.*
Madrone	*Arbutus menziesii*
Maple †	*Acer spp.*
Oak	*Quercus spp.*
Poplar †	*Populus spp.*
Reed, giant	*Arundo donax*

Wetland/aquatic information
(If you herbicides in or near water, it is crucial that you use a product labeled for use in aquatic areas. This section gives specific information about this type of application)

Information on cut stump treatments
(Specific information on the rates and methods used for this application type)

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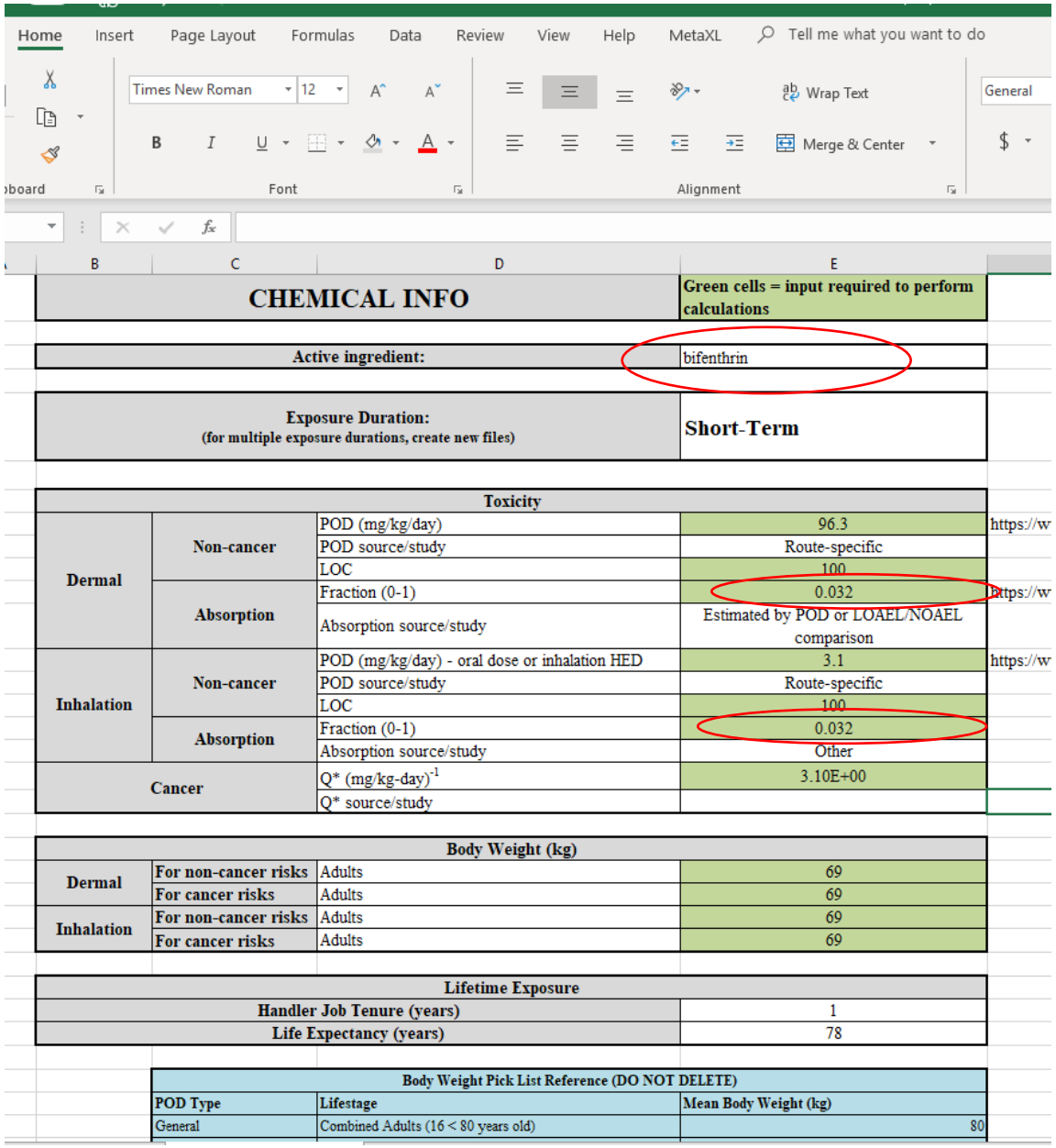
Where do the PPE recommendations come from?



