

# Regulating Pesticides: The California Story

California Department  
of Pesticide Regulation





*A Guide to Pesticide  
Regulation in California*

*California Environmental Protection Agency  
California Department of Pesticide Regulation*



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**A Guide to Pesticide Regulation in California**



California Environmental Protection Agency  
**California Department of Pesticide Regulation**



California Department of  
Pesticide Regulation

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# Preface

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California's Food and Agricultural Code Section 11501 sets forth the general purposes of the legal code that fundamentally authorizes the State's pesticide regulatory program:

- To provide for the proper, safe, and efficient use of pesticides essential for production of food and fiber and for protection of the public health and safety.
- To protect the environment from environmentally harmful pesticides by prohibiting, regulating, or ensuring proper stewardship of those pesticides.
- To assure agricultural and pest control workers of safe working conditions where pesticides are present.
- To permit agricultural pest control by competent and responsible licensees and permittees under strict control of the Department of Pesticide Regulation and the County Agricultural Commissioners.
- To assure consumers and users that pesticides are properly labeled and appropriate for the use designated by the label and that state or local governmental dissemination of information on pesticidal uses of any registered pesticide product is consistent with the uses for which the product is registered.
- To encourage the development and implementation of pest management systems, stressing application of biological and cultural pest control techniques with selective pesticides when necessary to achieve acceptable levels of control with the least possible harm to the public health, nontarget organisms, and the environment.

Explaining how Department of Pesticide Regulation policies and programs work to fulfill these and other responsibilities is the intent of this publication.

**Editor's Note**

The State's pesticide regulatory program has had departmental status since 1991, as the Department of Pesticide Regulation, within the California Environmental Protection Agency. But the pesticide program had its beginnings in the early 1920s as a function of the California Department of Agriculture (later to be called the Department of Food and Agriculture). The Department of Agriculture published an annual report from 1919 through 1958. Those reports were an invaluable and priceless source of information for this publication. Excerpts from the report were also used as pullout quotations throughout this publication. Please note that when a quotation is attributed to "Department annual report," the reference is to an annual report of the California Department of Agriculture.

# California's First Century of Pesticide Regulation

California has regulated pesticides for a century. Its citizens — through their Legislature — have established a comprehensive body of law to control every aspect of pesticide sales and use, and to assure that the state's pesticide regulators also have the tools to assess the impacts of that use. The first pesticide-related law was passed in this state in 1901, and since the 1960s, a whole body of modern, increasingly science-based pesticide law and regulation has come into being.

The California Department of Pesticide Regulation (DPR) protects human health and the environment by regulating pesticide sales and use and by fostering reduced-risk pest management. DPR's strict oversight begins with product evaluation and registration, and continues through statewide licensing of commercial applicators, dealers and consultants, environmental monitoring, and residue testing of fresh produce. In 2001, DPR had an annual budget of approximately \$60 million, with a staff of about 460, including scientists from many disciplines. Their work is augmented by approximately 400 biologists working for County Agricultural Commissioners in all 58 counties on local pesticide enforcement.

## The 19th Century: Pests Flourish, New Pesticides Developed

The Industrial Revolution of the mid-19th century made mechanized farming possible. With tractors to plow, farmers could cultivate larger acreages. The availability of machinery promoted intensified, specialized agriculture, with crops bred to a uniformity that made for easier machine processing. But this monocultural mass production provided an ideal environment for insect pests to flourish. At the same time, remarkable new transportation systems made possible both the commercial transport of harvested crops and hitchhiking by insect pests to new homes where no natural predators existed. As migration opened up the American West, farmers cleared forests to garner cultivable lands, and native pests often adapted to the change by acquiring a taste for domestic crops. Moving a crop to a new area can transform a previously unimportant insect into a serious pest. The Colorado potato beetle was a local insect with another name and an appetite limited to wild grasses until potatoes were introduced to the American West from South America and their acreage increased throughout the mid-1800s. To confront the escalating pest problem, the federal government in the 1880s helped establish a system of land-grant colleges to teach the agricultural sciences and research new ways to control insects, weeds and other pests.

Few chemicals were available at the time to fight pests. A number of insecticides had been in use for centuries, primarily mineral, herbal or animal preparations. The most popular were hellebore (a poisonous herb of the lily family), quassia (distilled from various tropical trees of the ailanthus family), lime, and tobacco, all applied in water-based solutions; various types of oils; copper compounds; and of course, sulfur (whose earliest recorded use was by the Summerians well before 2500 BC). In the Middle East, pyrethrum flowers (a member of the chrysanthemum family) were dried, powdered, and sold worldwide as a powerful insecticide, but attempts failed to grow the flower in the U.S. and produce economical amounts of insecticide.

Arsenic, used against insects and rodents for millennia, was typically mixed with food bait to fight household pests. In the mid-1800s, farmers found they could use Paris green, a common, arsenic-containing paint pigment, to kill insects in their fields. Then as now, farmers were searching for pest control that was inexpensive, quickly applied,



***Putting the Ladybird to Work:  
colonizing beneficial insects in an  
orange orchard; 100 ladybirds  
[ladybugs] to each container.***

*— Caption on this 1919  
Department photograph*

and effective. Paris green was swiftly followed by London purple (calcium arsenite), lead arsenate and calcium arsenate. In the 1880s, French grape growers accidentally discovered that Bordeaux mixture, a combination of hydrated lime and copper sulfate, could fight powdery mildew fungus.

The use of pesticides grew tremendously into the 1900s, but the materials used did not change radically. The active ingredients in most pesticides were compounds of arsenic, antimony, selenium, sulfur, thallium zinc, copper, or plant-derived alkaloids. Hydrogen cyanide gas was also used for fumigation, and various oils applied to fight pests. The first selective herbicide was discovered in 1896 when iron sulfate was found to kill broadleaf weeds but not cereal crops. Over the next decades, many other simple inorganic compounds (e.g., sodium nitrate, ammonium sulfate and sulfuric acid) were put into very limited use as herbicides. However, since labor for weed removal was cheap and readily available, farmers were not generally interested in using herbicides. Instead, they used a combination of clean cultivation, tillage, crop rotation with weed-competitive crops, and hand-weeding to keep their weed problems under control.

Likewise, even in the early decades of the 20th century, use of insecticides and fungicides was not widespread, and confined largely to high-value tree fruit crops. Although a few scientists expressed concerns over arsenic residues remaining on sprayed fruits and vegetables, the consensus was that wind and rain removed most residues and in any case, arsenic was not considered harmful in the small amounts present on sprayed produce. Little thought was given to the potential hazard of repeated exposure to small amounts of arsenic present all around, for the chemical was also used to color paper, candles, artificial flowers, fabrics, toys, plates, carpets and clothing.

California's first pesticide law, one of the first in the nation, was passed in 1901.

### Early Pesticide Regulation: Focus on Consumer Fraud

With the relatively small number of pesticides in use in the early 20th century, pesticide regulation was a matter of low priority at both the state and federal levels. There was little concern about their long-term effects on health or the environment. The focus of regulation was on protecting pesticide users from fraud by ensuring product quality. Pesticides, like many products of the time (including foods and drugs), were often adulterated or mislabeled. It was not unusual for manufacturers to make extravagant claims for products that were useless at best, and sometimes destructive to the plants on which they were used.

The nation's first pesticide law was passed in New York in 1898. Oregon and Texas followed in 1899, and California and Washington in 1901. California's law (Act of February 28, 1901, Chapter 53) was entitled "An act to prevent fraud in the sale of Paris green used as an insecticide," and charged the Director of the University of California Agricultural Experiment Station with ensuring the quality of a single arsenic-based product, Paris green, the most widely used insecticide. Dealers were required to submit samples of their products to the Experiment Station with a written statement describing brand names, number of pounds contained in each package, name and address of manufacturer, and percentage of Paris green contained. "The statement so furnished," the law declared, "shall be considered as constituting a guarantee to the purchaser that every package . . . contains not less than the amount . . . set forth in the statement." The Agricultural Experiment Station was tasked with analyzing samples. Sellers of deficient products were guilty of a misdemeanor and according to the new law, "shall be fined not less than fifty dollars nor more than two hundred dollars, together with the costs of the suit."

The commercial success of Paris green spurred the development of other arsenic-based pesticides and Congress responded in 1910 by passing a pesticide product quality law, the Federal Insecticide Act, essentially a labeling law concerned with protecting consumers from ineffective pesticides or deceptive labeling. The statute, applauded for its inclusiveness, applied to a large class of products — insecticides and fungicides — not previously covered by any laws. However, the new law contained neither a federal registration requirement nor any significant safety standards.

California's parallel legislation, the State Insecticide and Fungicide Act of 1911 (Chapter 653), was also primarily concerned with mislabeling and adulteration. The

State Legislature had appointed a committee of California pesticide users and manufacturers to draft the new law, and they recommended taking wording from the California Fertilizer Act of 1903. The State's new statute went beyond the 1910 federal pesticide control law in that it required all manufacturers, importers and dealers in insecticides and fungicides to register their products (for a \$1 fee) with the Secretary of the Board of Regents of the University of California, submitting a statement on "the component parts of the substances which they proposed to offer for sale." Proper labeling was also required, stating the name of the product, name and address of the manufacturer, place of manufacture, and chemical analysis showing "the percentage of each substance claimed to have insecticidal value, the form in which each is present and the materials from which derived, and the percentage of inert ingredients." The purpose of this latter provision "was to enable the user to know the insecticidal value of the material, and also to make the manufacturer more careful as to the composition of his products." This section was described at the time as the "most radical of any of the requirements, and was the one most seriously objected to by those who wished to oppose the law . . . . Practically the only serious objections came from the makers of 'secret' remedies who had been profiting by the use of fictitious names."

The law also required that the Agricultural Experiment Station sample and analyze all registered pesticides annually. However, the number of registered brands in the first two years after passage of the law grew "well toward 10,000," and it became quickly apparent that annual analysis would be impossible. The law was amended to remove that requirement in 1914. At the same time lobbying by manufacturers and dealers prompted the Legislature to eliminate the requirement for detailed pesticide labeling, requiring instead a "general" statement of the contents. A second amendment exempted a number of products from the registration requirements, including several household insecticides (for example, flypaper, mothballs, ant poison), as well as sheep dip, lice killer, and sulfur. In 1916, further amendments provided for an additional registration fee and for issuing certificates of registration. In 1917, new rules required pest control businesses to have a certificate of qualification from the County Horticultural Commissioner (later to be called County Agricultural Commissioner).

In 1919, the California Department of Agriculture (CDA) was created from the State Commission on Horticulture. In 1920, legislation brought "the several County Horticultural Commissioners in California, a total of 52, and their deputies . . . under the direction of the Director of Agriculture, in the performance of their duties pertaining to the standardization of fruits, vegetables and other plant products, and in the prevention of the illegal introduction into the state of plant diseases, noxious weeds and insects and other animal pests . . . . This cooperation is appreciated and fills a long-felt want in the Department," the Department said in its annual report. "It is a means by which the Department is kept in touch with the undertakings and accomplishments of the horticultural commissioners in their endeavor to serve the fruit growers and farmers of the state."

The new Department of Agriculture, in its first annual report in 1920, declared the need for a new law to regulate pesticide manufacture and sale, to "accomplish the following purposes:

- *Encourage the manufacture and sale of standard and well-tried remedies.*
- *Discourage the sale of poorly compounded or low-grade remedies prepared in a poorly equipped factory, or by the careless manufacturer.*
- *Prohibit the sale of worthless preparations placed on the market either through ignorance or with intent to defraud.*
- *Prohibit the sale of preparations which are injurious to cultivated plants or domestic animals, or are a menace to the public health.*
- *Restrain the activities of the clever fakir who profits by falsely claiming some new discovery or some mysteriously acting poison, and in reality is selling some common and well-known substance under camouflage of coloring matter or odor."*

With the 1921 passage of the Economic Poisons Act (Act of June 3, 1921, Chapter 729), regulatory authority over pesticides was transferred from the University of California to CDA. ("Economic poison" was a synonym used for "pesticide.")

A 1911 California statute required registration of pesticide products and "a statement of component parts."

Legislation in the 1990s substituted statutory references to “economic poison” with the more commonly understood “pesticide.”) The 1921 law also expanded CDA’s authority beyond insecticides and fungicides. The statute was described in a 1921 Department report as “a novelty in legislation of this type, there being no other law, state or national, regulating the manufacture and sale of rodent poisons and weed poisons.” The legislation gave CDA authority to control not only the manufacture and sale but also the use of pesticides. However, the Department recognized that “the State is a large one and to attempt to distribute a corps of inspectors large enough to detect fraudulent practices would be a hopeless task . . . (Therefore) arrangements are now being made for the appointment of five or six County Horticultural Commissioners to act as collaborators in the enforcement of the Economic Poison Act.”

The new Economic Poison Act also required manufacturers when registering their products to supply information on how a product was formulated, as well as a product sample to assure quality standards. Cancellation or denial of registration was authorized for products found detrimental to agriculture or public health. Throughout the 1920s, CDA used its in-house labs to “test the efficacy of insecticides and fungicides for which it appears extravagant claims have been made.” Evidence gathered was used to file misdemeanor charges against the manufacturer if the product was already registered, or to cancel or refuse registration.

The right of the CDA Director to refuse to register or to cancel the registration of a firm “attempting to sell fraudulent or worthless insecticides” was upheld in a 1925 Appellate Court decision, overturning an earlier Superior Court decision that had held the 1921 Economic Poison Act unconstitutional (*A.R. Gregory v. CDA*).

Although CDA had the authority to refuse to register a pesticide if it was proven ineffective, without data in hand, there was no way of determining efficacy before a product was registered and used in the field, forcing the Department into a situation where it had to grant a registration. This loophole was closed by the Legislature in 1929 when it gave the Department authority to require “practical demonstration as may be necessary” to determine that products were effective and that they were not “generally detrimental or seriously injurious to vegetation.” Although the statutes allowed cancellation based on health or environmental problems, the acknowledged focus of programs of the time was adulteration and misbranding. CDA’s 1934 annual report said that its program “affords protection to the consumer as to quality and quantity and to the manufacturer by preventing unfair competition.” Hundreds of product samples were analyzed each year, and about 30 percent were routinely found “extensively deficient.” (By the 1940s, that percentage had dropped to about 10 percent, and deficiencies were attributed more to “irreducible error in manufacturing technique and not to an attempt to defraud.”)

***Enforcement of the law protects the manufacturer against unfair competition and the consumer against an army of unscrupulous individuals, lying in wait to get the consumer’s dollar without giving value received. The industries themselves are responsible for passage of the agricultural chemical laws and cooperate in their enforcement.***

– 1933 Department annual report

### The 1920s: Food Residues Become a Concern

Adulteration of food by dishonest merchants — a centuries-old problem — worsened in the 19th century as a rapidly urbanizing America became more dependent on faraway sources of food. Poisonous adulterants were not uncommon, and people were sickened and even died as a result. In 1906, Congress passed the Pure Food and Drug Act, putting the U.S. Bureau of Chemistry (later to be reorganized as the U.S. Food and Drug Administration) in charge of protecting consumers against adulterated, misbranded, or impure food and drugs. Pesticide residues on food were not a significant concern until the 1920s, when the issue was pushed to the forefront with increasing pesticide use by farmers, and by a series of reported illnesses and several well-publicized seizures of fruit with high arsenic levels by health officials in major American cities.

Federal and state agricultural officials responded with reassurances that arsenic residues were not a concern if the pesticide was properly applied, and embarked on educational campaigns to persuade farmers not to overspray. In December 1925, a handful of illnesses among British consumers of American-grown fruit prompted the English authorities to warn against consumption of foreign-grown apples, and sales of California apples plummeted. In response, State pesticide regulators the next year began analyzing small quantities of fresh produce for residues and in 1927, the California

Legislature passed the Chemical Spray Residue Act. This law made it illegal to pack, ship, or sell fruits or vegetables with harmful pesticide residues. It also established allowable arsenic residues that mirrored those that had been established by the federal government that same year. These allowable residues (called tolerances) were set by the U.S. Bureau of Chemistry for apples and pears in interstate commerce and for export.

California's Spray Residue Act established monitoring programs designed not only to safeguard the consumer against harmful residues, but also to certify California-grown fruit as free of excess residues. The Department operated a voluntary, fee-based certification program until the 1940s. The goal was to ensure that no shipments of California fruit were confiscated by other states or nations because of excess residues. When illegal residues were found, the lots of produce were quarantined and growers were instructed on how to remove residues with an acid wash. However, growers whose crops repeatedly had residues over allowable levels faced hefty fines and even jail sentences.

In 1934, the Economic Poison Act was amended to prohibit pesticide sales in anything other than the registrant's container, with "name and percent of every ingredient . . . intended for use on or sold for application to any food crop in such a way as to leave a residue deleterious to health must be plainly stated on label." *Deleterious residues* were defined as residues of arsenic, fluorine, and lead, the only chemicals for which the federal government had tolerances established. CDA expanded its monitoring program to sample for these residues, and by 1935 was taking 25,000 samples a year, 22,000 under the voluntary certification program and 3,000 as part of the Department's use enforcement program.

With the introduction of many new synthetic organic pesticides in the late 1930s and 1940s, residue sampling expanded to test for DDT and other organic compounds. In 1949, the Spray Residue Act was amended to expand the definition of potentially harmful spray residues beyond those of arsenic, fluorine and lead to encompass "any pesticide or constituent thereof which on produce is harmful to human health in quantities greater than a maximum amount or permissible tolerances established by rules and regulations of the Director." The amendments also gave the Director authority to set tolerances. Laws passed in 1967 and 1983 reinforced the right of California's Agriculture Director to review federal tolerances and adopt them in the State, or to set more stringent tolerances. With the creation of the Department of Pesticide Regulation (DPR) in 1991, that authority was transferred to the DPR Director. The federal Food Quality Protection Act of 1996 preempted states from setting their own tolerances.

In 1953, the Legislature amended the Spray Residue Act to include grains used to feed livestock or poultry. This was in response to the Department of Agriculture's concerns that it could not take legal action in cases where pesticide misuse contaminated anything other than fruits or vegetables.

At the federal level, the Food, Drug, and Cosmetic Act was amended in 1954 to prohibit registration of any food-use pesticide that left residues until and unless the U.S. Food and Drug Administration (U.S. FDA) issued a tolerance that sanctioned "safe" residue levels.

### New Pesticides and the "Green Revolution"

By the mid-1930s, a wider variety of pesticides were being used, including pyrethrins, rotenone-containing preparations, zinc and iron sulfate, petroleum oils, and the new products of organic chemistry. The new products included agents that controlled nematodes and weeds, that defoliated plants and preserved wood, and that stimulated or retarded plant growth. In addition, as CDA reported in 1944, "chemists (have) synthesized emulsifiers, wetting agents, solvents and similar adjuvants or accessory substances which . . . greatly facilitate accomplishment of pest control."

That same year, the Department expressed concern about what it called the "hazards of new products. The rapid increase in the use of synthetic organic chemicals," the Department said in its annual report, "illustrates the need for study to provide for intelligent handling of products of this nature. Possible industrial health hazards of new products should be anticipated. Problems constantly arise as to hazards to workers not only in mixing of chemicals but in making field applications. When a chemical is not acutely poisonous, generally little is known as to the extent of its injuriousness.



The Department has had a produce testing program since the 1920s.

Information should be at hand with regard to insidious chronic poisoning of newly developed materials, as well as to their acute toxicity.” (It would be another 40 years before the State’s pesticide regulators received legal authority and developed the scientific expertise to begin the task of collecting data and analyzing the potential long-term effects of pesticide exposure.)

The Department took note of these “remarkable advances and unprecedented developments in the chemistry of pest control,” which along with new, high-yield plant varieties, chemical fertilizers, irrigation technology, and mechanization, helped prompt the so-called “Green Revolution.” By the late 1940s, the use of inorganic arsenic-, lead- and fluorine-based compounds had significantly decreased. New, organic compounds like DDT, 2,4-D and ethyl parathion were revolutionizing agriculture, increasing yields and reducing the need for higher-priced, labor-intensive weed and insect control methods and pest-reducing practices.

The number of registered products continued to grow as manufacturers rushed to market the new products of organic chemistry. A 1945 Department report noted the increase in product registrations, stating that in 1925, “only 1,700 products were on the market for pest control purposes in California.” In 1935, “the total had doubled to about 3,500 products, and (in 1945) over 7,000 different (pesticides were) registered for sale in this State.” By 1950, there were 9,070 registered products, and by 1956, there were 11,904. (The number of registered products continues to change from year to year within a narrow range; in 2000, it was about 11,500 products.)

Pesticide applications by aircraft increased as well. In 1934, 65,479 acres were treated by aircraft, by 1939 it was 296,000 acres, in 1947, 614,348 acres and by 1953, 3.5 million acres. With this technological development came increasing concerns about and problems with aerial drift.

In 1947, Congress responded to the increasing use of pesticides by enacting the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). This law governing the registration, sale, possession and use of pesticides required that pesticides distributed in interstate commerce be registered with the U.S. Department of Agriculture (USDA). The law also contained a rudimentary labeling provision. Like its 1920 predecessor, FIFRA in 1947 was more concerned with product quality and efficacy than with safety. However, the statute declared pesticides “misbranded” if they were harmful to man, animals or vegetation (except weeds) when properly used.

Major defects in the new law soon became apparent. The registration process was largely a hollow formality since the U.S. Secretary of Agriculture had no power to refuse registration, even for a chemical considered highly dangerous. The Secretary could register a formal protest against registration but this did not prevent the registrant from manufacturing or distributing the product. The only way the Secretary could deal with a hazardous product was to take legal action for misbranding or adulteration, with the burden of proof on the government. Congress did not deal with this aspect of FIFRA until it revised the law to strengthen regulatory authority in 1964.

In California, regulators had clearer authority. Since the passage of the Economic Poison Act of 1921 and its 1929 amendments, the state’s Director of Agriculture (and subsequently the Director of DPR) could cancel a registration, or refuse to register, any pesticide determined to be ineffective, damaging to non-target organisms, or detrimental to public health and safety when properly used. The Director also had authority to cancel or refuse registration to registrants who made false or misleading statements about their products.

Another defect in the 1947 FIFRA law was a lack of federal regulatory control on use of a pesticide in the field. That was not true in California, where the Director of Agriculture had some authority over use practices since the 1920s. Then came the dramatic increase in pesticide use in the late 1940s. Growers experimented with the new products, applying them in a variety of ways on a variety of crops, sometimes with insufficient knowledge of their effects or toxicity. Benefits were immediately apparent — healthy plants and increased yields. However, there were problems as well. Drift caused damage to non-target crops and killed livestock and honeybees. Improper applications caused injury and death to workers and others. Regulators realized they needed stronger, more targeted control measures.

***The importance of California’s excellent pesticides law is attested by the numerous requests for information concerning it which have been received from other states and countries where interest is evident in progressive legislation and control of agricultural chemicals.***  
– 1939 Department annual report

### Problems Prompt New Controls

A joint legislative committee was set up in 1947 to study the problems. Resulting 1949 legislation put a clear emphasis on safety in regulating pesticides, and led to the State's first regulations which governed pesticide handling and imposed restrictions on certain pesticides with the potential to cause injury to people, crops, or the environment. Permits were required to possess or use these pesticides.

With passage of this statute, regulation of professional applicators moved from the county level to become a responsibility shared by the State and the County Agricultural Commissioners. As far back as 1917, pest control businesses in California were required to obtain a certificate of qualification from the County Agricultural Commissioner. In 1935, the State Department of Agriculture was given the authority to adopt regulations, but the enforcement was left at the county level. In 1949, California made its first statewide effort to regulate pesticide application with legislation (Act of July 20, 1949, Chapter 1043) that required professional agricultural applicators and pilots be licensed by the State Department of Agriculture, with registration required in the county of operation. The new law also required applicators to keep certain records of applications and report this information to the County Agricultural Commissioner.

In 1949, state law was amended to expand state labeling requirements to adjuvants. In 1967, legislation gave the Department of Agriculture full authority to require registration and oversee the use of adjuvants. Adjuvants (emulsifiers, spreaders, wetting agents and other efficacy enhancers) are subject to registration in California but are exempt from federal registration requirements.

California's regulations continued to be fine-tuned throughout the 1950s, as an increasing number of newly developed but highly toxic chemicals were introduced to the market. Detailed regulations were adopted including buffer zones to protect adjacent crops and residences, and restrictions on nozzle sizes, wind velocities, and other factors to limit drift.

### Silent Spring: Concerns About Long-Term Effects

The 1960s forever changed the way society viewed pesticides. Although problems had been apparent for some time — most notably, concerns about possible acute health effects and the increasing resistance of some pests to the new products — the signal event was the publication in 1962 of *Silent Spring*. Author Rachel Carson presented compelling arguments that pesticides and other chemicals were being used with little regard for their impact on either human health or the environment. *Silent Spring* is widely considered to have sparked the modern environmental movement.

Many changes in federal and state law have come about in the more than 40 years since *Silent Spring*. In 1969, Congress passed the National Environmental Policy Act (NEPA), which required federal agencies to consider environmental matters before undertaking new actions.

In 1970, the U.S. Environmental Protection Agency (U.S. EPA) was created to bring cohesion to the expansion of federal environmental activities. Both the USDA pesticide registration functions and the tolerance-setting authority that had been the province of the U.S. FDA were transferred to U.S. EPA (although U.S. FDA retained its residue monitoring program).

In 1969 and 1970, landmark legislation was enacted in California that required a "thorough evaluation" of pesticides before registration and gave the Department of Agriculture clearer authority to establish criteria for studies to be submitted by pesticide manufacturers. This legislation also gave the Department distinct authority to place restrictions on how pesticides may be used. The Director was also required to begin a program of orderly and continuous evaluation of pesticides and eliminate from use those posing a danger to the agricultural or nonagricultural environment. Two years later, the Department hired its first "in-house" evaluation scientists to review data submitted to support registration requests. The Department previously had relied on scientists at the University of California and in other state departments to evaluate data.

In 1949, California passed its first laws to regulate applications of pesticides statewide.

In 1971, a mill assessment (set at that time at \$0.008 per dollar of pesticide sales) was enacted. Beginning in 1989, the Legislature approved a series of increases in the assessment level, and at the same time decreased the level of General Fund support for department activities. (See Chapter 15 for a more detailed discussion of regulatory funding.)

The Legislature changed the name of the Department in 1972 to the *Department of Food and Agriculture*. The name change acknowledged a widening of the Department's mission to include a statutory mandate not only to promote and protect California agriculture but also to protect public health, safety, and welfare. In 1991, the pesticide regulatory program was given departmental status as the Department of Pesticide Regulation (DPR), under the newly formed California Environmental Protection Agency (Cal/EPA).



In 1972, legislation transferred authority over the pesticide workplace to the State's pesticide regulatory program.

Legislation passed in 1972 (Chapter 794) made the development of pesticide worker safety regulations the joint and mutual responsibility of the California Department of Food and Agriculture (CDFA) and the Department of Health Services. (With the formation of Cal/EPA, DHS' consultation role was transferred to Cal/EPA's Office of Environmental Health Hazard Assessment.) The legislation also delegated pesticide use enforcement to CDFA and the County Agricultural Commissioners. With this, CDFA became the primary state agency responsible for the occupational safety of employees handling agricultural pesticides. CDFA's Worker Health and Safety program took a forceful role in making the workplace safer for pesticide users and workers. Regulations were adopted in the 1970s requiring pesticide handlers to receive safety training, that they be provided protective clothing and equipment, and mandating longer intervals before workers could re-enter fields treated with some pesticides. California also became the first state to require handlers to use closed systems when mixing and loading certain highly toxic pesticides into application equipment. The Department also established a pesticide illness reporting and investigation system still unique in the nation.

In 1972, FIFRA was extensively amended, virtually rewriting the law. The goal was primarily to strengthen its enforcement provisions and to shift its emphasis from labeling and efficacy to protection of health and the environment. The 1972 amendments also extended the scope of federal law to give U.S. EPA exclusive authority over pesticide labeling, establish standards for the certification of restricted pesticide applicators, and cover intrastate registrations to ensure states did not register pesticides that were not registered federally. The provisions were tested after California imposed additional data requirements as a condition of registration. The National Agricultural Chemical Association and other industry groups sued CDFA in 1980, arguing that federal law preempted states from imposing their own registration requirements and fees. A federal district court found in favor of the Department, ruling there was no federal preemption of state registration requirements. The litigants also tried unsuccessfully to persuade Congress to amend FIFRA to prevent states from requiring data that were different from or additional to data required by U.S. EPA.

