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# OVERVIEW OF WILDLIFE SERVICES' ADVERSE INCIDENT REPORTS FIFRA SECTION 6(a)(2)

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**ABSTRACT:** The United States Department of Agriculture/Animal and Plant Health Inspection Service (APHIS)/Wildlife Services (WS) program fulfills a Federal responsibility for helping solve problems which occur when human activity and wildlife are in conflict with one another. This is accomplished through the recommendation and/or implementation of integrated pest management strategies (IPM). WS IPM strategies often involve both technical assistance and direct damage management. One management technique used by WS is the application of Federally and State registered vertebrate pesticides. APHIS has several vertebrate pesticides registered for use by WS. On June 16, 1998, the U.S. Environmental Protection Agency (EPA) passed a final rule amending the Federal Insecticide, Fungicide, and Rodenticide Act, Section 6(a)(2) on the reporting requirements for adverse incidents that involve pesticides. Adverse incidents, as defined by the EPA, can affect non-target wildlife, domestic animals, humans, property, and plants. WS employees reviewed the program's pesticide records for potential adverse incidents dating back to January 1, 1994. In this paper, we discuss the minuscule impacts WS has had on the environment while using registered pesticides.

**KEY WORDS:** adverse incidents, 6(a)(2) reporting, Wildlife Services, pesticides, FIFRA

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## INTRODUCTION

The Animal and Plant Health Inspection Service (APHIS) of the United States Department of Agriculture (USDA), administers the Wildlife Services (WS) program, and is authorized by the Animal Damage Control Act of March 2, 1931 (7 U.S.C. 426-426c). The Act authorizes WS to cooperate with states, individuals, public and private agencies, organizations, and institutions in conducting research and demonstrating and implementing activities to reduce wildlife-human conflicts. WS activities are conducted in accordance with all applicable Federal, State, and local regulations, including the National Environmental Policy Act, the Endangered Species Act, and the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA).

WS employs an integrated pest management (IPM), or integrated wildlife damage management program in which a variety of wildlife damage management methods are used, dependent on the situation and species in question. The application of pesticides is one of the wildlife management methods used as part of WS IPM strategies. The production and use of pesticides in the U.S. is regulated by the Environmental Protection Agency (EPA), U.S. Department of Agriculture, the Food and Drug Administration, and State agencies (EPA 1999b).

Pesticides are defined as any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any pest; products used to kill or repel pest animal and plant species (40 C.F.R. 152.3). By this definition, one can infer that some of these substances are toxic materials, potentially toxic to human beings. Due to this toxicity or potential toxicity, several systems exist for the tracking and surveillance of both human and animal pesticide exposures (California Environmental Protection Agency, Department of Pesticide Regulation 1997; Felsot 1998; General Accounting Office 1995; Litovitz et al. 1998; Ministry of Agriculture, Fisheries

and Food-Pesticide Safety Directorate 1999). Since 1978, the EPA has collected information on incidents of exposure due to pesticides (General Accounting Office 1995). In 1992, the EPA began computerizing the information into the "Incident Data System." The General Accounting Office (1995) found the EPA's Incident Data System did not have sufficient data to determine whether action to protect public health is necessary and may not be responding to all cases of adverse health effects caused by pesticide use.

Following the General Accounting Office (1995) report, the EPA undertook a major rewrite of the FIFRA Section 6(a)(2) rule (40 C.F.R. 159.184(a)) requiring standardized adverse incident reports from registrants to improve its collection and analysis of incident data. The revision, which became effective August 17, 1998, lists specific requirements on data to be reported, including identification of the pesticide involved and a detailed summary of the incident being reported. A registrant is defined by the EPA as "any person who holds, or ever held, a registration for a pesticide product issued under FIFRA section 3 or 24(c)" (40 C.F.R. 159.184(a)). Employees and agents have no independent obligation to submit adverse effects information to EPA. However, registrants are responsible for information possessed by their employees and agents. In this paper we review WS historical adverse incident submissions required to be collected for the EPA's pesticide adverse incident reporting system.

## METHODS

Upon implementation of the new rule, EPA required registrants to submit historical adverse effect information held by the registrant on June 16, 1998, which had not been previously submitted to the EPA but is considered reportable under 40 C.F.R. 159.184(a). However, the reporting obligation only applied to adverse incidents that

were alleged to have occurred on or after January 1, 1994; that involved human hospitalizations or fatalities, fatalities to domestic animals, and fatalities to some species of fish and wildlife; and that fell under the other requirements as outlined by EPA.

