

● P E S T I C I D E D R I F T

“INDISCRIMINATELY FROM THE SKIES”

Pesticide drift is “unavoidable” whenever pesticides are applied. Drift is greatest from aerial applications, when typically about 40 percent of the pesticide applied is lost to drift. Drift from aerial applications routinely is measured hundreds of yards away from the application site, and has been measured miles away. Ground applications of pesticides can drift for hundreds of feet.

Health effects of drift are difficult to study, but several careful studies have documented health problems related to drift exposure.

Laws concerning drift are written to protect farmers from each other’s pesticides. They are not designed to protect individuals from unwanted exposure or to protect nearby residences. In most northwest states, the only laws concerning drift are those that prohibit application of a pesticide inconsistent with its label.

There is no simple solution to drift problems. Changes in application techniques, setting up buffer zones, and systems for notifying nearby residents about pesticide applications can all help. The best solution for drift problems is to replace chemically-based pest management techniques with sustainable alternatives.

BY CAROLINE COX

Pesticide drift can be defined in its simplest terms as “that portion of the spray cloud that leaves the target area.”¹ Talk to anyone who has experienced drift, however, and a much more complex picture emerges: a poisoned person who spends years trying to regain health; a pet injured or infertile; contaminated homes or property that must be abandoned; loss of a year’s livelihood when contaminated crops can’t be sold. This article is a brief overview of the complexities of drift: the personal side of drift incidents; how often and how far pesticides drift; and actions to take to reduce or resolve drift problems.

The Human Side of Drift

One of the best ways to begin to understand the complexities of pesticide drift is to look at a few of the many drift incidents that occur around the Northwest



Caroline Cox is JPR’s editor.

The title of this article is taken from chapter 10 of Rachel Carson’s classic reporting of pesticide hazards, *Silent Spring*. (See reference #52.)

every year. The costs of poisoning and the diversity of problems are staggering.

In June 1993, 60 workers at the Cameron Nursery in Franklin County, Washington, were exposed to drift from an aerial application of two very highly acutely toxic insecticides, methamidophos and azinphos-methyl, together with a carcinogenic fungicide, mancozeb.^{2,3} Fifty-five of the workers became ill.

In 1992, a Newport, Oregon, resident was walking her dog on her property when she heard helicopters spraying the phenoxy herbicide 2,4-D on adjacent land. She was soon covered with a sweet white substance that drifted onto her and her property. Her whole house smelled of the pesticide and caused her multiple injuries including a rash, numb fingers, severe headaches, blurred vision, and a lost voice. For the next two years she suffered from chronic fatigue, ovarian cysts, and endometriosis.⁴

A Montana organic farmer’s crops were contaminated twice by pesticides drifting from a neighbor’s field. He reported the first incident to the Department of Agriculture, but his neighbor became so upset that he did nothing about the second incident. He took the loss (thousands of dollars) because to report the incidents would destroy what remained of his rela-

tionship with his neighbor.⁵

A summer intern with Kern County (California) Cooperative Extension in 1984 was at work in a tomato field, collecting weather records.⁶ A gust of wind brought a strong odor of pesticide from a neighboring potato field; the intern almost collapsed but struggled out of the field. The potato farmer told the intern that he had been spraying paraquat,⁶ an herbicide known to be damaging to human lungs.⁷ A test of the intern’s lung function gave results typical of a ninety-year-old person, rather than a healthy young adult.⁶

A Christmas tree farm near the Alpine Elementary School (in Alpine, Oregon) was sprayed with the organochlorine insecticide endosulfan while about 85 children were playing on the playground. Wipings from the swingset and samples of grass from the playground were found by the Department of Agriculture to be contaminated. The Department of Agriculture later assessed a small civil penalty against the applicator.⁸

An Inevitable Consequence

Wherever and whenever pesticides are used, drift occurs. The amount of drift has been characterized as “considerable”⁹ by the National Research Council and is thought to vary from about 5 percent (un-

der optimal, low-wind conditions) to 60 percent (under more typical conditions).⁹ The Office of Technology Assessment estimates that about 40 percent of an aerial insecticide application leaves the “target area” and that less than 1 percent actually reaches the target pest.¹⁰ (See Figure 1.)