In 1972, CDFA began licensing agricultural pest control advisers, with a later requirement for training and continuing education. Adviser licensing was directed at setting standards for professional conduct for those who advise growers on pest control methods and by requiring that pest control recommendations be in writing, making advisers legally accountable. In 1999, new regulations were adopted requiring that after 2002, prospective advisers must take more college courses related to integrated pest management and sustainable agriculture.

The 1970s saw an expansion of CDFA's pesticide enforcement focus. Federal grant money that followed the passage of the 1972 FIFRA amendments allowed the Department to upgrade its field offices with additional staff. This made possible more training and better supervision of the County Agricultural Commissioners, who have primary responsibility for field enforcement of the state's pesticide regulations.<sup>1</sup> Field inspection

*continued on page 10*

<sup>1</sup> Rather than establishing a uniform system of regulation of pesticide use throughout the state, the Legislature has chosen a flexible system, adjusting local need and environmental concerns and placing wide discretion in County Agricultural Commissioners, manifesting its intent that local concerns and conditions be given paramount importance.

# Preemption: Federal, State, and Local Jurisdiction Over Pesticide Use

Federal laws are always preeminent: once Congress passes laws that occupy an area, no government at a lower tier, i.e., at the state or local level, may pass laws that conflict with the federal laws. For example, FIFRA clearly states that pesticide labeling is regulated only at the federal level, by that preempting state or local laws in this arena. In other words, no state or local government can dictate what is on a pesticide product label. (However, a state can refuse to allow registration of a product and hence the possession, sale and use of any pesticide not meeting its own standards.)

The California Constitution also allows the State to preempt local jurisdictions. The Constitution states that local governing bodies (for example, City Councils or Boards of Supervisors) may pass laws (called “ordinances” at the local level) provided they do not conflict with state law. However, California State law (Chapter 1386, Statutes of 1984) states that no local government “may prohibit or in any way attempt to regulate any matter relating to the registration, sale, transportation, or use of pesticides, and any of these [local] ordinances, laws, or regulations are void and of no force or effect.” (FAC Section 11501.1)

The 1984 legislation was passed in response to a State Supreme Court ruling that same year in *The People v. County of Mendocino*. In that case, the State Attorney General had sued the county, arguing that State law preempted a 1979 initiative approved by Mendocino County voters to prohibit the aerial application in the county of phenoxy herbicides. The herbicides were used by a forest products company to retard hardwood growth in favor of conifer growth. The initiative followed a 1977 incident in which an aerial herbicide application drifted nearly three miles onto school buses.

A lower court ruled in favor of the State, finding that California law preempted county regulation of pesticide use. However, in 1984 the State Supreme Court disagreed, ruling that “the Legislature has not preempted local regulation of pesticide use,” that Mendocino’s “initiative ordinance neither duplicates nor contradicts any statute,” and that voters in any California county could prohibit the use of pesticides in that county, even if such use were authorized by state and federal law.

The Court stated, “The legislative history (of FIFRA) does not demonstrate a clear Congressional intention to preempt traditional local police powers to regulate the use of pesticides or to preempt state power to distribute its regulatory authority between itself and its political subdivisions.”

In response, the State Legislature passed a bill adding Section 11501.1 to the Food and Agricultural Code, stating it is “the intent of the Legislature to overturn” the Supreme Court ruling, and that “matters relating to (pesticides) are of a statewide interest and concern and are to be administered on a statewide basis by the state unless specific exceptions are made in state legislation for local administration.”

In an unpublished 1986 opinion, the Court of Appeal for the Third Appellate District found FAC Section 11501.1 constitutional and in so doing invalidated a Trinity County local pesticide ordinance.

(Local governing bodies may pass ordinances that regulate or restrict pesticide use in their own operations. For example, a City Council may pass an ordinance that restricts pesticide use in municipal buildings and in public parks, and a school district board can decree that certain pesticides cannot be used in schools.)

In 1991, in *Wisconsin Public Intervenor v. Ralph Mortier*, the U.S. Supreme Court ruled that, absent state law to the contrary, federal pesticide law does not preempt local regulations dealing with the use of pesticides. The U.S. Supreme Court ruled that FIFRA “leaves the allocation of regulatory authority to the absolute discretion of the states themselves, including the options of . . . leaving local regulation of pesticides in the hands of local authorities under existing state laws.” Because California law clearly prohibits local ordinances, the 1991 U.S. Supreme Court decision had no effect in California.

In 1996, legislation (Chapter 361, AB 124) clarified but did not significantly alter DPR’s preemption authority. The legislation required the Department to notify any local agency that promulgates an ordinance governing the sales, use, or handling of pesticides whenever the Department determines that the ordinance is preempted by existing State law. The bill also required the Department, if necessary, to file court action to have the ordinance invalidated and to prohibit its enforcement.

*continued from page 8*

procedures were standardized, their scope widened to include all aspects of pesticide use (with a particular emphasis on worker safety), record-keeping, storage, and disposal.

In 1977, CDFA recognized the increasing importance of pesticide regulation by elevating the program to Division status. From the 1920s through the 1950s, pesticide registration and regulation had been only one of the functions of the Department's bureau (later division) of chemistry. When the Department's various chemistry laboratories were consolidated, the regulation of both pesticides and fertilizers became the province of the Bureau of Agricultural Chemicals and Feed, within the Division of Inspection Services. In 1977, pesticide functions were split off to CDFA's new Division of Pest Management, Environmental Protection and Worker Safety.

### California's Environmental Quality Act and Its Impact on Pesticide Regulation

In 1970, California passed its own version of NEPA with the enactment of the California Environmental Quality Act (CEQA). It is the State's principal statute mandating environmental impact review of development projects in California and applies generally to all state and local agencies and to private activities that the agencies finance or regulate. CEQA requires, among other things, that an environmental impact report be developed and subject to public review and comment before a permit is issued for a project that might impact environmental quality.

In 1976, the State Attorney General issued an opinion that the State's pesticide regulatory program had to comply with CEQA when registering a pesticide or granting a license, permit or certificate. In other words, the opinion stated, under the terms of CEQA, the Department was required to prepare an environmental impact report (EIR) before registering any of the several hundred new pesticide products that come onto the market each year. In the same vein, County Agricultural Commissioners were required to prepare an EIR before approving several thousand permits issued annually to users of certain, high-hazard ("restricted") pesticides.

After a specially convened Environmental Assessment Team determined this was not feasible, legislation was passed in 1978 (Chapter 308, AB 3765) which provided for an abbreviated environmental review procedure that would serve as the functional equivalent to a full-scale EIR. This meant that the State and the County Agricultural Commissioners did not have to prepare an EIR on each product or permit approved. Instead of an EIR, documentation of environmental impacts, mitigation measures, and alternatives were required. This necessitated expanding review of data before registration, a revision of Department regulations relating to pesticide registration and evaluation, public notice of proposed actions and decisions, and requiring site-specific permits to use certain restricted pesticides. The regulations also set up a mechanism for interaction between the Department and other State agencies which have responsibility for resources that may be affected by pesticides (*see Pesticide Registration and Evaluation Committee, Chapter 3*). In December 1979, the State's pesticide regulatory program was certified by the State Resources Agency as functionally equivalent to CEQA. Any substantial changes in the certified regulatory program must be submitted to the Secretary of the Resources Agency for review, and the Secretary has the authority to determine whether the change alters the program such that it no longer meets the qualification for certification.

### The 1980s: A Decade of Legislative Mandates

With the 1980s came far-reaching legislation that added authority and functions to the Division. In 1983, Governor Deukmejian issued Executive Order D-15-83, designating the pesticide regulatory program within CDFA as the lead agency in matters pertaining to pesticides. (Since its creation in 1991 by Governor's Reorganization Plan Number One [GRP-1], DPR has continued as the State agency with primacy over pesticide use and regulation.)

Increasing concern about air pollution resulted in the passage of 1983 legislation (Chapter 1047, AB 1807, sometimes called the Toxic Air Contaminant Act) to give the

The 1980s were highlighted by an expansion of pesticide regulatory authority and passage of a number of statutory mandates.

State broader authority over airborne toxins. While most of the control measures were the responsibility of the Air Resources Board, industry concerns about CDFA primacy over pesticide regulation led to DPR being given the lead in evaluating pesticides in ambient air and developing control measures.

In 1984, the Legislature passed the Birth Defect Prevention Act (Chapter 669, SB 950) which required that all registered pesticides have complete and adequate chronic health effects studies. This increased the scope and responsibilities of CDFA's Registration functions and led to the creation in 1985 of a separate Medical Toxicology Branch to evaluate toxicological data and prepare health evaluations and risk assessments. California's is the only pesticide regulatory program in the country with a large and highly regarded scientific and technical staff that evaluates toxicology, environmental and other data required for pesticide registration, and conducts comprehensive risk assessments, including assessment of dietary risk.

The Pesticide Contamination Prevention Act (Chapter 1298, Statutes of 1985, AB 2021) focused on mitigating the effects of pesticides in ground water. The law required the Department to establish a database of wells sampled for pesticides, to collect data on the physical properties of pesticides that might lead to ground water contamination, and to control the use of and monitor for these pesticides.

The 1980s also marked the continued expansion of the Department's pesticide enforcement program. Enforcement Branch staffing was increased and legislation passed to enhance enforcement authority. AB 1614 (Chapter 943, Statutes of 1985) authorized the County Agricultural Commissioners to levy direct civil penalties on persons for violations of specified provisions relating to pesticides. Subsequent legislation (Chapter 843, Statutes of 1989, AB 1873) gave a more limited penalty authority to Department staff, and in 2000 (Chapter 806, SB 1970), DPR was given authority to levy civil penalties for serious cases resulting from high-priority investigations or multi-jurisdictional violations. AB 1142 (Chapter 908, Statutes of 1988) improved the Director's authority to seize and destroy a crop treated with a pesticide not registered for that crop.

In the 1980s, the U.S. EPA began developing a national Worker Protection Standard, initially modeling it on California's pioneering work in this area. Although the national worker protection standard that went into effect in 1995 differed in some respects from California's program, it had a common foundation and an essential similarity in purpose. Most elements of California's worker safety program exceeded the federal standard and where it did not, regulatory changes were made to bring those portions into compliance.

In 1988, Congress again amended FIFRA, strengthening U.S. EPA's authority in several major areas. The principal focus of the amendments was to accelerate the pesticide reregistration process and authorize the collection of fees to support re-registration activities. (To ensure that previously registered pesticides measure up to current scientific and regulatory standards, FIFRA requires the review and "re-registration" of all existing pesticides.)

During the 1980s, the decades-old residue monitoring program was enhanced with the addition of three new elements, including a program to test raw produce destined for processing (Produce Destined for Processing Program), and another to sample crops before harvesting (Preharvest Program). The most significant addition was the Priority Pesticide Program, designed to provide data useful for accurate assessments of dietary risk. With it, the Department began targeted sampling of commodities known to have been treated with pesticides of health concern. In the 1990s, the preharvest and processing programs were eliminated after several years of monitoring data demonstrated consistently lower percentages of detectable residues and lower rates of violations than in the Marketplace Surveillance Program. (*See Chapter 8 for more information on residue monitoring programs.*)

In 1990, responding to the public's concern about food safety, California expanded pesticide use reporting requirements to include all applications made to agricultural food crops and many non-agricultural applications as well. This replaced a system of limited use reporting that began in the 1950s. Farmers and pest control businesses now provide complete, site- and time-specific documentation of every pesticide application made to agricultural food crops, including post-harvest applications. In addition, reporting requirements also extend to applications by professional structural pest control companies, and to applications on parks, golf courses, cemeteries, rangeland and pastures, and



In 1990, California established the nation's first system for mandatory reporting of all agricultural pesticide use.

along roadside and railroad rights-of-way. (See Chapter 10 for more information on pesticide use reporting.)

### What is a pesticide?

A pesticide is any substance or mixture of substances intended to control, destroy, repel, or attract a pest. Any living organism that causes damage or economic loss or transmits or produces disease may be the target pest. Pests can be animals (like insects or mice), unwanted plants (weeds), or microorganisms (like plant diseases and viruses). Though often misunderstood to refer only to insecticides, the term pesticide also applies to herbicides, fungicides, and various other substances used to control pests. Under U.S. and California law, a pesticide is also any substance or mixture of substances intended for use as a plant regulator, defoliant, or desiccant.

### Pesticide Regulation Given Departmental Status

In 1991, California's environmental authority was unified in a single Cabinet-level agency — the California Environmental Protection Agency (Cal/EPA). This brought the Air Resources Board, State Water Resources Control Board, and Integrated Waste Management Board under an umbrella agency with the newly created Department of Toxic Substances Control and Office of Environmental Health Hazard Assessment (OEHHA). As part of this reorganization, the pesticide regulation program was removed from CDFG and given departmental status as the Department of Pesticide Regulation within Cal/EPA. All pesticide-related statutory responsibilities and authorities were transferred to DPR with the exception of the Biological Control Program and the pesticide residue laboratory, which remained with CDFG, and local enforcement duties, which are under the County Agricultural Commissioners.

Cal/EPA was created with six primary goals. These are to: 1) focus on those activities, processes and substances presenting the greatest risk to public health and the environment; 2) set risk-based priorities using the best, most consistent science available; 3) provide vigorous and fair enforcement of the law, not only for public protection, but also to assure that law-abiding businesses are not undercut by unscrupulous competitors; 4) open the regulatory process for public participation; 5) view environmental protection and economic progress as complementary goals; and 6) prevent pollution from being created, rather than attempting to control it after the fact. The reorganization enhanced the State's effectiveness to protect the environment by giving Cal/EPA responsibility for coordinating issues which cross jurisdictional lines.

DPR, with primary responsibility for regulating pesticide use and its potential impacts on water, air, soil, and biological organisms, had long had a cross-media program which develops and enforces mitigation measures that account for interactions across media. At the same time, several regulatory agencies have general jurisdiction and authority over specific media, such as the Air Resources Board (air), State Water Resources Control Board (water), and the Department of Fish and Game (fish and wildlife). In recognition of these roles, DPR has entered into a number of memoranda of understanding or agreements with such agencies to ensure a coordinated and effective approach to pesticide regulation regardless of the media impacted. In addition to these written cooperative agreements, DPR engages in frequent interagency consultations. Such consultations may be program-specific. For example, DPR is directed in statute to consult with OEHHA concerning the joint adoption of worker protection regulations as well as registration and risk assessment actions. In other cases, the consultation may be more systematic, such as a standing interagency advisory committee. DPR chairs advisory committees, including the Pesticide Registration and Evaluation Committee and the Pest Management Advisory Committee.

### Accomplishments and Future Directions

DPR's primary mission is ensuring the safe use of pesticides. Since its creation in 1991, the Department has made significant strides in enhancing worker and environmental protections, strengthening uniformity of enforcement in the field while maintaining local discretion and flexibility, streamlining the regulatory process to encourage registration of safer materials, encouraging the development and use of reduced-risk pest management practices, and using existing and new statutory requirements to ensure the completion of an up-to-date toxicological database for all pesticide active ingredients.

*Notable accomplishments in its first decade of existence as a full-fledged Department include:*

- In 1990, California became the first state to require full use reporting of all agricultural pesticide use and structural pesticides applied by professional applicators. By the end of the decade, the Department had developed sophisticated analytical techniques to improve the quality and accuracy of the data collected and to ensure its usefulness and availability to a wide audience via the Internet.

- DPR established its “IPM Innovator” awards program in 1994 to aid in disseminating information on alternative methods of pest management. It recognizes growers and others who are already developing and using innovative ways of managing pests, and actively coordinates the formation of new “innovator” groups.
- As part of its commitment to encouraging voluntary, community-based, pollution prevention programs, DPR is one of the few government agencies in the nation awarding grants to help develop innovative pest management practices that reduce the risks associated with pesticide use. A grants program established in 1996 was expanded in 1998 with a complementary program of public-private alliances targeted at reducing pesticide risks to workers, consumers, and the environment. The grants program embodies DPR’s approach of funding small, localized projects that help groups take research results and move them into the field via applied research and demonstration projects that, if successful, can be funded for broad geographic implementation
- In the late 1990s, DPR completed collection of required health effects data on a priority list of 200 pesticides of highest health concern. The mandate to collect data came with the 1984 passage of the Birth Defect Prevention Act. DPR is also completing risk assessments and risk mitigations on the highest-risk chemicals. By 2000, DPR had also completed collection of environmental fate data on pesticides required by the Pesticide Contamination Prevention Act of 1985; using this and other data, DPR scientists had developed methodology designed to put its ground water program on a more preventive basis.
- During the 1990s, requests for registration of new products increased as a result of the introduction of new chemical and biological agents. During the same period, budgetary constraints had led to reduced staffing to deal with the problem, and the average time to register a new pesticide increased from 200 days to more than 300 days. New staffing provided in the 1999-2000 budget allowed DPR to focus more resources on reducing the backlog. At the same time, increased staffing allowed the Department to reinvigorate an initiative begun in the 1990s to collaborate with the U.S. Environmental Protection Agency to share resources and expedite reviews and approvals of new pesticides, particularly those that pose lower risks to human health and the environment.
- In 1999, DPR also began to bring its wealth of information and various regulatory and nonregulatory tools to bear in developing solutions to water quality problems. With budget augmentations that began in the 1999-2000 fiscal year, DPR established a surface water protection program consistent with its longstanding ground water program. The goal of DPR’s surface water program is to characterize pesticide residues in surface water bodies (including rivers, streams, and agricultural drains), identify the sources of the contamination, determine the mechanisms of off-site movement of pesticides to surface water, and develop site-specific mitigation strategies.
- Schools have been a special focus for DPR and its staff. In 1993, DPR staff began working with school districts across the state to implement reduced-risk pesticide programs. In 1994, DPR sent to each of the state’s 1,000-plus school districts a 43-page booklet designed to encourage and assist school officials in setting up an IPM program. In 1996, DPR reported on its two-year survey of the State’s school districts about their pest management practices, policies and programs. In 1998, a DPR grant enabled a consortium of school districts to develop a training curriculum for school IPM and a school pesticide record-keeping system. In 2000, another DPR grant is being used to develop model school IPM programs in five counties. In the 2000-01 fiscal budget cycle, DPR also received funding to establish a program to provide technical and logistical assistance to schools that wish to adopt IPM and reduce pesticide use.
- In response to an agency-wide directive, the Department in 1999 completed an in-depth assessment of its enforcement program. As part of this effort, input was solicited from the County Agricultural Commissioners, representatives of production agriculture, the pesticide industry, public interest groups, farm labor representatives, and other interested parties. The Department in early 2000 began implementing a variety of action items identified in the assessment, including expanding resources



In 1994, DPR presented its first “IPM Innovator” awards to recognize leadership and creativity in developing new reduced-risk pest management strategies.

for compliance assessment and county supervision; initiating a drift control initiative; improving enforcement planning and evaluating, and enhancing state and county authority to take action against pesticide violations. Fulfilling the challenges presented by the scope of the recommendations was expected to take several years.

- In the 1990s, to ensure uniform and effective compliance and enforcement, DPR and the County Agricultural Commissioners initiated three key projects: development and implementation in 1994 of enforcement guidelines to carry out a policy to foster consistent statewide enforcement responses; development and implementation of the "Pesticide Use Enforcement Prioritization Plan," a plan that prioritizes county activities based upon factors such as risk; and, finally, development and implementation of negotiated workplans for each county to assist them in more effectively planning activities and resource commitments. The Enforcement Initiative also made several recommendations to foster uniform and effective compliance and enforcement, including developing written guidelines for commissioners in the form of enforcement matrices or an enforcement or compliance policy manual.

To meet the expectations of stakeholders and the public for timely, responsive, friction-free access to government information and services, in 1999 DPR began to strategically re-engineer its website, and by extension, its business functions, to take advantage of the tremendous opportunities offered by advances in information technology. The goals are to make all databases fully accessible and searchable via the Internet, to ensure that DPR staff have access to timely, reliable information needed for decision-making, to develop a needs-guided delivery of information and services, and to transition business processes to take advantage of new technologies and make them Internet-capable.

DPR faces numerous challenges during the coming years. Because of the unique nature of the pesticide regulatory program, its first and foremost priority is to ensure that its pest management decisions are based on a solid scientific foundation, and that these decisions protect public health and the State's sensitive ecosystems. DPR's task is also to assure the continued supply of high-quality food and fiber products while encouraging reduced pesticide use and greater use of lower-risk pest control alternatives. DPR's operations must also be open, accessible, and accountable; the Department is working diligently to assure that the voluminous information that DPR collects on pesticides and their impact on human health and the environment is available in a timely and convenient manner. Critical to the Department's success will be building more partnerships with its stakeholders, piloting new approaches to environmental protection, and bringing more public involvement into the process.



*State government should take every opportunity to use information technology to make state services and programs more accessible and hassle-free.*

*– Governor Gray Davis,  
September 2000*



# The Rulemaking Process

Statutes are laws enacted by a legislature. Regulations are rules enacted by government agencies that have the same force of law as statutes. An agency receives its power to adopt regulations from statutes, and cites this authority at the end of each regulation. Regulations are rules adopted by a regulatory agency (like DPR) to carry out, interpret, or make specific the statutes enforced or administered by it, or to govern its procedures. The process of writing and adopting regulations is called rulemaking

The State Administrative Procedures Act (APA) prescribes the process for putting regulations into place (Government Code 11340-11359). Among other requirements, the APA requires state agencies to give public notice when proposing regulations, to provide extensive documentation to support the need and authority for the regulation, to receive and consider public comments, to submit regulations and rulemaking files to the Office of Administrative Law (OAL) for review to ensure compliance with the requirements of the APA, and to have the regulations published in the California Code of Regulations (CCR). The role of OAL is to ensure that state agency regulations are authorized by statute, consistent with other law, and written in a comprehensible manner.

A regulation typically takes six months to a year to complete. The APA also allows agencies to file emergency regulations, provided the rulemaking meets certain criteria. However, unlike permanent regulations, which stay on the books until revised or repealed, emergency regulations expire within 120 days, and therefore must be followed by proposal of permanent regulations.

The CCR contains the text of the regulations that have been formally adopted by State agencies, reviewed and approved by OAL, and filed with the Secretary of State. The CCR consists of 27 titles (including the Food and Agricultural Code, where most pesticide-related regulations reside). The CCR is available at offices of County Clerks, county law libraries, and many public libraries. The Food and Agricultural Code is available online on DPR's Web site <[www.cdpr.ca.gov](http://www.cdpr.ca.gov)>. The CCR is available at <<http://ccr.oal.ca.gov>>.

**External Scientific Peer Review:** The purpose of peer review is to uncover any technical problems or unresolved issues in a draft document so that the final publication will reflect sound technical information and analyses. It is a process for enhancing the scientific or technical work product.

As a result of a legislative mandate (Chapter 295, Statutes of 1997, SB 1320), no Cal/EPA board, department, or office "shall take any action to adopt the final version of a rule [that establishes a regulatory level, standard, or other requirement for the protection of public health or the environment . . . without submitting] . . . the scientific portions of the proposed rule, along with a statement of the scientific findings, conclusions, and assumptions on which the scientific portions of the proposed rule are based and the supporting scientific data, studies, and other appropriate materials, to the external scientific peer entity for its evaluation."

The legislation mandated peer review by the National Academy of Sciences, the University of California, California State University, any similar institution of learning, or by a group of individual scientists recommended by the UC President.

FAC Section 14023(b) mandates that toxic air contaminant (TAC) health evaluation documents be reviewed by the Scientific Review Panel. (*See Chapter 4 for description of DPR's TAC program*). If regulations involve scientific documents already reviewed under the TAC program, the review by the TAC panel constitutes the legally required external peer review.

This external peer review process is in addition to the internal peer review that DPR typically conducts on its scientific documents. Also, the Food and Agricultural Code (Section 11454.1) directs OEHHA to provide scientific peer review of DPR risk assessments (including risk characterization documents and exposure assessment documents). In addition, DPR has chosen to submit risk assessments to U.S. EPA for peer review. (*See next page for flowchart of rulemaking process.*)

**FLOWCHART OF RULEMAKING PROCESS**

**PREPARATION OF THE PROPOSED ACTION FOR PUBLIC COMMENT**

The Legislature gives limited lawmaking power to a state agency or department when, by passing a statute, it gives the agency a task. An agency or department must have delegated authority from the Legislature to adopt, amend, or repeal a regulation, and must demonstrate the necessity for the proposed regulatory action by presenting substantial evidence in the rulemaking record.

**DPR:** Conducts preliminary rulemaking activities, such as research and stakeholder workshops, and prepares proposed action including notice, regulation text, reason for regulation, and costs to state and local government and the economic impact on business.

**Consultation with other agencies:** Depending on the issues addressed in proposed regulations, DPR may consult with the Office of Environmental Health Hazard Assessment, the Air Resources Board, the Department of Food and Agriculture, or other agencies.

**External scientific peer review:** *If the regulations are based on new scientific studies or methodology, that science (not the regulations themselves) must be peer-reviewed by the University of California, National Academy of Sciences or similar approved institutions. Peer review must be completed before adoption of final regulations.*

**DPR:** Submits proposed action to the State Office of Administrative Law (OAL).

**OAL:** Reviews notice for compliance with legal criteria and filing requirements. If approved, notice published in OAL's *California Regulatory Notice Register* and on DPR Web site [www.cdpr.ca.gov], and mailed to interested parties.

**PUBLIC COMMENT PERIOD (45-day minimum)**

**Public Comment:** Begins when proposed action published. All rulemaking documents must be available for public review and comment. Hearings may be scheduled by DPR or by request. Written comments may be submitted via mail and e-mail. DPR must consider public input relevant to the proposal.

**FINAL REVIEW AND ADOPTION**  
After resolution of public comments and other issues, the regulation is adopted.

**DPR:** Reviews comments, plus any new information from other sources, and decides whether they warrant changes to proposed action.

*No changes or non-substantive changes*

**DPR:** Changes that are "sufficiently" related require a 15-day notice for public comment on the revised text.

*Changes to proposed action are necessary*

**DPR:** Major changes "not sufficiently" related require a new 45-day notice.

**DPR:** Completes rulemaking record, with extensive documentation, including regulation text, final statement of reasons, and responses to all comments relevant to proposed action. DPR must explain how proposed action was changed to accommodate comments, or reasons for no changes. Rulemaking record must be submitted to OAL within one year of publication of notice.

**OAL:** Typically has 30 working days to determine whether to approve proposed action based upon legal criteria and on adequacy of response to comments.

**DPR:** May be possible to revise and resubmit to OAL. DPR can also abandon proposed action, and the rulemaking record automatically closes one year after publication in the Register.

*OAL approves*

**Filing:** New regulation is filed with the Secretary of State and printed in California Code of Regulations. Regulation typically goes into effect 30 days after filing.

# Departmental Organization

The Department includes two programmatic divisions: the Division of Registration and Health Evaluation, and the Division of Enforcement, Environmental Monitoring and Data Management. Each programmatic division has branches that are responsible for carrying out DPR's objectives through established programs. A third division, Administrative Services, provides general support services.

## Division of Registration and Health Evaluation

### ***Pesticide Registration Branch***

The Pesticide Registration Branch is responsible for product registration and coordinates the required evaluation process among DPR branches and other State agencies. A pesticide must be registered (licensed) with DPR before it can be used, possessed, or offered for sale in California. The Pesticide Registration Branch serves as primary liaison to registrants. The Branch prepares public notices and corresponds with registrants regarding data requirements, determinations of the health effects of pesticides, and final actions on registrations. Branch scientists share data review responsibilities with staff scientists in other branches. The Branch also manages all data received; oversees call-ins of data on environmental fate and acute and chronic toxicology, and other data needed under a reevaluation; maintains product label files and the pesticide data library; and provides information on registered pesticides and label instructions to pesticide enforcement agencies and the public. The Branch maintains chemical ingredient and product/label databases that the public can access on the Department's external Web page.