Information on historical adverse incidents for the time period requested was compiled by WS employees for the United States, Guam, Puerto Rico, and the Virgin Islands. Reportable incidents included those resulting from all APHIS registered pesticides, as well as all other pesticides with the same active ingredient, even if registered by another entity or used by another individual. WS employees searched the WS management information system, as well as other electronic and paper files. The management information system tracks program activities by cooperator property agreements. Program activities recorded include, but are not limited to: pesticide application, species taken, applicator, property, date, time.

WS employees searched documents for reportable categories of adverse incidents which included incidents involving humans, domestic animals, fish or wildlife, plants, other non-target organisms, water contamination, and property damage (40 C.F.R. 159.184(b)(5)). Examples of reportable adverse incidents involving APHIS registered products may include a common raven (*Corvus corax*) pulling an M-44 device (active ingredient: sodium cyanide) or an employee accidentally inhaling DRC-1339 (active ingredient: 3-Chloro-4-methylbenzenamine hydrochloride). The failure of a product to perform is also required to be reported under 6(a)(2). Moreover, any allegation is considered reportable if the location is known, the active ingredient is known, and there is a person identified to contact for follow-up information. A cause-effect link does not need to be established between an incident and the pesticide product reported to be involved.

Certain information and incidents are exempt from 6(a)(2) reporting. Exemptions include toxic effects to non-target pests, providing they are similar to the pests listed on the label (40 C.F.R. 159.184(b)(5)). Also exempt, until EPA reinstates the requirement, are incidents in which a registrant has been informed that a person or nontarget organism may suffer a delayed or chronic adverse effect in the future.

## RESULTS

During the 1994 to 1998 period, APHIS held registrations for seven active ingredients used as pesticides by WS which included: 3-Chloro-4-methylbenzenamine hydrochloride (CAS No. 7745-89-3), an avicide; strychnine alkaloid (CAS No. 57-24-9) and zinc phosphide (CAS No. 7733-02-0), rodenticides; sodium cyanide (CAS No. 143-33-9) and sodium monofluoroacetate (CAS No. 62-74-8), predacides; and sodium nitrate (CAS No. 7631-99-4) and carbon (CAS 7440-44-0), burrow fumigants.

For the 4.5 year period, from January 1, 1994 through June 16, 1998, the WS program compiled a list of 34 incidents (Table 1). Incidents involving the take of nontarget species, within the proper use of the pesticide involved, comprised 97% (n=33) of reported incidents. The remaining incident involved the accidental exposure of an employee to a pesticide. Incidents involving M-44s encompassed 97% (n=33) of these reported incidents. The only other incident involved an allegation of domestic geese (*Anerinae*) and ducks (*Anatinae*) fatalities after exposure to a zinc phosphide product registered by a state government. Four of the reported incidents involved domestic dog (*Canis familiaris*) fatalities. These were the only listed incidents for which EPA required a report, given EPA's limitations on the historical incident summaries requested.

Table 1. Adverse incidents recorded by Wildlife Services for APHIS vertebrate pesticide active ingredients for the period between January 1, 1994 through June 16, 1998.

Species	Pesticide	Year				
		1994	1995	1996	1997	1998
American crow	Sodium cyanide	0	0	4	3	3
Black-billed magpie	Sodium cyanide	1	0	0	0	0
Common raven	Sodium cyanide	0	0	1	6	8
Dog, domestic	Sodium cyanide	1	0	0	1	2
Ducks and geese, domestic	Zinc phosphide	0	0	0	1	0
Swift fox	Sodium cyanide	0	0	0	0	2
Human	Sodium cyanide	0	0	0	1	0
<b>Totals</b>		<b>2</b>	<b>0</b>	<b>5</b>	<b>12</b>	<b>15</b>

## DISCUSSION

Pesticides are used by WS for IPM of several different vertebrate species, including, but not limited to, European starlings (*Sturnus vulgaris*), domestic pigeons (*Columba livia*), and coyotes (*Canis latrans*). APHIS had seven active ingredients registered to be used as pesticides by WS from 1994 to 1998. The registrations for the active ingredients held by APHIS accounts for only 1.5% of all the active ingredients registered by the EPA from 1967 to 1997 (U.S. Environmental Protection Agency 1999b).

