















DRIIFT

6 24 '03

A wide-angle photograph of a lush green soybean field. The plants are densely packed and appear to be in the early stages of pod development. In the background, a line of trees and utility poles is visible under a clear sky. A teal rectangular box is overlaid on the left side of the image, containing the text "Dicamba Issues" in white serif font.


Dicamba Issues



PIRT







Volatility: Vapor drift may occur at high temperatures that cause some herbicides to change into gaseous form and move off target.



Physical Drift: Pressure too high on 4-wheeler boom apparatus resulting in fine spray particles that moved 30+ feet up into trees, downwind of application.



Air Temperature Inversions

Causes, Characteristics and Potential Effects on Pesticide Spray Drift

John W. Enz

Professor Emeritus
Department of Soil Science

Vernon Hofman

Professor Emeritus
Department of Agricultural
and Biosystems Engineering

Andrew Thostenson

Extension Pesticide
Program Specialist

Pesticide spray drift always has been a costly and frustrating problem for applicators.

It's particularly frustrating because some of the seemingly best weather conditions for pesticide application are often the worst. That is because these conditions are caused by air temperature inversions. Air temperature inversions provide near-perfect conditions for tiny, aerosol-size droplets to drift away from their targets.

Understanding inversions is essential to following state and federal regulations that prohibit pesticide application during inversions, observing pesticide manufacturers' warnings about inversion conditions on product labels and preventing unintended pesticide contact with nontarget areas. An understanding of air temperature inversions – why they occur, their characteristics and their dissipation – requires a basic understanding of energy transfer at the Earth's surface and in the lower layers of the atmosphere.



Arbus, Inc.

Large Blower
for
Tractor Cases used in the Midwest U.S.

Arbus diamond
1500

4260

Washington State Drift Complaints

Where Were We?



“Ah, the good ol’ days ...”



Let's start with the 1950's

- 2,4-D and Grapes

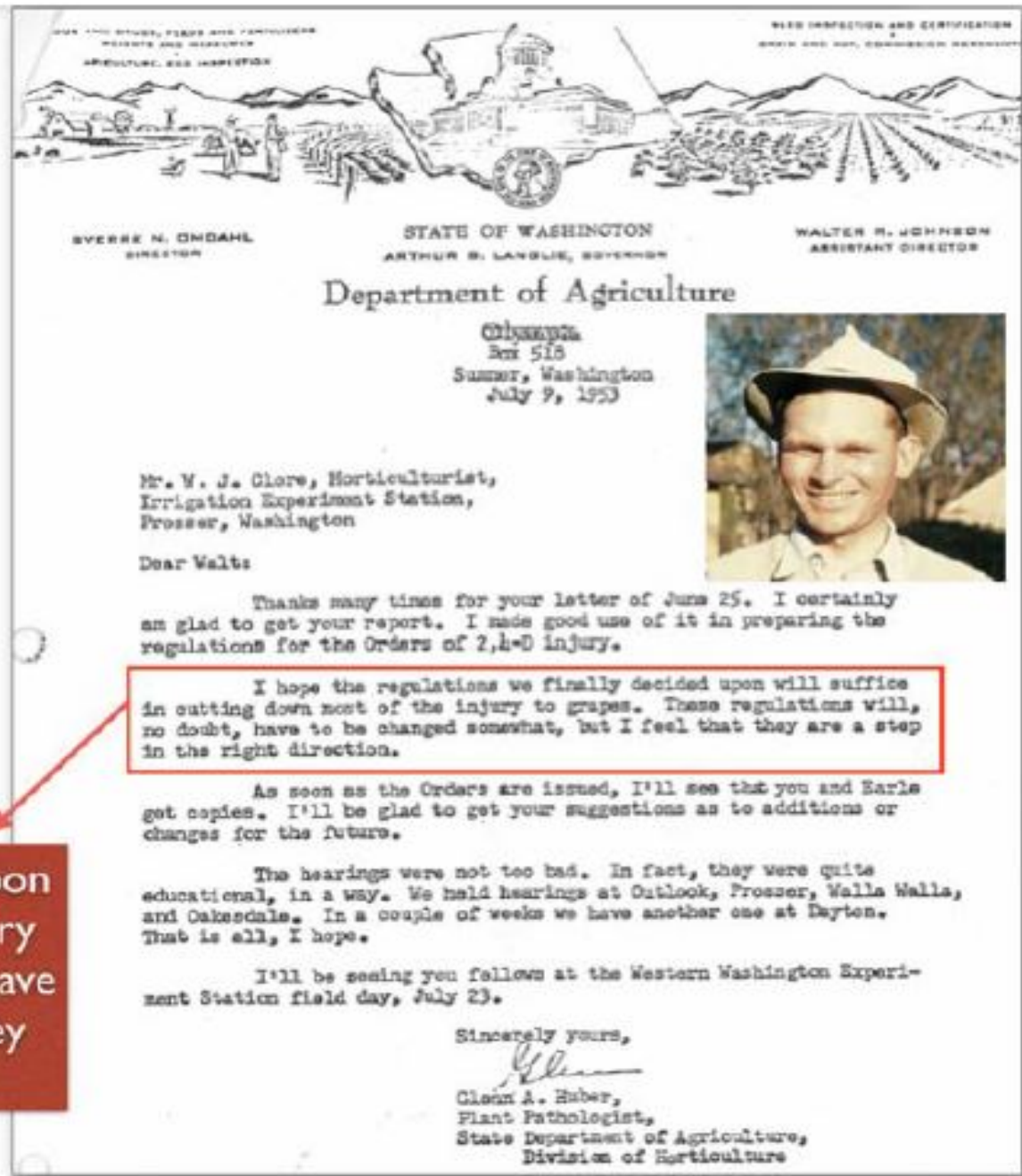




- 2,4-D problems first recognized in concord grape vineyards in central eastern Washington in 1950



"I hope the regulations we finally decided upon will suffice in cutting down most of the injury to grapes. These regulations will no doubt, have to be changed somewhat, but I feel that they are a step in the right direction."