### ***Medical Toxicology Branch***

The Medical Toxicology Branch has two major functions: review of toxicology studies and preparation of risk assessments. DPR requires a registrant to submit data on a product's potential chronic, subchronic, and acute health effects.<sup>2</sup> Medical Toxicology staff scientists review the data for: new active ingredients and new products containing currently registered active ingredients; label amendments on currently registered products which include major new uses; and reevaluation of currently registered active ingredients. These reviews are mandated under the Department's general authority to register pesticides and under various specific statutory mandates.

Staff scientists review toxicology data for adequacy and indications of possible adverse health effects. They use the results of these reviews and exposure information from other branches to assess the adequacy of product labels, and to conduct health risk evaluations and risk assessments that estimate the potential for adverse health effects in humans. These assessments are then peer-reviewed by Cal/EPA's Office of Environmental Health Hazard Assessment (OEHHA) and by the U.S. Environmental Protection Agency.

### ***Worker Health and Safety Branch***

The Worker Health and Safety Branch is generally responsible for characterizing human exposure, assessing safety, and developing mitigation mechanisms when needed. The Branch's Exposure Characterization and Assessment Program develops human

*The staff of the Bureau consists of the administrative, laboratory, inspection, and sampling forces, who make investigations of suspected violations of law, conduct hearings, draw and analyze official samples of, and observe and report upon, products sold to the public. Farm advisers, county agricultural commissioners, branches of the Department and the University, and other official agencies have cooperated as experts on technical problems.*

*– 1940 Department annual report*

<sup>2</sup> Chronic toxicity refers to adverse effects from many repeated exposures over the greater portion of a lifetime. Subchronic toxicity refers to adverse effects from exposures of intermediate timeframes, often 30 to 90 days. Acute toxicity refers to adverse effects from a one-time or very few exposures.

exposure assessments for use in the Department’s risk characterization documents. In addition, staff scientists review pesticide registrant protocols and audit registrant exposure monitoring studies conducted in California.

The Branch’s Workplace Evaluation & Industrial Hygiene Program evaluates pesticide products and labeling for effectiveness in controlling exposure hazards and recommends additional safety measures when needed. The Pesticide Illness Surveillance Program (PISP) analyzes investigations of pesticide-related illnesses conducted by County Agricultural Commissioners. The PISP database helps validate the effectiveness of exposure control measures and identifies areas where improvements are needed.

The Exposure Monitoring Program staff designs and conducts field studies to characterize exposure to pesticides. Staff develops exposure monitoring methods to respond to new exposure situations and incorporate technological developments to refine exposure estimates. Staff provides medical advice and assistance to practicing physicians on pesticide exposures, and assist County Agricultural Commissioners when necessary on illness investigations. Staff also investigates unsafe work conditions detected by the Pesticide Illness Surveillance Program.

### **Division of Enforcement and Environmental Monitoring**

In 2001, the Department was authorized for about 430 employees and had a budget of approximately \$63 million.

#### ***Pesticide Enforcement Branch***

The Pesticide Enforcement Branch’s primary responsibility is to enforce federal and State laws and regulations pertaining to the proper and safe use of pesticides. The Branch has overall responsibility for pesticide incident investigations and enforcement actions. It administers the nation’s largest state pesticide residue monitoring program and conducts outreach and compliance activities.

The Branch also inspects and samples pesticide products to determine whether a product is registered, the labeling requirements are met, and the product formulation meets the quality guaranteed by the registrant. Pesticide use enforcement activities in the field are largely carried out by County Agricultural Commissioners (CACs) and their staffs (approximately 400 biologists) in California’s 58 counties. Enforcement Branch staff provides training, coordination, supervision, and technical support to the CACs.

#### ***Environmental Monitoring Branch***

The Environmental Monitoring Branch monitors the environment to determine the fate of pesticides, protecting the public and the environment from pesticide contamination through analyzing hazards and developing pollution prevention strategies. The Branch’s Environmental Hazards and Assessment Program (EHAP) provides environmental monitoring data required for emergency eradication projects, environmental contamination assessments, pesticide registration, pesticide use enforcement, and human exposure evaluations. EHAP takes the lead in implementing many of the Department’s environmental protection programs.

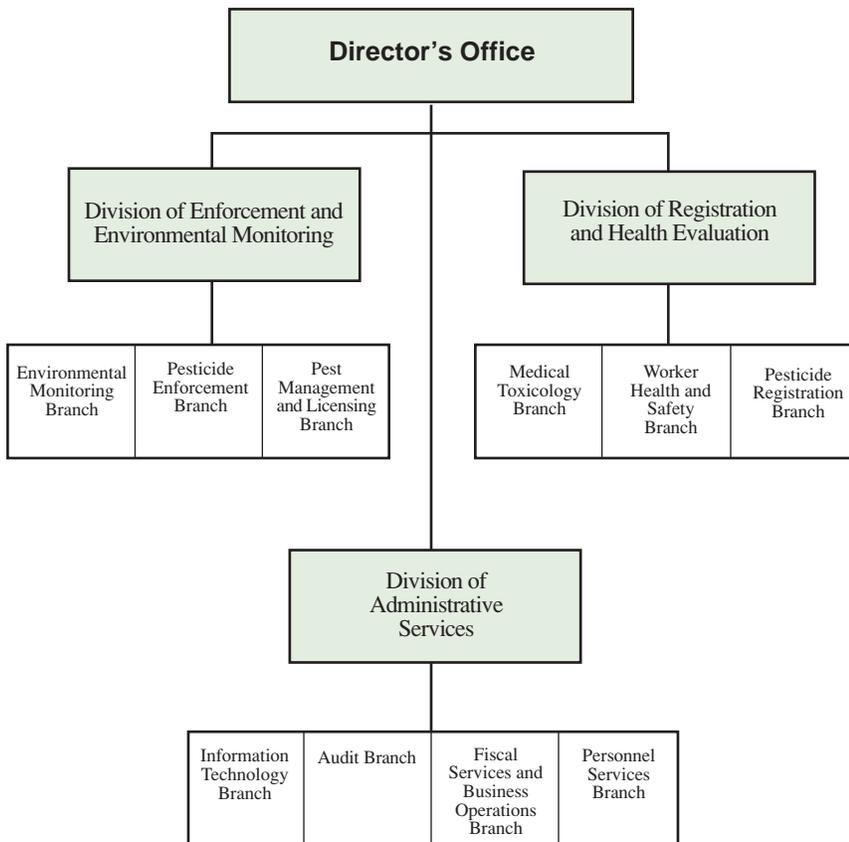
#### ***Pest Management and Licensing Branch***

This, the Department’s newest branch, has four major programs. The Pest Management Analysis and Planning Program (PMAP) evaluates pesticide and pest management problems and provides information and grants to develop new strategies that reduce adverse environmental impacts and hazards from pesticide use. The Branch also oversees licensing and certification of dealers, pesticide brokers, agricultural pest control advisers, pest control businesses, and applicators; manages the Endangered Species Program; and collects, reviews, corrects, and analyzes pesticide use reporting data.

### Division of Administrative Services

The Division of Administrative Services provides those services necessary for running a state department, such as personnel, accounting, budgeting, contracting, and other related functions. The Division includes the Financial Management, Personnel Services, Audit and Information Technology branches. Audit Branch is responsible for auditing DPR's internal programs, the pesticide regulatory and enforcement programs supported by the mill assessment, and mill assessment payments by registrants, brokers and dealers. The Information Technology Branch provides support services to the Department, including coordination, evaluation and implementation of information technology needs and overall coordination of data processing activities. Activities include programming and network support and configuration, database management and security, and design and maintenance of internal and external Web pages.

### Organization chart



*These are good laws and everyone knows they work. Under them, the Department has endeavored to work with vision and does those things that are generally accepted as honestly sound by the best informed persons.*  
– 1938 Department annual report

## Strategic Planning

DPR has broad authority to regulate pesticides in California and a responsibility to regulate in a manner that is fair, effective, efficient, and responsive to our various constituencies. This mandate requires practical and productive planning. Realizing this, DPR has created a blueprint over the past five years from which to build a dynamic organization committed to environmental protection and with the capacity to anticipate and react to a changing world. Strategic planning gives us that blueprint.

DPR, working in concert with the County Agricultural Commissioners, began work on its first strategic plan in the fall of 1993, in response to the passage of legislation (Chapter 418, SB 1082, Statutes of 1993) that among other things required Cal/EPA and all its departments, boards, and offices to “institute quality government programs to achieve increased levels of environmental protection and the public’s satisfaction through improving the quality, efficiency, and cost-effectiveness of the state programs which implement and enforce state and federal environmental protection statutes.”

The legislation stated that the quality government programs must include:

1. A process for obtaining the views of employees, the regulated community, the public, environmental organizations, and governmental officials with regard to the performance, vision, and needs of the agency implementing the quality government program.
2. A process for developing measurable performance objectives using the views of the persons and organizations specified in the first paragraph.
3. Processes for continually improving quality and for training agency personnel, using the information obtained from implementing the first two paragraphs.

Strategic planning was given a further boost in 1994, with the passage of the State Government Strategic Planning and Performance and Review Act. The bill (Chapter 779, AB 2711) was an urgency statute that took effect when signed into law in September 1994. It required that “in developing its strategic plan, each agency, department, office, or commission shall consult with at least the following affected parties: employee organizations, the Legislature, client groups served, suppliers, and contractors.” Strategic plans were also to “identify the steps being taken to develop

performance measures that could be used for a performance budgeting system or a performance review.”

The legislation also required the State Department of Finance (DOF) to annually survey agencies to obtain specified information concerning strategic plans and to recommend which agencies should develop or update a strategic plan. It also required DOF to develop a plan for conducting performance reviews of those state agencies which DOF recommended have strategic plans. In 1996, in a report to the Legislature on strategic planning, DOF recommended that all agencies have a strategic plan and later that year, issued a strategic planning directive. It mandated that all agencies have strategic plans in place by July 1, 1997, and stated that future budgetary requests would only be approved if consistent with an approved strategic plan.

In its 1996 report to the Legislature, DOF identified DPR as one of the state entities having completed a strategic plan. That same month, DPR released the second volume of its strategic plan, which laid out more than 200 action items DPR identified to achieve its goals.

In October of 1997, DOF outlined minimum components of a strategic plan, including: a description of the agency and its core principles; an agency mission statement; internal/external evaluation of key factors which influence the success of the agency in achieving its mission and goals; its vision, i.e., the image of its desired future; strategic goals along with objectives for specific steps to fulfill those goals; and performance measures, the quantified results to be achieved. In response, the DPR Management Team updated its strategic plan to add performance measures and to reflect recent changes in its internal/external evaluation. DPR submitted its revised plan in July of 1997.

In early spring of 2000, the DOF expanded its planning process to include operational planning at the branch level, and DPR began a new strategic planning cycle. All DPR employees were offered the opportunity to participate in identifying key opportunities to improve human and business process results, in alignment with strategic goals. This planning approach will help to institutionalize the continuous improvement process of the pesticide regulatory program on a systematic basis and as an outcome of special projects, initiatives and team efforts.

# Pesticide Registration

## The Registration Process

Before a pesticide may be marketed and used in California, DPR evaluates it thoroughly, under guidelines of the Food and Agricultural Code (FAC), to ensure that it will not harm human health or the environment. Pesticides that pass this scientific, legal, and administrative process are granted a license that permits their sale and use according to requirements set by DPR to protect human health and the environment. This licensing process is called “registration.” A “registrant” is someone who does business in California selling pesticidal chemicals or formulated pesticide products.<sup>3</sup> The term “registrant” does not include retail pesticide dealers, but may include manufacturers of the basic, technical-grade pesticidal chemicals; formulators who prepare the end-use products; and distributors who put their own labels on pesticide products purchased from formulators.

The law requires prospective registrants to submit tests and studies of the pesticides to DPR for evaluation. DPR’s Director may decide not to register a pesticide product, or cancel the registration of any product already registered. That action must be based on serious, uncontrollable adverse effects on the environment; greater detriment than benefit to the environment; harm to vegetation, domestic animals, or public health and safety; and uses deemed to hold little or no value.

Several DPR branches participate in pesticide registration to assure that a product used according to label instructions will cause no harm (or “adverse impact”) on nontarget organisms that cannot be reduced (or “mitigated”) with protective measures or use restrictions. The Pesticide Registration Branch coordinates this process and serves as liaison to pesticide registrants.

The registration process begins when applicants submit data to DPR on a product’s toxicology; how it behaves in the environment; its effectiveness against targeted pests (“efficacy”); its hazards to nontarget organisms; its effects on fish and wildlife; the degree of worker exposure, and its chemistry. Several branches with different areas of expertise review the data.

### **Registration and evaluation includes the following steps:**

- The Medical Toxicology Branch reviews toxicology and other studies from the registrant for adequacy and potential adverse effects. If potential adverse health effects are found, the pesticide’s risk potential is studied and a risk evaluation is prepared by the Medical Toxicology and Worker Health and Safety Branches. If the pesticide is a new active ingredient, it is prioritized for risk assessment. (See Chapter 5 for discussion of risk characterization process.)
- In the Pesticide Registration Branch, staff scientists with expertise in chemistry, microbiology, plant physiology, pest/disease prevention, and fish and wildlife biology review required scientific data to determine the effects of pesticides on target pests (efficacy) as well as nontarget effects (that is, effects on species not considered the target pest). The latter includes nontarget effects on plants (phytotoxicity); fish and wildlife hazards (ecotoxicity); impact on endangered species; effects on the environment, e.g., environmental fate, breakdown products, leachability and persistence

***The control of pesticides in California is obtained through registration. Manufacturers intending to sell pesticides must register their products and fully comply with the law.***  
– 1939 Department annual report

<sup>3</sup> Because pesticidal chemicals are usually highly concentrated and will not mix easily with water, most are mixed with other ingredients (such as emulsifiers, solvents, wetting agents) before being marketed as end-use products. The prepared, or formulated, mixture is called a formulation.

***A material not valuable for its intended purpose, or one which, even when properly used, is detrimental to cultivated vegetation, to domestic animals, or to the public health, will not be registered and can not be sold in California.***  
– 1933 Department annual report

(chemistry); pest and disease protection (entomology); and plant pathology. Included is a review to ensure that product residues on harvested commodities will not exceed legal limits when the pesticide is used according to label directions.

- Product labels are reviewed by four branches. Registration Branch reviews labels for compliance with U.S. EPA labeling standards and clarity. Medical Toxicology ensures labels accurately reflect human health hazards indicated by toxicology data. The Pesticide Enforcement Branch reviews labeling to address regulatory concerns — such as whether label requirements can be enforced in the field — before registration. The Worker Health and Safety Branch examines labels to assess the adequacy of use instructions to protect pesticide users and others from overexposure. If any changes are necessary, DPR staff work with the registrant and U.S. EPA to recommend revisions that will satisfy health or environmental concerns. (According to federal law, pesticide label language is under the sole jurisdiction of U.S. EPA. Any changes in label language must be approved by U.S. EPA before the product can be sold in this country. A state cannot require manufacturers to make changes in labels. However, states can refuse to allow registration and hence the possession, sale and use of any pesticide not meeting its own standards.)
- Finally, Environmental Monitoring Branch evaluates pesticide products for potential to contaminate ground or surface water, and Pest Management and Licensing Branch for detrimental impacts on integrated pest management<sup>4</sup> systems, when appropriate.

DPR also consults with other public agencies on proposed pesticide registrations and more broadly on regulatory policies through routine daily contacts and, more formally, through the Pesticide Registration and Evaluation Committee (PREC). Chaired by the Assistant Director of DPR’s Registration and Health Evaluation Division, the PREC meets regularly (typically every two months). It brings together all public agencies with legal jurisdiction on use of pesticides, or whose activities or resources may be affected by use of pesticides. The committee includes representatives of the State Departments of Health Services, Food and Agriculture, Industrial Relations, and Fish and Game; the Structural Pest Control Board; Cal/EPA’s Office of Environmental Health Hazard Assessment, State Water Resources Control Board, Air Resources Board, Integrated Waste Management Board, Toxic Substances Control Department; the University of California; U.S. EPA, Region 9; U.S. Department of Agriculture; and the California Agricultural Commissioners and Sealers Association.

The purpose of the PREC is to advise DPR on regulatory development and reform initiatives, evolving public policy and program implementation, and science issues associated with evaluating and reducing risks from the use of pesticides. It also fulfills a critical interagency consultation role mandated by CEQA. (In 2000, the Department’s Pesticide Advisory Committee, whose function was overlapped with that of the PREC, was merged with the latter committee.)

Once reviews are completed, a decision to register or deny an application is proposed. If any reviewing DPR branch recommends against registration due to inadequate data, unacceptable studies, or unmitigated adverse effects, the product is not registered until all concerns are resolved, including concerns raised by other State agencies. Proposed decisions to register or deny applications are posted weekly, beginning a 30-day period for public comment before the decision is final.

While State registration parallels the federal program in many respects, there are differences in application. DPR may require additional or different studies than those required by U.S. EPA. These studies include but are not limited to data on worker

4 Integrated pest management (IPM) is an ecosystem-based strategy that focuses on long-term prevention of pests or their damage through a combination of techniques such as biological control, habitat manipulation, modification of cultural practices, and use of resistant varieties. Pesticides are used only after monitoring indicates they are needed according to established guidelines, and treatments are made with the goal of removing only the target organism. Pest control materials are selected and applied in a manner that minimizes risks to human health, beneficial and nontarget organisms, and the environment. The IPM approach can be applied to both agricultural and non-agricultural settings, such as the home, garden, and workplace.

exposure, treatment for accidental poisoning, foliar (leaf) residue, indoor exposure potential, hazards to bees, and dust hazard from powdered products.

DPR requires efficacy data be submitted as part of an application for registration. U.S. EPA requires manufacturers to develop such data but waives its submission, except for products with public health uses, such as disinfectants.

DPR also gives specific attention to evaluating pesticide use under California's unique climatic and cultural conditions. Pesticide residues which decay rapidly under warm, humid conditions may persist longer under hot, dry conditions typical in many California agricultural areas. Some crops, such as rice, may be grown with water and land management practices that differ from other areas of the country. Algicides and other pesticides used in swimming pools must reflect the outdoor, year-round use typical of California.

Such differences affect evaluations of product safety and effectiveness. Varied conditions, combined with local use enforcement mechanisms, allow use of some pesticides to be restricted to certain areas of California, as opposed to a statewide ban. This may be accomplished by placing restrictions in regulation; by making a pesticide a restricted material and recommending use restrictions to the County Agricultural Commissioners (*see Chapter 7 for discussion of restricted material permit system*); or by working with the registrant to place California-only instructions on the federally approved label.

DPR sometimes denies registration to products approved by U.S. EPA. The Department may base such decisions on toxicology or environmental studies judged to be inappropriate or inadequate, label instructions that fail to mitigate possible hazards, or inadequate margins of safety. (*See discussion of risk characterizations, Chapter 5.*) DPR has also denied State registration for federally registered products that could not show reasonable effectiveness under California conditions, or which did not meet labeling claims. From its review and evaluation, DPR may also impose use restrictions and mitigation measures beyond those listed on labels, either through regulation or through the restricted materials permit system.

### Improving the Process

**Harmonization Project with U.S. EPA:** A 1993 study of DPR's registration process by consultants Charles M. Benbrook and Deanna J. Marquart (*see the article in this Chapter for information on "Challenge and Change: A Progressive Approach to Pesticide Regulation in California"*) made a series of recommendations, including that DPR explore ways of interacting with U.S. EPA to speed the registration of new, more environmentally benign pesticides. Dr. Benbrook recommended that DPR work cooperatively with U.S. EPA, avoiding duplication of effort and developing specialized expertise tailored to augment that of the federal agency.

In March 1995, DPR and U.S. EPA signed a formal commitment to step up the pace of harmonization, a project begun in 1994 to more closely coordinate the federal and California pesticide regulation programs. Harmonization goals include reducing needless duplication, getting safer products to market faster, and more quickly removing those products from use that pose unacceptable risks. Resources saved by harmonization can then be spent on accelerating the registration of low-risk products.

The agreement between DPR and U.S. EPA included target dates for completion of key phases. The first target date — June 1995 — was met with the two agencies sharing their reviews of acute toxicology data. Passage of the federal Food Quality Protection Act (FQPA) in August 1996, put many harmonization activities on hold while U.S. EPA dealt with its new priorities. As U.S. EPA comes to terms with FQPA, it is refocusing on projects of mutual interest with California. Harmonization efforts have also begun to shift to the world stage with opportunities presented by the North American Free Trade Agreement (NAFTA). It is also critical for DPR to stay abreast of the emerging global approach to risk assessment represented by the Organisation for Economic Cooperation and Development's (OECD) monograph system.

**Streamlining Registration:** The 1993 *Challenge and Change* report also recommended that DPR reorient its activities toward a risk-driven prioritization theme: getting



DPR may impose use restrictions beyond those listed on the product label.

lower risk products registered more expeditiously and devoting regulatory efforts on higher-risk products and activities.

In 1993, legislation (Chapter 963, AB 771) established an interim registration process that allowed DPR to waive or delay certain data requirements for federally registered pesticides which meet specified criteria. Registration Branch can waive efficacy data and certain ground water studies if Pest Management and Licensing Branch confirms that the product would reduce risks when used in a pest management system. The product must reduce risks to workers, public health or the environment, lessen the risk of pest resistance problems, or reduce a substantial risk of economic loss as a result of a pest infestation for which there is no other feasible control. The registrant must agree to generate the required data. DPR charges an additional \$5,000 fee to cover additional costs involved in this interim registration.

A second interim registration process was established by 1995 legislation (Chapter 608, SB 283) that allows DPR to issue a certificate of “emergency registration” for federally registered products that have been previously used in the State under a Section 18 emergency exemption issued by U.S. EPA. (A discussion of the Section 18 process concludes this Chapter.) Once a pesticide is registered federally, it automatically is no longer eligible for a FIFRA Section 18. The legislation established a mechanism to allow the temporary use of the pesticide while the California registration process for that product was being completed. DPR must determine that all required data has been submitted and that it is probable that the product will be registered within a year. The emergency registration may be issued for one year, with an additional year renewal possible. The Department must also certify that there are no indications the product would pose an unacceptable risk to worker safety, and that DPR’s delay in completing a timely review of the data was beyond the control of the registrant.

The Department used recommendations in the *Challenge and Change* report, those of registrants, and its own review of the registration process to identify changes to substantially reduce the time required for product approval, without altering California’s strict standards. During the 1990s, DPR prioritized risk assessments to provide a more effective process for new, reduced-risk active ingredients and also made data review procedures more efficient.

In 1994, to encourage the registration of pesticides that pose lower risks to public health and the environment, DPR began allowing companies to submit applications for registration of microbial, biochemical, and new reduced-risk products to California when they submit applications for federal registration. In 1999, DPR began allowing companies to submit concurrent applications for products classified by U.S. EPA as “public health pesticides” or “antimicrobial pesticides,” provided the product had human health benefits. This expedited registration process was mandated by 1997 legislation (Chapter 428, SB 464) that allowed DPR to waive the submission and/or review of efficacy data for antimicrobial pesticides, if certain criteria were met.

In 1999, the Legislature allocated supplemental funds to the Department to hire additional staff to focus on the registration of reduced-risk pesticides and on reducing the registration backlog.

**Ombudsman:** In 1993, in response to a recommendation in the *Challenge and Change* report, DPR established an ombudsman position to help solve pesticide registration problems quickly and efficiently. The Ombudsman provides a central contact point for the regulated community, the public, and other government agencies on pesticide registration issues and general aspects of pesticide regulation. On a day-to-day basis the Ombudsman answers questions and acts as a troubleshooter in the investigation and resolution of disputes. By interpreting and clarifying policy issues and identifying problem areas, management is assisted in internal streamlining efforts to increase efficiency and timeliness. The Ombudsman represents the department at the statewide Cal/EPA Ombudsman Forums which allow attendees to obtain information about interdepartmental issues. In addition to general presentations to various groups, the Ombudsman also conducts training workshops for the regulated community. This facilitates understanding of and compliance with the extensive pesticide regulatory process.

In the 1990s, the Department focused on streamlining its program while maintaining California’s high environmental and health standards.

## “Challenge and Change” Changing Pesticide Regulation in California

DPR continuously strives to improve its processes and programs while removing bureaucratic obstacles and encouraging creative and environmentally sound pest management practices in California. A 1993 report commissioned by Cal/EPA highlighted DPR’s commitment to quality government.

In *Challenge and Change: A Progressive Approach to Pesticide Regulation in California*, regulatory analysts Dr. Charles Benbrook and Deanna J. Marquart provided an in-depth critique of DPR’s pesticide registration program. While the then-new Department was already working on a number of the goals suggested by Dr. Benbrook, the report helped focus DPR efforts to create a more efficient and effective registration process without compromising California’s environmental standards. Challenge and Change made three general recommendations: (1) change DPR policies and procedures to improve the efficiency of product review and approval; (2) make relative risk of pesticide products and active ingredients the guiding factor in DPR priorities, and (3) use the Department’s regulatory powers to increase influence of biologically-based pesticide control programs, including integrated pest management (IPM).

Toward that goal, DPR established an “IPM Innovator” award program in 1994 to recognize growers and other leaders in alternative methods of pest management. The program distributes information about the latest and most effective IPM techniques, and encourages and coordinates creation of new “innovator” groups.

***Other DPR achievements that address recommendations in Challenge and Change include:***

- Appointing a Pesticide Registration Ombudsman.
- Providing training sessions for registrants.
- Reviewing registration applications for biopesticides and other reduced-risk pesticides concurrent with their submission to U.S. EPA.
- Implementing legislation that helps expedite registration of products that fit into pest management systems.
- Developing guidelines for risk and exposure assessment; participating in Cal/EPA effort to establish uniformity in risk assessment.
- Facilitating policy discussions in public advisory committees.
- Participating in national and international development of exposure assessment guidelines.
- Focusing scientific and regulatory efforts in risk reduction measures on certain high-risk use patterns.
- Initiating projects to reduce risk incrementally and set pest management research priorities.
- Conducting workshops to address regulatory barriers to reduced-risk pest management strategies.
- Proposing regulations to require continuing education in reduced-risk pest management.

*continued from page 24*

### Registration of Pest Control Devices

The structural pest control industry sponsored 1998 legislation (Chapter 651, AB 1134) which created a program to require the registration of devices used to control wood-destroying pests. Under the law, DPR must review the efficacy and safety of each device before registration. As of July 1, 2001, it is unlawful to sell, possess, or use a structural pest control device in California, unless it is registered by DPR.

The Structural Pest Control Device Program is enforced by DPR, the CACs, and the Department of Consumer Affairs' Structural Pest Control Board (SPCB). DPR has authority to take registration and enforcement actions against parties who violate device statutes. At the local level, the CAC is authorized to levy civil penalties for violation of device statutes. In addition, the SPCB may take disciplinary action against its licensees for violations of device statutes.

Funding for the device program is derived from a fee assessed by SPCB for each structural fumigation performed in California. Those fees are placed in the Structural Pest Control Device Fund, and are used to support structural pest control device activities performed by DPR and SPCB.

### Experimental Uses and Research Authorizations

Before federal or state regulators register a pesticide, they must collect data on how it behaves under field conditions, including factors such as efficacy, environmental fate, and potential worker exposure. In addition, DPR requires California-specific data. During the summer growing season when farmers apply many pesticides, most states have significant rainfall, in contrast to California's typically dry summers. Because field studies must be conducted to collect these data, permit processes have been set up under both federal and State law to allow limited, experimental uses of pesticides.

Under FIFRA, U.S. EPA may grant registrants experimental permits for new uses of registered or unregistered pesticides. Products granted a federal experimental use permit may then be granted conditional registration — limited to experimental uses — in California, provided certain data requirements are met. If the test product contains an active ingredient already registered for other uses in the State, registrants must submit data on acute toxicity and analytical methods to detect residues in the treated commodity. If the product contains a new active ingredient unregistered in California, chronic health effects studies are also required.

Federal experimental use permits are not required for most experiments on less than 10 acres, unless they involve certain genetically-engineered microbial pesticides. Conducting these small-scale experiments in California, however, requires a research authorization from DPR's Pesticide Registration Branch. Approximately 600 to 800 research authorizations are issued yearly, and about two-thirds involve compounds already registered for other uses in California. Most research authorizations are for 10 acres or less, although experimental plots may extend up to 100 acres, provided the use is federally registered.