Statements about the inevitability of drift have been made time and time again by those who are closely connected with the agrichemical industry. Consider, for example, the following statements about drift:

- Two agricultural engineers from the University of California at Davis, wrote in 1964 that “the very first use of agricultural chemicals for pest control probably resulted in undesirable residues on nearby households, persons or animals, wildlife areas, or adjacent crops.”¹¹

- Canadian agricultural researchers, began a 1978 article about drift in agriculture by writing that “whenever any agricultural pesticide is applied to a field from either groundrig or aircraft, there is an initial migration of some of the active ingredient away from the target area.”¹²

- University of Arizona entomologist George Ware explained drift issues for an applicator training manual in 1983: “Some loss by drift is unavoidable.”¹³

- Dr. Earl Spurrier from the National Agricultural Chemicals Association (now called the American Crop Protection Association) speaking at a convention in 1984: “Drift ... can be reduced to more acceptable levels, but it cannot be eliminated entirely ...”¹⁴

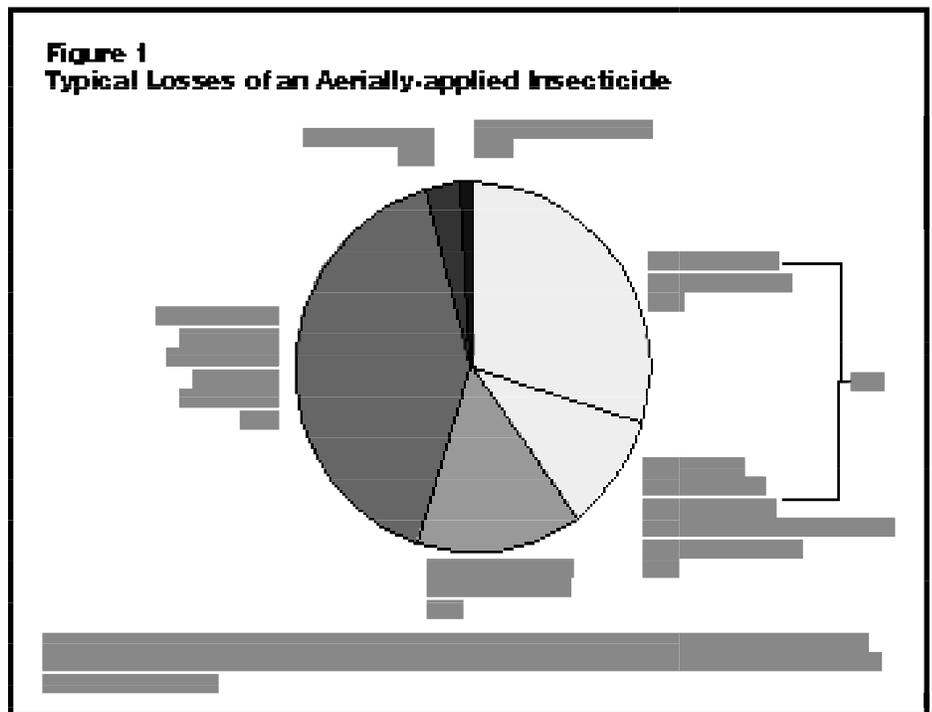
- In 1987, Loren Bode, an agricultural engineer from the University of Illinois, told aerial applicators they should “start from the premise that there will almost always be some spray drift.”¹⁵

- In 1993, the pages of an agriculture industry trade journal state that drift “cannot be completely eliminated.”¹⁶

The conclusion is inescapable.

How Far Can Pesticides Drift?

Aerial Applications: Typical estimates of pesticide drift following aerial application range from 100 meters (330 feet) to 1600 meters (5250 feet).¹⁷⁻³² In virtually every study available to NCAP (totalling 16), pesticides



were detected as far away from the application as samples were taken,¹⁷⁻³² so these numbers cannot give a definite answer to the question of how far pesticides can drift.