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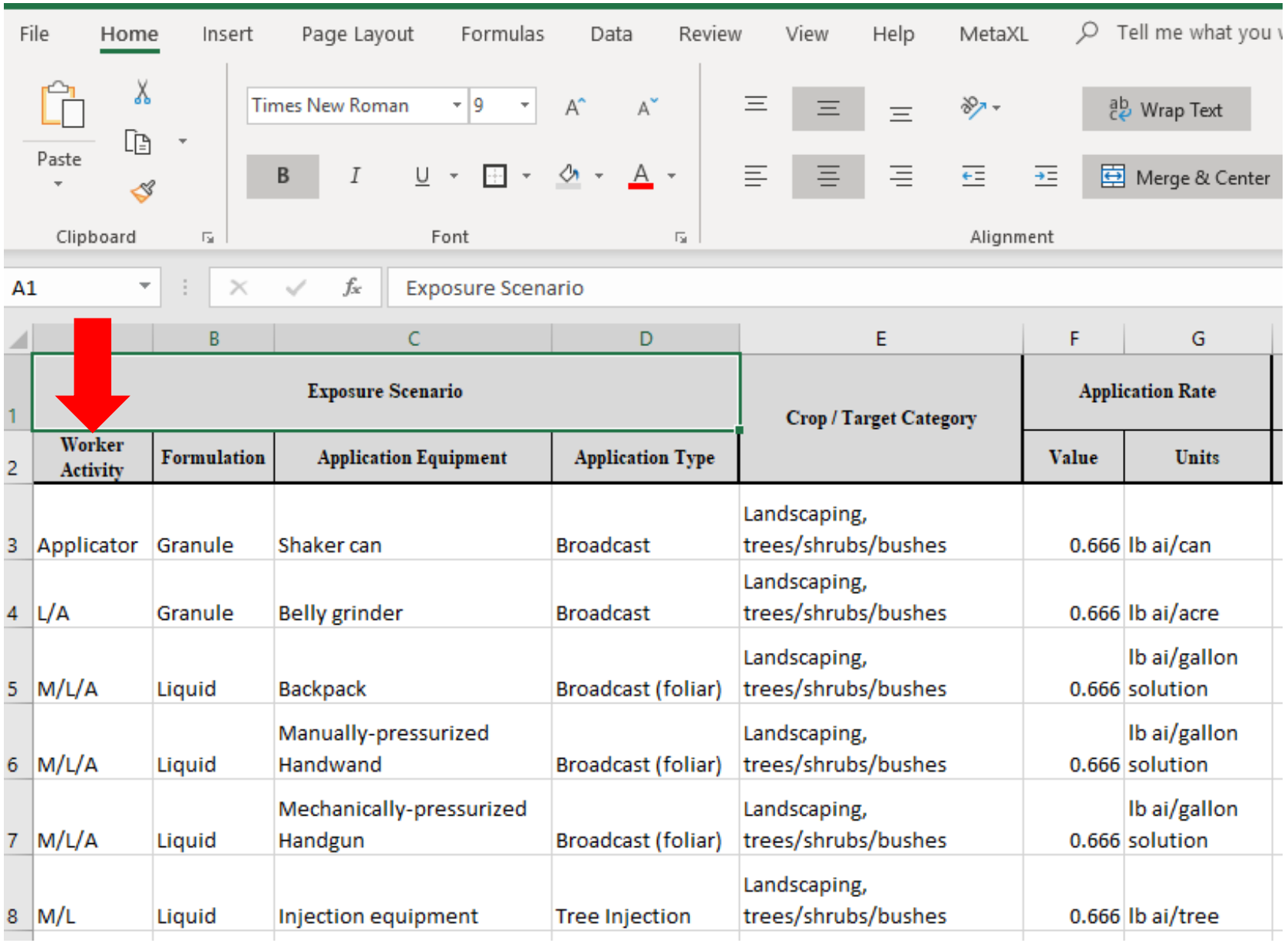
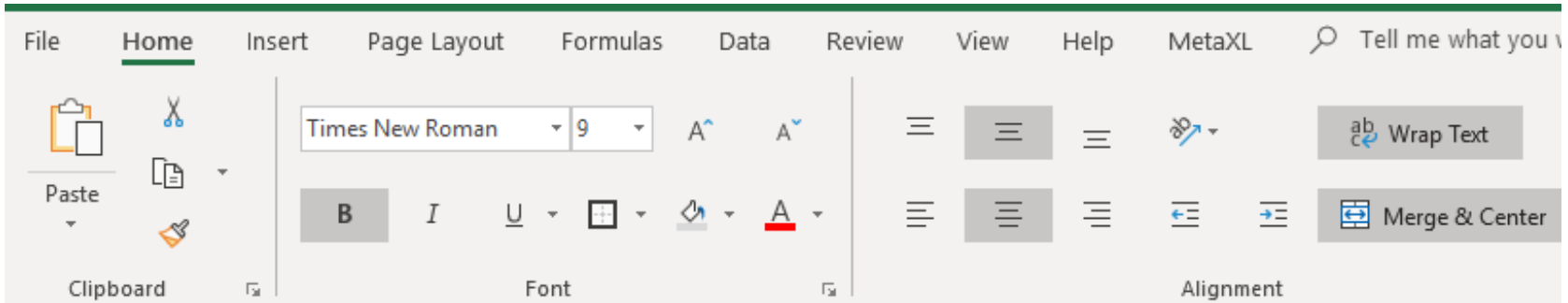
	B	C	D	E
	CHEMICAL INFO			**Green cells = input required to perform calculations**
	Active ingredient:			bifenthrin
	Exposure Duration: (for multiple exposure durations, create new files)			**Short-Term**
	Toxicity			
	Dermal	**Non-cancer**	POD (mg/kg/day)	96.3
			POD source/study	Route-specific
			LOC	100
		Absorption	Fraction (0-1)	0.032
			Absorption source/study	Estimated by POD or LOAEL/NOAEL comparison
	Inhalation	**Non-cancer**	POD (mg/kg/day) - oral dose or inhalation HED	3.1
			POD source/study	Route-specific
			LOC	100
		Absorption	Fraction (0-1)	0.032
			Absorption source/study	Other
	Cancer		Q^* (mg/kg-day)$^{-1}$	3.10E+00
			Q^* source/study	
	Body Weight (kg)			
	Dermal	**For non-cancer risks**	Adults	69
		For cancer risks	Adults	69
	Inhalation	**For non-cancer risks**	Adults	69
		For cancer risks	Adults	69
	Lifetime Exposure			
	Handler Job Tenure (years)			1
	Life Expectancy (years)			78

	Body Weight Pick List Reference (DO NOT DELETE)		
	POD Type	**Lifestage**	**Mean Body Weight (kg)**
	General	Combined Adults (16 < 80 years old)	80