In applying for a research authorization, the applicant must specify the pesticides, treated crop or site, size of the trials, rates to be used, any existing tolerances, and proposed disposition for the treated crop. If the pesticide is not currently registered for any use, the applicant must supply information on acute health effects. DPR may require additional data as necessary to assess potential adverse effects to workers, the public, or the environment. If there is no applicable residue tolerance for the crop, the research authorization requires the crop to be destroyed.

DPR and County Agricultural Commissioners administer various other restrictions, designed to provide close regulatory control of experimental uses of pesticides.

### Exemptions from Registration Requirements

***Sterilants Used in Medical Devices:*** Among the provisions of the 1996 federal Food Quality Protection Act was to transfer jurisdiction over certain liquid chemical sterilant products from U.S. EPA to the U.S. FDA. Based on the law, U.S. FDA took over regulation of sterilants used on critical or semicritical medical devices. These products

***Continuous experimentation and investigation in the field of pest control by competent technical workers result in the appearance of many new insecticides, fungicides, and other agricultural chemical products, as well as improvements in older ones.***  
— 1939 Department annual report

were exempted from FIFRA and no longer subject to federal pesticide registration requirements (since U.S. FDA does not “register” the products it regulates).

Legislation (Chapter 530, Statutes of 1997, SB 365) designed to harmonize California law with federal law authorized DPR to exempt from California registration requirements any liquid chemical sterilant product intended for use on critical or semicritical medical devices, that has been exempted from regulation by the U.S. EPA and has been approved for sale by U.S. FDA.

**Section 25(b) Exemptions:** In 2000, DPR adopted regulations exempting certain kinds of minimum-risk pesticides from registration requirements. The regulations were authorized by 1997 legislation (Chapter 691, SB 445) that allowed DPR to exempt certain chemicals from registration after U.S. EPA had done so. Most exempt chemicals are low-risk substances that have a wide range of other, nonpesticidal uses as foods, medicines, or household items. They include substances such as garlic, peppermint, rosemary, corn oil, cedar chips, and castor oil. DPR scientific staff evaluated each substance for potential hazards before placing it in the exemption regulation. The products cannot make claims to control or mitigate microorganisms that pose a threat to human health, including but not limited to disease-transmitting bacteria or viruses. Claims that specify possible control of disease carried by insects or rodents are also prohibited. In addition, the product must not include any false or misleading statements. Products exempted from registration still remain under DPR oversight. The Department continues to require manufacturers to submit reports of any adverse effects from the use of the exempted products so that DPR can reassess exemptions if necessary.

**Section 24(c) Special Local Need Registrations and Section 18 Emergency Exemptions:** Federal law allows states to issue certain special registrations and emergency exemptions for pesticide use under specific circumstances. Under criteria outlined in Section 18 of FIFRA (emergency exemptions) and Section 24(c) (special local need, or SLN registrations), these uses can be approved outside the lengthy regular U.S. EPA registration process. Criteria include data to support the use, and justification that no other registered products are available to meet the emergency situation or special local need. These special registrations and emergency exemptions have limitations on use and require special labeling.

A Section 24(c) can be requested by either the manufacturer as the first party or by a third party such as a grower association. A Section 18 can only be requested by a third party such as a grower association or County Agricultural Commissioner. The supporting documentation and justification are supplied by growers, pest control advisers, County Agricultural Commissioner offices, university, and other knowledgeable experts.

**Section 24(c) Special Local Need registrations:** These are state-specific registrations, through which states can register a new pesticide product for any use, or additional use of a federally-registered product, as long as there is both a demonstrated “special local need” for such a product, and a tolerance, exemption from a tolerance, or another clearance under the Federal Food, Drug and Cosmetic Act has been established. The special local need can be in a region of the state or can cover the entire state, and can be for a food or nonfood use. If for a food or feed use, a residue tolerance (or exemption from tolerance) must already be established for the active ingredient on that commodity. (Sometimes a group tolerance for similar kinds of crops is already in place.) Residue data to support the proposed use rates and method of application must be available for review. Some reduced-risk active ingredients, such as *Bacillus thuringiensis* (B.t.), are exempt from the tolerance requirement.

The special local need must be justified and supported by knowledgeable experts and there can be no registered products available to meet the need. Once issued, an SLN remains in effect indefinitely until withdrawn by the registrant, manufacturer or DPR, or until U.S. EPA cancels the use. (DPR issues approximately 100 SLNs each year.)

**Section 18 emergency exemptions:** A state can issue a Section 18, after approval by U.S. EPA, to meet an emergency pest problem. The emergency need can occur in a region of the state or in the entire state and is for food or feed use only. Because the use of exemptions from registration should be kept to a minimum, Section 18 applications undergo intensive scrutiny by DPR. Each year, DPR rejects several Section 18 applications.



*We should not encourage spraying or get into the habit of spraying ourselves unless we know just exactly what we are spraying for. As a general rule, the man who sprays and doesn't know just exactly what he is spraying for, or what he ought to use, is not getting results in his spraying. Spraying requires a knowledge of the pests which are on the trees. It requires a thorough knowledge of insecticides and fungicides, and until we have the knowledge we cannot do spraying that is altogether effective.*

– 1922 Department annual report

Extensive documentation of the emergency pest problem must accompany a Section 18 request, including detailed information on the nature of the emergency, costs of control, past yields, projected losses, a five-year economic profile for the crop, and evidence of the lack of registered, available alternative pest control practices. DPR routinely contacts university researchers and other expert sources to verify the justification. The request must also include any available residue data to support a tolerance level. (Until 1996, an “action level” for the amount of residue allowed at harvest was all that was required, but the Food Quality Protection Act of 1996 required that a time-limited residue tolerance be issued with each Section 18. Time-limited tolerances are issued only for the duration of the Section 18. ) After DPR’s scientific review of the residue, chemistry, toxicology, and efficacy data — and confirmation of the emergency need — the request is forwarded to U.S. EPA with a proposed time-limited tolerance. (DPR staff prepares the scientific evaluation for many Section 18 tolerances. U.S. EPA has relied on DPR’s expertise for those reviews, reducing the time it takes to issue a Section 18.)

When it approves the Section 18, U.S. EPA also establishes a time-limited tolerance. If the nature of the pest emergency allows no time for U.S. EPA’s review, DPR may issue a “crisis” Section 18. This allows the chemical to be used before a tolerance is set. However, because crops cannot be harvested until U.S. EPA issues a tolerance, DPR does not issue crisis Section 18s until convinced, after consultation with U.S. EPA, that the federal agency will grant the tolerance. Nonetheless, DPR alerts growers that treated crops cannot be harvested until the tolerance is set and, if a tolerance is not issued, that the crop may not be harvested.

California issues about 30 to 40 Section 18s annually.

**Minor-Use Crops:** Section 18s and Section 24(c)s are issued mainly for “minor-use” crops. A “minor use” is generally agreed to be any use of a pest control product for which the sales value is insufficient to justify the cost by a commercial registrant to obtain and maintain a registration, particularly the costs associated with data generation and submission. A minor use may be the frequent use of a product on a low-acreage, specialty crop or the infrequent or localized use of a product on a high-acreage crop. In either case, the problem of obtaining a registration for the minor crop is primarily one of economics. As research and development costs for meeting regulatory requirements increase, pesticide registrants concentrate their registration efforts in areas where financial returns justify the costs. Thus, a registrant may choose to delete minor uses from a product label, or not register minor uses, rather than provide data to support registration.

Minor use pesticide registrations include most pesticide uses on fruit, nut and vegetable crops, as well as uses on commercially grown flowers, ornamentals, trees and turf grass. For many states, including California, minor crops make up a significant portion of all crop sales.

The great number of crops grown here, the diverse geography and weather, and the multiple growing seasons make the use of Section 18s and 24(c)s important in this state. The Pesticide Registration Branch manages review and evaluation for both Section 18 and Section 24c applications.

**Registration of products before they are offered for sale eliminates those that are worthless or dangerous; examination of labeling and advertising corrects misrepresentation; and analysis of materials assures conformity with the guaranteed composition.**  
– 1950 Department annual report

## Comparing Section 18s and Section 24(c)s

### Section 18

- Provides an exemption from registration requirements; tolerance must be set
- For limited use to treat sudden and limited emergency pest infestations
- Request from “third parties” only (grower groups, County Agricultural Commissioners, or universities)
- Request made through DPR, issued after approval by U.S. EPA; DPR may issue “crisis” Section 18 after consultation with U.S. EPA
- Can be used during the 30-day public comment period
- Issued for up to one year. Renewable if the emergency recurs or persists (although renewal difficult after the third year)
- Not subject to U.S. EPA maintenance fee
- Use requires a restricted material permit even if product is not a restricted material

### Section 24(c)

- Provides a special registration, with a tolerance already in effect
- To meet a special local need (which may be a region of the state or the whole state)
- Requests from “first parties” (registrants) as well as third parties
- DPR issues without U.S. EPA review, although U.S. EPA may rescind
- Must be posted for the 30-day public comment period before use is allowed.
- Has no expiration date, although it may be withdrawn by the registrant, U.S. EPA, or DPR
- Subject to U.S. EPA maintenance fee
- Use requires a permit only if the product is a restricted material

### For both:

- No feasible alternative is available
- Manufacturer must authorize access to its toxicology, residue, chemistry, and efficacy data.
- Chemical may or may not be registered for other uses

The great number of crops grown in California, the diverse geography and weather, and multiple growing seasons make Section 18s and 24(c)s important to the State.



# Continuous Evaluation and Reevaluation

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California law (Food and Agricultural Code 12824) requires DPR to “eliminate from use in the state” any pesticide that “endangers the agricultural or nonagricultural environment, is not beneficial for the purposes for which it is sold, or is misrepresented.” To perform this function, the law requires the Department to “develop an orderly program for the continuous evaluation” of currently registered pesticides.

The principle that chemical use should not cause unacceptable risks to human health or the environment guides all DPR decisions. Before any pesticide is registered for use in California, DPR evaluates the pesticide’s toxic potential, its potential exposure to people and the relationship between toxic effects and that potential exposure, and the potential for a pesticide to cause environmental problems. After a pesticide is registered, several DPR programs evaluate use practices to detect possible problems. For example, the Pesticide Illness Surveillance Program (*see Chapter 9*) identifies high-risk situations warranting DPR action to implement additional California restrictions on pesticide use. DPR conducts field studies to monitor exposure to workers and measure how pesticides move and break down in air, soil, and water. The Department uses the data collected to evaluate the effectiveness of DPR’s regulatory programs and to assess the need for changes. Risk assessments completed on currently registered active ingredients may also trigger changes in DPR requirements on how a pesticide is used. Registrants are also required by law to report to DPR any adverse effects (for example, harm to humans, animals, or the environment) that occur after their products are registered.

## The Reevaluation Process

In addition, DPR has a formal Reevaluation Program. California regulations (Title 3, CCR Section 6221) require DPR to investigate all reports of actual or potentially significant adverse effects to people or the environment resulting from the use of pesticides. (*See Chapter 9 for a discussion of incident investigation.*) If DPR has reason to believe that a pesticide may cause unreasonable adverse effects to people or the environment, the regulations require DPR to reevaluate the pesticide to determine if it should remain registered.

The regulations specify factors that may initiate reevaluation. They include: (1) public or worker health hazard; (2) fish or wildlife hazard; (3) other information suggesting a significant adverse risk; (4) environmental contamination; (5) unwanted damage to plants; (6) residues over allowable limits; (7) hazardous packaging; (8) inadequate labeling; (9) lack of efficacy; (10) disruption of the implementation or conduct of pest management; or (11) availability of an effective and feasible alternative material or procedure which is demonstrably less destructive to the environment. Reevaluation is often triggered by ongoing Departmental registration reviews, State and county pesticide use surveillance and illness investigations, pesticide residue sample analyses, or environmental monitoring activities. Information from other State or federal agencies, or other sources, may also trigger a reevaluation.

The Pesticide Registration Branch administers the reevaluation process and coordinates data reviews and communication with registrants. When a pesticide enters the reevaluation process, DPR reviews existing data. DPR also requires registrants to provide additional data to determine the nature or the extent of the potential hazard or identify appropriate mitigation measures, if needed.

Legislation (Chapter 483, Statutes of 1997, SB 603) gave DPR the authority to cancel the registration of, or refuse to register, any pesticide if the registrant fails to

State law requires the Department to “develop an orderly program for the continuous evaluation” of currently registered pesticides.

submit data requested in a reevaluation. If DPR cancels a registration, the registrant may request a hearing.

Data submitted by registrants are evaluated by the appropriate scientists or specialists in the Pesticide Registration, Medical Toxicology, Worker Health and Safety, Environmental Monitoring, Pest Management and Licensing, and Pesticide Enforcement Branches.

DPR concludes reevaluations in several ways. If the data show that use of the pesticide presents no significant adverse effects, DPR concludes the reevaluation without additional mitigation measures. If additional mitigation measures are necessary, DPR adopts regulations to mitigate the potential adverse effect. In applicable situations, DPR works with registrants and the U.S. EPA to revise labels to mitigate hazards. If the adverse impact cannot be mitigated, DPR cancels or suspends the registration of the pesticide product.

CCR Section 6225 regulations require DPR to prepare a semiannual report describing pesticides evaluated, under reevaluation, or for which factual or scientific information was received, but no reevaluation was initiated.

The U.S. EPA administers a program called Special Review that parallels DPR's reevaluation process. However, California's process deals with a broader range of issues that may affect only certain products rather than all products containing an active ingredient, and focuses on conditions peculiar to California use. U.S. EPA's Special Review, on the other hand, addresses risks posed by pesticide use on a national scale.

### Evaluating Pesticides in Air

DPR conducts air monitoring and evaluation under its general reevaluation mandate and under the mandates of Assembly Bill 1807 (Chapter 1047, Statutes of 1983, and amended by Chapter 1380, Statutes of 1984, AB 3219), the Toxic Air Contaminant Act.

**Toxic Air Contaminant (TAC) Program:** DPR's TAC program is one of several options the Department can use to control airborne pesticide residues. DPR has broad authority over the registration, sale, and use of pesticides in California to protect health and the environment. This authority is derived from a number of laws that cover all aspects of pesticide use in all media — air, ground and surface water, food, and in occupational and home-and-garden settings. This general regulatory authority allows DPR wide latitude to regulate application rates, ensure pesticide efficacy, designate pesticides as restricted materials, develop criteria to prevent unacceptable pesticide residues in food and water, license applicators and dealers, protect workers and finally to require reporting of all agricultural pesticide use. This authority is such that the Department can, with sufficient reason, demand that all use of a chemical cease immediately. Well before the 1983 passage of the TAC legislation, the Department regulated pesticides in air, beginning in the 1940s with regulations that governed maximum wind speeds and direction at time of application, and outlawing applications where conditions favored drift.

With the enactment of California's TAC legislation, the Legislature created the statutory framework for the evaluation and control of chemicals as toxic air contaminants. The statute defines TACs as air pollutants that may cause or contribute to increases in serious illness or death, or that may pose a present or potential hazard to human health. The law also requires listing as TACs all identified hazardous air pollutants (HAPs) under Section 7412 of Title 42 of the United States Code. DPR is responsible for the evaluation of pesticides as TACs. (The Air Resources Board [ARB] is lead agency for nonpesticidal substances in air.)

In general, the law focuses on the evaluation and control of pollutants in ambient community air. In implementing the law, DPR must conduct a review of the physical properties, environmental fate and human health effects of the candidate pesticide; determine the levels of the pesticide in air; and estimate human exposure and the potential human health risk from those exposures. The law requires DPR to list in regulation those pesticides that meet the criteria to be TACs. DPR must then determine the appropriate degree of control measures for the pesticide. Under its general regulatory authority, DPR may also conduct compliance monitoring to assure that users adhere to the control measures as appropriate.

Registration...is not a recommendation of a product, for the Department does not endorse any product. Registration is simply a guarantee that the product is under supervision of the Department...  
 — 1933 Department annual report

**DPR's TAC Program consists of two phases:** risk assessment (evaluation and identification) and risk management (control). The first phase involves an extensive evaluation of the candidate pesticide to assess the potential adverse health effects and to estimate levels of exposure associated with its use. Environmental Monitoring Branch first prioritizes pesticides for consideration, placing them on a TAC candidate list based on the amount of pesticide used and sold in California, persistence in the atmosphere, and health effects information. DPR then requests the ARB to conduct California-specific monitoring studies to measure the air concentrations of pesticides. Different strategies must be used to monitor levels of pesticides in ambient air compared to other types of air pollutants, such as automobile exhaust. Because most of California's pesticide applications normally occur in agricultural areas and are seasonal in nature, ARB conducts the monitoring studies to collect data during the worst-case situation in the areas of high use during the season of peak use instead of collecting samples throughout the State. With the assistance of computer models, this "worst-case" information is later extrapolated to other locations and other times to estimate the ambient exposures of those people living near places where pesticides are used.

In general, for each candidate pesticide, two types of monitoring are conducted: samples are collected in ambient community air, and others in air near an application. For ambient community air measurements, ARB collects samples at three to five locations (usually schools or other public buildings) in communities near agricultural areas expected to receive applications of the pesticide being monitored. Samples of 24 hours in duration are collected for four days per week, for four or more consecutive weeks. For application-site monitoring (i.e., sampling before and after a specific application), samples are collected immediately before, during and for approximately 72 hours following a pesticide application.

To complete its evaluation, DPR is required to prepare a report for each pesticide that includes an assessment of exposure of the public to ambient concentrations of the pesticide; a risk assessment that includes data on health effects, including potency, mode of action, and other biological factors; an overview of the environmental fate and use of the pesticide; and the results of air monitoring studies conducted in California to measure the levels of the candidate pesticide present in ambient air. The draft report is peer-reviewed by OEHHA and the ARB. DPR subjects the document to public review through a workshop and comment period. Based on the results of these reviews, the draft report is revised as appropriate. The draft undergoes a rigorous peer review for scientific soundness by the TAC Scientific Review Panel (SRP), a panel of experts representing a range of scientific disciplines. As part of its review, the SRP prepares findings on whether the document considered all scientific information and recommends to DPR whether to list the pesticide as a TAC. Based on the results of this comprehensive evaluation, DPR determines whether the pesticide meets the criteria to be a TAC, and if so, regulations are adopted adding the pesticide to the TAC list.

Once a candidate pesticide has been declared a TAC, it enters phase two of the program: the mitigation, or control, phase. In the mitigation phase, DPR investigates the need for and appropriate degree of controls for the TAC. If reductions in exposure are needed, DPR must develop control measures to reduce emissions to levels that adequately protect public health. DPR must use the best practicable control techniques available, which may include, but are not limited to, changing the use instructions on the product label; applicator training; restrictions on use patterns or locations; changes in application procedures; reclassification of the pesticide as a restricted material; or banning use by canceling a product's registration. In developing control measures, the law requires DPR to coordinate with the County Agricultural Commissioners, air pollution control districts, and air quality management districts in the counties where the pesticide is used.

From late 1998 through 2000, DPR made several changes to its AB 1807 implementation policies and procedures to fully integrate the TAC process into its ongoing review and assessment of pesticides. Working with the SRP, the Department merged its comprehensive risk assessment procedures to conform with established AB1807 procedures. DPR scientists undertook internal steps to ensure that the presentations of their scientific assessments were made in a manner consistent with other AB 1807 documents. This effort resulted in a consistent presentation of scientific assessments from DPR and OEHHA.

***Without intensive legal and chemical control of these highly technical products, unscrupulous persons could exploit consumers, and deliver deficient, hazardous, or fraudulent materials.***  
– 1944 Department annual report

Working with the SRP, the Department also established a mechanism to ensure that the priorities set for TAC monitoring reflected the Department's overall priority list for conducting risk assessments (under the Birth Defect Prevention Act and as part of the registration process). Differences between the priority list for TAC candidate monitoring and the risk assessment priority list led to monitoring being done many years before a risk assessment was completed. As a result, some monitoring studies were 10 or more years old by the time the rest of a submittal was ready for the SRP. In the interim, use patterns may have changed, making the monitoring data less relevant.

Moreover, DPR made changes in its overall risk characterization process to ensure that the toxicological evaluations done under other programs could be readily used as the basis of required TAC documents. The Department also made changes to ensure transparency of the TAC process, posting draft reports on its Web site and accepting comments via E-mail in addition to the normal comment process. The Department also worked with the SRP to establish a timetable for regular submission of health effects documents to the Panel for its review and findings as a precursor to possible regulatory listing as a TAC. The goal is more efficient monitoring strategies and activities, and streamlined mitigation activities.

### Other Air Programs

Separate from the formalized TAC and volatile organic compound (VOC) programs (see Chapter 11 for discussion of VOC program), DPR also conducts air monitoring as part of its continuing evaluation of pesticides. Environmental Monitoring Branch characterizes the source and recommends mitigation measures for off-target movement of pesticide residues that have resulted in crop damage, illegal crop residues, contamination of the environment, or complaints by the public. The Registration Branch may use this information in reevaluating the use of currently registered pesticides. The Enforcement Branch also uses the data in developing restricted materials permit conditions and use regulations designed to mitigate problems caused by pesticides in air. These monitoring studies help DPR evaluate the likelihood of pesticides causing health problems for workers using pesticides and for people near treated areas, and to provide data to develop new use practices designed to prevent harm. However, even the most carefully developed risk reduction measures cannot adequately take into account the variety of situations that occur in nature; various microclimates and special environmental characteristics can produce unexpected results. Therefore, DPR periodically does monitoring to evaluate the effectiveness of its risk reduction measures. If air monitoring finds unacceptable levels of pesticides in ambient air, monitoring data helps in the development of new control measures. For example, in 1997 and 1998, DPR conducted extensive monitoring of methyl bromide field fumigations to validate the effectiveness of the restrictions on the widely used fumigant. As a result, new suggested permit conditions were issued in November 1997, increasing the size of the minimum buffer zones. In 1998, again based on monitoring and other data, DPR reduced the minimum buffer zones for some fumigations of less than 10 acres. In 2000, based on extensive monitoring studies and other data, the Department adopted regulations formalizing many use restrictions carried out earlier by permit condition.

Environmental Monitoring Branch analyzes air monitoring data to assist the Medical Toxicology and Worker Health and Safety Branches in conducting risk characterizations, and monitors air residues of pesticides applied by the California Department of Food and Agriculture to eradicate exotic pests (such as the Mediterranean fruit fly). This information is used to help assure that the public is not exposed to levels of pesticides that may cause adverse health effects. Environmental Monitoring Branch also conducts special projects targeted at specific regional concerns. For example, in 1999 and 2000, DPR conducted monitoring for fumigants and other agricultural pesticides used around Lompoc in Santa Barbara County, to help resolve community concerns about possible overexposure to pesticides and resulting health problems. (See Chapter 13 for discussion of Lompoc Interagency Work Group activities.)



*The use of airplanes in the application of insecticides has received considerable impetus during recent years...*

*– 1934 Department annual report*

# Assessing Pesticide Risks

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The mission of DPR is in essence to ensure that people and the environment are protected from adverse effects that may be associated with pesticide use. Determining what those effects might be and under what circumstances they can occur is essential to an effective regulatory program. When this information is known, measures can be taken to limit exposures so that adverse effects can be avoided.

This chapter discusses the process DPR uses to assess pesticide risk, that is, to estimate the likelihood that an adverse health effect will result from an exposure (or exposures) to a particular amount (dose) of a pesticide or pesticides. *Risk assessment* is a process designed to answer questions about how toxic a chemical is, what exposure results from its various uses, what is the probability that use will cause harm, and how to characterize the risk.

Toxicity is an inherent property of all substances; all chemical substances can produce adverse health effects at some level of exposure. Risk of adverse health effects is a function of toxicity and exposure. Exposure to a substance determines the dose and the substance's toxicity determines the potency of the dose. Therefore, determining both toxicity and exposure is necessary in assessing the risk of chemicals. An extremely toxic substance is of little concern if there is no exposure to it. On the other hand, a moderately toxic chemical to which many people are exposed creates a substantial potential risk to human health. Hazard is best defined as the potential of a substance to cause harm, whereas risk is the probability of adverse effect under specified conditions of exposure. Regulatory agencies use various experimental data to determine the conditions likely to result in toxic effects, and use that information to set exposure doses which are reasonably expected to cause no adverse health effects. Once the risk has been assessed and characterized, risk managers decide if and how any unacceptable risk of harm can be reduced to an acceptable level. The results of risk assessments are often the driving force behind new DPR regulations and use restrictions.

**Brief History of Risk Assessment:** Since the late nineteenth century, risk assessment and risk management have been everyday activities of many industries, including banking and insurance. In the early twentieth century, the principles of risk assessment began to be applied to human health and safety and by the 1940s, toxicologists began to study the problem of establishing limits on exposures to hazardous substances that would protect human health. The impetus to better assess safety of chemical exposures took on new urgency in the decades that followed, as it became apparent that long-term exposures could have chronic health implications. The Congressional passage in the 1970s of landmark environmental and occupational safety legislation raised the importance of risk analysis and led to efforts to systematize general procedures and policies and formalize quantitative methodologies.

In California, the focus on pesticide risk assessment grew out of the 1984 passage of the Birth Defect Prevention Act (*BDPA, see separate article in this Chapter*). The BDPA mandated that the State bring the toxicological database on pesticides (based on required studies) up to current scientific standards, determine if the studies identified adverse health effects, and determine if those health effects were significant. These determinations are made through the risk assessment process. These mandates prompted the 1985 creation of the Medical Toxicology Branch to evaluate toxicological data and conduct risk assessments.

Toxicity is an inherent property of all substances; all chemical substances can produce adverse health effects at some level of exposure. Risk of adverse health effects is a function of toxicity and exposure.

## Birth Defect Prevention Act

In 1984, the Legislature passed the Birth Defect Prevention Act (BDPA, Chapter 669, SB 950). The law required that DPR not register new active ingredients without a full complement of health effects studies, and mandated that registrants of older pesticides (those registered before 1984) bring health effects data on their chemicals up to current scientific standards. The studies (primarily done on experimental animals) were in the following areas: chronic toxicity, mutagenicity, neurotoxicity, oncogenicity, reproductive effects, and teratology. The BDPA required DPR to use these and other data to determine if a pesticide would cause human health problems. If continued use of a pesticide presents a significant health hazard that cannot be mitigated, DPR is required to cancel the registration of products containing that active ingredient.

The BDPA mandated that DPR begin by determining 200 active ingredients that would be the first focus of enforcement. The priority list included chemicals with the most significant data gaps, widespread use, and which were suspected of being of greater health concern. (A data gap means that DPR lacks adequate health effects studies in any one of the required categories listed above.)

In January 1986, DPR notified registrants of data gaps for pesticide products containing any of the 200 priority active ingredients. DPR found that much of the data submitted in response to the data call-in notice did not meet U.S. Environmental Protection Agency guidelines. Because these studies had been performed some years before, many registrants were unable to obtain additional data from the laboratories that conducted the original studies. Registrants then contracted with laboratories to begin new studies; however, most registrants failed to complete and submit new chronic health effects studies within the time frames set by the law. The BDPA required submission of data on priority-list pesticides by March 1991, a deadline the Legislature later extended to March 1996 (Chapter 1228, Statutes of 1991, SB 550). Subsequent legislation (Chapter 1, Statutes of 1995-1996, SB 1XXX) extended until December 1997 the data deadline for two pesticides, methyl bromide and pentachlorophenol.

By the end of 2000, 55 of the 200 priority active ingredients had either been withdrawn from the market by their manufacturers or been suspended by DPR for failure to submit required data. (Product registrations are suspended if data for any active ingredient cannot be upgraded with the submission of additional information or if data were not submitted.) Of the 145 remaining, adequate data had been received for 142 (including required studies for methyl bromide and pentachlorophenol). Pesticide registrants are in compliance with the BDPA when DPR receives all required studies, unless later evaluation by DPR scientists determines that any study is not adequate. For the three active ingredients not in compliance, studies for one were under review for adequacy, and exemptions had been granted for products containing the other two. (Under the BDPA, a pesticide may be exempted from the data requirements if it is determined the chemical has only limited use, and there is insignificant exposure to workers or the public.)

In 1992, DPR began the process of calling in data for the 703 registered active ingredients that were not on the priority list, under a timetable set by 1991 legislation (Chapter 1227, AB 1742).