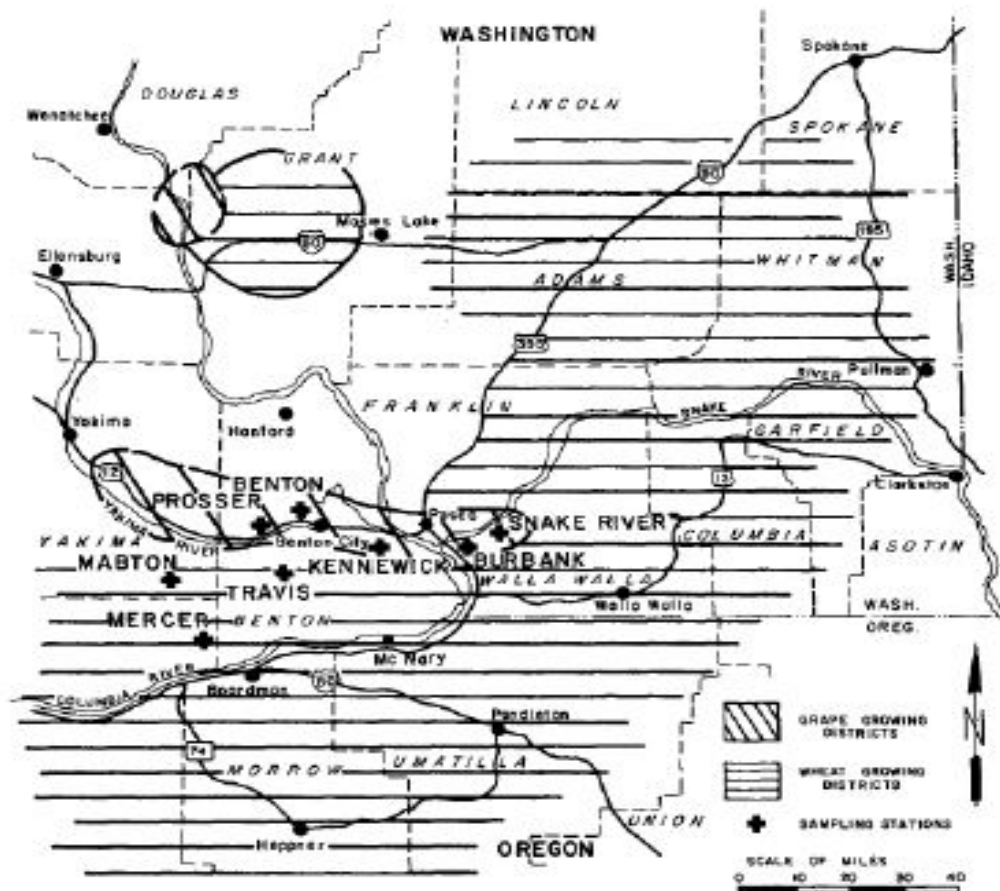


The neighborly drift concern did not go away

- 1952 (in California): Civil Aeronautics Administration (FAA) bans use of 2,4-D dust due to widespread damage to cotton and grapes from use on nearby cereal grains
- 1952-53: At least nine crop-dusting cases reach appellate courts (suggesting many more cases at lower courts)
- Grape injury surveys were initiated from 1953 through 1955 due to chronic-severe symptoms.
 - ✓ Injunction requested but denied to stop Horse Heaven Hills 2,4-D aerial applications to wheat
 - ✓ Observation that problem was related to volatile esters
- 1959 to 1963 symptom severity triggered a systematic survey of 14 vineyards from Walla-Walla to Grandview
- 1964 HV 2,4-D esters banned in Benton and Yakima Counties
- 1964-1969 few symptoms were observed
- 1969-1973 General and severe damage was again observed but throughout all of central Washington... 1973 was worst year on record

Early 1970's WSU-CE Field Sampling Network Investigations

Around the clock air monitoring for 2,4-D HV, LV, and NV formulations during the active grape-growing season



Grape and grain growing areas of central Washington in the WSU-CE 1974 Sampling network



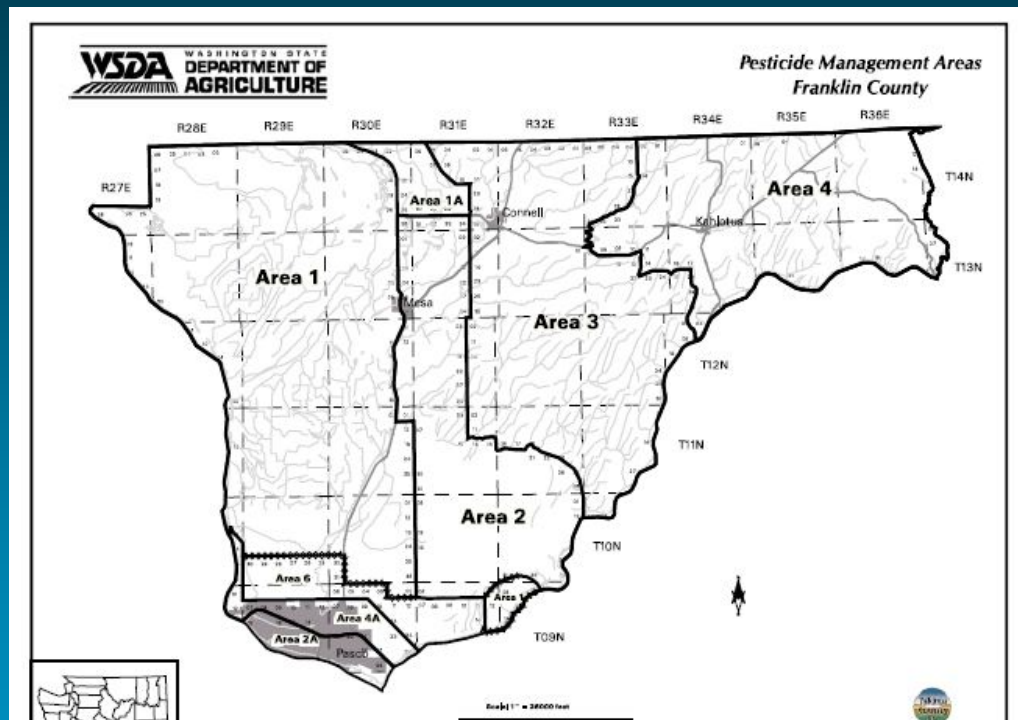
High volatility 2,4-D control areas in Benton and Yakima counties 1974

Phenoxy Herbicide Rules



Late 1970's - Early 1980's Use Restricted Herbicide Rules for Eastern Washington.

- 85 degree cutoff
- LV date cutoffs
- Nozzle restrictions
- Pressure Restrictions
- Evening cutoffs
- RUP's in WA state



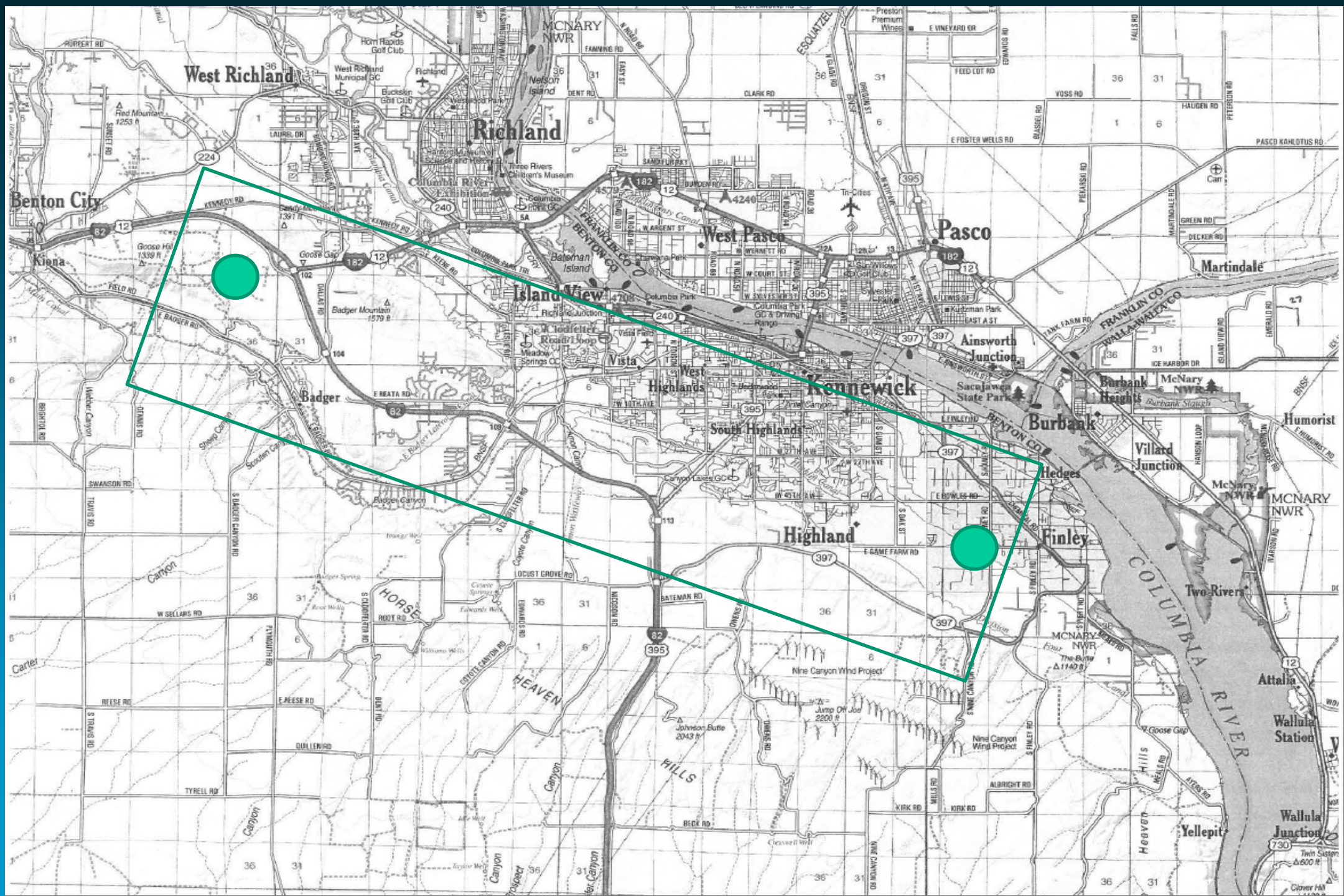
County Phenoxy Rules

- Many areas in E. WA counties were designed around grapes.
- Wine grape acreage tripled over a 15 year period.