Drift does occur over much greater distances. For example, cold air drainage carried forestry applications of the insecticides orthene and trichlorfon over 1.25 miles in Washington’s Cascade mountains.³³ Moderate winds carried cabaryl over 2 miles from a Vermont apple orchard.³⁴ Using a fluorescent tracer, drift was measured 4 miles from an insecticide application on a California oat field.³⁵ From Colorado wheat fields during hot weather, 2,4-D and dicamba drifted between 5 and 10 miles.³⁶ In central Washington, winds and hilly terrain combine to cause 2,4-D drift for 10 to 50 miles and paraquat drift for up to 20 miles.^{37,38}

Ground Applications: Drift from tractor-powered application equipment can range from 16 to 60 meters (50 to 200 feet).³⁹⁻⁴² Other types of ground applications can drift even further: drift from orchard mist-blowers has been measured from 50 to 240 meters (160 to 740 feet) from the applications;⁴³⁻⁴⁷ drift from roadside spraying equipment has been measured at 100 meters (320 feet);⁴⁸ and drift from

chemigation (pesticides applied through an irrigation system) at 200 meters (640 feet).⁴⁹

Drift Can Hurt

Pesticide drift causes illness and injury in people who are exposed. Probably the best evidence for this comes from California, where pesticide illness reporting is more complete than in other states. In 1991, over 350 illnesses and injuries were reported as a result of drift. These accounted for about 20 percent of the pesticide-related illnesses and injuries reported.⁵⁰ However, documenting health problems associated with exposure to pesticides is never easy. Establishing exposure, especially to multiple pesticides, can be difficult. Correlating this exposure with symptoms of illness is also difficult, particularly if the symptoms are similar to those caused by common viral infections. This doesn’t mean that it can’t be done! A close look at examples of health care professionals carefully studying the effects of pesticide drift is worthwhile.

Two Israeli physicians examined eight patients who had complained of weakness, dizziness, abdominal cramps, nausea, diarrhea, and irritability over a month-long period. The patients lived about 150 yards

from a cotton field that had been sprayed 17 times during a growing season of less than a hundred days. Twelve insecticides had been used. All the patients were women who remained in their houses during the daytime hours when spraying took place. Other family members left their homes during these times for school and work, and did not report symptoms of illness. Monitoring their blood for the activity of acetylcholinesterase (AChE), an enzyme inhibited by the insecticides used on the cotton, showed that average AChE activity in these patients was reduced about 45 percent. Symptoms disappeared, and normal AChE activity was restored, when the spray season ended. The patients had been first seen by their local physician who believed that he was dealing with "group hysteria."⁵¹

Officials from California's Environmental Protection Agency investigated a drift incident involving the herbicide paraquat in 1991. (Paraquat concentrates in lung tissue and is acutely toxic to humans by all routes of exposure.) Because the herbicide damaged plants in a characteristic manner, it was possible to identify the area affected by drift, about a mile downwind of the treated field. A survey of residents found that coughing, diarrhea, eye irritation, headache, nausea, unusual tiredness, and wheezing were all more frequent in the exposed community. Among those residents who reported having smelled the paraquat, two symptoms of moderate to high exposure to paraquat (fever and nausea) were also reported. Paraquat is about 1000 times more toxic through inhalation than through ingestion and drifting droplets, being small, are easily inhaled. This increases the toxicity of paraquat drift.⁷

Legal Strategies for Dealing with Drift Incidents

If you, your property, or your domestic animals are drifted upon by pesticides, you may want some legal protection or compensation. Many of us feel strongly the sentiments that Rachel Carson expresses with eloquence in her classic *Silent Spring*. "We have subjected enormous numbers of people to contact with these poisons, without their consent and often

without their knowledge. If the Bill of Rights contains no guarantee that a citizen shall be secure against lethal poisons distributed either by private individuals or by public officials, it is surely only because our forefathers, despite their considerable wis-