By the end of 2000, there were 538 active ingredients no longer subject to data requirements. These active ingredients had been withdrawn from the market by the manufacturers, were suspended by DPR, or were not subject to BDPA data requirements (for example, spray adjuvants). Of the remaining 165 active ingredients, 127 had complete data on file and four were exempt. Another nine were at various stages in the process. (Requests were received for waivers or exemptions, which the BDPA allows for those chemicals with insignificant exposure potential.) The remaining five active ingredients are subject to suspension.

Once a pesticide registration is suspended, registrants must halt all sales. Retail dealers may continue selling affected products for two years, and consumers may continue to use products on hand.

DPR scientists continue to evaluate health effects data submitted by registrants to confirm that studies were conducted properly and that chemicals registered on the basis of those studies can be used safely in California.

*continued from page 35*

To fulfill the mandates of the BDPA, DPR established a procedure to prioritize all pesticides for risk assessment, placing them in high, moderate, or low-priority status. (The priority status was and continues to be determined by DPR's Adverse Effects Advisory Panel, which includes senior scientists from the Worker Health and Safety and Medical Toxicology branches, and Cal/EPA's Office of Environmental Health Hazard Assessment [OEHHA]). Prioritization is based on the nature of the potential adverse health effects identified in toxicity studies, number of potential adverse health effects, number of species affected, potential for human exposure, use patterns, amount of pesticide used, U.S. EPA evaluations and actions, and similar factors. Using these criteria, the panel prioritizes the pesticides for risk assessment, based on their potential for health problems.

Furthermore, DPR policy from the 1980s through 1996 called for completion of a full risk assessment before any new, high-priority pesticide active ingredient could be registered in California. (New active ingredients that were classified as moderate or low priority for risk assessment were allowed to proceed through the registration process after an evaluation but without a risk assessment.)

Under this policy, older chemicals registered before the passage of the BDPA were prioritized separately, and placed on a different risk assessment track. This bifurcation of effort slowed risk assessments for older chemicals that had been registered sometimes decades before, when risk evaluations were nonexistent or abbreviated, and at the same time delayed registration of new pesticides.

In 1996, DPR instituted a new policy integrating its risk assessment tracks. U.S. EPA extensively reviews new pesticide active ingredients before federal registration, using up-to-date toxicology data. On that basis, DPR policy now allows an active ingredient to be registered in California after an evaluation but without a risk assessment, providing all required toxicology and other data have been submitted. The newly registered active ingredient then goes to DPR's Adverse Effects Advisory Panel for prioritization.

Pesticides are now placed on a single priority list for risk assessment, allowing DPR to better focus its resources on pesticides that pose the highest potential risk.

### The Risk Assessment Process

*Risk assessment can be broken down into four steps:*

- hazard identification
- dose-response assessment
- exposure assessment
- risk characterization
- risk appraisal

**Hazard identification** involves the review and evaluation of a pesticide's toxic properties — the extent and type of adverse effects. This phase, conducted primarily by DPR's Medical Toxicology Branch, usually involves gathering data on whether exposure to a chemical causes an increased incidence of an adverse effect (for example, cancer or birth defects in experimental animal studies). This is usually determined by a battery of studies on several species of laboratory animals.

Hazard identification also determines whether it is scientifically correct to infer that adverse effects observed in one species will occur in other species; for example, whether substances found to cause tumors or birth defects in experimental animals are likely to have the same effect on humans. Evaluation may also involve characterizing behavior of a chemical within the human body and chemical interactions within organs, cells, or even parts of cells.

The **dose-response assessment** considers the effects (in terms of magnitude and/or incidence) that occur or are predicted to occur at a given dose level. State and federal guidelines require that laboratory animals receive doses sufficient to produce toxic effects. These tests often use doses which are much higher than those to which people might be exposed. The highest dose in a study which does not result in an observable effect (that is, the dose below the dose at which an effect was seen) is called the "no-observed-effect level" (NOEL). This NOEL is often the basis for calculating allowable

*It is more important to keep worthless or hazardous products off the market than to attempt to run down and catch those selling such materials after they have already made sales.*

*– 1946 Department annual report*

“Risk assessments have many uses, but a major one is to assist decision makers with the complex choices regarding the options in managing or reducing the potential human health risks associated with a substance or product. Risk management is defined in the US as the process of evaluating alternative regulatory actions and selecting among them. It has been characterized as an agency decision-making process that entails consideration of political, social, economic, and engineering information along with risk-related information to develop, analyze, and compare regulatory options and to select the appropriate regulatory response to a potential health hazard . . . . Using experience and judgment, the (risk) manager must determine a level of risk that is acceptable.”

– *Risk assessment, risk evaluation, and risk management, C.J. Henry (in Food Safety and Toxicity)*

human exposures. To compensate for inevitable uncertainties in the risk assessment process, various uncertainty factors may be applied to the NOEL to determine the allowable exposure level. (For example, the allowable human exposure may be set a hundredfold lower than the NOEL. The first safety factor of 10 allows for possible differences between how humans and animals might react to a chemical. The second safety factor of 10 takes into consideration that some humans are more sensitive than others.)

Of equal importance with hazard identification in assessing risk is **exposure assessment**, which estimates people’s potential exposure to a chemical at work and at home, in air and from water and food in their diets. The process involves specifying the population that might be exposed (looking at various subpopulations by occupation, age, gender, ethnicity, and other factors), identifying the routes through which exposure can occur (skin, inhalation, ingestion), and estimating the magnitude, duration, and timing of the doses that people might receive as a result of their exposure. (*See Chapter 6 for more information on DPR’s exposure assessment process.*)

**Risk characterization** integrates data from hazard identification, dose response and exposure assessments to develop a qualitative or quantitative estimate of the likelihood that any of the hazards associated with the pesticide will occur in exposed people. These evaluations offer estimates of risk or margins of safety. **Risk appraisal** describes the significance and uncertainties of the risk characterization.

DPR prepares a **risk characterization document (RCD)** for each pesticide that goes through this process. The RCD explains the results of the risk assessment. The risk characterization document assembles, critiques and interprets all pertinent scientific data on a chemical’s toxicology, human experience, and exposure.

An initial RCD draft undergoes internal departmental review by DPR scientists. The RCD then undergoes external peer review by scientists at OEHHA and U.S. EPA. DPR may also call upon other scientific experts for additional external peer review. External peer review provides critical information for DPR on the scientific completeness of its documents. DPR considers the comments from these reviews and makes changes as appropriate. As new data become available, DPR updates the RCD with appendices. Sometimes, the entire RCD may be rewritten if new information substantially changes the conclusions.

The final step, separate from the risk assessment process, is **risk management**, when regulators decide how much exposure to a given chemical will be allowed and (if necessary) evaluate and select risk reduction options. If estimated risk falls within acceptable parameters, including a margin of safety, DPR allows use (or continued use) of the pesticide. If estimates suggest an unacceptable level of risk (that is, an unacceptable safety margin), exposure mitigation measures (that is, risk reduction options) are explored, since exposure is the controllable aspect of risk or margin of safety. In determining mitigation strategy, DPR must consider effectiveness, practicality, and enforceability of mitigation measures. Exposure may be reduced by changes in chemical formulation and/or packaging, personal protective equipment and clothing, engineering controls, and restrictions on use of a chemical, among other options. The effects of any proposed mitigation measures are run through the risk assessment process again, to determine if they will result in sufficient exposure reduction.

Unlike risk assessment, risk management is not based solely on scientific considerations, since it also involves social, economic, and legal considerations to make regulatory and policy decisions. DPR considers these factors in analyzing the possible regulatory responses to potential health hazards. The process is necessarily subjective in that it requires value judgments on the acceptability of risks and the reasonableness of control measures. However, the crucial point is simple: DPR will not allow a chemical to be used unless it can be used safely. If risk management measures are inadequate, then a pesticide registration may be suspended, canceled, or denied.

## Proposition 65

In 1986, California voters passed a ballot initiative called “The Safe Drinking Water and Toxic Enforcement Act,” more familiarly known by its original name, Proposition 65. Among other mandates, the Act requires the State to publish a list of chemicals “known to the State to cause cancer or reproductive toxicity,” and to update this list annually.

***A chemical may be listed if:***

- State experts conclude that scientifically valid testing shows the chemical clearly may cause cancer or reproductive toxicity;
- if an authoritative body has formally identified it as causing cancer or reproductive toxicity; or if an agency of the State or federal government has formally required it to be identified as causing cancer or reproductive toxicity.

Twelve months after a substance is added to the State’s Proposition 65 chemical list, businesses with ten or more employees must provide a warning before knowingly and intentionally exposing their employees or the public to an amount of the listed pesticide that poses a significant risk. The warning must be “clear and reasonable.” Also, 20 months after a pesticide is listed, businesses must not knowingly discharge listed pesticides, in a concentration that poses a significant risk, into drinking water or onto land where it will pass or probably will pass into a source of drinking water. Prohibitions do not apply if exposures to listed carcinogens result in “no significant risk,” or if exposure to listed reproductive toxicants is less than 1/1,000th of the no-observed-effect level, or NOEL.

The Governor designated Cal/EPA’s Office of Environmental Health Hazard Assessment (OEHHA) as the lead agency for implementation of the Act. DPR’s Proposition 65 role is limited to conducting scientific evaluation of pesticides being considered for listing. In cases where a given chemical has both pesticidal and major nonpesticidal uses, DPR and OEHHA share responsibility.

DPR’s Medical Toxicology Branch reviews data regarding possible adverse health effects (carcinogenicity, reproductive and developmental toxicity, and genotoxicity) of pesticidal chemicals to assist OEHHA in determining when pesticides should be listed.

DPR’s hazard communication regulations (which govern pesticide and worker safety requirements) also provide a foundation for employers to meet the Proposition 65 warning requirements for employees in the pesticide workplace. Proposition 65 regulations also allow warnings to be provided in the same manner stated in the federal Hazard Communication Program regulations for workplace exposures.

California’s hazard communication program requires that, whenever employees are working in treated fields or handling pesticides, the employer must display certain leaflets in the Pesticide Safety Information Series (PSIS) produced by Worker Health and Safety Branch. The leaflets are available in both English and Spanish and must be read upon request to any employee. In addition, specific information on an application must be displayed at a central location within 24 hours of the application and remain for 30 days or until employees are no longer present, whichever occurs earlier.



# Monitoring and Evaluating Pesticide Exposure

## Exposure Assessment and Mitigation

Exposure is the critical connection between potentially harmful factors of substances like pesticides (as determined in the hazard identification phase of risk assessment, *see Chapter 5*) and human health effects. Exposure assessment is designed to estimate what exposures are experienced under differing use conditions. Exposure assessment requires estimating the concentration of a substance to which humans are exposed, the size of the population exposed, the nature of the exposed population (e.g., activity, age, occupation, special risk characteristics), and the duration and frequency (continuous or varied) of exposure. These assessments estimate exposures for various subpopulation groups, including pesticide handlers, field workers, consumers exposed to pesticides in the home and garden, and bystanders, particularly infants, children and other susceptible subgroups.

DPR conducts risk assessments of pesticides to determine the potential risks of pesticide exposures in occupational settings and community environments to pesticide handlers, farm workers, other pesticide users (e.g., persons using home-and-garden products), bystanders (persons near treated areas), and others who may be exposed (e.g., by entering treated areas, or by eating treated food). If unacceptable risks are identified, DPR determines whether they can be mitigated, that is, if use practices can be changed to reduce exposure to ensure safe pesticide use. Exposure assessments — as part of a complete risk characterization — are the basis for determining if existing safety measures are adequate. If inadequate, these documents may be a starting point for developing mitigation measures, such as engineering controls (e.g., closed tractor cab), administrative controls (e.g., restricted entry intervals), or personal protective equipment (e.g., rain suit, gloves). If use practices cannot be changed to adequately reduce exposure, DPR may eliminate use of the pesticide.

Worker Health and Safety (WH&S) Branch scientists review a wide variety of data, including toxicology studies (done primarily on animals), human exposure studies, pesticide use data, worker activity information, and crop statistics to calculate potential exposure for a variety of scenarios. To determine the dietary component of a risk assessment, Medical Toxicology Branch scientists review data to determine potential residues on and in food and dietary water. (*See separate article in this chapter on dietary risk assessment.*)

Exposure assessments begin with an evaluation of the physical and chemical characteristics of a pesticide. WH&S Branch scientists evaluate whether pesticide breakdown products (e.g., metabolites) occur, potential routes of exposure (e.g., dermal, inhalation, oral), the half-life of the chemical, and other properties as part of the assessment. WH&S scientists also evaluate pesticide product labeling and pesticide use data to identify pesticide use sites (e.g., crops, industrial uses, garden uses, indoor home uses) and application methods (e.g., hand-held sprayer, ground sprayer, aerial application) to characterize the exposure scenarios. In addition, scientists review pesticide labels to determine application rates and frequencies, preharvest intervals, restricted entry intervals and personal protective equipment. To calculate exposures, scientists consider the timing, frequency and duration of various worker activities relative to the pesticide application. WH&S Branch scientists also review pesticide illness and injury data to identify potential health problems attributed to exposure to the pesticide.

WH&S scientists prefer to use chemical-specific and activity-specific exposure data to derive exposure estimates for the risk assessment process. If such data are not



***Many pesticides are toxic to human beings and practically all are capable of causing some type of damage or injury if improperly handled.***

– 1950 Department annual report

available, scientists use data from surrogate studies or from the Pesticide Handlers Exposure Database (PHED), developed by Health Canada, U.S. EPA, and the American Crop Protection Association. PHED is a generic (not product-specific) pesticide worker exposure database containing measured values of dermal and inhalation exposures from dozens of field studies.

Scientists consider the likely routes of exposure, primarily inhalation of air containing dusts and vapors, skin (dermal) contact either with the pesticide directly spilled on skin or contact with foliage, soil, or other surfaces (e.g., household furniture, carpets) on which residues may be present, and ingestion of foods and water with pesticide residues. Depending on the chemical and physical properties of the substance, a particular exposure might not be considered significant; for example, a given chemical might not be absorbed by the body when spilled on the skin (because of a very low dermal absorption rate) but may be absorbed when present in drinking water. Exposure to a chemical, therefore, is not necessarily synonymous with the actual amount of the chemical absorbed by body fluids and tissues. Exposure assessments estimate an absorbed (internal or systemic) dosage from which a margin of safety and other risk estimates can be derived. It is the absorbed dose that usually determines the margin of safety (and thus any mitigation measures that might be necessary), although if there are significant irritant effects (for example, eye irritation), they could be the driving factor in any regulatory measures.

Traditionally, pesticide exposure assessments use conservative (that is, health-protective) single-point values for chemical concentrations, application frequency and rate, duration of contact, calculation of internal dose, and body weight to characterize the exposure scenarios. Characterizing these exposure variables in terms of their probable ranges yields a more realistic estimate of the exposure. This approach is generally referred to as probabilistic modeling, or Monte Carlo simulation. Instead of presenting a single point estimate of risk, probabilistic analyses characterize a range of potential risks and their likelihood of occurrence. In addition, those factors which most affect the results can be easily identified. WH&S Branch uses computer software that enables scientists to perform probabilistic simulations in pesticide exposure assessments. Such data — and continually evolving scientific techniques — form the basis for the detailed exposure assessments prepared by WH&S Branch.

### Exposure Monitoring Program

Assessing human exposure requires a wide and varied base of knowledge involving work tasks, application methods, application scenarios, and other circumstances. Each year, WH&S scientists conduct unique human exposure monitoring studies to provide data for the risk assessment process. Through these studies, scientists continually improve data collection methods, and more accurately predict likely exposures.

The scientists in the exposure monitoring program devote themselves to extending and refining DPR's understanding of the mechanisms of exposure. The scientists in this program monitor a variety of activities, such as mixing and loading, application by hand, by ground or air, worker reentry into treated fields, and structural fumigations. In each situation, the goal is to identify factors influencing the degree of exposure, as well as to measure exposure.

A variety of methods are used to develop data. Clothing worn by workers performing routine tasks is collected and analyzed to determine residue levels and estimated dermal exposure. This information identifies factors affecting transfer of a pesticide from foliage to work clothing or skin, or determines the effect of various application methods on worker exposure. In addition, urine and blood samples may be collected and analyzed for biological indicators of exposure. Goals include providing better estimates of worker exposure, evaluating mitigation measures, developing new monitoring methods, and validating new and established monitoring methods. All studies involving human subjects require formal protocols approved by an independent, University of California human subjects review committee.

The WH&S exposure monitoring scientists also collect data on the amount of pesticide residue deposited on plants following various application methods and rates.

***The rapid increase in the use of synthetic organic chemicals illustrates the need for study to provide data for intelligent handling of products of this nature.... Possible industrial health hazards of new products should be anticipated. Problems as to hazards to workers not only in mixing of chemicals but to those who make field applications constantly arise. When a chemical is not acutely poisonous, generally little is known of the extent of its injuriousness. Information should be at hand with regard to insidious chronic poisoning by newly developed materials, as well as to their acute toxicity....***

– 1939 Department annual report

# Dietary Risk Assessment

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DPR’s Medical Toxicology Branch assesses the safety of pesticides by looking at all routes of exposure to residues at work, in the home, and in the diet.

***Dietary risk from pesticide exposure is estimated by:***

1. looking at how toxic or harmful a pesticide might be (*see discussion on hazard identification, in Chapter 5*);
2. looking at the amount of pesticide residues that might be in or on food; and
3. looking at how much food might be eaten by various subpopulation groups.

Estimating how much residue might be in or on food involves several things. If the pesticide is used on food, studies determine how much of the pesticide is typically left after the chemical is applied to the crop in the field and then harvested. In addition, the U.S. Food and Drug Administration, U.S. Department of Agriculture, and DPR all have programs in which they collect random samples of fresh produce and test for residues in the laboratory. The U.S. FDA and USDA also test for residues in cooked and processed foods.

USDA does nationwide surveys every several years to estimate the kinds and amount of food that people eat. Food consumption is reported for people of different races and ethnic groups, age groups, genders, geographical regions, and seasons of the year. The consumption rate is expressed in terms of body weight and accounts for a potential higher intake by children, as compared to adults, on a per weight basis.

The next step in estimating dietary exposure is to multiply the amount of food that people eat with the residues that might be found on those foods. These dietary exposure estimates are combined with the toxicity data to assess the risk to various population subgroups, including infants and children, from the exposure to pesticide residues in food. The resulting information on dietary risk is then included in an overall assessment of the risk posed by the pesticide for all uses.

*continued from page 42*

These data characterize residue decay rates that may differ under varying environmental conditions. This information may be critical in determining potential worker exposures and is used in developing techniques for avoiding illness and injury.

WH&S scientists also assist County Agricultural Commissioners in the investigation of some pesticide-related illnesses and injuries. With adequate notice following an exposure incident, scientists can collect samples and interview workers to determine the cause and extent of exposure. These types of investigations are essential in making determinations of workplace safety.

WH&S scientists investigate the effectiveness of protective clothing, gloves, respirators, engineering controls (e.g., closed mixing systems for preparing pesticides for application, enclosed cabs) and other safety equipment in mitigating exposures. For example, recent work has demonstrated that enclosed cabs with air filters are effective in providing respiratory protection. With the implementation of the U.S. EPA Worker Protection Standard, this information is translated into regulatory language that will encourage use of the most protective equipment.

In addition to evaluating the effectiveness of mitigation strategies, exposure monitoring studies may be used directly for regulatory purposes. Setting reentry intervals, determining required protective gear, and developing safe handling practices rely upon accurate information about pesticide behavior in the field.

### Workplace Evaluation Program

DPR established the Pesticide Workplace Evaluation Program (PWEPP) in 1999. Its objective is to help County Agricultural Commissioner staff identify potential workplace hazards during their routine inspections for compliance with pesticide laws and regulations. PWEPP provides selected county inspectors and DPR Enforcement staff with training in industrial hygiene and occupational safety. WH&S scientists then work closely with the counties to evaluate hazards identified through this program and recommend changes to improve workplace safety.

WH&S Branch's Workplace Evaluation & Industrial Hygiene Program also evaluates pesticide products, pesticide-handling equipment, and labeling for effectiveness of exposure hazard control. Scientists in this program recommend control methods, when needed, to ensure adequate protection to the pesticide product user and others possibly exposed to pesticides. Evaluation includes review of federal product labels, hazard communication literature (MSDS), application worksite evaluations, and onsite compliance monitoring. Scientists work with other DPR groups, professional engineering and governmental occupational safety and health organizations to develop mitigation measures applicable to pesticide use. Recommended control methods are based on established industrial hygiene hierarchy of control. Scientists consult on matters of engineering controls, administrative controls, heat stress, personal protective equipment, and airborne monitoring methods.



DPR's Pesticide Workplace Evaluation Program is designed to help County Agricultural Commissioner staff identify potential workplace hazards during their routine inspections.

# Enforcing Pesticide Laws

DPR regulates pesticides under a comprehensive program that encompasses not only enforcement of pesticide use in agricultural and urban environments, but also prevention of environmental contamination, protection of workers, endangered species protection, and community relations. While the U.S. EPA promulgates minimum pesticide requirements, California's regulations are far more comprehensive. They include site-specific local permitting by the County Agricultural Commissioners (CACs) for use of restricted pesticides; periodic on-site observations by commissioners of application sites both before and during use; full documentation and reporting of agricultural pesticide use; post-use residue monitoring of treated commodities; and field worker safety inspections. These programs have evolved through legislation, regulation, and policy to provide an unparalleled level of protection for California's citizens and the environment from the potential harmful effects of pesticide use.

## Organization and Jurisdiction

DPR oversees a multi-tiered enforcement infrastructure. The Department is vested with primary responsibility to enforce pesticide laws in California, and the Pesticide Enforcement Branch and the Pest Management and Licensing Branch work with the County Agricultural Commissioners to enforce state pesticide laws and regulations.

Pest Management and Licensing Branch, among other duties, administers the licensing and certification program for pest control advisers, pest control applicators, pest control aircraft pilots, pest control businesses, pest control dealers, and pesticide brokers.

The Enforcement Branch supervises and evaluates the commissioners' enforcement programs; monitors pesticide products for compliance with labeling and sales requirements; conducts an extensive pesticide residue monitoring program for fresh produce; imposes sanctions for violations of pesticide laws and regulations; and conducts federal (U.S. EPA) inspections of pesticide producers.

The Enforcement Branch oversees three regional offices in Anaheim, Fresno, and West Sacramento. The regional offices provide supervision, training, coordination, and technical support to the county enforcement programs. Regional office personnel evaluate county programs through in-depth records inspections to identify the number and type of inspections, completeness of permits, accuracy and thoroughness of investigations, appropriateness of enforcement actions, and adequacy of other aspects of their enforcement program. Regional office staff also provides training to CAC staff, and guidance on policy and regulatory issues.

There are two additional elements of pesticide regulation that DPR does not directly administer, although the CACs have varying degrees of involvement with these local programs. The Structural Pest Control Board (SPCB), within the State Department of Consumer Affairs, administers licensing of structural pest control businesses and structural applicators. The CACs carry out local enforcement activities for structural pest control applications. DPR and SPCB have a memorandum of understanding (MOU) that guides the interactions of the respective programs. DPR registers pesticides and devices used in structural pest control. (See Chapter 3 for discussion of the registration process.) SPCB enforces licensing provisions and ensures consumer protections. The Department of Health Services (DHS) oversees the activities of local vector control agencies, and DPR and DHS have an MOU that covers mutual areas of interest regarding vector control practices.

***We consider persuasion a better enforcement method than threats, though at times prosecutions are necessary. It is our aim to have an efficient rather than a menacing force.***  
– 1936 Department annual report

In addition to the layers of jurisdiction in California, there are jurisdictional roles played out at the international border. The citizens of the United States and Mexico work and live in close proximity along the California-Baja border. Likewise, pesticide use occurs on both sides of the border and affects the citizens of both countries. Farmers own property and apply pesticides on both sides of the border. Pesticides may be purchased in one country and used in another, both legally and illegally. Pesticide users and farm workers may work on one side of the border and live on the other, and problematic pesticide applications may occur on either side of an international boundary.

DPR participates in two federal border projects. The first is the Pesticide Emergency Response Plan, a U.S. EPA-funded project that identifies individuals and agencies responsible for initial emergency response and investigation of pesticide incidents along the California/Mexico border. The second is the U.S./Mexico Pesticide Information Exchange Project, funded by U.S. EPA to cooperatively address common pesticide issues along the entire border. In 2000, DPR received funding to consolidate its state and federal pesticide border projects and to establish the position of a DPR Border Issues Manager, who serves as a single point of contact for pesticide enforcement issues involving the border region.

### Enforcement Authority

In 1972, amendments to the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) granted U.S. EPA primary authority to regulate pesticides in the United States. The amendments also gave U.S. EPA authority to delegate pesticide enforcement authority to states by entering into cooperative agreements with state pesticide regulatory programs. Under these agreements, states are authorized to train their personnel to enforce pesticide laws, and to develop licensing, certification and training programs for applicators of restricted-use pesticides. The amendments also authorized U.S. EPA to pay certain costs associated with these enforcement and training programs, subject to the state providing a certain percentage of matching funds. In 1975, after more than a year of negotiation, U.S. EPA signed its first cooperative agreement for pesticide enforcement — with California. The agreement served as a model for future state agreements of its type. With this agreement in place, a state has primary enforcement responsibility for pesticide use violations.

Before being allowed to train and certify applicators, a state must submit a detailed plan to U.S. EPA describing its authority and capabilities to carry out the program. Before U.S. EPA approves a plan, the state must adopt adequate laws and regulations to meet the minimum standards under FIFRA, including certification and record-keeping requirements for pesticide applicators; the inspection of establishments where pesticides are held for distribution or sale; and enforcement of pesticide labeling. U.S. EPA accepted California’s plan for the certification of commercial and private pesticide applicators in 1980. California has consistently maintained primary enforcement responsibility for pesticide use violations within the State from that time.

### Licensing and Certification

The Pest Management and Licensing Branch administers the Department’s Licensing and Certification Program. This program examines and licenses commercial pest control applicators, aerial applicators, pesticide dealers and brokers, and pest control advisers; and certifies pesticide applicators who use or supervise the use of restricted pesticides. The purpose is to ensure that persons selling, possessing, storing, handling, applying, and recommending the use of pesticides are knowledgeable in their safe use. Such licenses and certificates cannot be renewed unless the holder has completed certain minimum continuing education hours related to pesticides or pest management within each two-year license or certificate period.

In addition, pest control businesses, agricultural pest control advisers, and pest control aircraft pilots must register with each county in which they operate. The law provides that the commissioner may revoke for cause any registration to work in that county.

As far back as 1917, pest control businesses in California were required to obtain a certificate of qualification from the County Agricultural Commissioner. In 1947, newly

As far back as 1917, pest control businesses were required to get a certificate of qualification to provide services.

developed herbicides caused problems when drift occurred and crops in nearby fields were damaged. In response, the Legislature in 1949 enacted two laws (Chapter 1043 and Chapter 1294) that required professional agricultural applicators and pilots be licensed by the California Department of Agriculture (CDA), with registration required in the county of operation. The new laws also required licensees to keep certain records of applications and report information to the commissioner. With passage of this statute, regulation of professional applicators moved from the county level to become a responsibility shared by the State and the County Agricultural Commissioners. The law was specific in its requirements: “Applicants must indicate the specific type or types of agricultural pest control which they consider they are qualified to perform, and must submit a statement of their experience in that field. The law requires that each applicant must also satisfy the department of his character, qualifications, responsibility and good faith in seeking to carry on the business of agricultural pest control. . . . Qualifications of the applicant to conduct the type or types of business described in the application were determined from an agricultural commissioner familiar with his operations or by interview and oral examination conducted with the commissioner of his county of residence.”

In 1950, the first year licenses were required, 913 were issued, the largest number — 128 — in Los Angeles County, followed by 67 in Fresno County, 64 in Tulare, and 58 in San Bernardino. With licensing came training on how to use the new, more powerful pesticides. In its 1950 annual report, CDA noted that “the need for information with regard to agricultural chemicals and pest control, expressed by agricultural pest control operators and agricultural aircraft pilots, led to presentation of a ‘short course’ by the University of California in February. Over 500 persons attended the three-day session, and heard experts discuss citrus pest control, soil fumigation, pest control in deciduous orchards, pest control laws and safeguards, weed and rodent control, pest control for truck and garden crops, and agricultural use of aircraft.”