Year	Acres
1998	15,000
1999	19,000
2000	24,000
2001	27,000
2002	27,000
2003	27,000
2004	27,000
2005	28,000
2006	29,500
2007	30,500
2008	32,000
2009	36,000
2010	39,000
2011	41,000
2012	43,000
2013	45,000

Badger Canyon

- **Started noticing symptoms and getting complaints 1987-1988**
- **Dozens of complaints from 1989 – 1993**
- **Rules implemented in 1989 - 1992**

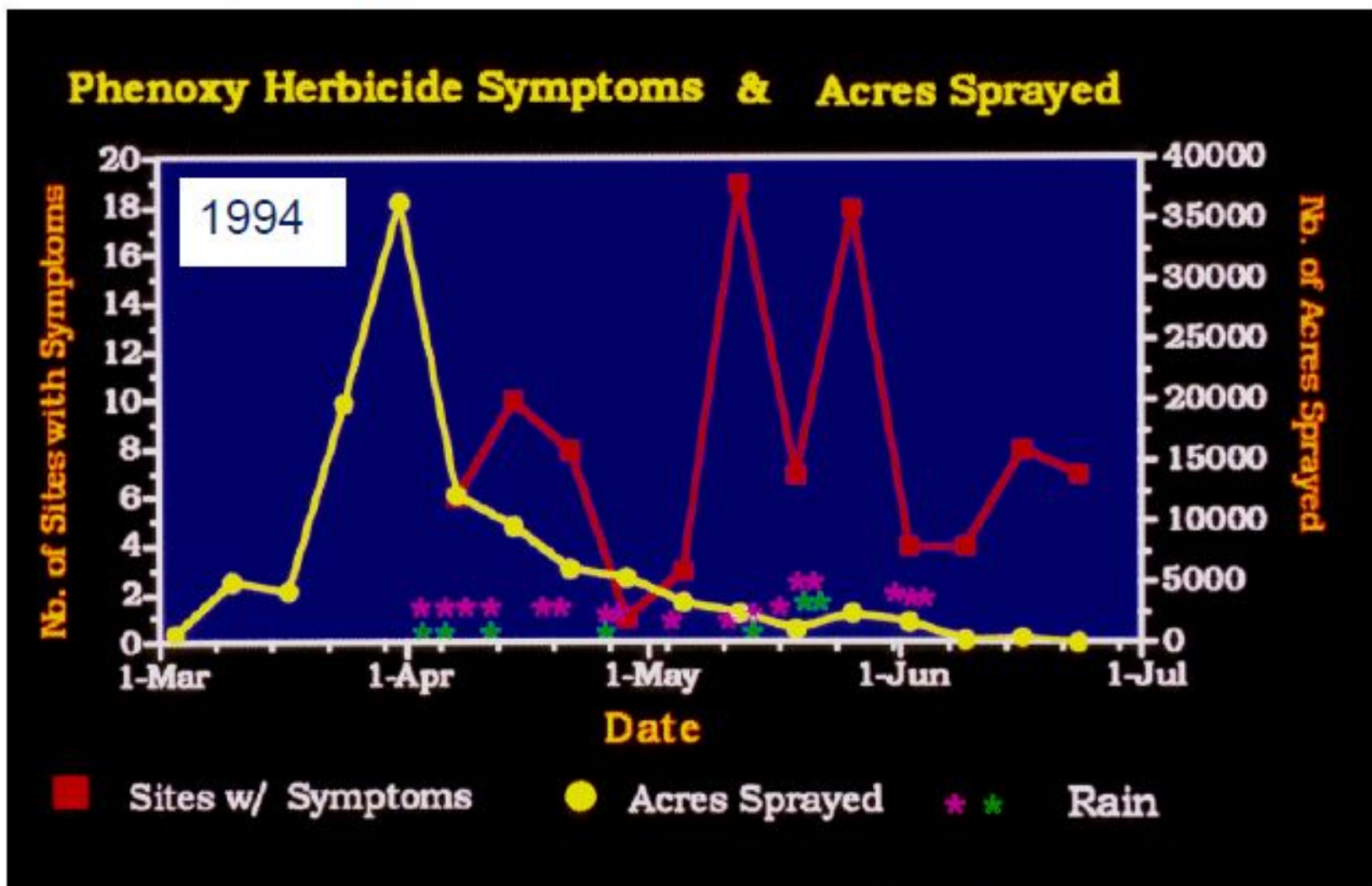




Air Mass Deposition

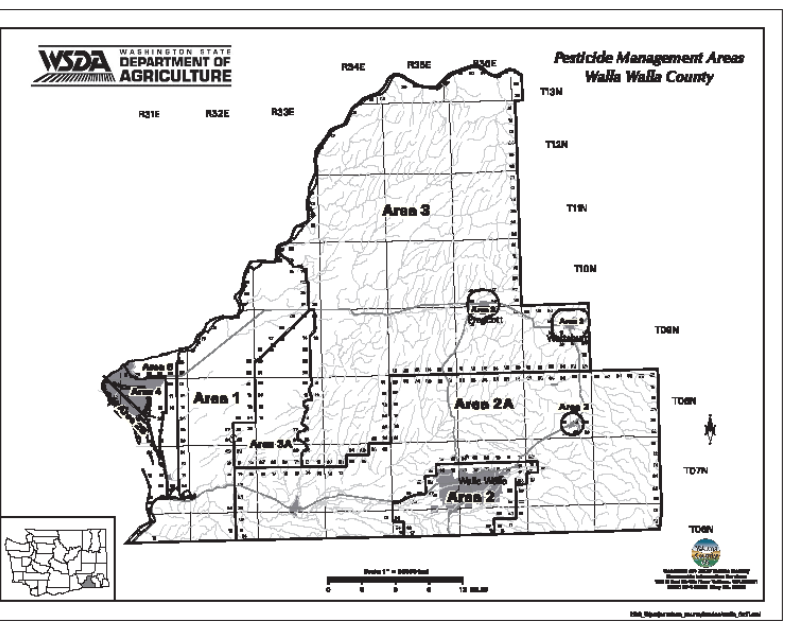
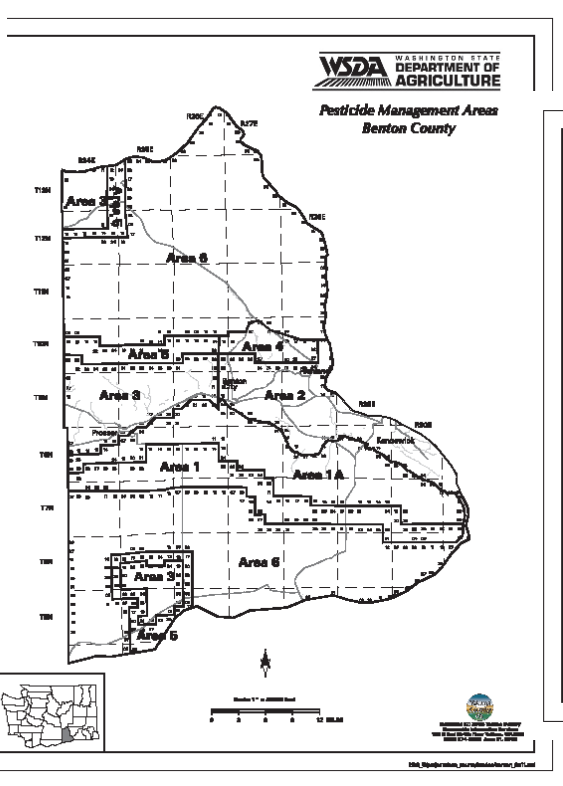
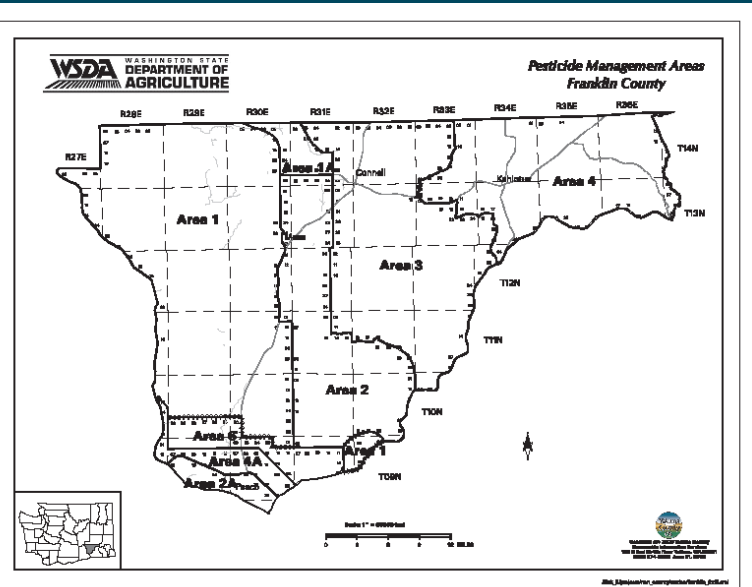
The 1994 WSU Sentinel Plant Monitoring Network