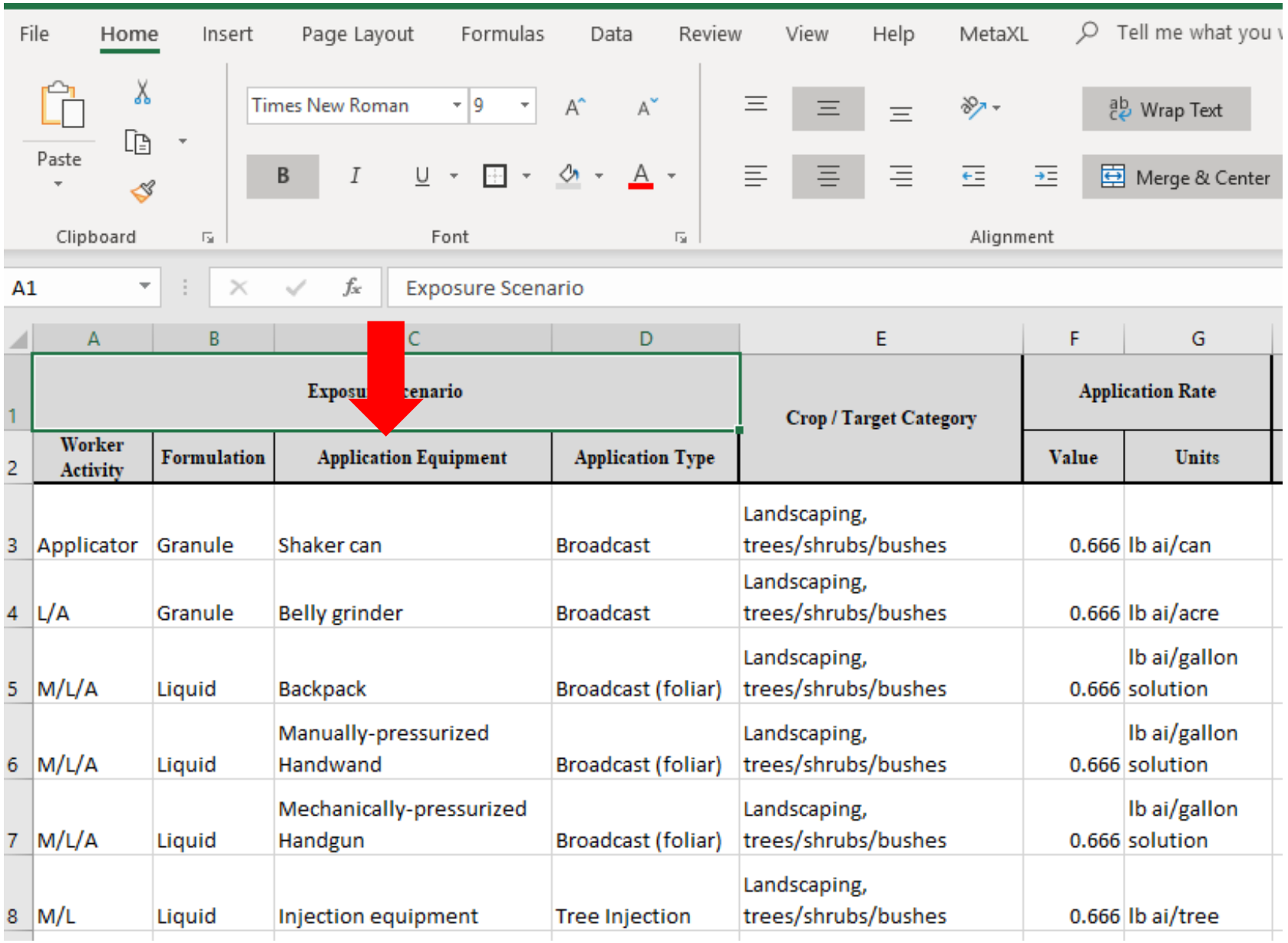


	B	C	D	E	F	G
1	Exposure Scenario			Crop / Target Category	Application Rate	
2	Worker Activity	Formulation	Application Equipment	Application Type	Value	Units
3	Applicator	Granule	Shaker can	Broadcast	Landscaping, trees/shrubs/bushes	0.666	lb ai/can
4	L/A	Granule	Belly grinder	Broadcast	Landscaping, trees/shrubs/bushes	0.666	lb ai/acre
5	M/L/A	Liquid	Backpack	Broadcast (foliar)	Landscaping, trees/shrubs/bushes	0.666	lb ai/gallon solution
6	M/L/A	Liquid	Manually-pressurized Handwand	Broadcast (foliar)	Landscaping, trees/shrubs/bushes	0.666	lb ai/gallon solution
7	M/L/A	Liquid	Mechanically-pressurized Handgun	Broadcast (foliar)	Landscaping, trees/shrubs/bushes	0.666	lb ai/gallon solution
8	M/L	Liquid	Injection equipment	Tree Injection	Landscaping, trees/shrubs/bushes	0.666	lb ai/tree



A1 | Exposure Scenario

	A	C	D	E	F	G
1	Exposure Scenario			Crop / Target Category	Application Rate	
2	Worker Activity	Formulation	Application Equipment	Application Type	Value	Units
3	Applicator	Granule	Shaker can	Broadcast	Landscaping, trees/shrubs/bushes	0.666	lb ai/can
4	L/A	Granule	Belly grinder	Broadcast	Landscaping, trees/shrubs/bushes	0.666	lb ai/acre
5	M/L/A	Liquid	Backpack	Broadcast (foliar)	Landscaping, trees/shrubs/bushes	0.666	lb ai/gallon solution
6	M/L/A	Liquid	Manually-pressurized Handwand	Broadcast (foliar)	Landscaping, trees/shrubs/bushes	0.666	lb ai/gallon solution
7	M/L/A	Liquid	Mechanically-pressurized Handgun	Broadcast (foliar)	Landscaping, trees/shrubs/bushes	0.666	lb ai/gallon solution
8	M/L	Liquid	Injection equipment	Tree Injection	Landscaping, trees/shrubs/bushes	0.666	lb ai/tree



	A	B	C	D	E	F	G
1	Exposure Scenario				Crop / Target Category	Application Rate	
2	Worker Activity	Formulation	Application Equipment	Application Type		Value	Units
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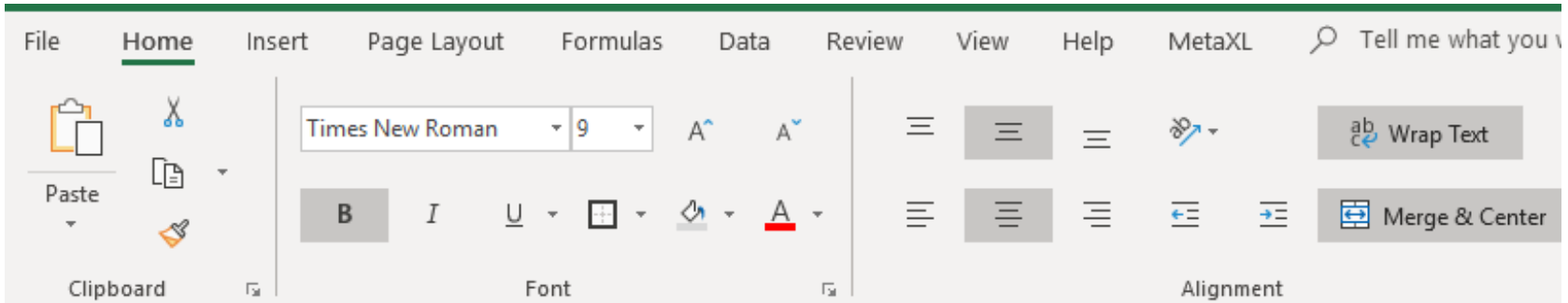

A1 | Exposure Scenario

	A	B	C		E	F	G
1	**Exposure Scenario**				**Crop / Target Category**	**Application Rate**	
2	**Worker Activity**	**Formulation**	**Application Equipment**	**Application Type**		**Value**	**Units**
3	Applicator	Granule	Shaker can	Broadcast	Landscaping, trees/shrubs/bushes	0.666	lb ai/can
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5	M/L/A	Liquid	Backpack	Broadcast (foliar)	Landscaping, trees/shrubs/bushes	0.666	lb ai/gallon solution
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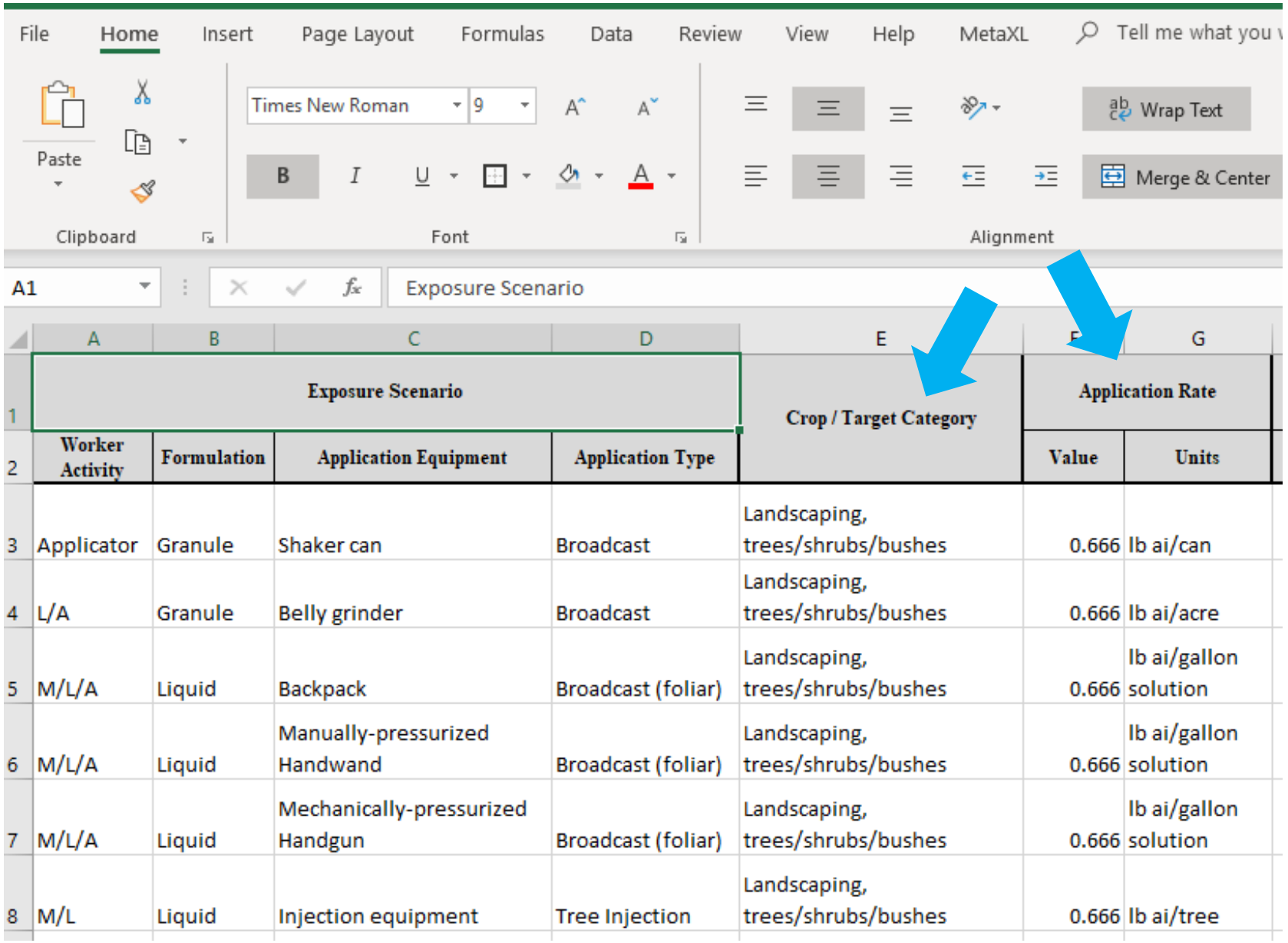