The new statutes also required CDA to adopt rules and regulations governing the use of “injurious materials” and “injurious herbicides.” In response, CDA adopted regulations in 1950 that established the restricted material classification system. Placed in this category were 2,4-D, parathion, TEPP, calcium arsenate, lead arsenate, and copper acetoarsenite. The regulations also governed nozzle sizes, wind velocities, distances from susceptible crops and other factors “involved in limiting drift of these chemicals onto susceptible crops on properties other than those being treated.” The regulations required applicators to obtain permits to use these potentially harmful pesticides and to take “certain precautions . . . to prevent injury to persons, valuable plants, and animals (including honeybees).”

In 1971, legislation (Chapter 1276) was passed to upgrade the professionalism of persons making agricultural pesticide use recommendations by, among other things, requiring the licensing of agricultural pest control advisers.

At the federal level, the 1972 amendments to FIFRA prompted further changes in the pest control licensing program. Congress recognized that some chemicals, while too dangerous for general use, could be used safely with training and gave U.S. EPA the flexibility to regulate pesticides beyond the choice of either registration or cancellation. U.S. EPA classifies pesticides into either general or restricted categories, with the latter group available only to “certified applicators.” U.S. EPA prescribed certification standards and allowed states such as California to set up their own U.S. EPA-approved training programs.

In 1976, California incorporated the federal certification requirement for pesticide applicators. Other categories of licenses and certificates were set up, requiring different levels of training and expertise depending on the kind of pesticides handled and the degree to which a person used pesticides in their work. The State plan also provided for the certification of growers who apply federally restricted pesticides. This was done through the existing State restricted material permit process. U.S. EPA accepted California’s plan for certification of commercial and private pesticide applicators in 1980.

In 1993, the Legislature (Chapter 1176, AB 770) expanded the State’s regulatory licensing requirements to include all persons who sell or distribute any pesticide

***Legislative investigations had indicated the need for more stringent control over the use of injurious pest control materials which might drift and thereby present a serious hazard to persons, animals, and crops.***

– 1950 Department annual report



California's restricted materials permit program is the only one of its kind in the country.

products registered by DPR and labeled for agricultural use in California. Under this statute, the person that first sells a pesticide into or within the State, whether the registrant, a pesticide broker, or a pesticide dealer, is responsible for paying the mill assessment (an assessment based on pesticide sales, *see Chapter 15, Funding*). The bill created a new license category for pesticide brokers, requiring them to possess the appropriate DPR license to conduct business with or within California. The law also made it unlawful to purchase a pesticide labeled for agricultural use except from a person licensed as a pest control dealer or broker.

In 1999, DPR adopted regulations that require prospective agricultural pest control advisers (PCAs) to take more college courses related to integrated pest management and sustainable agriculture. The Department licenses PCAs to offer recommendations to farmers and others on agricultural pest control. Upgrading the PCA educational requirements was first suggested in 1994 by DPR's Pest Management Advisory Committee. The committee concluded an upgrade was necessary if PCAs were to produce recommendations that incorporate reduced-risk pest management strategies. The new requirement goes into effect for PCA licenses issued after December 31, 2002.

### Restricted Materials and Permitting

In 1976, the State Attorney General issued an opinion that the pesticide regulatory program had to comply with the California Environmental Quality Act (CEQA) when registering a pesticide or granting a license, permit or certificate. In other words, CEQA required the Department to prepare an environmental impact report (EIR) before registering a pesticide or issuing a permit to use a restricted pesticide. After a specially-convened Environmental Assessment Team determined this was not feasible, legislation was passed (Chapter 308, Statutes of 1978, AB 3765) that provided for an abbreviated environmental review as the functional equivalent to a full-scale EIR. The legislation noted that timeliness in the application of pesticides is paramount to good pest management and that individual permits to apply pesticides must often be issued on short notice, thereby making impractical the lengthy environmental review required in the preparation of an environmental impact report or negative declaration. Among other things, the legislation led to the Department's development of regulations which expanded the scope of the permitting system and placed new responsibilities on the County Agricultural Commissioners.

As a practical matter, the legislation meant that the state pesticide regulatory agency and the County Agricultural Commissioners did not have to prepare an EIR on each activity they approved. However, documentation of environmental impacts, mitigation measures, and alternatives was required.

The criteria to designate a pesticide as a restricted material in California include hazards to public health, farm workers, domestic animals, honeybees, the environment, wildlife, or crops other than those being treated. DPR gives pesticides a restricted designation through regulation. All federally restricted-use pesticides are designated as restricted materials in California by reference in regulation. In addition, California has additional pesticides that DPR has designated as restricted-use. DPR may propose pesticides for designation as restricted materials at any time, often based on a review of data submitted by registrants or information derived from field studies or incident investigations. (For example, pesticides found in ground water from routine agricultural use are designated restricted materials to allow for greater local control over their use.)

DPR designed the restricted material permit program to accommodate widely divergent local needs. Before a farmer or pest control business can buy or use a restricted material (whether federally restricted or California-restricted only), they must be certified by DPR, that is, they must have had specified training in handling and using pesticides. In addition, to buy or use a California-restricted pesticide, a person must obtain a permit from the County Agricultural Commissioner. (Most pesticide products are not restricted materials, and persons using nonrestricted pesticides are not required to obtain a permit.)

The regulations require the CAC to determine if a substantial adverse health or environmental impact will result from the proposed use of a restricted material. If the CAC determines that this is likely, the commissioner may deny the permit or may issue

it under the condition that site-specific use practices be followed (beyond the label and applicable regulations) to mitigate potentially adverse effects. DPR — relying on its scientific evaluations of potential health and environmental impacts — provides commissioners with information in the form of suggested permit conditions. DPR’s suggested permit conditions reflect minimum measures necessary to protect people and the environment. The commissioners use this information and their evaluation of local conditions to set site-specific limits on applications. To maintain CEQA equivalency, CACs must have flexibility to restrict use permits to local conditions at the time of the application. Therefore, the commissioners may follow the DPR-provided guidelines, or may structure their own use restrictions.

Permits to apply restricted materials are the functional equivalent of environmental impact reports; therefore, they must be site- and time-specific. The site can be clearly described when the permit is issued. However, since permits are issued for a 12- or 24-month period, and it is not possible to schedule the time of application months in advance, time-specificity is achieved by the grower filing a “notice of intent” (NOI) to apply the pesticide. The NOI must be submitted to the commissioner at least 24 hours before the scheduled application. The notice must describe the site to be treated and the pesticides to be applied. It must also contain information on any changes in the environmental setting (for example, construction of residences or schools, changes in types of crops to be planted) that may have occurred since the permit was issued. This notice allows the commissioner an additional opportunity to review the planned application, and apply additional restrictions if needed.

Agricultural commissioners have the option of issuing multi-year permits to perennial agricultural plantings (such as fruit trees or grapevines), nonproduction agricultural sites, and nonagricultural sites. However, the permittee must immediately notify the commissioner of any changes in the information on the permit (for example, a change in the kind of crops planted, or a newly constructed labor camp or home nearby).

County staff review notices of intent and can halt the proposed application if conditions warrant. County staff make pre-application inspections on at least 5 percent of the use sites identified by permits or notices of intent. These are primarily spot checks to ensure that information contained on the permit is accurate.

### Cooperative Agreement with U.S. EPA

DPR’s comprehensive enforcement program includes a federal component administered through a cooperative agreement with U.S. EPA. This program includes compliance monitoring and compliance assistance (outreach) elements that focus on pesticide applicators and workers in various settings. The purpose of compliance monitoring is to find out whether pesticide applicators follow pesticide labeling and regulatory requirements, and take appropriate enforcement action for violations found. Compliance monitoring by DPR staff does not result in direct enforcement action, but may trigger followup inspections. Compliance assistance is designed to provide information to pesticide users and workers on regulatory requirements addressing worker protection, endangered species, ground water and restrictions on use.

Information is also provided on safe handling procedures, and how to properly store, transport and dispose of pesticides. Increasing the knowledge of pesticide users and workers will increase compliance and reduce the risk of pesticide exposure to the public, workers and the environment.

Each year DPR identifies State priorities and reviews the cooperative agreement program to assure its activities incorporate U.S. EPA’s national priorities. These priorities may include the monitoring of pesticide applications near residential areas, hospitals, schools, waterways, endangered species habitat, farm labor camps, parks and certain crops. They also may include the monitoring of pesticides falling under new regulatory requirements (e.g., worker protection), or “special chemicals” identified by federal or State regulatory agencies. Examples of special chemicals include those regulated as minimal exposure pesticides, pesticides undergoing California or federal review, or pesticides that have been canceled or suspended. DPR and U.S. EPA, Region 9, then negotiate an agreement to administer and carry out a work plan that addresses these mutual priorities.

***Laws cannot be most effectively enforced without a certain amount of educational work and even investigation must at times be undertaken....***

*– 1923 Department annual report*

To carry out the work plan, DPR initiates a schedule of both compliance monitoring and compliance assistance activities. Compliance monitoring activities specify types of inspections conducted under the cooperative agreement. These inspections include those conducted at pesticide producing establishments, and retail and wholesale market sites. Pesticide dealers who sell restricted materials, pesticide users, and licensed or certified pesticide applicators are also subject to inspection and monitoring activities. In addition, DPR conducts inspections at federal facilities including military bases, national parks and wildlife refuges.

DPR has a strong commitment to providing compliance assistance to the regulated community through outreach activities. DPR and CAC staff regularly present information to trade or industry groups such as the California Agricultural Production Consultants Association, California Agricultural Aircraft Association, Pest Control Operators of California and other industry associations.

### County Pesticide Use Surveillance

Beyond administering the restricted materials permitting system, the County Agricultural Commissioners enforce other State laws and regulations relating to pesticide use at the local level.

#### *The commissioners:*

- inspect the operations and records of growers, pest control businesses, pesticide dealers, and agricultural pest control advisers;
- register licensed pest control businesses, pest control aircraft pilots, and agricultural pest control advisers (these businesses and individuals must obtain statewide licenses from DPR, and register in each county where they operate);
- conduct pesticide incident and illness investigations;
- take enforcement action (including levying fines and penalties) if violations are found; and
- provide training to pesticide users.

*(A broader discussion of the wide range of CAC duties and responsibilities can be found on the opposite page.)*

### Enforcement and Compliance Options

The legal authority for the pesticide regulatory program is found primarily in Divisions 6 and 7 of the Food and Agricultural Code. These legal provisions and the regulations adopted pursuant to them give DPR, the CACs, or their respective representatives, broad authority to access private property for enforcement activities such as audits, inspections, investigations, sampling, or testing. These laws also authorize DPR and the CACs to discipline violators through various types of sanctions and to protect the public by prohibiting or stopping hazardous activities.

#### *Enforcement tools include:*

- Administrative civil penalties initiated by a CAC or by DPR;
- Refusal, revocation, or suspension of county registrations or licenses and certificates issued by DPR and a CAC;
- Civil and criminal court actions initiated by DPR (through the Attorney General) or local prosecutors;
- Cease-and-desist orders issued by DPR or a CAC;
- Seize/hold produce orders issued by DPR (to place a hold on agricultural commodities that exceed pesticide tolerances);
- Crop abatement orders issued by DPR (allows the destruction of agricultural commodities that exceed pesticide tolerances);
- Crop seizures issued by DPR (allows seizure and destruction of agricultural commodities or sites treated with a pesticide not registered for use on that commodity or site); and

  
**Many California farmers rely on trained operators to apply pesticides for them. This employment trend has increased as modern agriculture has found need for expensive application equipment, such as aircraft, to provide effective and economical pest control. Furthermore, many of the modern pesticides are dangerous to handle and farmers prefer to hire trained and properly equipped operators to apply the chemicals for them.**  
 – 1958 Department annual report  


## The County Agricultural Commissioners

The size and diversity of California agriculture dictate a much more complex partnership between State and local pesticide regulatory authorities than anywhere else in the nation. DPR works closely with California's County Agricultural Commissioners (CACs), who serve as the primary enforcement agents for State pesticide laws and regulations.

The Boards of Supervisors have appointed County Agricultural Commissioners in all the state's 58 counties to direct offices staffed by county employees. (A handful of small counties share commissioners, so there are actually fewer than 58 CACs in the state.) CACs receive State as well as county funding, and they enforce State laws and regulations that cover environmental protection, pest prevention, worker and consumer protection, and a variety of special services.

Although State law offers various enforcement options to CACs, the commissioners often encourage compliance through educational programs. These may include informal or formal compliance actions (such as warning letters), corrective interviews, presentations to community and industry groups, and training sessions for pesticide users.

Farmers must obtain site-specific permits from their CAC to purchase and use many agricultural chemicals. The commissioner must evaluate the proposed application to determine whether it is near a sensitive area, such as wetlands, residential neighborhoods, schools, or organic fields. State law requires commissioners to ensure that applicators take precautions to protect people and the environment. Based on this evaluation, the CAC may deny the permit or require specific use practices to mitigate any hazards. For example, a permit may be contingent upon the method of application, time of day, weather conditions, and use of buffer zones. When such permit conditions are in place, they have the force of regulation and are strictly enforceable.

Part of the commissioner's duty in issuing a permit is to decide the need for a particular pesticide and whether a safer pesticide or better method of application can be used and still prove effective. CACs regulate pesticide use to prevent misapplication or drift, and possible contamination of people or the environment. CAC staffs also enforce regulations to protect ground and surface water from pesticide contamination, and they may work with regional water boards and the State Water Resources Control Board. Some CACs serve as air pollution control officers for their counties.

Among a CAC's most important responsibilities is the investigation of pesticide-related illnesses and injuries. All reported pesticide-related illnesses and injuries are investigated by the commissioner in the county in which the illness occurred. CAC staff interview the victims and employer, if the illness occurred on the job. If violations of pesticide law or regulations are found to have contributed to an illness, the commissioner takes enforcement action. If a crop or structure

is contaminated during an incident, a CAC biologist takes residue samples for laboratory analysis. Commissioners can quarantine a crop that contains illegal pesticide residues.

In most counties, the CAC is the first contact on any farm-related issue. Commissioners enforce many laws administered by the California Department of Food and Agriculture (CDFA), including those related to pest detection and exclusion and to quality standards for fruits and vegetables. CDFA also provides biological control organisms that commissioners may use to solve persistent pest problems. Additionally, CACs work with the State Department of Fish and Game to prevent agricultural runoff into wildlife areas and similar problems.

Although they are called "agricultural" commissioners, CAC duties range far beyond the farm gate. For example, CAC employees check maintenance gardeners to ensure they are licensed to apply pesticides, and that their pesticides are labeled for professional landscaping. CAC biologists inspect home pesticide applications, such as structural fumigations for termites, and check structural pest control employees for proper training and equipment.

Since many pesticides are used in non-agricultural settings — sanitizers in municipal water treatment plants, disinfecting chemicals in food service facilities and hospitals — pesticide laws may overlap other areas where workplace safety is involved. Therefore, CACs may also work with the State Departments of Industrial Relations and Health Services. Commissioners also consult with the State Department of Forestry about pesticide use on forest lands.

### *Outside the pesticide arena, County Agricultural Commissioners have responsibilities including:*

- Sampling imported produce at airports, seaports, and post offices for exotic pests such as the Mediterranean fruit fly. Also checked are shipments of nursery products from areas that may harbor unwanted pests.
- Inspecting nurseries and seed producers to check the viability of rootstock and seed, and inspecting beehives for disease and pest infestations.
- Checking for insect damage, rot and decay at packing stations; inspecting grapes, citrus, and other fruit for sugar content.
- Enforcing the state's organic food laws, and overseeing certified farmers' markets in their counties.
- Preparing an annual county crop report with statistics used by universities, agricultural organizations, lending institutions, and others.
- Conducting weights and measures programs. All but four commissioners also serve as county sealers, who check supermarket scales and gasoline pumps for accuracy.

*continued from page 50*

- Prohibit harvest orders issued by DPR or a CAC (delays harvest until the expiration of a pesticide label preharvest interval or until produce does not carry pesticide residue in excess of tolerance).

**Administrative actions:** DPR can refuse, revoke or suspend the right of a pest control operator’s or maintenance gardener’s business license to perform pest control, and a pesticide dealer’s business license to sell pesticides. Pest control advisers, licensees and certificate holders who use pesticides are also subject to these administrative actions.

County Agricultural Commissioners have the authority to refuse, revoke or suspend the registrations of pest control operators and maintenance gardeners to use pesticides and that of pest control advisers to make pesticide recommendations. In 1984, commissioners were granted authority to levy structural pest control civil penalties. As an agent of the Structural Pest Control Board, commissioners may fine any structural pest control licensee up to \$1,000 per violation of pesticide laws in the Food and Agricultural Code or the Business and Professions Code. Commissioners may also suspend the right of a structural pest control licensee to perform work in their county for up to three days.

In 1985 (Chapter 943, AB 1614) commissioners were granted authority to levy agricultural civil penalties. Commissioners may fine any pesticide user, adviser, or dealer up to \$1,000 per violation of specified sections of the Food and Agricultural Code. In 2000, commissioners were given the authority to refuse, suspend or revoke permits of individuals who disregard fines or lawful orders (Chapter 806, SB 1970).

In 1989, DPR was granted limited authority to levy civil penalties (Chapter 843, AB 1873). DPR’s authority at that time was restricted to violations of law prohibiting the sale of unregistered or mislabeled pesticides, and those prohibiting the packing, shipping or selling of produce containing illegal pesticide residues. In 2000, legislation (Chapter 806, SB 1970) expanded that authority to allow DPR to levy civil penalties for serious cases resulting from priority investigations or multi-jurisdictional violations that cannot be handled by a single CAC. DPR-imposed civil fines can range as high as \$5,000 per violation.

In 1993, legislation (Chapter 848, AB 774) made it a crime for a grower to knowingly treat a commodity or crop with a pesticide that had been stolen or illegally obtained. Violators are subject to a fine of \$10,000 plus one-half the value of the crop to which the illegal pesticide was applied. In addition, the law provided that DPR licensees found to have knowingly sold, applied, or provided stolen pesticides shall have their license suspended for at least 18 months.

If DPR and County Agricultural Commissioners believe civil penalties are not warranted, they have an option of obtaining compliance through violation notices, compliance interviews, and warning letters. These less severe actions are generally used to document first-time, nonsubstantive violations. In addition, they can issue “cease and desist” orders to halt activities that may create a hazard involving the use of pesticides in violation of laws or regulations.

**Criminal and civil actions:** Criminal and civil actions can be taken against licensees, certificate holders, permittees, and other pesticide users. These actions can also be taken against pest control advisers, sellers and manufacturers of pesticides. Civil actions can be filed by the State Attorney General or a county district attorney. Criminal penalties range from a minimum of \$500 and/or not more than six months of imprisonment, to \$50,000 and/or imprisonment of one year for offenses involving intentional or negligent violations that created a hazard to human health or the environment. Civil complaints can be filed only by the State Attorney General. Penalties range from \$1,000 to a maximum of \$25,000. Criminal and civil proceedings are considered instead of agricultural or structural civil penalties for repetitive or intentional violations, or violations that have created a hazard to human health or the environment.

**Crop Quarantine, Crop Abatement, Crop Seizure:** DPR may quarantine and hold any lot of produce that contains pesticide residues in excess of the federal allowable levels. The owner of the produce has the option of reconditioning the produce to remove the illegal residues. If the illegal residues cannot be removed, the produce cannot be sold. In addition, DPR is authorized to seize lots of produce based on a suspicion they contain illegal pesticide residues. The produce is then laboratory-tested and, should

DPR issues these types of professional licenses to individuals and businesses that apply, sell or recommend pesticides.

**Individuals**

- Agricultural Pest Control Adviser License
- Qualified Applicator Certificate
- Qualified Applicator License
- Pest Control Dealer Designated Agent License
- Pest Control Aircraft Pilot Certificate

**Businesses**

- Maintenance Gardener Pest Control Business License
- Pest Control Business License
- Pest Control Dealer License
- Pesticide Broker License

illegal residues be present, the seizure is maintained. Should a residue of an unregistered pesticide be found on a crop in the field, DPR can prohibit the harvest, and in some cases order the crop destroyed. DPR also may order a crop or commodity destroyed or prohibit harvest of a crop treated with a pesticide not registered for use on the crop or commodity even though no residues are found, if the presumptions are not rebutted that the treated crop or commodity presents a health or environmental hazard, or the pesticide was used to gain an unfair business advantage.

### Improving Enforcement

In 1992, DPR and the County Agricultural Commissioners began working together on developing uniform enforcement guidelines, which were finalized in 1994. The guidelines acknowledged the necessity of a uniform enforcement response policy while maintaining the ability to recognize local conditions in decision making. Under the guidelines, violations of the State's pesticide regulations have been categorized as minor, moderate, or serious violations. Minor violations primarily involve paperwork oversights. The stiffest penalties have been reserved for violations classified as serious. These are violations of laws that protect health, property or the environment and may involve restricted material permits, licensing, and worker or public safety.

Violations are categorized and then assessed using a decision tree to determine an appropriate response or option. Since the decision tree takes the violator's compliance history into account, more violations prompt more severe action. To achieve statewide consistency, counties must use these guidelines for each incident. If a county's response differs from the guidelines, a written decision report must be prepared that describes the factors that influenced the alternate decision.

In 1994, DPR and the commissioners began a program to target county enforcement on activities that directly protect worker and public health and the environment. Each county has a negotiated work plan that gives the highest priority to such enforcement activities as worker protection inspections, illness investigations, applications of certain high-toxicity pesticides, and agricultural applications near parks or schools. Lower priority is given to activities like routine inspections of growers or businesses with no recent violations. The commissioners focus on inspections in areas where there has been a history of problems or potential for problems. This planning process is conducted each year, allowing DPR and the commissioners to continually evaluate program priorities.

**Enforcement Initiative:** In response to a Cal/EPA-wide directive, the Department in mid-1999 began an in-depth assessment of its enforcement program. The directive noted Cal/EPA's commitment to implement its "stringent environmental standards resolutely, but equitably," and asked that each Cal/EPA entity examine the structure and conduct of compliance and enforcement activities.

In July 1999, DPR convened a team of Department staff and CAC representatives to review the means used by the Department and the CACs to maintain compliance by the regulated community, and examine the kinds of enforcement actions taken by DPR and the CACs. As part of this effort, input was solicited from representatives of production agriculture, the pesticide industry, public interest groups, and farm labor and other interested parties.

The team's report recommended a variety of changes in policy, procedures, regulations, and statutes. The Department in early 2000 began implementing several action items, including expanding resources for compliance assessment and county supervision; initiating a drift control initiative; improving enforcement planning and evaluation; and enhancing State and county authority. Fulfilling the challenges presented by the scope of the recommendations was expected to take several years.

**Compliance Assessments:** In 1997, the Department began a Compliance Assessment Program to perform on-site field evaluations of pesticide users to assess the degree of compliance with certain, predetermined requirements of the Food and Agricultural Code. Enforcement Branch staff conduct compliance assessments by observing specific aspects of pesticide use in field situations and by documenting pesticide user compliance with requirements. DPR and the CACs use this information to identify program strengths and weaknesses, plan focused inspections, design outreach programs, make programmatic and policy changes, and modify annual work plans.



*Consistent enforcement of good laws and regulations is in many ways an aid to legitimate business.*  
– 1938 Department annual report

DPR uses compliance assessment data to evaluate the effectiveness of laws, regulations, and label requirements. CACs also use the data to identify statewide trends, target enforcement activities, and evaluate county pesticide use enforcement priorities.

**Effectiveness Evaluations:** As part of the process of reimbursing CACs for local enforcement costs, Enforcement Branch staff conduct midyear and annual effectiveness evaluations of all County Agricultural Commissioners' offices and staff. The program provides evaluations for major elements of the county's program, describes successful program aspects, and follows up with CACs on needed improvements. The evaluations consider financial reports, adherence to enforcement guidelines, enforcement action appropriateness, investigation quality and timeliness, restricted material permit accuracy, business registration and license records, and inspection quality.

County evaluations are part of DPR's supervision and support function. Evaluations are used not only to determine reimbursement to counties for program costs, but also to identify and document areas of program strengths and deficiencies. Enforcement Branch staff discusses these program areas with each CAC. Redirection or focusing of resources is the desired result if program deficiencies are found. Regional Office liaisons work with CACs to carry out these program changes.

**Enforcement Database:** In 1997, the Department received legislative funding to create a statewide enforcement database. The project was initiated primarily as an enforcement tool to track and review the compliance history of licensees before approving or renewing a State pesticide license. (*For more information on the database, see Chapter 14.*)

**Law enforcement which is the  
result of intelligence and  
integrity is permanent.**

– 1938 Department annual report

## Product Compliance Program

Product registration enforcement began in 1911 with a pesticide product quality program, when truth-in-labeling laws were in their infancy and adulteration and misrepresentation of products were common. A 1935 department description of the program served to describe it for many years to come: “The work includes the inspection, sampling, and analyzing of all substances under (DPR’s) supervision. Many thousands of inspections take place on dealers’ shelves, in warehouses, and frequently in the hands of actual purchasers or users in order to determine whether all materials are registered and properly labeled. Official sampling of registered materials is carried on throughout the State. These samples are analyzed and, if the results do not conform to the guarantee, the registrant is dealt with according to the provisions of the California statutes . . . ”

Over the decades that followed, modern manufacturing techniques reduced and then virtually eliminated product adulteration and contamination. As a result, in the 1990s, DPR reduced the scope of its product monitoring program as well as the Federal Product Compliance Monitoring Program it had also administered in California. The new program, administered under a cooperative agreement with U.S. EPA, is called the Product Compliance Program (PCP).

Monitoring activities for PCP include inspections of facilities where pesticidal products are manufactured, prepared, processed, packaged, repackaged, labeled, or relabeled. These “establishment inspections” may also be conducted at facilities where records are held by registrants. Marketplace surveillance inspections are also included in PCP compliance monitoring activities. Marketplace sampling sites include government agencies; retail and wholesale nurseries, hardware, home and garden centers; landscape material suppliers; agricultural chemical dealers; feed, farm and pet stores; beauty and barber suppliers; medical,

dental, and veterinary suppliers; industrial and institutional suppliers; restaurant and hospital suppliers; grocery and drug stores; pool and spa centers; marine supply dealers; or any other site where pesticides are sold.

Pesticidal product samples may be collected during establishment or marketplace inspections and are submitted to the CDFA Center for Analytical Chemistry to compare the percent of active ingredient in the container with the formulation declared on the label, and to check for possible product contamination.

Additional monitoring may be conducted focused on compliance with State pesticide laws and regulations. These are limited to activities related to evidence collection in pesticide exposure, crop damage, or crop loss investigations; follow-up investigations to formal complaints; and environmental effects studies.

Enforcement Branch inspectors conduct pesticide registration monitoring to ensure that products offered for sale in California are registered with DPR. Pesticide Registration Branch assists by confirming the product’s licensing history and providing up-to-date label information. The sale and use of unregistered (and therefore potentially unreviewed) products could result in adverse health effects or crop loss due to lack of efficacy.

Enforcement Branch inspectors also monitor to ensure products meet federal criteria for child-resistant packaging and that labels contain all necessary information, particularly requirements resulting from the federal Worker Protection Standard. Other important program activities include assisting retailers who may not be familiar with pesticide laws and regulations and investigating unregistered pesticide product complaints by citizens, competing manufacturing firms, and government agencies.



# Pesticide Residue Monitoring

Adulteration of foods and beverages by unscrupulous vendors was a centuries-old problem that worsened in the 19th century, as the nation became more urbanized and dependent on faraway sources of food. In 1887, the U.S. Bureau of Chemistry published a series of reports revealing that milk and wine were routinely diluted with water, pepper with dirt, and coffee with cereal. Aniline dyes were found in candies and toxic metals in canned vegetables. The majority of adulterants cheated consumers but were not harmful; however, poisonous adulterants were not uncommon, and people were sickened and even died as a result.

In 1906, Upton Sinclair's novel *The Jungle* exposed conditions at Chicago meat-packing plants, and triggered a public revulsion that pushed Congress into passing the Pure Food and Drug Act. It put the U.S. Bureau of Chemistry (reorganized in the 1920's as the U.S. Food and Drug Administration) in charge of protecting consumers against adulterated, misbranded, or impure food and drugs. Residues of arsenic and other toxic pesticides on food were but one of many food safety concerns, one that had surfaced periodically, beginning in the 1890s. That was to change as farmers took to using arsenic more often, and in greater quantities, to fight pests like codling moth, Colorado potato beetle, and the grasshopper.