Injury more associated with light precipitation events and not with 2,4-D application records



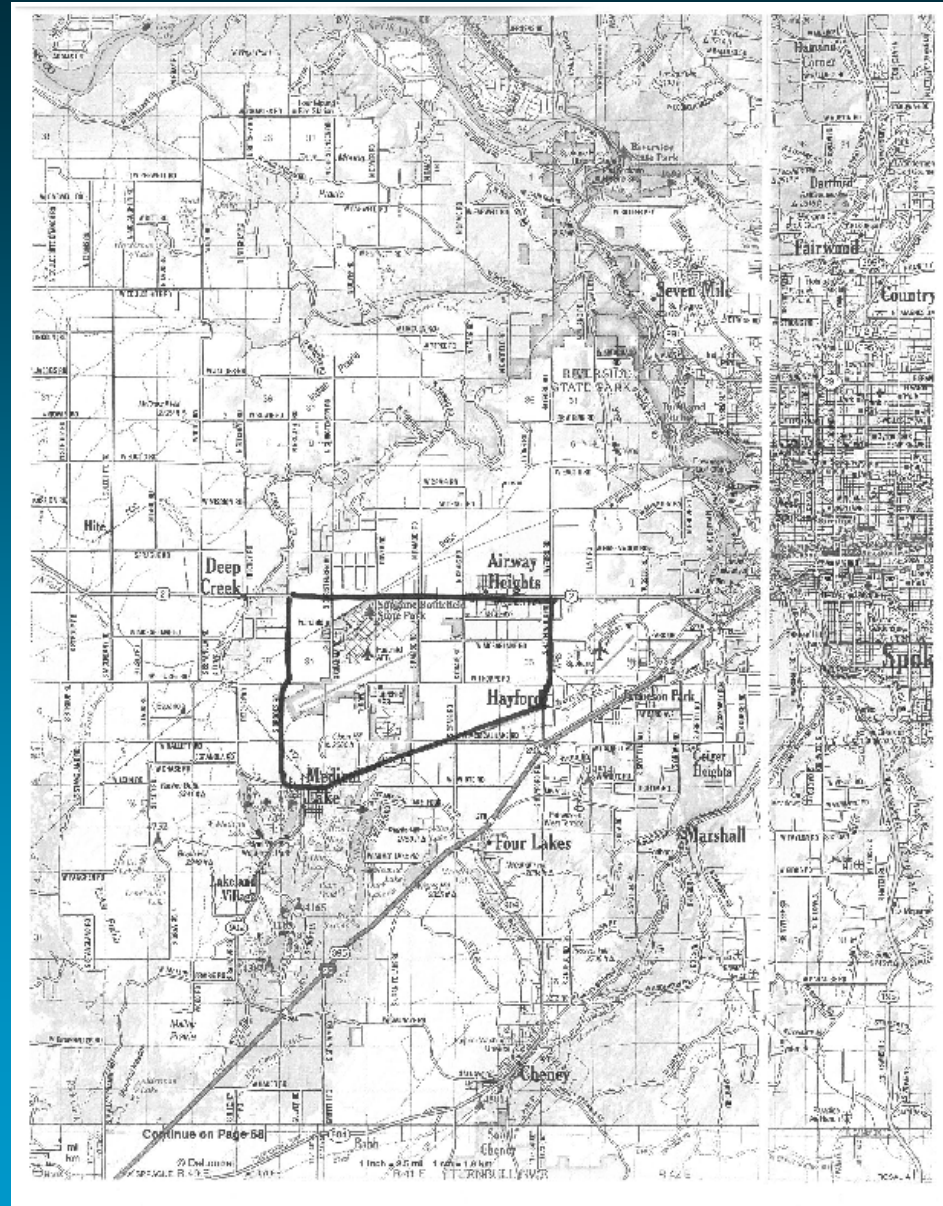
From Allan Felsot

Tri-County Area Rules



Tordon - 1979

- Fairchild Air Force base west of Spokane (Airway Heights)
- Use of Tordon in the 1970's
- Ground water contaminated
- Rules in 1979 place a “No Tordon restriction” in a given area



- Desiccant drift onto nearby crops in Walla Walla County
- 1987 – 1988
- WSDA monitored the area daily

Soil that Moves.....

- Sulfometuron-methyl (Oust)
- Franklin County – 1985
- Soil movement from ROW affecting adjacent crops

- Clopyralid (Curtail)
- Columbia Basin – 1989
- Label had a 12-month plant back
- A number of fields were showing symptoms
- Label modified to an 18-month plant back

Daminozide (Alar)

- Summer 1989 – “Don’t Eat Apples”!
- TV announcements to wash apples
- 1,000 samples in 10 days
- Only 1-2 very low level detections attributed to pre-1989 use

1992

**Encapsulated methyl
parathion (PennCap-M)**

**- Application records requested
from > 290 orchards**



Amitraz (Taktic)

- Mite control
- Mis-use killed 3,000 colonies. Was originally blaming Penncap-M



AMINOCYCLOPYRACHLOR

- One issue in Stevens County along several miles of road. Root uptake.
- Oregon has issued rules



Clearfield Wheat and Beyond Herbicide

**A few incidents, but the concern did
not happen.**

A large, dark brown pile of compost is the central focus of the image. The pile is situated outdoors, with a line of tall, green pine trees in the background under a clear blue sky. The foreground shows a dirt or gravel surface with some wet patches and tire tracks. The text 'Compost 1999 - 2000' is overlaid in white on the right side of the image.

Compost
1999 - 2000

Symptoms Observed

- Fiddle-necking of growing points.
- Some epinasty.
- Growth not stunted.
- Color not affected.



Washington State Drift Complaints

Is There Less Drift Now?

Case and Inspection Data

	1990's	2017	2018	2019
Total Cases	400 – 500 cases per year	116	166	34 +
Total Inspections		248	208	74
# of Violations		646	625	
Drift		23	52	10 +
Herbicide		54	65	
Human Exposure		13	30	

Aim and Reckon = \$5,000,000



2012 – 2103: Flumioxazin (Chateau, Valor) moving with dust

- One incident had a 300 foot buffer for pears. Label was not followed.