	A	B	C	D	E	F	G
1	Exposure Scenario				Crop / Target Category	Application Rate	
2	Worker Activity	Formulation	Application Equipment	Application Type		Value	Units
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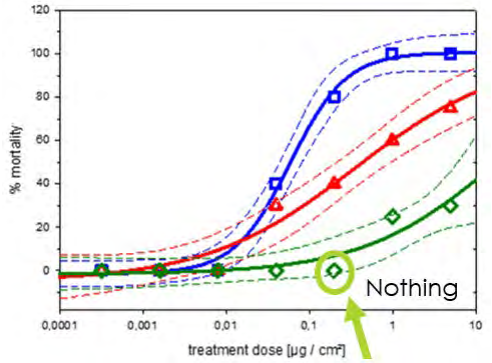
8	M/L	Liquid	Injection equipment	Tree Injection	Landscaping, trees/shrubs/bushes	0.666	lb ai/tree

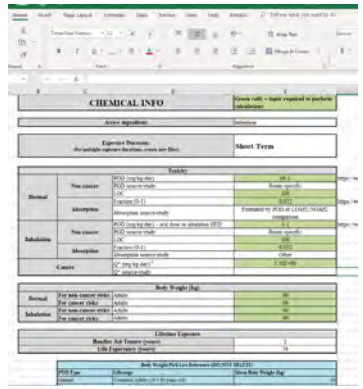
MOE = NOAEL/Estimated Exposure Dose

Ratio of: how bad is it?

if the MOE is 2 --the expected exposure from this application is only two times higher than the point where we start seeing problems

MOE over 100 is considered acceptable





MOE = NOAEL/Estimated Exposure Dose

Ratio of: how bad

if the MOE is 2 --
two times higher

MOE over 100 is

NOAEL = 75 ppm
EEC = 50 ppm

$$\frac{75}{50} = 1.5 \quad \text{MOE}$$

$$\frac{75}{5} = 15 \quad \text{MOE}$$

$$\frac{75}{0.5} = 150 \quad \text{MOE}$$

Here are modelled data from EPA

Exposure Scenario		Combined MOE Values MOE > 100 Acceptable | The Larger the Better								
Formulation	Application Equipment	Single Layer | No gloves			Single Layer | Gloves			Double Layer | Gloves		
Granule	Shaker can	15,000	48,000	61,000	18,000	150,000	380,000	18,000	150,000	380,000
Granule	Belly grinder	26,000	30,000	31,000	28,000	33,000	34,000	41,000	53,000	55,000
Liquid	Backpack	130	130	130	240	260	260	410	450	460
Liquid	Manually-pressurized Handwand	77	78	78	5,700	15,000	17,000	6,000	17,000	20,000
Liquid	Mechanically-pressurized Handgun	49	51	51	130	150	150	190	230	230
Liquid	Injection equipment	38,000	39,000	39,000	200,000	230,000	230,000	240,000	290,000	300,000
		No respirator	Half-face	Full-face	No respirator	Half-face	Full-face	No respirator	Half-face	Full-face

MOE way over 100 = low risk activity

Here are modelled data from EPA

Exposure Scenario		Combined MOE Values MOE > 100 Acceptable | The Larger the Better								
Formulation	Application Equipment	Single Layer | No gloves			Single Layer | Gloves			Double Layer | Gloves		
Granule	Shaker can	15,000	48,000	61,000	18,000	150,000	380,000	18,000	150,000	380,000
Granule	Belly grinder	26,000	30,000	31,000	28,000	30,000	34,000	41,000	53,000	55,000
Liquid	Backpack	130	130	130	240	250	260	410	450	460
Liquid	Manually-pressurized Handwand	77	78	78	5,700	16,000	17,000	6,000	17,000	20,000
Liquid	Mechanically-pressurized Handgun	49	51	51	130	150	150	190	230	230
Liquid	Injection equipment	38,000	39,000	39,000	200,000	230,000	230,000	240,000	290,000	300,000
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Granule	Belly grinder	26,000	30,000	31,000	28,000	30,000	34,000	41,000	50,000	55,000
Liquid	Backpack	130	130	130	240	250	260	410	440	460
Liquid	Manually-pressurized Handwand	77	78	78	5,700	12,000	17,000	6,000	13,000	20,000
Liquid	Mechanically-pressurized Handgun	49	51	51	130	150	150	190	230	230
Liquid	Injection equipment	38,000	39,000	39,000	200,000	230,000	230,000	240,000	290,000	300,000
		No respirator	Half-face	Full-face	No respirator	Half-face	Full-face	No respirator	Half-face	Full-face

MOE way over 100 = low risk activity

Here are modelled data from EPA

Exposure Scenario		Combined MOE Values MOE > 100 Acceptable | The Larger the Better								
Formulation	Application Equipment	Single Layer | No gloves			Single Layer | Gloves			Double Layer | Gloves		
Granule	Shaker can	15,000	0	61,000	18,000	150,000	380,000	18,000	150,000	380,000
Granule	Belly grinder	26,000	0	31,000	28,000	33,000	34,000	41,000	53,000	55,000
Liquid	Backpack	130	30	130	240	260	260	410	450	460
Liquid	Manually-pressurized Handwand	77	78	78	5,700	15,000	17,000	6,000	17,000	20,000
Liquid	Mechanically-pressurized Handgun	49	51	51	130	150	150	190	230	230
Liquid	Injection equipment	38,000	39,000	39,000	200,000	230,000	230,000	240,000	290,000	300,000
		No respirator	Half-face	Full-face	No respirator	Half-face	Full-face	No respirator	Half-face	Full-face

MOE under 100 = risk is too high

Here are modelled data from EPA

Exposure Scenario		Combined MOE Values MOE > 100 Acceptable | The Larger the Better								
Formulation	Application Equipment	Single Layer | No gloves			Single Layer | Gloves			Double Layer | Gloves		
Granule	Shaker can	15,000	[illegible]0	61,000	18,000	150,000	380,000	18,000	150,000	380,000
Granule	Belly grinder	26,000	[illegible]	31,000	28,000	33,000	34,000	41,000	53,000	55,000
Liquid	Backpack	130	130	130	240	260	260	410	450	460
Liquid	Manually-pressurized Handwand	77	78	78	5,700	15,000	17,000	6,000	17,000	20,000
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Liquid	Injection equipment	38,000	39,000	39,000	200,000	230,000	230,000	240,000	290,000	300,000
		No respirator	Half-face	Full-face	No respirator	Half-face	Full-face	No respirator	Half-face	Full-face