## Focus Turns to Pesticide Residues

In 1919, a city health inspector in Boston noticed a fruit stand with pears that were heavily spotted with a white substance resembling flour. An analysis revealed the white dust to be arsenic, sprayed on the trees during the growing season to control insects. The U.S. Department of Agriculture had analyzed a number of fruit samples and concluded that if arsenic was applied early in the growing season, residues should not be a health problem. However, federal authorities began a program to periodically examine fruit for residues and to educate farmers on the residue problem and encouraging them not to overspray fruit. Farmers also developed techniques to wipe or wash residues from their harvested crops. Between 1920 and 1925, despite reported illnesses and several well-publicized seizures of fruit with high arsenic levels by health officials in major American cities, state and federal officials continued to emphasize farmer education and persuasion about potential problems of overspraying.

In Great Britain, government control was stricter, after a 1900 tragedy in which 70 persons died and 6,000 were made ill because a brewer used arsenic-contaminated sugar in making his beer. As a result, England imposed a strict limit on the amount of arsenic allowed in food, including fresh fruit. In December 1925, a handful of illnesses among British consumers of American-grown fruit prompted the English authorities to analyze imports. Finding arsenic residues in excess of the allowable level, the British Health Ministry issued a warning not to eat imported apples, "especially . . . apples grown in dry foreign climates, where the apples are repeatedly sprayed during growth or the rainfall is not sufficient to wash off the deposit." Sales of fruit grown in California — an area of low rainfall and high pesticide use — plummeted, prompting State pesticide regulators in 1926 to begin analyzing small quantities of fresh produce for residues.

In 1927, the U.S. Bureau of Chemistry set the first federal limits (called tolerances) on allowable arsenic residues on apples and pears in interstate commerce and for export. The Bureau considered it health-protective, even though it was not as strict as the British tolerance. The Bureau was concerned about the economic impact of suddenly imposing strict residue limits on farmers, and decided to gradually reduce the tolerances as better



*There should be neither misunderstanding nor ill feeling if shippers everywhere met spray residue regulations, and it cannot be too strongly stated that it is economically entirely practicable to meet them.*

– 1938 Department annual report

equipment was developed for washing fruit. (This was done over the next several years and by 1932, the American tolerance was the same as Great Britain's.)

### California's First Legislation

In response to Britain's 1926 threat of an embargo, the California Legislature passed the Chemical Spray Residue Act, which went into effect the day it was signed (May 28, 1927). It made it illegal to pack, ship, or sell fruits or vegetables with harmful pesticide residues. It also set residue tolerances for arsenic identical to those established by the federal government, and created a program to control residues of arsenic-based sprays on fruits and vegetables. California's new residue testing program was designed as much to promote marketing of the State's fruit as to safeguard consumers against harmful arsenic residues. The goal was to ensure that no shipments of California fruit were confiscated at their destination because of excess residues. All exports required a certificate of chemical analysis. The California Department of Agriculture (CDA) administered both an enforcement-oriented monitoring program, and a fee-based testing program that allowed growers to obtain State certification that their crops were free from arsenic residues.

By 1935, CDA was taking 22,000 samples a year in its voluntary certification program. (This service was phased out by the 1940s.) It was also taking about 3,000 enforcement samples, checking for illegal residues. Enforcement monitoring involved inspectors making daily visits to wholesale and retail markets in Los Angeles, San Diego and San Francisco. Laboratories in those cities analyzed the samples. When illegal residues were found, the lots of produce were quarantined and growers were instructed on how to remove residues with an acid wash. However, growers whose crops repeatedly had residues over allowable levels faced hefty fines and even jail sentences.

In 1934, the federal government set tolerances for residues of fluorine and lead, and California followed suit, expanding its monitoring to sample for these residues. With the introduction of many new synthetic organic pesticides in the late 1930s and 1940s, residue sampling expanded again to test for DDT and other organic compounds. In 1949, the Spray Residue Act was amended to include in the definition of a spray residue "any pesticide or constituent thereof which on produce is harmful to human health in quantities greater than a maximum amount or permissible tolerances established by rules and regulations of the Director." The amendments also gave the Director authority to set tolerances. Laws passed in 1967 and 1983 reinforced the right of California's Agriculture Director to review federal tolerances and adopt them in the State, or to set more stringent tolerances. With the creation of the Department of Pesticide Regulation (DPR) in 1991, that authority was transferred to the DPR Director. (Federal legislation passed in 1996 preempted states from setting their own tolerances.)

In 1950, with the use of the new synthetic chemicals increasing, the Department noted a decline in arsenic residues. The report described arsenic as "one of the oldest spray residues on fruits and vegetables. At one time it was the only poisonous contaminant likely to be found . . . the only one in which there was public health interest, and the only one for which a tolerance was established in California law." By 1950, there were few residues of arsenic, lead, and fluorine; DDT was the most common residue found. Despite the wide variety of chemicals used, there were only four tolerances on the books: arsenic, lead, fluorine and DDT.

The U.S. Food and Drug Administration (U.S. FDA) held nine months of hearings in 1950 on setting tolerances for the newly introduced organic pesticides, collecting more than 8,000 pages of testimony presented by 246 witnesses, among them the chief of California's pesticide regulatory program. He reported that year that the hearings "brought to general attention the previous lack of dependable information on the kind and magnitude of spray residues found on produce commonly marketed." In 1955, the U.S. FDA issued tolerances for 60 different pesticides on many crops.

In 1953, the Legislature amended the Spray Residue Act to cover grains used to feed livestock or poultry. This was in response to the Department of Agriculture's concerns that it could not take legal action in cases where pesticide misuse contaminated anything other than fruits or vegetables.

**Enforcement work must be reasonable, avoiding hysteria, and simultaneously evaluate all factors. It is unfair knowingly to exaggerate a case to the extent that people, in order to escape a hypothetical danger, will avoid sprayed products entirely, and thereby deprive themselves of valuable foods. With continuation of careful enforcement, the proportion of low-residue fruits and vegetables continues to be satisfactory.**  
– Dr. Alvin J. Cox, head of the Department's pesticide regulatory program, in a 1941 article for the American Journal of Public Health, cited in 1942 annual report

At the federal level, the Food, Drug, and Cosmetic Act was amended in 1954 to prohibit registration of any food-use pesticide that left residues until and unless the U.S. FDA issued a tolerance that sanctioned “safe” residue levels.

The 1980s saw a dramatic increase in concern about pesticide residues in food, particularly fresh produce. Widespread public attention was drawn to the issue in 1984 when the Natural Resources Defense Council (NRDC) published a report entitled, *Pesticides in Food, What the Public Needs to Know*. The theme of the report was like many to follow: that government pesticide residue monitoring programs were not doing an adequate job of protecting public health.

The NRDC report was followed by a 1985 study from the Commission on California State Government Organization and Economy (“Little Hoover Commission”) entitled *Control of Pesticide Residues in Food Products: A Review of the California Program of Pesticide Regulation*. This report highlighted deficiencies in CDFA’s monitoring of fresh produce, and criticized the Department of Health Services (DHS) for not conducting routine pesticide residue monitoring of processed foods.

The presence of pesticide residues in food received worldwide attention in July of 1985 when widespread illnesses were reported by persons who ate California-grown watermelons that contained illegal residues of the pesticide aldicarb. This misuse of aldicarb — a criminal act by a handful of growers — was often cited as an example of the failure of the regulatory system.

Federal agencies that monitor the food supply were not exempt from criticism. The U.S. General Accounting Office targeted them in two 1986 reports, *Pesticides: Better Sampling and Enforcement Needed on Imported Food*, and *Pesticides: Need to Enhance FDA’s Ability to Protect the Public from Illegal Residues*.

### California Expands Residue Monitoring

The flurry of interest and activity sparked a variety of responses. In 1985, partly in response to criticisms in the Little Hoover Commission report, the Department expanded its residue monitoring system. Funded in part by a budget augmentation and partly by legislation, more than \$2 million was added to the Department’s budget to create three new monitoring program elements to complement marketplace surveillance, and to almost double the number of samples analyzed. The new monitoring elements began in 1987 and included a program to test raw produce destined for processing (established and funded by Chapter 1285, Statutes of 1985, AB 1397) and another to sample crops before harvesting. The third monitoring element (called Focused Monitoring and later Priority Pesticide Program) targeted sampling of commodities known to have been treated with pesticides of health concern. The goal was to collect data to assist in making accurate assessments of dietary risk.

In 1987, the National Academy of Sciences (NAS) issued a report which further reinforced public concerns about food safety. This report, *Regulating Pesticide Residues in Food: The Delaney Paradox*, examined the effect that the Delaney clause of the Federal Food, Drug, and Cosmetic Act had on U.S. EPA’s regulation of pesticide residues in food. (The Delaney Clause, added to law in the 1950s, prohibited additives in processed foods that are found to induce cancer in humans or animals. In 1996, the Delaney Clause was repealed with passage of the omnibus Food Quality Protection Act.) As part of its examination, the NAS committee developed theoretical estimates of risk from dietary exposure to 53 potentially carcinogenic pesticides used on food crops.

In 1988, the State’s Assembly Office of Research published *The Invisible Diet: Gaps in California’s Pesticide Residue Detection Program*, which was highly critical of both DHS and CDFA. And in March 1989, the NRDC issued the report, *Intolerable Risk: Pesticides in Our Children’s Food*. It concluded that preschoolers are being exposed to dangerous levels of toxic pesticides in both fresh and processed foods and generated a tremendous amount of media attention and controversy.

The NRDC report also prompted renewed attention from the State Legislature on food safety and contributed to passage of the Food Safety Act of 1989 (Chapter 1200, AB 2161), which added and expanded several sections in the Food and Agricultural Code and the Health and Safety Code. The statute required increased priority pesticide

***It is of paramount interest to California’s agricultural economy that the healthfulness of its products is beyond question.***  
– 1946 Department annual report

monitoring; established a scientific advisory committee to review residue analytical methods; established a committee to fund research into alternative pest management practices; required risk assessments on the dietary exposure to pesticides in both raw and processed foods; gave the Department authority to call in acute toxicity studies where needed to support risk assessments; required the Department of Health Services to commence a processed food monitoring program; and required private laboratory accreditation and reporting by private laboratories of findings of illegal pesticide residues in the channels of trade. The bill also gave the Department clear statutory authority to require full pesticide use reporting.

The legislation also required that DPR and the State Department of Health Services jointly review the State and federal pesticide registration programs to determine if infants and children were adequately protected from dietary pesticide residues. The review was to take into consideration an evaluation of the federal registration program being undertaken by the National Academy of Sciences (NAS).

When the NAS released its report in June 1993, Cal/EPA formed the Pesticide Exposure to Children Committee (PECC), with scientists representing DPR, DHS, OEHHA, CDFA, U.S. EPA, and the University of California. Their conclusions were presented in a May 1994 report to the Legislature. The PECC concluded that “the current California and federal pesticide regulatory systems adequately protect infants and children from risks posed by pesticide residues in the diet,” while citing “potential areas for improvement of the pesticide registration and food safety programs.” The committee called on DPR, “in its role as the lead agency for pesticide regulation,” to continue efforts to work with U.S. EPA “to achieve greater harmony in pesticide regulatory programs.” The committee also made a number of recommendations on enhancing the risk assessment process, many of which have been carried out. For example, the committee recommended that DPR and U.S. EPA assess pesticide risk not only from a dietary standpoint but consider other possible routes of exposure, including drinking water and home pesticide use, an approach that was adopted by the end of the decade.

With the passage of AB 2161, the number of samples taken in the four monitoring elements reached an annual high of more than 12,500 samples in 1989, and remained high through the early 1990s before declining to about 8,000 by 2000. At the same time, the Department also enhanced its analytical capabilities. In 1988, residue program chemists were using multiresidue analytical methods (called screens) that could detect 108 pesticide active ingredients, metabolites, and breakdown products; by 1991, that number had increased to more than 200. The testing results are usually available within eight hours.

Budgetary cutbacks in 1992 and 1993 prompted the reduction and then the cessation of the preharvest and produce destined for processing programs. These programs had been designed to address specific concerns, respectively, the use of illegal pesticides before harvest and the presence of pesticides on produce destined for processing. Because monitoring in these programs had demonstrated consistently lower percentages of detectable residues and lower rates of violations than in the Marketplace Surveillance Program, their suspension was not expected to adversely affect food safety. In mid-2000, the Priority Pesticide Program was combined with the Marketplace Surveillance Program to take advantage of the increased utility of full use reporting data and to improve quality control over sampling and analysis.

### Marketplace Surveillance Program

DPR samples individual lots of domestically produced and imported foods and analyzes them for pesticide residues to enforce the tolerances set by U.S. EPA. Samples are collected from throughout the channels of trade — at points of entry (seaports and State border stations), packing sites, and the wholesale and retail markets. Pesticide Enforcement Branch staff collect most samples, although County Agricultural Commissioners collect many point-of-origin (e.g., packing sites) samples. All samples are tested with multiresidue screens (*see Testing Methods below*). In addition, selected samples receive specific analysis for nonscreenable pesticides of enforcement concern.

***Sensitive and accurate chemical methods have been developed to examine produce for traces of spray residue and the methods have been streamlined to minimize the time required for analysis. To shorten the time still further, this Department maintains field laboratories .... Speed is essential to determine promptly whether a suspected lot should be passed or quarantined out of sale.***  
 – 1947 Department annual report

DPR samples only fresh produce (the Department of Health Services has authority over processed food). The samples are analyzed as unwashed, whole (unpeeled), raw commodity. If illegal residues are found (either above the U.S. EPA tolerance or with no tolerance established for that particular food/pesticide combination), DPR can invoke various sanctions. (See Chapter 7 for information on enforcement and compliance options.)

Domestic and imported food samples collected are classified as either “surveillance” or “compliance.” Most samples that DPR collects are the surveillance type; that is, there is no prior knowledge or evidence that a specific food shipment contains illegal pesticide residues. DPR takes compliance samples as follow-up to the finding of an illegal residue or when other evidence suggests that a pesticide residue problem may exist. (An illegal residue is one that is above the tolerance level or any residue of a pesticide not allowed to be used on the commodity.)

The data collected under regulatory monitoring are extensive; however, they are not statistically representative of the overall residue situation for a particular pesticide, commodity, or place of origin. Some sampling bias may be incurred by weighting toward such factors as commodity, place of origin with a history of violations, or large volume of production or import. In addition, the total number of samples of a given commodity analyzed for a particular pesticide each year may be insufficient to draw specific conclusions about overall residues for a commodity in commerce.

Under a statutory mandate (FAC 12532, Statutes of 1986, Chapter 1375, SB 1889), the focus of the residue monitoring program is to prevent “public exposure to illegal pesticide residues.” Therefore, residue monitoring is directed toward enforcement of U.S. EPA tolerances. (An additional benefit of merging the Priority Pesticide with the Marketplace Surveillance Program is that all sample results are now enforceable. Because the focus of the Priority Pesticide Program was data gathering, analyses were typically not done until days or weeks after the sample was collected. If illegal residues were found, no enforcement action could be taken because of the difficulty of investigative followup.)

The Department investigates every case of an illegal residue detected in its residue monitoring programs. Enforcement staff interview shippers and packers to learn where the produce was grown. If the produce came from out of State, the produce remains under quarantine and information is forwarded to U.S. FDA for further enforcement action. If the produce was grown within California, enforcement staff interview growers, pest control applicators, and others to learn how the produce was contaminated before determining appropriate enforcement action. (For information on enforcement and compliance options, see Chapter 7.)

About 8,000 samples are taken annually of about 150 different kinds of commodities. Eighty percent of the samples are of approximately 75 commodities important in the diets of infants and children, or in the population overall. With the merging of the Priority Pesticide Program with Marketplace Surveillance sampling, dietary risk assessors gained significantly more data. Under the Priority Pesticide Program, there had been a limited number of samples taken of each commodity and each was typically analyzed for a single pesticide among a small group of chemicals under regulatory scrutiny. In the Marketplace Surveillance Program, a larger number of samples are taken of each commodity, and each is analyzed using multiresidue screens capable of detecting more than 200 pesticides and breakdown products. This data is especially useful to dietary risk assessors focusing on the cumulative dietary impact of multiple residues of pesticides with similar biological modes of action. (The federal Food Quality Protection Act mandated that dietary risk assessment consider this cumulative exposure to pesticides.)

Under a statutory mandate (FAC 12532, Statutes of 1986, Chapter 1375, SB 1889), DPR annually publishes a summary overview of the residue monitoring program in the Pesticides in Fresh Produce report. The Residue Monitoring Program is the most extensive State residue monitoring program in the nation. Managed by Pesticide Enforcement Branch, it is the final check in an integrated network of programs designed to ensure the safe use of pesticides in California.



***The rapid strides being made in the development and use of new agricultural chemicals require a similar and concurrent development of analytical methods. Adequate analytical technique is essential ... in securing accurate information on dosages, dilutions, and applications of the chemicals and in following the fate of chemicals in mixtures and as residues on treated plants....***  
– 1945 Department annual report

### Testing Methods

The analytical methods used to measure pesticide residues are generally capable of determining levels well below tolerances (legally allowable residue levels). DPR tests samples using both multiresidue screens, capable of detecting a large number of pesticides, as well as specific analyses for targeted pesticides.

CDFA's Center for Analytical Chemistry provides testing and analytical methods development services to DPR. The laboratory analyzes for pesticide residues in fresh produce and environmental samples (foliage, soil, air and water). As part of DPR's pesticide registration process, a registrant must provide acceptable analytical methods for any active ingredient registered for use in or on food crops. The registrant must also provide analytical methods for all metabolites of regulatory significance. CDFA's laboratory evaluates these methodologies to determine their validity, speed and feasibility. Laboratory scientists also develop new testing methods for DPR, particularly multiresidue screening methods that are faster and capable of detecting a wider range of materials. The laboratory develops residue methods for sampling on nontarget crops, soil, water, and other materials to assist in evidence collection during misuse investigations.

### Coordination with Federal Agencies

The effectiveness of DPR's pesticide residue monitoring program is enhanced by a cooperative monitoring agreement with the U.S. FDA, which monitors raw and processed food nationwide. DPR and U.S. FDA staff meet regularly to plan sampling strategies that complement rather than duplicate each other. The two agencies share monitoring results and cooperate on investigations.

The U.S. Department of Agriculture (USDA) has cooperative agreements with DPR to sample selected commodities and with CDFA to analyze them for pesticide residues. In 2000, California was one of 10 states involved in this nationwide project, known as the Pesticide Data Program (PDP). USDA started the PDP in May 1991 to provide data on pesticide dietary exposure, food consumption, and pesticide usage. U.S. EPA uses the data to help make more realistic assessments of dietary pesticide risk, and for its ongoing review of pesticide tolerances.

The focus of USDA's PDP is gathering comprehensive data on minute traces of residues. To do this, multiresidue methods were enhanced to be sensitive to residue levels of significantly less than 50 parts per billion. California's participation in PDP helped produce significant enhancements of the multiresidue screens that can simultaneously detect many pesticides.

***The spray residue program protects the health of consumers of fresh and dried fruits and vegetables through sampling and analyzing produce to make certain that it does not carry spray residue in excess of the tolerances permitted by law.***  
– 1947 Department annual report

# Protecting Workers and the Public

The mission of DPR is to protect public health and the environment from adverse effects of pesticide use. All DPR programs are oriented to that mission, by requirements for thorough data review of pesticides before sale or use, safety training of professional pesticide handlers, ongoing monitoring of people and the environment to detect potential situations for pesticide exposure, and local enforcement to ensure laws and regulations are being obeyed. This chapter focuses on programs conducted by the Department's Worker Health and Safety (WH&S) and Enforcement Branches.

With the establishment of the WH&S Branch in the 1970s, DPR instituted training requirements for pesticide handlers and established a pesticide illness reporting and investigation system unique in the nation. In 1992, DPR strengthened its training requirements by setting up a hazard communication program requiring employers to maintain and make available to their employees a written hazard communication program, pesticide use reports, and material safety data sheets. DPR also pioneered development of a national policy on the use of filtered-air enclosed cabs and closed mixing and loading systems as an alternative to personal protective equipment. DPR was the driving force behind development of this U.S. EPA program, which follows the principles of industrial hygiene by replacing personal protective equipment with engineering controls.

In 1994 and 1995, a new federal Worker Protection Standard was implemented nationwide, among other things revising employer requirements to give farm workers personal protective equipment and safety training. Although the federal standard drew on California's worker safety program as its model, there were significant differences between the two. In 1995, U.S. EPA recognized California's unique agricultural practices and worker safety program and conditionally approved a request by DPR for equivalency of its worker safety program. Approval became final with California's 1997 adoption of conforming regulations.

## Key Worker Protection Elements

***California regulations require employers to ensure specific worker protection measures. For example, employers are responsible for:***

**Product Use Information** – Pesticide product labels must be at the worksite and available to employees on request.

**Hazard Communication** – Employees must be made aware of the hazards they might face working with pesticides and what to do to protect themselves.

**Training** – Employees must be trained before being allowed to work with pesticides or in treated fields. Training is to include safety requirements for handling pesticides; the meaning of information on the pesticide label concerning human health effects; where exposure to pesticides might occur, and ways pesticides can enter the body; pesticide poisoning symptoms; emergency first aid; how to get emergency medical care; routine and emergency decontamination procedures; need for, limitations, use, and cleaning of personal protective equipment; prevention, recognition and first aid for heat-related illnesses; environmental consideration; and warnings about taking pesticides home.

**Emergency Medical Care** – Employers must arrange for emergency medical care for applicators.



***We believe it our duty to guard  
against a possibility of  
contamination detrimental to a  
user of economic poisons.  
– 1939 Department annual report***

- Engineering Controls – Mechanical transfer systems which offer increased worker safety are required for mixing and loading of certain pesticide products.
- Personal Protective Equipment (PPE) – The employer must provide all necessary protective clothing and equipment required for handling any specific pesticide. PPE must be clean and in good repair.
- Records of Use – Records of where and when pesticides were used must be kept for most pesticide use situations.
- Medical Supervision – This is required for employees working with the more toxic organophosphate or carbamate pesticides in the production of an agricultural commodity. If employees handle these pesticides six or more days in a month, the employer must pay for routine blood monitoring to ensure that these employees are not being overexposed to these pesticides.

### Coordination with the County Agricultural Commissioners

DPR administers the State’s occupational pesticide safety enforcement program with field enforcement carried out by staff from each County Agricultural Commissioner’s office. Enforcement and Worker Health and Safety Branches provide coordination, supervision, and technical and legal support to the counties.

Working under contract to DPR, County Agricultural Commissioners agree to perform certain pesticide enforcement activities. These enforcement activities range from investigations of pesticide-related illnesses to checking training and storage records of pest control companies. The contracts now specify that a higher priority be given to such enforcement activities as worker protection inspections, illness investigations, applications of certain high-toxicity pesticides, and agricultural applications of pesticides near parks or schools. Lower priority is given to activities such as routine inspections of growers or businesses with no recent violations. When DPR and the County Agricultural Commissioners put together their annual enforcement workplans, the pesticide illness statistics are reviewed to see where additional emphasis may be needed in education or enforcement.

The WH&S and Enforcement Branches conduct training sessions for County Agricultural Commissioner staff on illness investigative techniques. The two branches also provide a manual on illness investigations for State and county investigators. WH&S Branch’s Pesticide Workplace Evaluation Program is targeted specifically at finding ways to reduce the number of pesticide-related illnesses. DPR trains CAC enforcement staff in principles of industrial hygiene and occupational safety so that they have the skills needed to expand beyond enforcement activities to help employers achieve a safe pesticide workplace. The training provides insights into the sources of pesticide-related illness and injury and offers practical measures to prevent these illnesses and injuries.

WH&S physicians and other staff are also available to consult with health care providers and local health authorities, often in conjunction with active illness investigations. In addition, DPR staff is available to consult with the medical community about pesticide-related concerns. The Department also conducts field studies each year to monitor pesticide exposures to workers performing routine tasks. The goal is to determine if additional measures are necessary to eliminate unacceptable exposures. (See Chapter 6 for discussion of exposure assessments.)

The WH&S Branch also produces a series of leaflets to help employers train their workers in pesticide handling and in working safely in and around where pesticides are used. The “Pesticide Safety Information Series” (PSIS) leaflets cover safety requirements for pesticide use in agriculture and in other work situations. There are leaflets specifically for the agricultural workplace and other leaflets addressed to nonagricultural settings where pesticides are used. Subjects include: hazard communication (worker rights), first aid, medical supervision, pesticide handler safety, pesticide storage and transportation, protective equipment and engineering controls, minimal exposure pesticides, and respiratory protection. The leaflets are available on DPR’s Web site in English and in Spanish. California regulations require these documents be part of pesticide handler and field worker training.

***Any report of injury attributed to pesticides in California is investigated not only to ascertain if a faulty product or other violation is concerned, but also in order that knowledge of all circumstances surrounding the injury may minimize recurrence of the accident.***  
 – 1944 Department annual report

### Investigating Pesticide-Related Illnesses and Incidents

**Incident Investigation:** DPR or the County Agricultural Commissioners investigate reported incidents involving adverse human or animal health effects, alleged misuse of pesticides, or pesticide damage to crops, property, or the environment. Information gathered during these investigations helps determine possible violations of pesticide laws and regulations and subsequent enforcement actions. Investigations are also a critical element in evaluating pesticide use patterns and the effectiveness of the regulatory system. DPR uses the results to improve safety and better protect health and the environment.

The commissioner's office in the county where the incident occurred is the lead investigative agency. CAC staff works in consultation with a senior pesticide use specialist in the Pesticide Enforcement Branch, who can in turn draw on the expertise of other branches in the Department. For example, Worker Health and Safety (WH&S) and Medical Toxicology staffs provide assistance for incidents involving illnesses. Environmental Monitoring staff may assist when incidents involve environmental effects, and the Pesticide Registration Branch can provide experts in plant physiology and chemistry for incidents that adversely affect fish and wildlife. In some incidents involving human illness or injury, WH&S scientists become directly involved in the investigation, especially when there is no implication that pesticide misuse caused the injury.

Human effects incidents include pest control aircraft accidents, pesticide handler accidents, exposure to residues in treated areas (fields, offices, homes), and exposure from drift. Property incidents involve plant damage resulting from drift of a herbicide, bee kills, domestic animal poisonings, residues that result in the inability to market a crop or animal, or phytotoxic effects due to persistent residues in the soil. Environmental effects include contamination or damage to the environment, such as fish or wildlife kills; lake, stream, or ground water contamination; crop losses or property damage, and air pollution.

Pesticide incidents come to the attention of the Department and commissioners in a variety of ways: pesticide illness reports from physicians; citizen or employee complaints; reports from other government agencies; notification from pest control operators, growers, or labor contractors; or from State and county surveillance and compliance monitoring activities.

Certain incidents trigger special handling and are considered "priority" investigations (under criteria established by an agreement with U.S. EPA, Region 9). Counties must report them to DPR by the most expedient method. DPR in turn reports priority incidents to U.S. EPA, the State Department of Health Services, State Department of Fish and Game, and other affected government agencies.

Criteria triggering priority investigation status include episodes involving death, serious illness or injury, or illness to five or more persons; aircraft accidents; significant environmental contamination; property loss; fish and wildlife kills; or episodes occurring at or near California's state, tribal, or international borders. Cooperating agencies may become involved in a priority incident investigation from the onset, bringing their special expertise to bear.

Incident reports are routinely forwarded to the agricultural commissioners for investigation unless they pertain to a situation where the Food and Agricultural Code places primary investigative responsibility with DPR — such as pesticide registration, product quality, and product labeling. DPR and the agricultural commissioners take joint responsibility for investigation of illegal pesticide residues on produce. In addition, the Department of Industrial Relations investigates certain incidents, including those involving pesticide manufacturing, use of ethylene oxide, and arsenic used in wood preservative treatment.

Investigative reports are prepared at the conclusion of each incident investigation and the CACs may pursue enforcement actions. DPR attorneys monitor and help in the development of case files, and DPR may prosecute administrative cases or serve on prosecution teams with county district attorneys or the State Attorney General's office.