- Soil fumigant off gassing due to poor soil preparation and/or soil seal
- Desiccant drift during potato, garbanzo and other crop burn down as a pre-harvest aid



**Washington State Drift
Complaints**

What Are We Doing About It!

A SUMMARY OF
**Airblast Application
Studies**

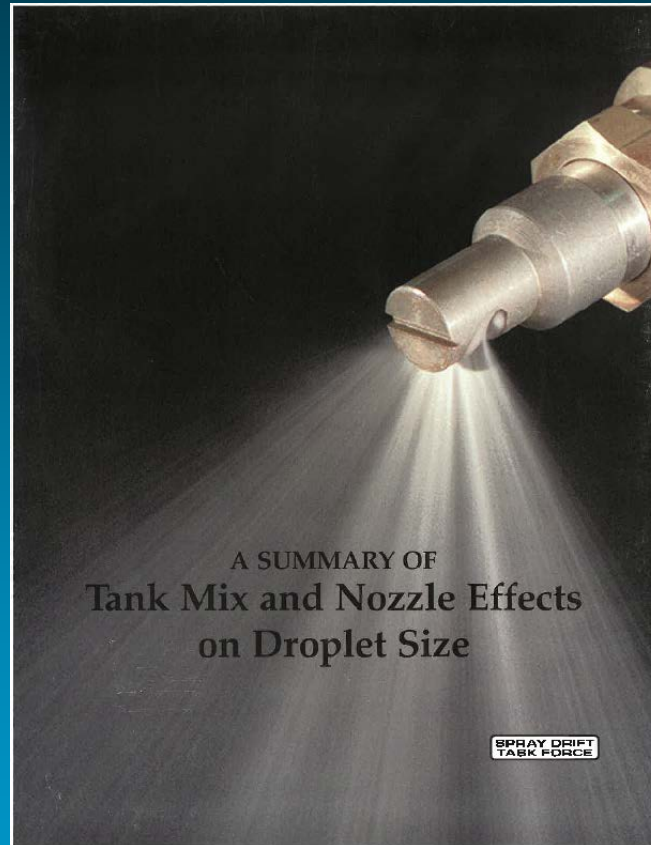


A SUMMARY OF
**Aerial Application
Studies**



SPRAY DRIFT
TASK FORCE

Spray Drift Task Force



A SUMMARY OF
**Tank Mix and Nozzle Effects
on Droplet Size**

SPRAY DRIFT
TASK FORCE

1997

A SUMMARY OF
**Ground Application
Studies**



A SUMMARY OF
**Chemigation Application
Studies**



SPRAY DRIFT
TASK FORCE

Pesticide Label Language

- **Do not drift onto sensitive crops or desirable plants**
- **Do not apply within 300 feet of pears**
- **Do not apply during an inversion**
- **Do not apply if there is an inversion at field level**
- **Do not apply if there are sensitive plants or crops 250 feet downwind**
- **Do not apply if winds are less than 2 MPH**
- **Do not apply if winds are greater than 10 MPH**
- **Do Not apply if someone is within the AEZ**

CropLife

a WEISTER MEDIA WORLDWIDE brand croplife.com

May 2019

Outside The Box

The ways to manage spray drift are not always obvious in the age of dicamba-resistant technologies.

See page 8



560
297
17106
02200

977 420250 774 0140018
115 4100000 112 200
010 010 010

ASD 10100 4 10100 10100
10100 10100 10100

9120 4 10100 10100 10100

20000 10100 10100 10100 10100 10100 10100 10100

10100 10100 10100 10100 10100 10100 10100 10100

Also Inside:

Nozzles and Tips Review, p. 12

Summer Show Preview:

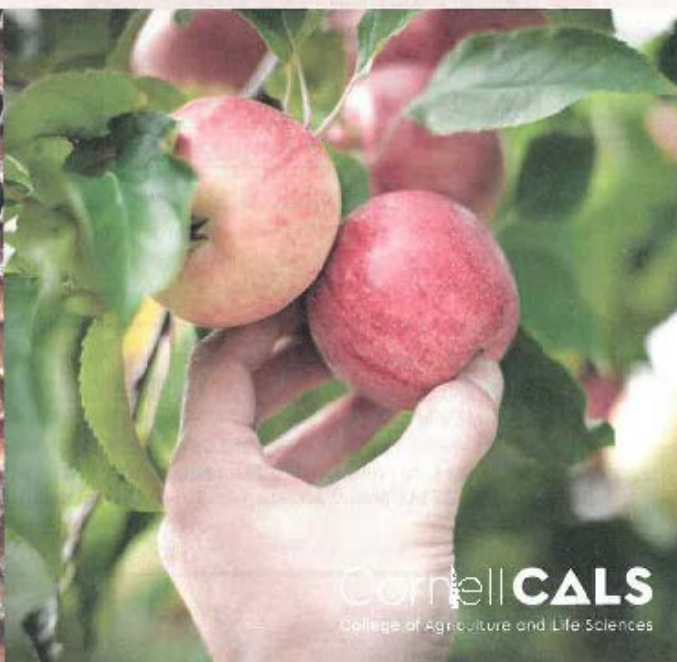
Spreaders, p. 28



A Pesticide Decision-Making Guide to Protect Pollinators in *Tree Fruit Orchards*

2018 Edition

By Maria van Dyke, Emma Mullen, Dan Wixted, and Scott McArt



Cornell CALS
College of Agriculture and Life Sciences



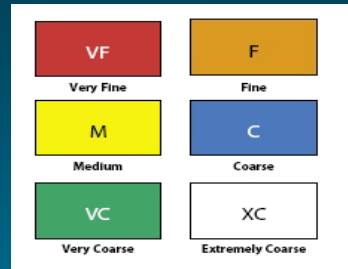
**Use Restricted Herbicide
County Rules**

Phenoxy Herbicide Rules Update

- Keeping LV ester cutoff dates across different counties.
- Keeping evening cutoff times - to reduce inversion condition applications.
- Keeping the aerial application of phenoxyes / dicamba prohibition within 1 mile of a vineyard. (between 1/2 mile and 1 mile still allowed by permit request)
- Keeping aerial applications of Use Restricted – phenoxy / dicamba type products to coarse or larger sized droplets.

Phenoxy Herbicide Rules Update

- **Standardizing the droplet size / pressure language to be more consistent with labels.**



- **Eliminating the open LV ester container prohibition at Mix/Load area.**
- **Eliminating the prohibition of ferrying with LV esters over an area under order.**
- **Eliminating restriction limit of 1 pint/acre on oil type carriers and adjuvants.**
- **Eliminating the prohibition on turning or flying low over cities, towns, residences and other sensitive sites.**
- **Eliminating duplication between Statewide rule and specific County rules for Temperature cutoff's and wind restrictions.**



DO YOU APPLY PESTICIDES?

YES

NO

I am in the business of applying pesticides on other people's property

I apply pesticides on property owned by me or my employer

I work for a governmental agency or tribe

I sell or consult Non-Home and Garden Pesticides

I perform Structural Pest Inspections

I am the "Responsible Party" for my business (only 1 per company)

I am NOT the designated "Responsible Party" for my company

I WILL use RUP's

I WON'T use RUP's

I will use pesticides experimentally (either using EUP's or registered pesticides in a manner not indicated by the label)

I will apply RUP's and/or use power equipment to apply pesticides

I work in a licensed dealer outlet

I work outside of a licensed commercial pesticide retail outlet

I work for a government agency (eg. WSU county extension)

I perform WDO inspections for real estate transactions

I perform WDO inspections that are NOT for real estate transactions.