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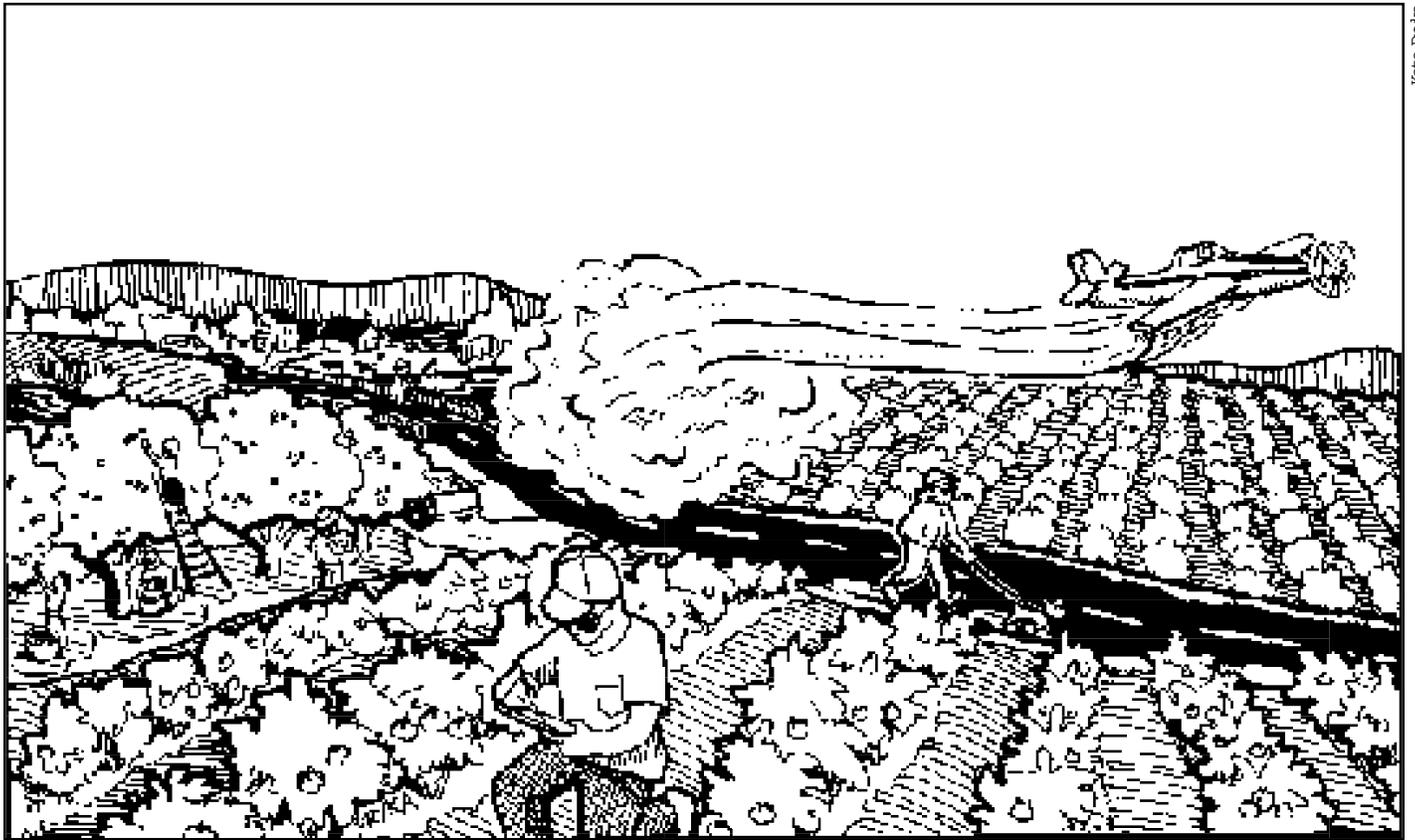
dom and foresight, could conceive of no such problem."⁵² Unfortunately, most of the laws related to pesticide use are not designed to protect individuals and their property from exposure. Instead, they are written to allow as much pesticide use, with its inevitable drift, as possible.