The number of adverse incidents reported by WS in the 4.5 year period requested by EPA is slight in comparison with the amount of pesticide applied by WS in roughly the same time period (Table 2). Five of the seven active ingredients registered by APHIS had no adverse incidents associated with their use. The two remaining active ingredients reported adverse incidents as less than 0.1% of WS use (Table 2). This comparison illustrates the rarity of EPA-defined "adverse incidents" resulting from WS wildlife management activities using vertebrate pesticides and the minimal impact of WS pesticide use on the environment.

Table 2. Adverse incidents compared to pesticide use by Wildlife Services from 1994 through 1998.

Active Ingredient	Common Name	Units Used	Amount Used	Adverse Incidents	Adverse Incidents as Percent of Use
3-Chloro-4-methylbenzenamine hydrochloride	DRC-1339, Starlicide	N/A	636 kg	0	0
Carbon and sodium nitrate	Gas Cartridge	37,737 cartridges	N/A	0	0
Sodium cyanide	M-44	209,136 capsules	188.2 kg	33	0.016
Sodium monofluoroacetate	Livestock protection collar	1,703 collars	5.1 kg	0	0
Strychnine alkaloid	Strychnine grain baits	N/A	3,997 kg	0	0
Zinc phosphide	Zinc phosphide	N/A	41,322 kg	1	0.001

Thirty-three incidents (97%) involved the use of sodium cyanide in the M-44 device. M-44s are mechanical devices that deliver a lethal dose of sodium cyanide to canids when they pull the top of the device. During 1997, the EPA (1999a) reported 2,112,773.5 kg of cyanide compounds had been released in the United States. WS used 42,010 M-44 devices during fiscal year 1997. Since each device contains about 0.9 g of sodium cyanide, a total of 37,809 g were used that year. That amount is less than 0.002% of the total amount released in the United States during 1997. WS adverse incidents accounted for only 0.000004% of all the cyanide used in the U.S. during 1997 and only 0.016% of all sodium cyanide used by WS during 1994 through 1998.

In many states, swift foxes are managed as predators. Two swift foxes (*Vulpes macrotis*) were taken by M-44s in Oklahoma. These foxes were listed as adverse incidents due to their protected status in Oklahoma as a furbearer, which has a closed season year round and statewide (Oklahoma Department of Wildlife Conservation

2000). The take of common ravens, American crows (*Corvus brachyrhynchos*), and a black-billed magpie (*Pica pica*) by M-44s could be a consequence of the bait attractant or the attractiveness of the shiny metal. The owners of the four dogs taken by M-44s were each in violation of property boundaries and/or leash laws. The remaining M-44 incident involved the eye exposure to sodium cyanide of a WS employee which resulted in no medical treatment necessary. The single zinc phosphide incident included the potential poisoning of domestic ducks and geese. No evidence was produced that confirmed zinc phosphide as the cause of death.

Several other adverse incident reporting processes exist, each with its own focus. The Ministry of Agriculture, Fisheries, and Food in Great Britain has created the Wildlife Incident Investigation Scheme (the Scheme), a reporting system for the investigation of possible cases of illegal poisoning of wildlife (Ministry of Agriculture, Fisheries and Food-Pesticide Safety Directorate 1999). The Scheme initiates investigations

based on incidents involving the possible pesticide poisoning of wildlife, insects, and/or pets categorizing poisoning incidents into three main categories: 1) approved use of the product according to specified conditions for use; 2) misuse of a product by careless, accidental, or willful failure to adhere to the correct practice; and 3) abuse of a pesticide in the form of deliberate, illegal attempts to poison animals. This process is similar to the U.S. EPA's 6(a)(2) reporting requirement by providing a means of surveillance of pesticide use and helping in the verification and improvement of the risk assessments made in the registration process.

Due to the differences in reporting structure, data from the Scheme and from 6(a)(2) reporting cannot be directly compared. However, the data is similar enough that some analogies can be made about the adverse incidents. Analysis of the 1997 Scheme data illustrated that, in Britain at least, the majority of "adverse incidents" involving wildlife and domestic pets have been attributed to the deliberate misuse or abuse of pesticides (Ministry of Agriculture, Fisheries and Food-Pesticide Safety Directorate 1999). The Scheme recorded 651 and 607 suspected poisoning incidents in 1996 and 1997, respectively. Twelve adverse incidents (6%) in 1996 and six adverse incidents (3%) in 1997 arose from the approved use of pesticides. The Scheme indicates that misuse and abuse of pesticide products have been primary contributors to adverse incidents. Such incidents can result from poor storage, spillage, chemicals not being used in an approved manner, or compounds being disposed of in an inappropriate way. Deliberate abuse of products may be less likely to be disclosed through 6(a)(2) reporting, strictly because deliberate abuse of a pesticide may not be reported to the registrant and, therefore, may not be reported under 6(a)(2) to the EPA.