I WILL NOT be producing an agricultural commodity (eg. private golf course, school, cemetery)

I WILL be producing an agricultural commodity (including farm, forestry, nursery)

YES

NO

COMMERCIAL APPLICATOR

COMMERCIAL OPERATOR

PRIVATE COMMERCIAL APPLICATOR

PRIVATE APPLICATOR

No License Required

DEMONSTRATION & RESEARCH

PUBLIC OPERATOR

No License Required

DEALER MANAGER

COMMERCIAL PEST CONTROL CONSULTANT

PUBLIC PEST CONTROL CONSULTANT

STRUCTURAL PEST INSPECTOR

STRUCTURAL PEST INSPECTOR

Takes Laws and Safety and all endorsements for applications made by all company employees

Laws and Safety and applicable endorsements

Laws and Safety and applicable endorsements

Private Applicator Exam

Laws and Safety and applicable endorsements

Laws and Safety and applicable endorsements

Dealer Manager

Laws and Safety and applicable endorsements

Laws and Safety and applicable endorsements

SPI General and SPI Practical

Laws and Safety and PCO Structural

KEY:

Work Performed

License Type

Exams

ACRONYMS/DEFINITIONS:

EUP: Experimental Use Pesticide

RUP: Restricted Use Pesticide

SPI: Structural Pest Inspector

WDO: Wood Destroying Organism

Non-Home and Garden: Pesticides that are NOT intended for personal use by the general public and around a residence

2019 - Licensed Applicators in Washington State

- **Total # = 20,200**
- **Dealers = 1,214**
- **Private Applicators = 10,447**
- **Public Operators = 4,491**
- **Commercial Applicators in Ag = 409**
- **Commercial Applicators in Landscape = 786**
- **Aerial Commercial Applicators = 61 (46 in EA WA)**
- **Commercial Operators employed in Ag = 1,176**
- **Applicators that do Soil Fumigation = 336**
- **Applicators that do aquatic applications = 1,291**

Recordkeeping



Washington State Department of Agriculture
PESTICIDE APPLICATION RECORD (Version 1)
 Pesticide Management Division
 PO Box 42500
 Olympia WA 98504-2500
 (877) 301-4555

NOTE: This form must be completed same day as the application and it must be retained for 7 years (Ref. chapter 17.21 RCW)

1. Date of Application - Year: _____ Month: _____ Day: _____ Start Time: _____
 Stop Time: _____

2. Name of person for whom the pesticide was applied: _____
 Firm Name (if applicable): _____
 Street Address: _____ City: _____ State: _____
 Zip: _____

3. Licensed Applicator's Name (if different from #2 above): _____
 Firm Name (if applicable): _____ Tel. No.: _____
 Street Address: _____ City: _____ State: _____
 Zip: _____

4. Name of person(s) who applied the pesticide (if different from #3 above): _____
 License No(s), if applicable: _____

5. Application Crop or Site: _____

6. Total Area Treated (acres, sq. ft., etc.): _____

7. Was this application made as a result of a WSDA Permit? No Yes (if yes, give Permit No.) # _____

8. Pesticide Information (please list all information for each pesticide, including adjuvants (buffer, surfactant, etc.)
 c) Total Amount of Pesticide Applied in Area Treated d) Concentration

a) Full Product Name	b) EPA Reg. No.	c) Total Amount of Pesticide Applied in Area Treated	d) Concentration

9. Address or exact location of application. NOTE: If the application is made to one acre or more of agricultural land, the field location must be shown on the map on page two of this form.

10. Wind direction and estimated velocity (mph) during the application: _____

11. Temperature during the application: _____

12. Apparatus license plate number (if applicable): _____

13. Air Ground Chemigation

14. Miscellaneous Information: _____



Washington State Department of Agriculture
PESTICIDE APPLICATION RECORD (Version 2)
 Pesticide Management Division
 PO Box 42500
 Olympia WA 98504-2500
 (877) 301-4555

NOTE: Application information must be completed same day as the application and must be retained for seven years (Ref. chapter 17.21 RCW)

1. Name & Address of Person for Whom Pesticide was Applied: _____
 2. Applicator Name and Address (if different from #1): _____
 Firm Name (if applicable): _____
 Street Address: _____ City: _____ State: _____
 Zip: _____

3. Full, complete address or exact location of application (NOTE: if the application is made to one acre or more of agricultural land, the field location must be shown on the map on page two of this form): _____
 4. Misc. Info: _____

5. Date and Time of Application (Start and Stop)	6. Crop or Site Treated	7. Acres Treated (or other measure)	8. FULL PRODUCT NAME	9. EPA Registration Number	10. Amount of Product Applied		11. Concentration
					Rate per acre (or other measure)	Total Product Applied	



Washington State Department of Agriculture
PESTICIDE APPLICATION RECORD (Version 3)
 Pesticide Management Division
 PO Box 42500
 Olympia WA 98504-2500
 (877) 301-4555

NOTE: This form must be completed same day as the application and it must be retained for 7 years (Ref. chapter 17.21 RCW)

1. Date of Application - Year: _____ Month: _____ Day(s): _____

2. Name of person for whom the pesticide was applied: _____
 Firm Name (if applicable): _____
 Street Address: _____ City: _____ State: _____ Zip: _____

3. Licensed Applicator's Name (if different from #2 above): _____ License No.: _____
 Firm Name (if applicable): _____ Tel. No.: _____
 Street Address: _____ City: _____ State: _____ Zip: _____

4. Air Ground Chemigation

5. Application Crop or Site: _____

6. Total Area Treated (acres, sq. ft., etc.): _____

7. Was this application made as a result of a WSDA Permit? No Yes (if yes, give Permit No.) # _____

8. Pesticide Information (list all information for each pesticide including adjuvants in the tank mix):
 c) Total Amount of Pesticide Applied in Area Treated d) Pesticide Applied/Acre (or other measure) e) Concentration Applied f) Depth of Application (Chemigation)

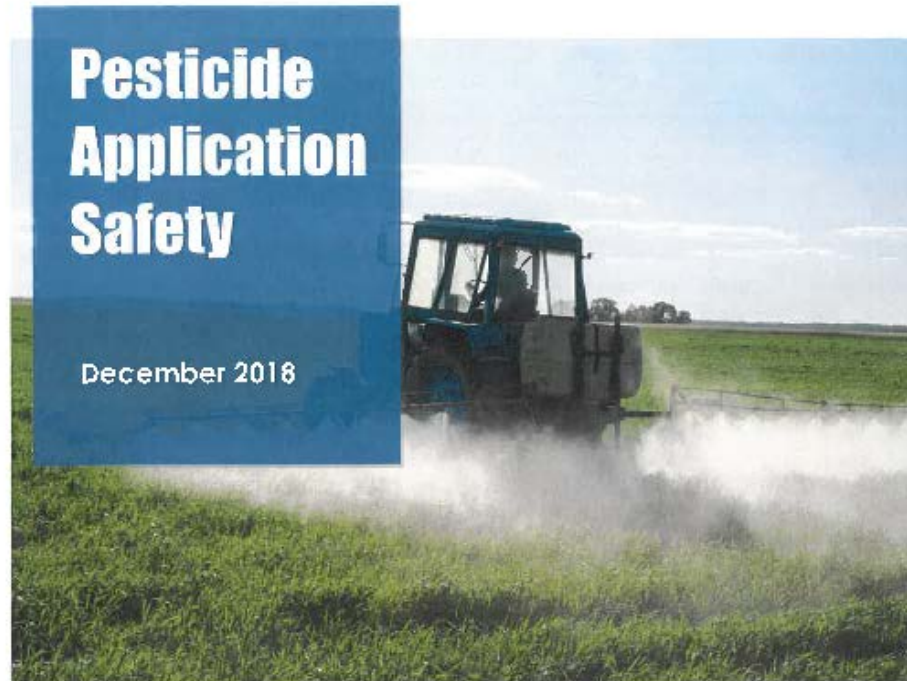
a) Full Product Name	b) EPA Reg. No.	c) Total Amount of Pesticide Applied in Area Treated	d) Pesticide Applied/Acre (or other measure)	e) Concentration Applied	f) Depth of Application (Chemigation)

9. Address or exact location of application. NOTE: If the application is made to one acre or more of agricultural land, the field location must be shown on the map on page two of this form.