In general, laws in the Pacific Northwest (and elsewhere) do not deal directly with the problem of drift. Of the five Northwest states, only California has an explicit prohibition of drift. Even that is not absolute because the law prohibits only "substantial" drift.⁵³ Also, restricted use pesticides in California can have special drift requirements imposed by the county agricultural commissioner.⁵⁴ In Washington, damage to "humans, desirable plants and animals, or wildlife" is prohibited by administrative rules, but not drift specifically.⁵⁵ Drift is covered in all northwest states by general prohibitions against applying a pesticide in a manner that is inconsistent with its labelling.⁵⁶⁻⁶⁰ Idaho and Oregon also have a prohibition against applying a pesticide in a careless or negligent manner.^{57,59} However, the language on the label relating to drift is often ambiguous. For example, "Do not apply when weather conditions favor drift."⁶¹

Pursuing a drift case through the administrative procedures that result in civil penalties or through the legal system can be difficult, expensive time-consuming, and frustrating. However, this does not mean that you shouldn't try a legal approach. Pesticide users should be obligated to follow the law. The process of trying to get the law enforced can be a powerful tool for educating your community about pesticide issues and publicizing pesticide hazards in the media.

Here are some important steps to take if you are planning legal proceedings concerning a drift incident:

- Immediately after the incident, take care of your personal health. Wash yourself. Remove and save contaminated clothing and other contaminated objects as evidence. Get medical attention if necessary.
- Report the incident to your state department of agriculture (Department of Pesticide Regulation in California). All northwest states have a time limit of either 30 or 60 days for making such a report although in Idaho, Montana, and Washington failure to file such a report does not preclude further legal action.⁶²⁻⁶⁶ The highest priority for most states is to investigate cases where one farmer's pesticide ap-



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plication has damaged another farmer's crop. It will take persistence to get an investigation of other kinds of cases. Remember, it's often true that the "squeaky wheel gets the grease." Keeping copies of letters you write and records of phone calls you make is important. If state officials are unwilling to document your incident (collect and analyze samples of soil, vegetation, or clothing for residues) consider having samples analyzed by a private laboratory. (NCAP can help with referrals.)

- If possible, find out the name of the pesticide product used. Get a copy of the label. (The pesticide user should be able to give you a copy of the label. If the user is not cooperative, contact the pesticide manufacturer, a state agency, an elected official, or ask NCAP for help.) Try to determine, from your reading of the label, if a violation has occurred. Remember that any use inconsistent with the label is against the law.

- Photograph or videotape anything you think might be useful.

- Get competent, experienced legal help. NCAP can help with referrals.

Beyond the Courtroom, What Can You Do?

Even if you don't want to pursue legal action following a drift incident, the steps outlined above are crucial if you want to keep more drift incidents from occurring in the future. In addition, there are other kinds of actions you can take:

Talk to your neighbor: Your pesticide-using neighbor may well be happy to take steps to reduce your drift problems. Remember that all of the pesticide that drifts on your property represents his or her money that is being "thrown away." Perhaps your neighbor will agree to substituting ground applications for aerial ones, setting up a buffer zone between your properties, or giving you advance notice of planned applications. Provide information about alternatives and see if your neighbor is interested in using more sustainable management techniques.

Encourage media coverage: The more

publicity given to drift issues, the more awareness of the problem there will be in your community and in the country as a whole. Contact local newspapers, television stations, and radio stations. Tell them your story.

Be political: Drift is fundamentally a political problem: one person's use of a pesticide infringes on another person's right to be free from exposure to a toxic chemical. There are no "silver bullets" that can end drift problems instantly, but we can, over time, make progress. In Lompoc, California, residents whose homes were drifted upon by pesticide applications from neighboring farmers organized and have succeeded in getting the Department of Pesticide Regulation to plan an air monitoring study, the Department of Health Services to study health problems in the drift area, and the U.S. Environmental Protection Agency to fund integrated pest management training for farmers in the area. None of these actions is solving the immediate drift problems, but all have the potential for

making significant changes in the way that pesticides are used.⁶⁷

Promote pesticide alternatives: No pesticide can drift if it's not used. The only way that drift problems will come to an end is through the widespread adoption of sustainable nonchemical management practices. It's not an easy step, but working together will bring important changes. →

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Laws and Regulations Pertaining to Pesticide Drift in the Pacific Northwest