MOE under 100 = risk is too high ----except backpack sprayers

Here are modelled data from EPA

Exposure Scenario		Combined MOE Values MOE > 100 Acceptable | The Larger the Better								
Formulation	Application Equipment	Single Layer | No gloves			Single Layer | Gloves			Double Layer | Gloves		
Granule	Shaker can	15,000	0	61,000	18,000	150,000	380,000	18,000	150,000	380,000
Granule	Belly grinder	26,000	0	31,000	28,000	33,000	34,000	41,000	53,000	55,000
Liquid	Backpack	130	30	130	240	260	260	410	450	460
Liquid	Manually-pressurized Handwand	77	78	78	5,700	15,000	17,000	6,000	17,000	20,000
Liquid	Mechanically-pressurized Handgun	49	51	51	130	150	150	190	230	230
Liquid	Injection equipment	38,000	39,000	39,000	200,000	230,000	230,000	240,000	290,000	300,000
		No respirator	Half-face	Full-face	No respirator	Half-face	Full-face	No respirator	Half-face	Full-face

MOE under 100 = risk is too high

Here are modelled data from EPA

Exposure Scenario		Combined MOE Values MOE > 100 Acceptable | The Larger the Better								
Formulation	Application Equipment	Single Layer | No gloves			Single Layer | Gloves			Double Layer | Gloves		
Granule	Shaker can	15,000	0	61,000	18,000	0	380,000	18,000	150,000	380,000
Granule	Belly grinder	26,000	0	31,000	28,000	0	34,000	41,000	53,000	55,000
Liquid	Backpack	130	30	130	240	0	260	410	450	460
Liquid	Manually-pressurized Handwand	77	78	78	5,700	15,000	17,000	6,000	17,000	20,000
Liquid	Mechanically-pressurized Handgun	49	51	51	130	150	150	190	230	230
Liquid	Injection equipment	38,000	39,000	39,000	200,000	230,000	230,000	240,000	290,000	300,000
		No respirator	Half-face	Full-face	No respirator	Half-face	Full-face	No respirator	Half-face	Full-face

MOE goes over 100 = risk is acceptable

Here are modelled data from EPA

Exposure Scenario		Combined MOE Values MOE > 100 Acceptable | The Larger the Better								
Formulation	Application Equipment	Single Layer | No gloves			Single Layer | Gloves			Double Layer | Gloves		
		No respirator	Half-face	Full-face	No respirator	Half-face	Full-face	No respirator	Half-face	Full-face
Granule	Shaker can	15,000	[illegible]0	61,000	18,000	[illegible]0	380,000	18,000	[illegible]0	380,000
Granule	Belly grinder	26,000	[illegible]0	31,000	28,000	[illegible]0	34,000	41,000	[illegible]	55,000
Liquid	Backpack	130	[illegible]30	130	240	[illegible]0	260	410	[illegible]	460
Liquid	Manually-pressurized Handwand	77	78	78	5,700	15,000	17,000	6,000	17,000	20,000
Liquid	Mechanically-pressurized Handgun	49	51	51	130	150	150	190	230	230
Liquid	Injection equipment	38,000	39,000	39,000	200,000	230,000	230,000	240,000	290,000	300,000

MOE doesn't increase much

Here are modelled data from EPA

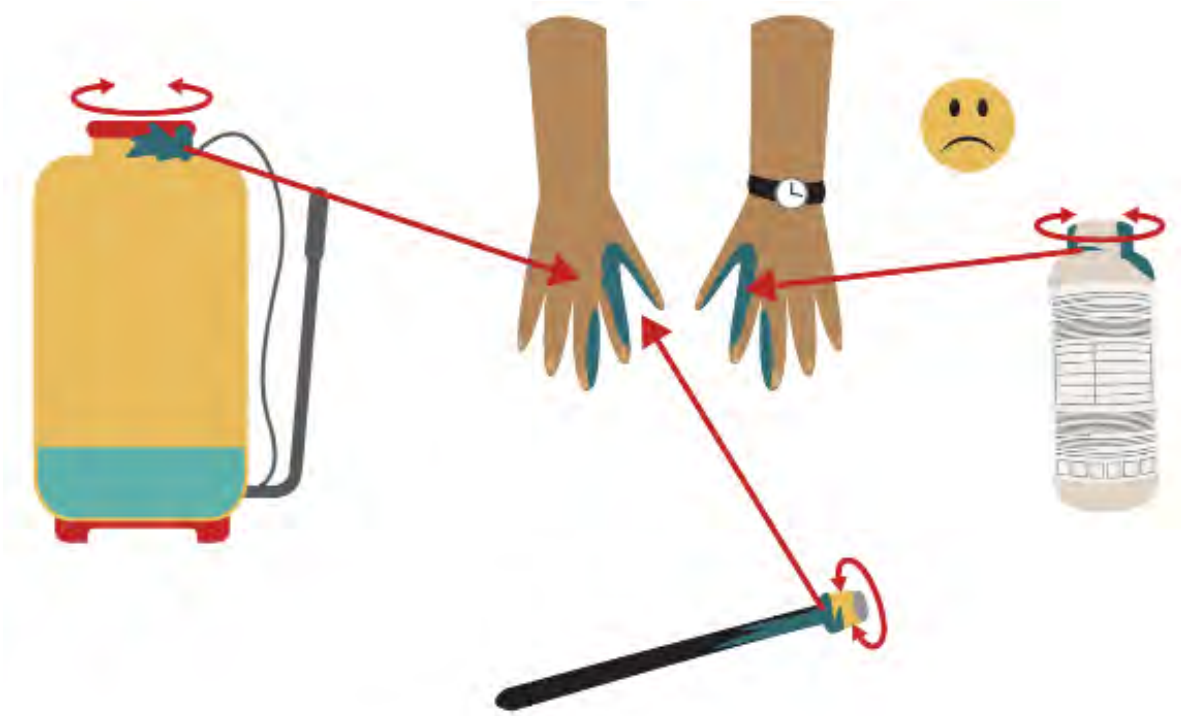
Exposure Scenario		Combined MOE Values MOE > 100 Acceptable | The Larger the Better								
Formulation	Application Equipment	Single Layer | No gloves			Single Layer | Gloves			Double Layer | Gloves		
Granule	Shaker can							0	150,000	380,000
Granule	Belly grinder							0	53,000	55,000
Liquid	Backpack								450	460
Liquid	Manually-pressu Handwand							0	17,000	20,000
Liquid	Mechanically-pressurized Handgun	49	51	51	130	150	150	190	230	230
Liquid	Injection equipment	38,000	39,000	39,000	200,000	230,000	230,000	240,000	290,000	300,000
		No respirator	Half-face	Full-face	No respirator	Half-face	Full-face	No respirator	Half-face	Full-face

The language on labels is not just a bunch of made-up directions by the manufacturer or their attorneys. PPE requirements and usage details are highly dictated by EPA.

Personal Protection Equipment

Wear PPE

- Read the label -that is the minimum
- Daily exposures can add up over time
- Consider a basic minimum PPE kit of gloves, long-sleeves, pants, close-toed shoes, & eye protection.