10. Date	11. Name of person(s) making the application	12. License No.	13. Apparatus Lic. Plate No.	14. Time		15. Acres Completed	16. Wind Dir.	17. Temp.
				Start	Stop			

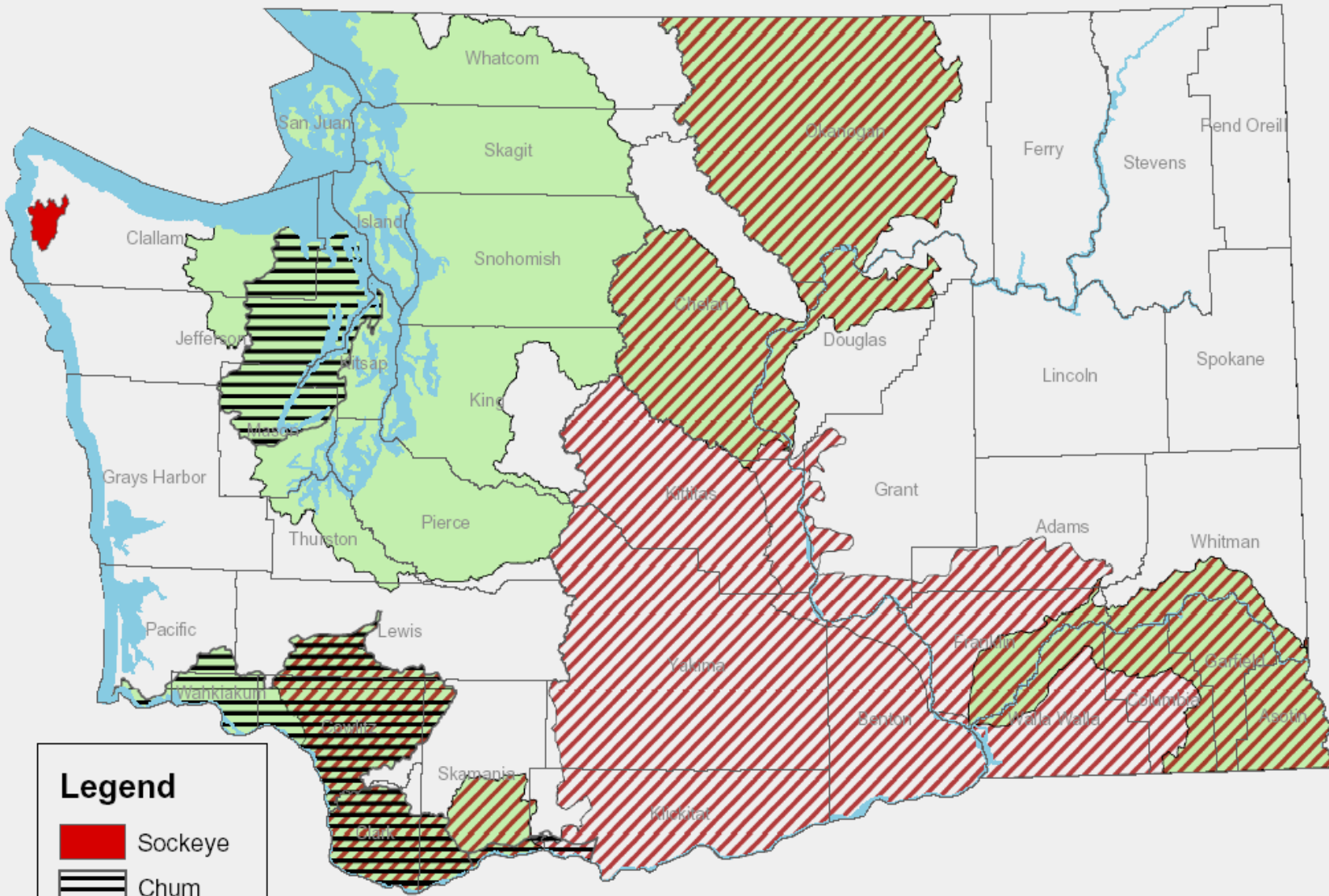
Legislation

Report to the Legislature



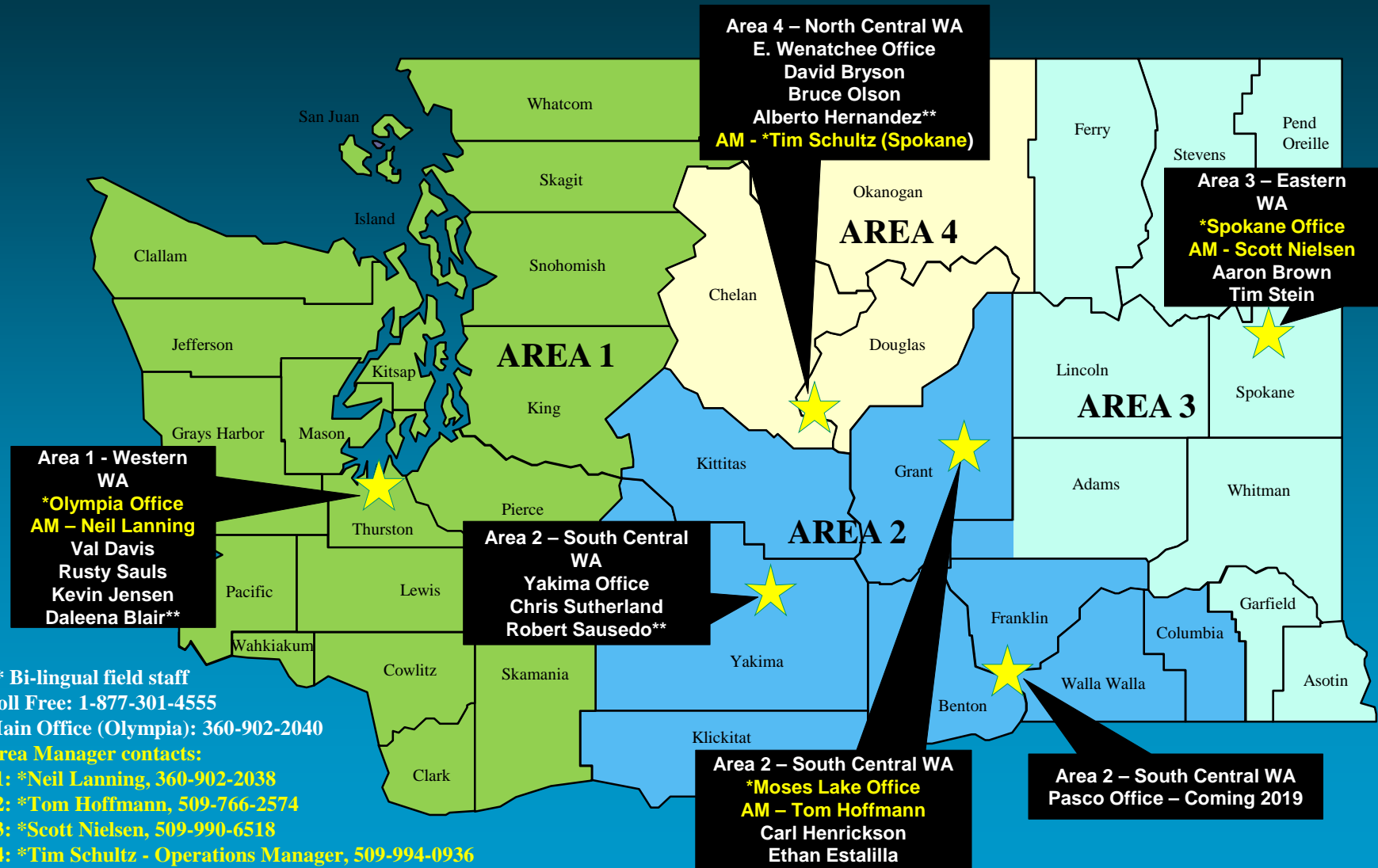
Prepared by

Pesticide Application Safety Workgroup



Court Rulings

Pesticide Compliance Offices and Coverage Areas



** Bi-lingual field staff
 Toll Free: 1-877-301-4555
 Main Office (Olympia): 360-902-2040
Area Manager contacts:
 #1: *Neil Lanning, 360-902-2038
 #2: *Tom Hoffmann, 509-766-2574
 #3: *Scott Nielsen, 509-990-6518
 #4: *Tim Schultz - Operations Manager, 509-994-0936

EXPOSED TO A PESTICIDE

What to do, who to call



Pesticide Management Division
P.O. Box 42589
Olympia, WA 98504-2589

¿Ha sido usted expuesto a pesticidas recientemente o ha sido testigo del uso inapropiado de pesticidas?