State	Legal Citation	Statutory or Regulatory Requirement
California	Food and Agricultural Code §12972	The use of any pesticide by any person shall be in such a manner as to prevent substantial drift to nontarget areas.
	Food and Agricultural Code §12973	The use of any pesticide shall not conflict with labelling registered pursuant to this chapter which is delivered with the pesticide
	Food and Agricultural Code §11791	It is unlawful for any person that is subject to this division to ... operate in a faulty, careless, or negligent manner.
	Food and Agricultural Code §14006.5	... no person shall use or possess any pesticide designated as a restricted material for any agricultural use except under a written permit of the commissioner.... Before issuing a permit for any pesticide the commissioner shall consider local conditions including, but not limited to, the following: (a) Use in vicinity of schools, dwellings, hospitals, recreational areas, and livestock enclosures. (b) Problems related to heterogenous planting of crops....
	Food and Agricultural Code §11761	Any person that alleges any loss, nonperformance, or damage as a result of the use or application of any pesticide ... shall, within 30 days from the time that the occurrence of such loss, nonperformance, or damage became known to such person, file with the commissioner of the county in which the loss, nonperformance, or damage ... is alleged to have occurred, a verified report of the loss, nonperformance, or damage.
	Food and Agricultural Code §11762	If a growing crop is alleged to have been damaged as a result of the activities which are described in Section 11761, the verified report of loss, nonperformance, or damage shall be filed prior to the time 50 percent of the crop is harvested....
	California Code of Regulations §6600	Each person performing pest control shall ... exercise reasonable precautions to avoid contamination of the environment.
Idaho	Idaho Code 22-3420	-- No person shall: (1) Use a pesticide in a manner inconsistent with its labeling except as provided for by regulation ... (7) Apply pesticides in a faulty, careless, or negligent manner.
	Idaho Code 22-34-17.	(1) Any individual suffering loss or damage resulting from the use or application by others of any pesticide must file with the department a written report of loss.... This report must be filed within sixty (60) days of the occurrence of the alleged damage, or prior to the harvest of more than twenty-five percent (25%) of such damaged crop. (2) ... The failure to file such a report shall not be considered a bar to the maintenance of any criminal or civil action.
Montana	Montana Code 80-8-305	(1) ... it is unlawful for any person: ... (d) to apply or attempt to apply any registered pesticide in a manner inconsistent with the label, ...
	Montana Code 80-8-301	(1) A person suffering loss or damage resulting from the use or application of any pesticide by any person shall, within 30 days from the time the occurrence of the loss became known to him, file with the department of agriculture a verified report of loss ... (2) ... the failure to file shall not of itself be considered any bar to the maintenance of any criminal or civil action.
Oregon	Revised Statutes 634.372	No person shall: ... (2) As a pesticide applicator or operator, intentionally or willfully apply or use a worthless pesticide or any pesticide inconsistent with its labeling.... (4) Perform pesticide application activities in a faulty, careless or negligent manner.
	Revised Statutes 634.372	(1) No action against a pesticide operator arising out of the use or application of any pesticide shall be commenced unless, within 60 days from the occurrence of the loss, within 60 days from the date the loss is discovered, or, if the loss is alleged to have occurred out of damage to growing crops, before the time when 50 percent of the crop is harvested, the person commencing the action: (a) Files a report of the alleged loss with the department; (b) Mails or personally delivers to the pesticide operator who is allegedly responsible for the loss a true copy of the report provided for under paragraph (a) of this subsection;
Washington	Revised Code 15.58.150	(2) It shall be unlawful: ... (c) For any person to use or cause to be used any pesticide contrary to label directions....
	Administrative Code 16-228-1875	(2) no person shall transport, handle, store, load, apply, or dispose of any pesticide, pesticide container or apparatus in such a manner as to pollute water supplies or waterways, or cause damage or injury to land, including humans, desirable plants and animals, or wildlife.
	Pesticide Application Act 17.21.190	Any person suffering property loss or damage resulting from the use or application by others of any pesticide shall file with the director a verified report of loss ... The report shall be filed within thirty days from the time that the property loss becomes known to the claimant. If a growing crop is alleged to have been damaged, the report shall be filed prior to harvest of fifty percent of that crop.... ... the failure to file the report shall not be considered any bar to the maintenance of any criminal or civil action.