The abuse and misuse of pesticides involving wildlife has been found throughout the world. Jackson (1998) reported on local people illegally poisoning livestock carcasses to take tigers (*Panthera tigris*) and leopards (*P. pardus*) in India. Poachers in Asia use the toxicant "RIBCOT" to take shrimp, crabs, and fish (Khan 1998). RIBCOT also adversely affects crocodiles, snakes, and other aquatic animals. A variety of birds in Australia have been illegally poisoned with fenthion (McKenzie et al. 1996). Even the U.S. is not immune to the misuse and abuse of pesticides. Individuals in Kansas illegally used furadan-laced carcass baits to poison raptors (*Buteo jamaicensis* and *Haliaeetus leucocephalus*) and coyotes (Allen et al. 1996).

The American Association of Poison Control Centers has developed the Toxic Exposure Surveillance System (TESS) to track human poison exposure cases (Litovitz et al. 1998). TESS averaged over two million exposures annually during the time period of 1994 to 1997. During 1997, residential poisoning accounted for 91.5% and occupational for 2.1% of all exposures. During the five year period analyzed, WS had one incident involving a human which was an occupational exposure in 1997 (Table 1). If the WS exposure had been added to the TESS, it would account for only 0.00004% of all occupational exposures reported to TESS in 1997.

TESS also tracks data by category of toxicant. WS use of sodium cyanide falls under the TESS' rodenticide category. In 1997, there were 17,516 (0.8%) exposures of rodenticides reported to TESS (Litovitz et al. 1998). If the WS exposure had been added to TESS, it would account for only 0.006% of all rodenticide exposures reported to TESS in 1997. Based on WS records and the records in TESS, we can hypothesize that when pesticides are used according to the label, the risk to humans is minimal to none. On the other hand, humans are at a greater risk with naturally occurring toxicants derived from organisms such as wildlife (6.9%) and plants (8.8%) (Litovitz et al. 1998).

In 1990, Washington State created the Pesticide Incident Reporting and Tracking (PIRT) Review Panel (Felsot 1998). The PIRT panel has oversight of the regulation of pesticide use and misuse. The 1997 PIRT Annual Report found that even after large amounts of pesticides had been applied to urbanized and agricultural lands, the number of adverse incidents reported was minimal (Felsot 1998). The Washington Poison Center reported that only 2% (n=3,092) of the 132,649 calls received involving poisoning incidences pertained to pesticides (Felsot 1998). In this report (Felsot 1998), the Department of Health listed 504 reports of suspected pesticide poisoning. However, only 47% (n=237) could be considered definite, probable, or possible cases of pesticide exposure or illness. The conclusion can be drawn from the PIRT report that investigations are often warranted when pesticide exposure incidents are reported.

Similarly, the California Department of Pesticide Regulation (DPR) maintains a surveillance program, and produces an annual report recording human health effects of pesticide exposure (California Environmental Protection Agency, Department of Pesticide Regulation 1997). In 1995, 2,401 people were reported to have been involved in pesticide exposure incidents (California Environmental Protection Agency, Department of Pesticide Regulation 1997). Pesticides were found to be a factor in only 66% (n=1,593) of the 2,401 cases. DPR found that severe intoxications often resulted from disregarding label instructions. These findings reinforce the conclusion from the PIRT report that alleged pesticide exposure incidents need to be investigated on situational details to determine the validity of and the circumstances around the reports.

After review of the pesticide incident reporting systems above and WS data, a trend can be ascertained. The number of adverse pesticide exposures, involving either humans or wildlife, is insignificant in comparison to the total number of incidents reported and the large amounts of pesticides used in the environment. Adverse incidents were caused most often by the misuse or abuse of a pesticide product. We anticipate that when the EPA reviews the data submitted under the 6(a)(2) reporting system, a similar trend will arise. The WS program provides a fundamental example of this: by using certified pesticide applicators and adhering to label restrictions, the occurrence of adverse incidents can be reduced to having little to no impact on the environment. WS will further minimize its impact on the environment by finding more selective attractants, reducing the amount

of pesticide needed to be efficacious, and developing alternative nonlethal methods. In conclusion, the misuse of pesticides cannot be completely avoided, but the data show that well conducted programs, like WS, significantly reduce the impact of vertebrate pesticides in the environment.

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