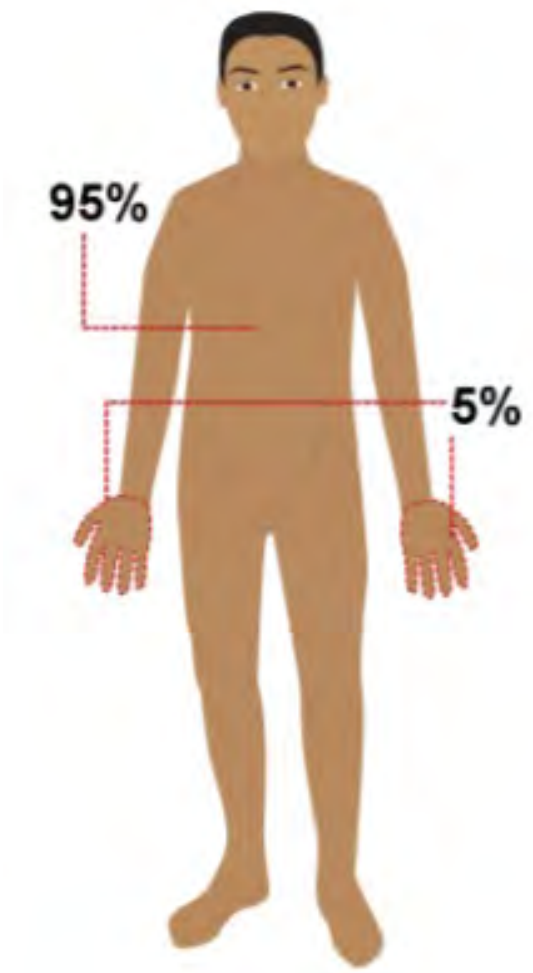


Wear PPE

- Fit the PPE to the situation
- Many exposures occur during mixing and loading. PPE goes on before you start, not just for spraying.

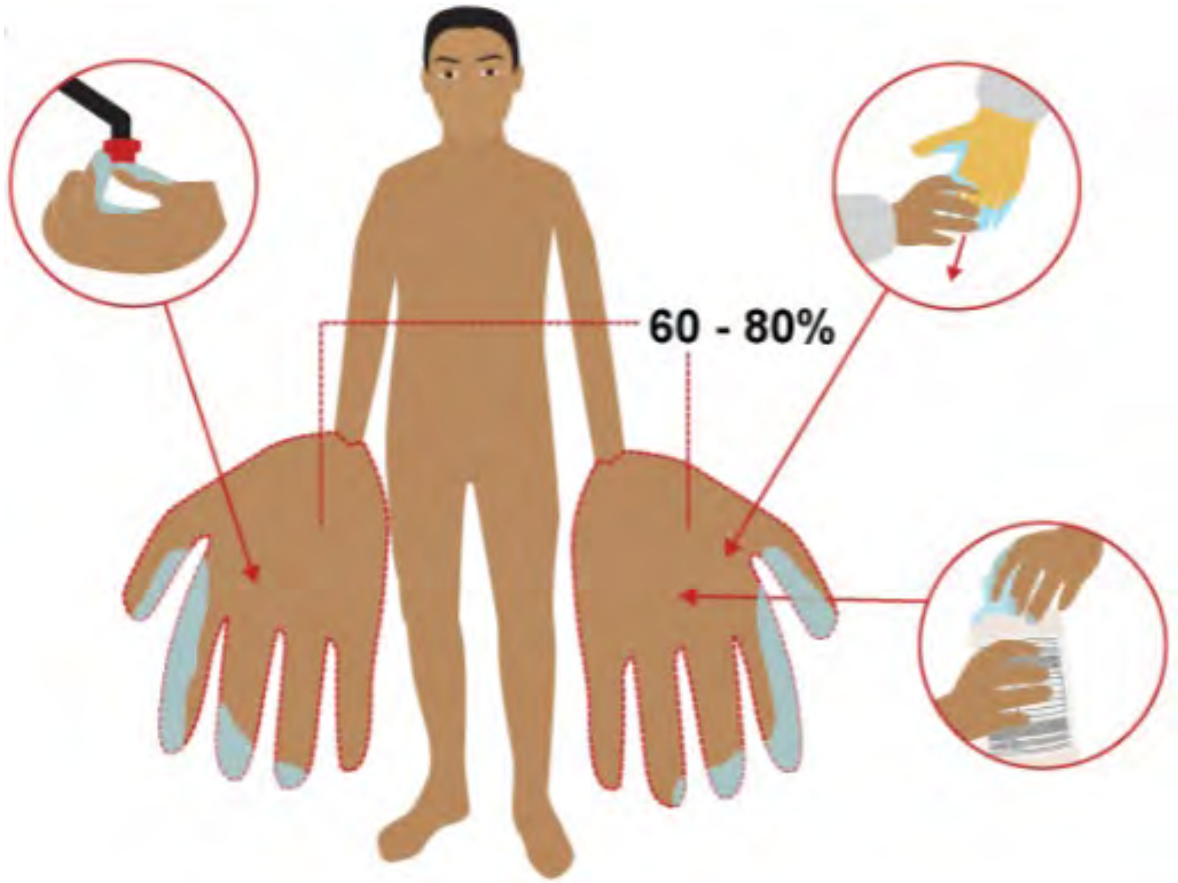
Consider this

Your hands are only 5% of your body’s surface area…



Consider this

…but they perform most of the contact your body will do in a day.



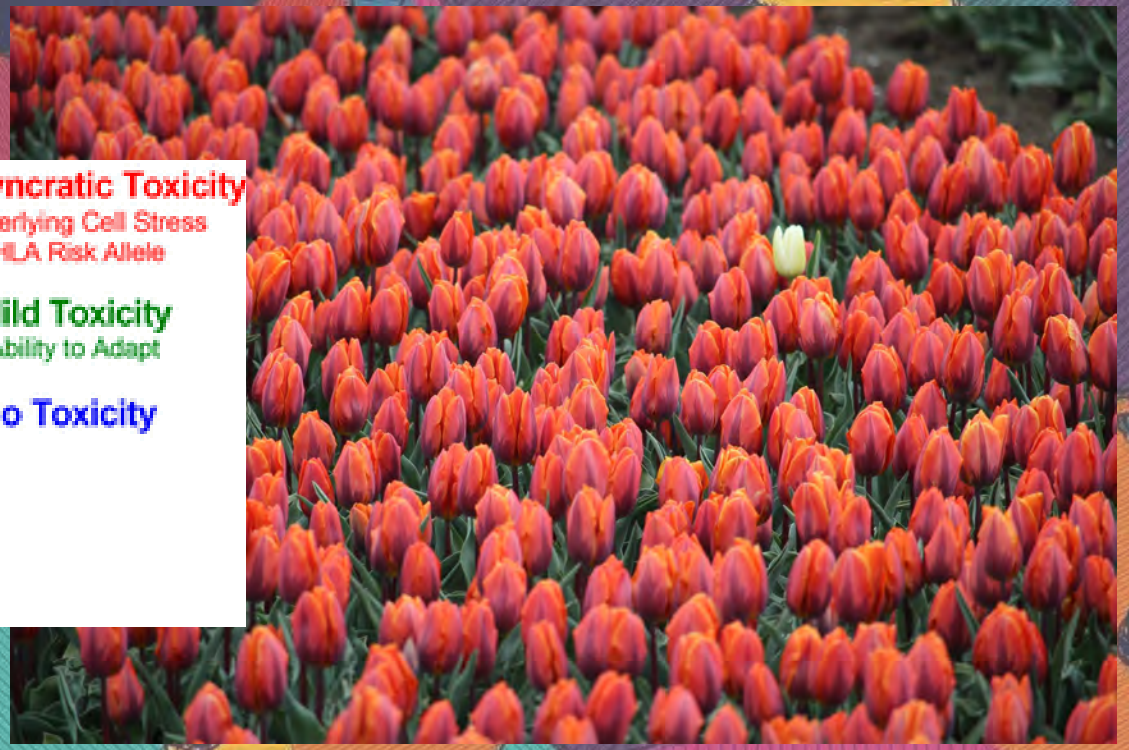
Early recognition of the signs and symptoms of pesticide poisoning, and immediate and complete removal of the source of exposure may save a person's life.