Have you been exposed to pesticides or witnessed inappropriate use of pesticides?

Para reportar el posible uso inapropiado de pesticidas que podría poner en riesgo a personas o al medio ambiente, comuníquese con el Departamento de Agricultura del Estado de Washington (WSDA por sus siglas en inglés) para obtener servicio en inglés y español al:

1-844-388-2020

Si es una emergencia médica, busque atención medica inmediatamente o llame al 911 para obtener ayuda.



WSDA investiga quejas sobre el mal uso de pesticidas. Visite nuestra página web: www.agr.wa.gov/pestfert.

AGR PUB 706-453 (R/12/16)

¿Ha sido usted expuesto a pesticidas recientemente o ha sido testigo del uso inapropiado de pesticidas?

Para reportar el posible uso inapropiado de pesticidas que pudiera haber causado daño a personas o al medio ambiente, comuníquese con el Departamento de Agricultura del Estado de Washington para obtener servicio en inglés y español al: **1-844-388-2020**

Si es una emergencia médica, busque atención medica inmediatamente o llame al 911 para obtener ayuda.



WSDA investiga quejas sobre el mal uso de pesticidas. Visite nuestra página web: www.agr.wa.gov/pestfert

Have you recently been exposed to pesticides or witnessed inappropriate use of pesticides? To report a possible inappropriate use of pesticides, contact the Washington State Department of Agriculture for service in English or Spanish at:

1-844-388-2020

If it is a medical emergency, seek medical attention immediately or call 911 for help.



WSDA investigates claims of pesticide misuse. Visit www.agr.wa.gov/pestfert for more information.

AGR PUB 706-453 (R/12/16)

Have you recently been exposed to pesticides or witnessed inappropriate use of pesticides?

To report a possible inappropriate use of pesticides, contact the Washington State Department of Agriculture for service in English or Spanish at: **1-844-388-2020**

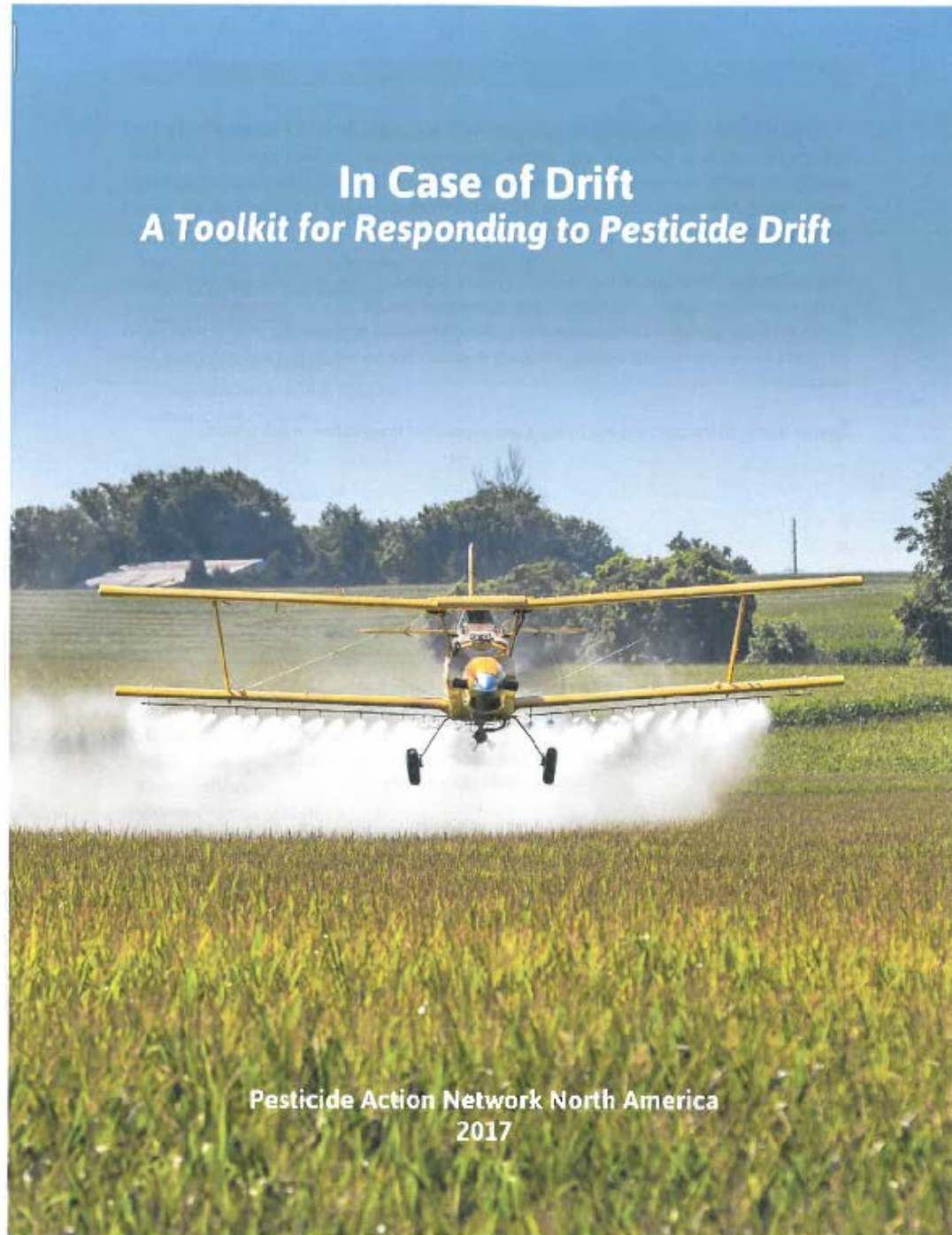
If it is a medical emergency, seek medical attention immediately or call 911 for help.



WSDA investigates claims of pesticide misuse. Visit www.agr.wa.gov/pestfert for more information.

In Case of Drift

A Toolkit for Responding to Pesticide Drift



Pesticide Action Network North America
2017



Human Exposure to Pesticide Drift: Washington State Report

February 2017

Written by:

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Patti Goldman (Earthjustice), Anne Katten (California Rural Legal Assistance Foundation),

Virginia Ruiz (Farmworker Justice)



www.pesticide.org



www.columbialegal.org

Washington State Drift Complaints

Where Are We Now?



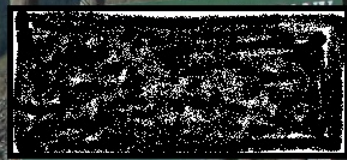
Some think they have been impacted by drift

The Repeat Caller!





WARNING
SPRAYING IN
PROGRESS
POSSIBLE
DRIFT



NO
PARKING





Aerial Applicator Fly-Ins



When an occupied structure beyond the agricultural employer's property boundaries comes within the AEZ, the **handler** must:

- Suspend (pause) the application.
- Evaluate conditions and ensure they can continue the application safely.
- Resume the application only if they are confident they can continue the application without drifting onto the occupied structure.



100 feet

Application Exclusion Zone

4-6 mph
S-SW





PROCESS

Investigating
Pesticide
Complaints



Washington
State Department of
Agriculture

PESTICIDE MANAGEMENT DIVISION
COMPLIANCE PROGRAM