- ✓ Upset stomach
- ✓ Pinpoint pupils
- ✓ Watery eyes
- ✓ Runny nose
- ✓ Excessive salivation (drooling)
- ✓ Excessive sweating
- ✓ Tingling and numbness
- ✓ Dizziness
- ✓ Skin irritation or rash
- ✓ Difficulty breathing

911 FIRE POLICE MEDICAL

FAMILY	Name	Phone	Address	Email
Parents				
Next of kin				
Neighbor				
Local contact				
Out of state contact				
WORK & HOUSEHOLD	**Name**	**Phone**	**Address**	**Email**
Parents' work				
School				
Homeowners association				
Landlord				
MEDICAL & CARE	**Name**	**Phone**	**Address**	**Email**
Hospital				
Physician				
Dentist				

Response to chemicals is different between and within people



Work clothing and residues

* Uniform service? Work showers?
* Wash work clothes in very hot water with strong detergent
* With an empty machine, run a hot water wash
* Hang them outside to dry on clothesline
* Do not mix work clothes with any other family laundry

Limit Exposure

* When is chance of exposure greatest?
* Don’t make applications upwind of where you are standing
* Don’t walk through a recently treated area (especially true with foliar applications)
* Don’t spray herbicide over your head

Limit Exposure

* Wash your hands before eating, drinking, chewing gum, using tobacco or the toilet
* Consider using herbicide dye to more easily recognize exposure
* Re-entry restrictions

PPE and Re-Entry

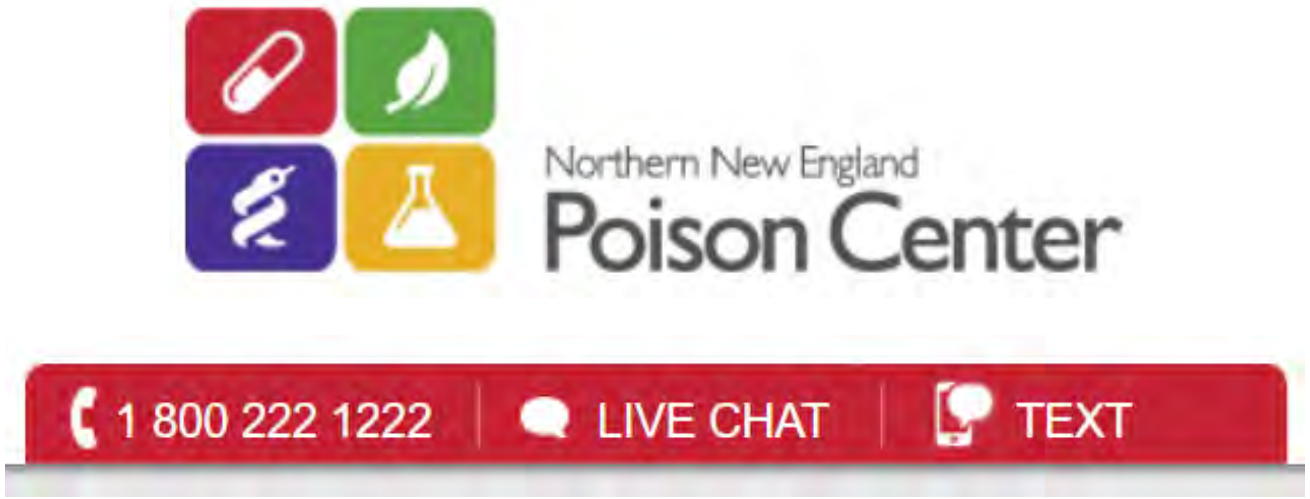
* Long-sleeved shirt and long pants

* Shoes plus socks

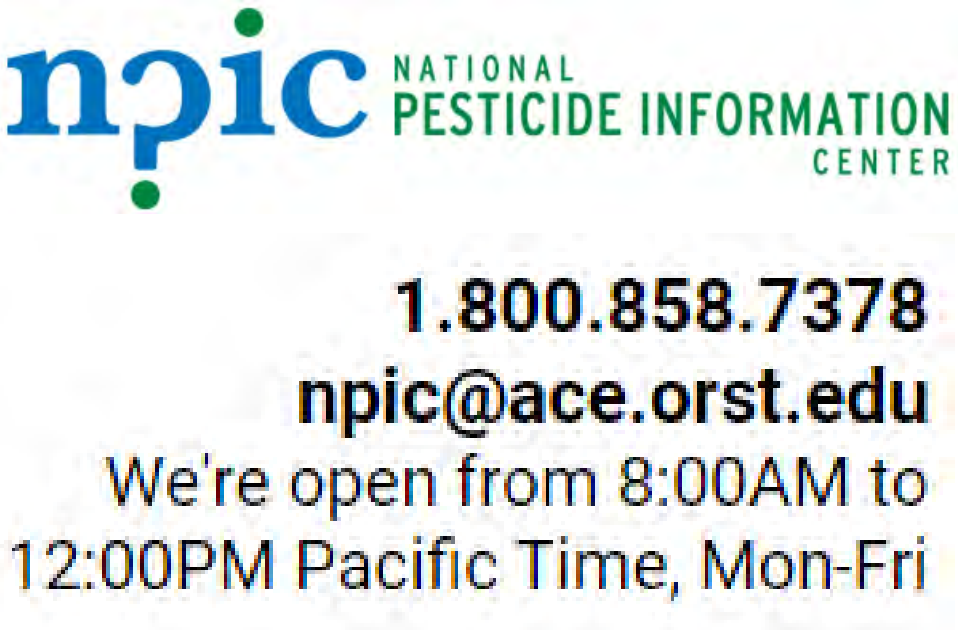
* Entry Restrictions for Non-WPS Uses:

For applications on rangeland and permanent grass pastures (not harvested for hay) and non-cropland areas, do not enter or allow worker entry into treated areas until sprays have dried.

Contacts for pesticide questions:



1-800-222-1222
https://www.nnepc.org/

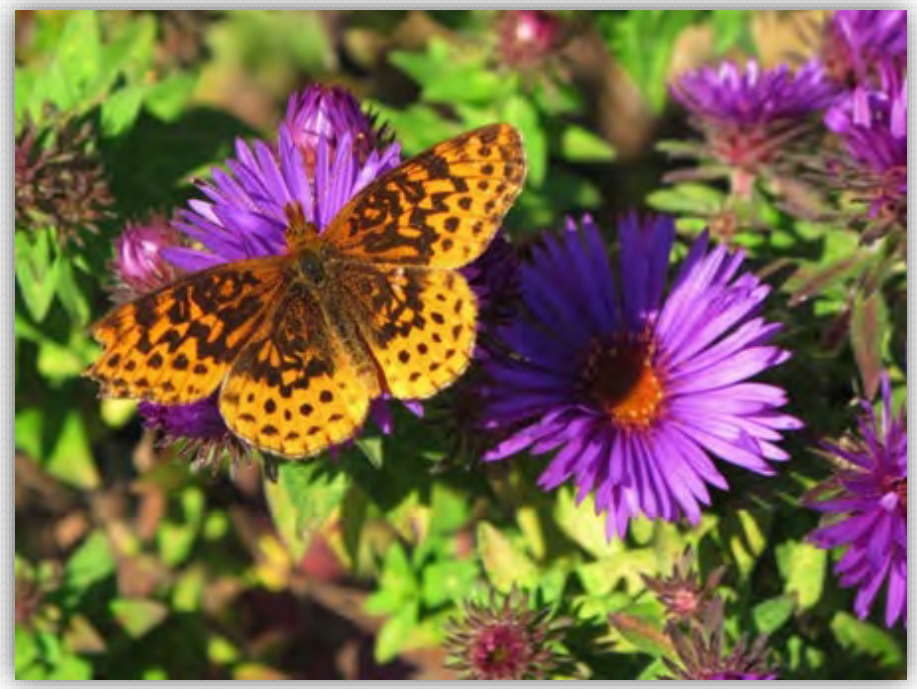


Pesticide Use in/on Surface Waters or Near Wetlands

- You need a waste discharge license from DEP to apply any pesticide to a water of the state
- Waters of state:
  - Lakes, ponds, rivers streams, marshes & wetlands
  - And any water that connects to them
  - Even use of *Bti* mosquito dunks requires a permit unless done in a fully contained water source

DEP General Permit Contact

- Gregg Wood
  - (207) 287-7693
- Ask for someone in “Waste Discharge Program”
  - (207)287-7688



Application near waters & wetlands

- BPC Rule - No broadcast application within 25 feet of the high-water mark
- Non-broadcast “spot treatment” defined:
    - Directed away from surface water;
    - Directed at specific pest organisms or infestations in a manner that minimizes deposition to non-target species and areas;
    - Conducted using non-powered application equipment capable of targeting pest organisms while avoiding non-target species;

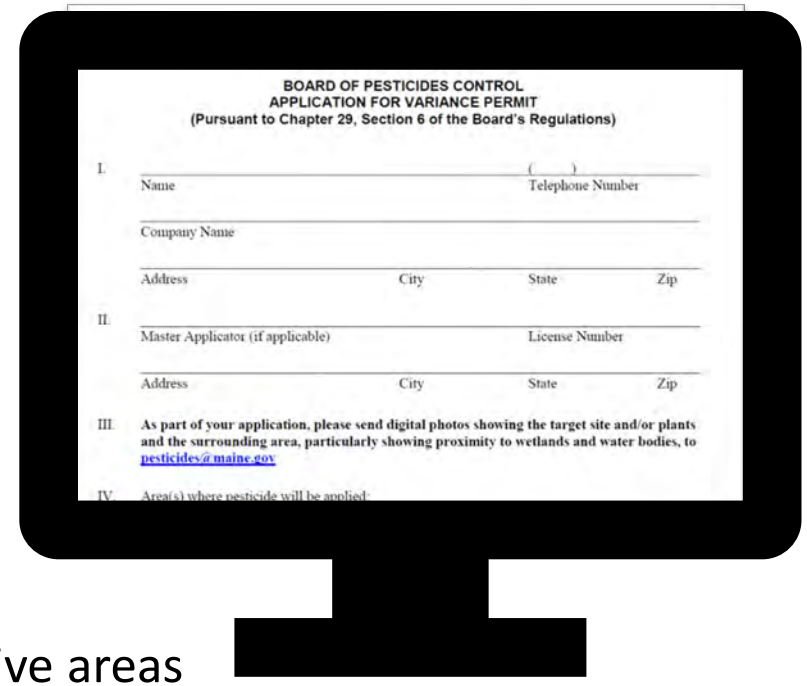
Application near waters & wetlands

- More on “spot treatment” defined:
  - During any calendar year, is confined to no more than 20% of the area located within 25 feet of surface water and
  - During any calendar year, does not cover any one contiguous area greater than 100 square feet;
  - Must not violate Shoreland Zoning Restrictions regarding vegetation removal.

Variances

http://www.maine.gov/dacf/php/pesticides/download_library.shtml

- The Board allows for a variance
  - Must achieve similar protection of the waterway, or
  - Must show a balance of risk and benefit
- Many vegetation management programs apply for a variance from the drift rules
- You must follow the variance agreement
  - May include specific buffers around
    - water, homes, gardens, lawns, playgrounds and other sensitive areas
  - Addition of spray thickener adjuvant
  - Notification in news media, etc.



BOARD OF PESTICIDES CONTROL
APPLICATION FOR VARIANCE PERMIT
(Pursuant to Chapter 29, Section 6 of the Board's Regulations)

I. Name ( ) Telephone Number
Company Name
Address City State Zip

II. Master Applicator (if applicable) License Number
Address City State Zip

III. As part of your application, please send digital photos showing the target site and/or plants and the surrounding area, particularly showing proximity to wetlands and water bodies, to pesticides@maine.gov

IV. Area(s) where pesticide will be applied:

Contacts for pesticide questions:

Maine Board of Pesticides Control

287-2931

pesticides@maine.gov

Pam Bryer
pamela.j.bryer@maine.gov
592-5146

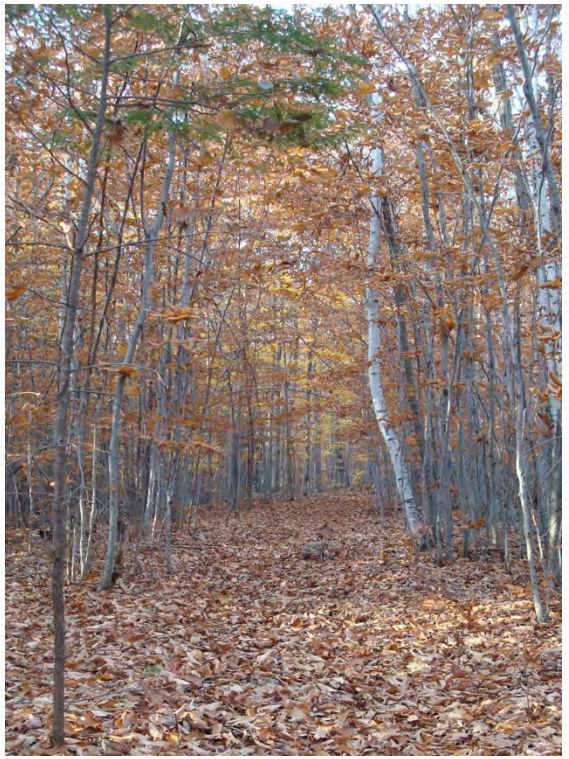
Posting considerations

- When posting signs
  - Easily seen from all points of normal ingress
  - Phone number on the sign is answered by someone who can
    - provide quick meaningful answers
    - quickly get information about an application done on that same day

Posting for sidewalks and trails

- Sidewalk - paved or constructed pedestrian walkway adjacent to a road

- Trail – marked passage, path or route used by the public for foot, bicycle or similar means of transport
  - Does not include rights-of-way primarily used by registered vehicles; (automobiles, ATVs or snowmobiles).



Posting for sidewalks and trails

- Must use one or more of the below methods
  - Post signs at a kiosk and/or prominent points of ingress and egress
  - Post signs in areas frequented by the public and in the vicinity of the application, i.e., commercial, retail or institutional buildings or public gathering places
  - Above signs must be:
    - Must be posted for 48 hours
    - Must be conspicuously positioned with print of sufficient size to be readily observed
  - Provide public notice through a website, listserv or print publication of local or regional relevance