***Accidents and injuries involving agricultural chemicals are investigated to see if any violation of law contributed to the mishap. Study of the details of some cases provides suggestions of advisable precautionary labeling or educational measures to avoid such accidents.***  
— 1954 Department annual report

### The Pesticide Illness Surveillance Program

California has the nation’s most comprehensive pesticide-illness monitoring system. As far back as 1993, the U.S. General Accounting Office concluded that “with the exception of the California state monitoring system, all (other state systems reviewed) were quite limited in coverage, comprehensiveness, and quality of information.” The report went on to suggest that the California monitoring system “could serve as a technical model for (the U.S. Environmental Protection Agency) and selected states.”

Records of pesticide-related illnesses and injuries among California workers have been maintained by various State agencies since the beginning of the 20th century, first by the State Department of Industrial Relations (DIR), then by the California Department of Public Health (later renamed the Department of Health Services). In 1972, the Legislature gave the then-Department of Agriculture primary authority over the safety of pesticide use in the agricultural workplace. In 1988, the regulations were revised to cover other, non-agricultural workplaces where pesticides are used (except for pesticide manufacturing, which is under the authority of Cal-OSHA). In 1991, with the creation of Cal/EPA, authority for regulating pesticide use was transferred to DPR.

The purpose of DPR’s Pesticide Illness Surveillance Program (PISP) is to evaluate the circumstances of pesticide exposures that result in illness. The PISP database provides the means to identify high-risk situations warranting DPR action to implement additional California restrictions on pesticide use. Staff regularly consults the illness data to evaluate the effectiveness of DPR’s pesticide safety regulatory programs and assess the need for changes. New regulatory initiatives may spring from analysis of the cumulative database or in direct response to illness episodes.

Taking illness data into consideration, DPR may adjust the restricted entry interval following pesticide application, specify buffer zones or other application conditions, or require pesticide handlers to use protective equipment that meets certain standards. Since many illness incidents result from illegal practices, illness investigations direct the attention of State and county enforcement staff to significant noncompliance activities. In some instances, changes to pesticide labels provide the most appropriate mitigation measures, and DPR cooperates with U.S. EPA to develop appropriate instructions for pesticide users throughout the country.

Since 1971, California physicians have been required by law (Section 2950 of the Health and Safety Code) to report all pesticide-related illnesses or injury to the local health authority (usually a county department of health). Copies of the Pesticide Illness Report are to be sent by the health officer to the County Agricultural Commissioner, Cal/EPA’s Office of Environmental Health Hazard Assessment (OEHHA), and DPR.

### The Investigative Process

Although DPR does receive some reports via direct physician reporting, the majority of its reports come through the workers’ compensation system. In California, any employed person may visit a physician and report that an illness or injury occurred on the job. The physician then examines the worker and submits a Doctors’ First Report of Occupational Illness and Injury to the appropriate insurer for payment of the professional fee. Since doctors do not always file the required pesticide illness reports, WH&S staff also reviews the Doctors’ First Reports, which California’s Labor Code requires workers’ compensation insurers to forward to the Department of Industrial Relations (DIR). WH&S staff regularly review reports at DIR and select for investigation by the agricultural commissioners any report that mentions a pesticide, or pesticides in general, as a possible cause of injury. Reports that mention unspecified chemicals also are investigated if the setting is one in which pesticide use is likely. In typical years, this procedure identifies two-thirds to three-quarters of the incidents investigated.

The agricultural commissioner of the county where the incident occurred investigates every reported illness. DPR provides guidance on collecting appropriate samples to document environmental exposures. As part of its technical support, DPR maintains specialized laboratories to analyze the samples. The CACs prepare reports describing the circumstances in which pesticide exposure may have occurred and any other relevant aspects of the case. When appropriate, the CACs request authorization from the affected

In 1993, the U.S. General Accounting Office praised California’s Pesticide Illness Surveillance Program, saying it “could serve as a technical model” for other states.

individuals to include pertinent portions of their medical records with the report. If investigations identify additional affected individuals, they are included in the investigation report and reflected in the PISP database.

WH&S staff evaluates physicians' reports and all the information the CACs have gathered, and classify incidents according to the circumstances of exposure to a pesticide. Excessive exposure to pesticides may cause illness by various mechanisms, and the surveillance program attempts to monitor all of them. Annual summaries and overviews of reported pesticide illnesses have been prepared since 1973 by WH&S Branch.

### Improving Physician Reporting

A continuing problem has been a lack of direct reporting by physicians. Beyond identifying cases that might otherwise escape detection, direct physician reporting allows DPR and the CACs to investigate promptly, while the people involved remain accessible, with accurate recollection of the event. In 1994, DPR initiated a project to improve physician familiarity and compliance with the reporting requirement. DPR cooperated with DIR to send summaries of the reporting requirements to more than 70,000 physicians with active California licenses. DPR then followed up in 1995 and 1996 with individual correspondence to doctors who reported pesticide cases to workers' compensation insurers but not to their local health officers. This effort increased direct reporting but it still accounts for less than a quarter of the reports received. DPR continues to seek ways to expedite direct reporting while minimizing the burden on practitioners.

A pilot study in 1996 and 1997 demonstrated the feasibility of reporting through poison control centers. In 1997, DPR began working with the California Poison Control System to help physicians in identifying and reporting cases appropriately. Confidentiality considerations prevent poison control centers from reporting cases on their own initiative, but they can offer to report on behalf of physicians who consult them.

Because most illness reports come through the workers' compensation system, illnesses related to nonoccupational pesticide exposures are probably underreported. Nonetheless, because of the wide variety of reports — many in the nonagricultural workplace where pesticidal products are similar to those used by consumers — it is considered unlikely that major hazards escape detection.

For several years, WH&S has explored a variety of ways to improve and capitalize on the information collected through illness investigations. In the early 1990s, the database was expanded to include the age, gender, and Social Security number of the victim and the Standard Industrial Classification code of the victim's employer. Collection of information on age, gender, and job classification will allow the development of better demographic information to help predict categories of persons at highest risk. With a victim's Social Security number, investigators can better track possible development of chronic health effects.

Beginning in 1998, data were collected using a revised and enhanced computer program. The new system took a necessary first step toward making surveillance data available to the public via the Internet, and provided the opportunity to increase the amount of data collected and to organize it more logically while protecting individual privacy rights.

The most obvious change concerned the categories into which the program classifies the activities of the affected people. Under the former system, activity codes combined aspects of occupation, mechanism of exposure, and equipment used. For instance, one of the categories used previously was exposure to drift. The limits imposed by the previous system provided no way to differentiate among farm workers, applicators or others exposed to drift. Similarly, recording that a person was applying pesticides when exposed precluded indicating the manner of exposure, except as part of a narrative description. The new, expanded system provides three separate entries for activity, exposure, and equipment used. DPR can identify the activities of people who were drifted upon and distinguish among sprays, spills, and drift exposures to applicators. The new system also allows DPR to record registration numbers, types of formulation, and

***Whenever commercial exploitation follows closely upon discovery of a new agricultural chemical, particular care is required to provide adequate labeling for assurance that the product will be used properly and with satisfaction and that injury will not result from careless or unadvisable handling.***  
— 1945 Department annual report

· application dates and sites individually for an unlimited number of different pesticides  
· in each case. This will allow DPR to respond more fully and accurately to inquiries  
· about particular products and uses.

· DPR staff also participates in the working group convened by the National Institute  
· for Occupational Safety and Health (NIOSH) to develop standards for collection of  
· information on pesticide illnesses. NIOSH now partially supports programs in the states  
· of Florida, New York, Oregon, and Texas that make use of the standards the working  
· group defined. This NIOSH program also supports pesticide work by the Occupational  
· Health Branch of the California Department of Health Services, which coordinates  
· closely with the DPR program.



# Pesticide Use Reporting

California's pesticide use reporting program is internationally recognized as the most comprehensive of its kind. DPR annually collects and processes more than 2.5 million records of chemical applications. (Single pesticide applications would generate more than one record if there are multiple chemicals applied.) California was the first state to require full reporting of all pesticide use in agriculture.

Under full use reporting, the following pesticide uses are required to be reported to the County Agricultural Commissioner, who, in turn, reports the data to DPR:

- for the production of any agricultural commodity, except livestock;
- for the treatment of postharvest agricultural commodities;
- for landscape maintenance in parks, golf courses, and cemeteries;
- for roadside and railroad rights-of-way;
- for poultry and fish production;
- any application of a restricted material;
- any application of a pesticide with the potential to pollute ground water (listed in regulation), when used outdoors in industrial and institutional settings; and
- any application by a licensed pest control operator (PCO). PCOs include ground and aerial agricultural applicators, structural applicators, and professional landscape gardeners.

Reports include the amount and name of pesticide applied, date and location (section, township, range) of the application, and crop, if the application was agricultural. The primary exceptions to the use reporting requirements are home and garden use and most industrial and institutional uses.

Pesticide use reports help DPR estimate dietary risk and ensure compliance with clean air laws and ground water regulations. Site-specific use report data, combined with geographic data on endangered species habitats, help County Agricultural Commissioners resolve potential pesticide use conflicts. DPR also uses the data to analyze how, when and where pesticides are used on different crops. Reduced-risk pest management alternatives can then be developed considering the different regions of the State and the commodities grown in these regions.

## History of Use Reporting in California

California has had limited use reporting since at least 1950. Then, the Department of Agriculture (DPR's predecessor) reported that the County Agricultural Commissioners "required agricultural pest control operators to submit monthly reports on their work." County requirements varied, but many included a statement for each application, showing the grower's name, location, spraying dates, crop, acres or other units treated, target pest, kind of pesticide used, and the strength and amount of the spray or dust mixture applied. Only statistics on aerial pesticide applications were forwarded to the State for statewide tabulation. In 1955, State regulators asked for reports on ground application acreage, but dropped the requirements for detailed reporting of pesticides used and commodities treated.

In 1970, the regulations changed, and farmers were required to report all applications of restricted pesticides. PCOs were required to report all pesticides used, whether

*If it were not for the insect pests and diseases which prey upon fruit and vegetable crops, the frosts of winter and heat waves of summer, we could figure our acreage production with considerable accuracy. Unfortunately, there have been times when the pest problem has not only restricted but threatened almost to eliminate some of our crops from commercial circulation.*  
– 1931 Department annual report

***The agricultural chemical problems in California are more numerous and more complex than in most other states. Farmers of California produce more than 200 different commercial crops in a terrain that includes the highest and the lowest altitude in the United States. Many of these specialty crops are not produced elsewhere. The rainfall varies from less than two inches a year in dry interior regions to over 100 inches near the coast. The growing season varies from a full 365 days a year in some areas to less than 100 days in others. Some areas never have snow, others have as much as 37 feet. Dense redwood forests grow in some parts of the State and other parts are desert wastelands. ....***  
*(see next page)*

restricted or nonrestricted. Both kinds of reports had to include the pesticide applied, date and location (section, township, and range) where the application was made, and the crop involved if the application was in agriculture. The reports were filed with the agricultural commissioner in the county where the applications were made and were reported, in turn, to the State, which entered the reports into a database and summarized it in annual publications.

The Food Safety Act of 1989 (Chapter 1200, AB 2161) gave the Department clear statutory authority to require full reporting of pesticide use. That year, the Department adopted regulations and full use reporting began in 1990. Reports are filed with the agricultural commissioner in the county where the applications occur. Commissioners send reports to the Department (most do so electronically), and information is entered into the statewide database.

Full use reports include the date and location (section, township, and range) for the application and the kind and amount of pesticides used. If the pesticide is applied to a crop, it must be specified. Two new data items — operator and site identification — were added to help determine and calculate the actual percentage of crops treated. These data are useful in making pesticide risk assessments.

### The Use Reporting Process

Before the purchase and use of pesticides, every property owner (or operator) is required to obtain a unique identification number from any county in which pest control work will be performed. Growers also obtain a site identification number from the County Agricultural Commissioner for each location and crop/commodity where pest control work will be performed, and this ID number is recorded on the restricted material permit or other approved form.

The information that must be reported for agricultural applications includes geographic location including the section, township, range, base, and meridian; operator identification or permit number, name and address; field location and site identification number; commodity/crop/site treated; acres or units planted and treated; application method (air or ground); amount of product applied along with its name and U.S. EPA/California registration number.

Non-agricultural applicators submit monthly summary reports that include only pesticide product name and manufacturer, the product registration number, amount used, number of applications, the kind of site treated (e.g., roadside, structure), and total number of applications of all pesticides.

Reports are submitted to the County Agricultural Commissioner's office, where they are reviewed by staff for accuracy, and entered into a county database. The data is transferred monthly to DPR. Fifty-six of the State's 58 counties — representing 99 percent of the reported pesticide use — transfer records electronically.

### Improving the Process

***The California Electronic Data Transfer System (CEDTS)*** was developed in 1991 by DPR in cooperation with the University of California and the Kern County Agricultural Commissioner's Office. Using standard modems and local telephone lines, this program provides the basis for transferring notices of intent and pesticide use reports from pest control operators, growers, and others to the County Agricultural Commissioners' offices. CEDTS helps make the full use reporting process more efficient, and improves the quality and timeliness of the data.

Growers and PCOs use many computer systems and software applications in their day-to-day farming and business operations. The CEDTS program does not place hardware or software requirements on industry participants, other than what is required for actual electronic transfer. The only limitations are placed on the data itself, which must meet the specified transmission format. Detailed system requirements and documentation can be obtained from DPR or from County Agricultural Commissioners.

Although response to CEDTS from pesticide users was favorable, adoption of the reporting system was slow. Many growers and pest control operators lack the time and

expertise to write the software that pulls together the necessary pieces of information into a single pesticide use application database that meets DPR's standardized data requirements. In response, in 1999, private software providers and others began introducing systems that allow use reporting via Internet Web sites. In addition, new programs are being developed to allow nonagricultural users of pesticides to file electronic reports.

**Site Identification (ID) and County Mapping Assistance:** During the first 10 years of full use reporting, site IDs were only unique when combined with the grower identification and often the commodity. They did not refer to parcels or specific geographic locations. Site IDs changed from year to year for the same grower, and also with changes in land ownership and property management. Evaluating historical pesticide use geographically, to the degree now often required, was nearly impossible under the existing site ID system. In December 1994, a pilot project provided training for county commissioner staffs in standard mapping techniques, procedures, and map interpretation. This was the first step in the development and implementation of a standardized site identification system. The training provided the skills and materials needed to locate sites (fields) on large, detailed topographic maps which could then enhance the assessment of environmental conditions at application sites and enable long-term tracking of applications on a geographic site-specific basis. Subsequently, the computerized permit programs were revised to include geographic information system (GIS) capabilities to capture the mapping coordinates of field sites and the supporting data. DPR has developed tools to allow field sites to be identified geographically, but with changing technological capabilities at the commissioner level, the department's primary function is now to provide technical expertise and support to the evolving county-level GIS programs.

**Improving the Accuracy of the Data:** The use report data is checked for accuracy at several steps in the process. After a record has been entered into the county database, the computer compares the pesticides reported used to those listed in the grower's permit files. (For the two counties not electronically processing their data, county biologists review the reports.)

As the use reports are loaded into DPR's database, upwards of 50 different validity checks are made against the data. In particular, the U.S. EPA or California registration number is verified and a check is made to validate that the commodity reported is an acceptable use of the pesticide product. Records with errors are returned to the county for resolution.

As a final error check, in 1997 and 1998, DPR specialists spent more than a year developing, testing, and implementing software to detect highly unlikely use rates (outliers). This method examines each record of pounds of active ingredient reported used per acre and compares it to a statistically developed normal application rate for each pesticide and commodity combination. Pesticide rates are considered outliers if (1) they are higher than 200 pounds of active ingredient per acre (or greater than 1,000 pounds per acre for fumigants); (2) they are 50 times larger than the median rate for all uses with the same pesticide product, crop treated, unit treated, and record type (that is, production agricultural or all other use); or (3) they are higher than a value determined by a neural network procedure that approximates what a group of 12 scientists believed were obvious outliers. This round of error checks typically removes only a small percentage of the records, typically less than 1 percent. However, a few errors are so large that if included they would significantly affect total pounds applied of the pesticide.

**Improving Access to the Data:** In the late 1990s, DPR took steps to improve public access to the data, and present it in a more meaningful context. Summaries of the statewide data (indexed by chemical and by commodity), long available on paper and diskette, were made available online. County summaries of use, which previously had only been available upon request, were also posted online. DPR supplemented the use data with a major study published online: *Pesticide Use Analysis and Trends from 1991 to 1996*. The study examined critical crops, pest problems, and high-use chemicals. The study also analyzed trends in pesticides where use was highest as measured in pounds, number of applications, and acres treated; this trend analysis has continued to be presented with pesticide use reports in subsequent years.

... More than 1,100 separate and distinct soil types have been recognized and mapped in the soil surveys of California. It is evident that California farmers are faced with a complex problem in selecting and using fertilizing materials and pesticides intelligently and effectively. Materials and agricultural practices of value in other parts of the country may be of little or no value in California. A vigilant and careful examination of all agricultural chemicals offered for sale in this State is necessary in order that farmers may purchase and use the chemicals they need for growing and protecting their crops in full confidence that these materials will meet the guarantees made for them.  
 — 1946 Department annual report

However, the summary reports present only a fraction of the use reporting database (typically a 650-megabyte file). Outside researchers and others who wanted to analyze the complete database in previous years could do so only by purchasing a data tape, which is cumbersome to use and requires specialized equipment. In 1999, DPR made the entire use report database from 1990 on available on CD-ROMs. In 2000, DPR was in the planning stages of developing software and purchasing equipment that would allow complex online queries of the database via DPR's external Web site.

### How DPR Uses the Data

The expansion of use reporting was primarily undertaken in response to concerns by many individuals and groups, including government officials, scientists, farmers, legislators, and public interest groups. It was generally acknowledged that more accurate information about pesticide use would provide a better base for evaluating pesticide impacts and making regulatory decisions. Several key areas in which data are proving useful are described.

**Risk assessment:** Without information on actual pesticide use, regulatory agencies must assume all planted crop acreage is treated with many pesticides even though most crops are treated with just a few chemicals. If the assumptions used by regulatory agencies are incorrect, regulators could make judgments that are overly cautious by several orders of magnitude. The use report data provides actual use data so DPR can better assess risk and make more realistic risk management decisions.

**Worker health and safety:** Pest control operators are required to give farmers a written notice after every pesticide application that includes the date and time the application was completed and the restricted-entry and preharvest intervals. The restricted-entry interval is the period required between a pesticide application and when workers may re-enter the field. The preharvest interval is the time between an application and the earliest date the crop may be harvested. Farmers are required to post signs at fields treated with certain pesticides. The signs must include information on pesticide use including when it is safe for workers to re-enter the treated area. Farmers must also make records of pesticide use available to workers. Use reporting makes this information readily available.

DPR's Worker Health and Safety Branch relies on use reporting data when doing exposure assessments, which is a part of the overall risk characterization process. Using this data, scientists can determine typical application rates and how often pesticides are used.

**Endangered species:** DPR is working with the County Agricultural Commissioners to combine site-specific pesticide use data with data on the locations of endangered species. The combined information helps commissioners resolve potential conflicts between pesticide use and the protection of endangered species. Location-specific data on pesticide use brings more accuracy to the evaluation of the possible impact of pesticides on endangered species so that use restrictions can be developed and implemented to protect fish and wildlife.

**Protecting air and water:** In meeting the requirements of the Pesticide Contamination Prevention Act of 1985, site-specific records help track pesticide use in areas that are susceptible to ground water contamination. By reviewing pesticide use data, a determination can be made whether a well became contaminated due to legal agricultural use practices.

With full pesticide use reporting, specific agricultural practices can be pinpointed to help protect surface water as well. This helps DPR in making recommendations on alternate pest control practices that protect surface water while ensuring pest control needs are met.

The federal Clean Air Act requires states to develop plans for reducing the emissions of volatile organic compounds, or VOCs, from all chemicals including pesticide products. VOCs help form smog which is harmful to both human health and vegetation. Accurate data on the amount of VOCs produced by pesticides are critical to developing measures that reduce VOC emissions. Without a state plan, the federal government could use arbitrary assumptions of the smog-contributing potential of pesticides to

*The Department does not issue recommendations regarding use of pesticides, nor does it supply formulas for them. However, it believes that cooperation and education are among the most desirable and eventually the most potent means of law enforcement, and accordingly tries to improve every opportunity to outline and to explain the requirements of law to all concerned.*

– 1941 Department annual report

impose unnecessary restrictions on pesticide use. DPR worked with the State Air Resources Board and the U.S. EPA to develop a plan based on the actual VOC emissions from pesticide products. This was made possible, in part, by accurate use data from full use reporting.

The pesticide use and label databases are often used to assess potential environmental impact in evaluating requests for special local need pesticide registrations or exemptions from registration to respond to emergency pest problems.

***Pest management alternatives:*** The Department is using the use reporting database to look at what pesticides are used on various crops. Reduced-risk pest management alternatives can then be assessed considering the different regions of the state and commodities grown in these regions.



***Even those of us who have lived  
in California for many years  
scarcely realize the important  
lead which California has taken  
and is taking in the subject  
of pest control.***

*– 1922 Department annual report*





# Protecting the Environment

The mission of DPR is to protect human health and the environment by regulating pesticide sales and use and fostering reduced-risk pest management. All DPR programs are oriented to that mission, with requirements for thorough data review of pesticides before sale or use, local enforcement to ensure laws and regulations are being obeyed and ongoing monitoring of people and the environment to detect potential for pesticide problems. This chapter focuses only on programs directed at environmental protection.

The environmental data collected by DPR (directly by staff and by private laboratories under contract) is critical to the Department's continuing evaluation of pesticide use and practices, and helps the Department implement laws and regulations to prevent pesticide pollution. DPR also performs field investigations to develop and evaluate mitigation measures to prevent off-site movement of pesticides to protect the environment. Monitoring data may also be components of human exposure evaluations performed by the Worker Health and Safety and Medical Toxicology Branches. Monitoring data can also assist the Pesticide Enforcement Branch in its investigations.

Environmental Monitoring Branch has the lead role in implementing the Department's environmental protection programs. The Branch's Environmental Hazards Assessment Program (EHAP) designs and conducts studies to provide data that help assess human exposures and ecological impacts of pesticide residues in the environment. Specific examples include monitoring to evaluate the effect of application methods on movement of pesticides, and to characterize off-site movement after application that may contaminate air, or surface or ground water, or crops. EHAP also conducts studies to evaluate measures designed to mitigate the adverse effects of pesticides, such as procedures involving the application of pesticides, and alternative pest management practices.

Monitoring the environment involves taking samples and analyzing them for specific chemical residues. EHAP staff develops sampling methods for pesticide residues and provides funding to the Department of Food and Agriculture Center for Analytical Chemistry for analytical method development. This ensures that the best procedures are available when they are needed.

These projects focus on monitoring under actual field conditions specific to California. Although other State agencies — including Air Resources Board (ARB), State Water Resources Control Board (SWRCB), Regional Water Quality Control Boards (RWQCBs), Cal/EPA's Office of Environmental Health Hazard Assessment (OEHHA), Department of Fish and Game, and Department of Health Services (DHS) — may also sample for pesticides in the environment, the purpose of such sampling would be to meet their specific legal mandates or to sample for ingredients or in media not sampled by EHAP. If pesticides are detected by these other agencies, DPR may conduct additional sampling to confirm the detections, characterize the nature and extent of the detections and, if necessary, determine how the off-site movement of pesticides may be mitigated.

## Air Programs

DPR conducts a number of activities addressing pesticides in air, including development of strategies to reduce pesticidal sources of volatile organic compounds (VOCs) which contribute to the production of smog. In addition, DPR conducts air monitoring and evaluation under its general reevaluation mandate and under the mandates of Assembly Bill 1807, (Chapter 1047, Statutes of 1983, and amended by Chapter 1380,

*Each scientific advance in the development of new pesticide products requires a similar advance or adaptation in the field of analytical chemistry in order that entomologists, plant pathologists and other scientists may correlate the compositions of the preparations used with the effects observed.*

– 1946 Department annual report

Statutes of 1984, AB 3219), the Toxic Air Contaminant Act. (For information on reevaluation and TAC monitoring, see Chapter 4.)

### Pesticide Element of the 1994 Ozone State Implementation Plan

The federal Clean Air Act requires states to meet national standards for airborne pollutants such as ozone. Many regions in California do not meet these standards. If any region does not meet the national standards for ozone, the area is designated as a nonattainment area, and the federal government can impose its own measures for meeting air standards. In response, California in 1994 submitted a State Implementation Plan (SIP) outlining how it would reduce volatile organic compounds (VOCs) from all sources, including pesticides. (VOCs contribute to the formation of ozone in the lower atmosphere; ozone is a component of smog.) The U.S. Environmental Protection Agency approved the SIP in 1996. In California, the ARB coordinated the overall development of the SIP, including consumer uses of pesticides. DPR is responsible for developing and implementing VOC reduction measures for commercially applied agricultural and structural pesticides.

The SIP is designed to reduce agricultural and commercial structural pesticidal sources of VOCs by 20 percent between the 1990 base year and 2005. (The exception is the San Joaquin Valley, where, because it was already close to meeting desired ozone levels, the goal was to reduce pesticidal VOCs by 13 percent by 1999.)

DPR worked with the ARB and U.S. EPA Region 9 to develop a plan based not on arbitrarily categorizing pesticides as VOC emitters but on measured pesticidal VOC emissions. Accurate data on VOC-producing pesticides was critical to the development of practical emission control measures for the State. DPR's approach to managing pesticide VOC emissions includes determining the VOC emission potential of pesticide products; estimating and tracking pesticide VOC emissions, based on use reporting and emission potential data; and reducing emissions, first by voluntary measures and, if they are unsuccessful, by regulatory means.

**Product Reevaluation (Data Call-in):** The initial step of the plan was to establish a method to accurately determine the VOC content of pesticide products and to calculate pesticidal VOC emissions. The baseline inventory was calculated by summing the estimated 1990 VOC emissions of each agricultural and commercial structural use pesticide. Emissions for each pesticide were calculated by multiplying the VOC emission factor (EF) value for each product by the use of that product in 1990. (The same methodology is used to estimate pesticidal VOC emissions for subsequent years.) In 1994 and 1995, DPR initiated data call-ins asking registrants to determine the VOC EF of their products either by analyzing products using the thermogravimetric analysis (TGA) method or by a default method that assumes all ingredients in the product except water and inorganic chemicals are VOCs.

**Tracking Pesticide VOC Emissions:** California is fortunate to have a reporting system for pesticide use which, with the VOC emission factor, allows for an accurate determination of pesticidal VOC emissions. To determine the actual VOC contribution of individual agricultural and structural use pesticides, the VOC EF of each formulated product is multiplied by the amount of that product used in a given year. The Pesticide Use Report is used as the reference for the amount of pesticide use.

The VOC EF of each product is estimated by one of the following: (1) measuring VOC emissions using the TGA method, (2) using measured VOC emissions from similar products, (3) assuming that all ingredients in the product except inorganic compounds, including water, are VOCs, or (4) assigning a default EF value. Additional VOC EFs may be used to calculate relative emissions provided adequate data are provided. For example, data documenting that a change in a specific application technique of a specific pesticide from 1990 lowers emissions could be a supplemental VOC emission factor.

In cooperation with DPR, the ARB developed a baseline inventory of estimated 1990 pesticidal VOC emissions based on 1990 pesticide use data. This baseline inventory may be adjusted if empirical data are developed to determine the impact of temperature, treated substrate (foliage, soil, water, etc.), application technique, and other conditions on VOC emissions.



*Pest control work, by reason of its technical nature, must of necessity be fostered and guided to a great extent by public institutions.*

– 1921 Department annual report

**Voluntary Measures:** DPR holds periodic workshops to review progress in meeting the reduction goals. The initial part of DPR's program is to reduce pesticide emissions through a variety of voluntary actions.

**These measures include:**

- Pesticide manufacturers altering formulations to eliminate or reduce VOC-emitting components;
- Registration of new products designed to be used at very low rates;
- Pesticide users switching to low-VOC formulations;
- Increased adoption of integrated pest management practices which typically includes reductions in the amount of pesticides used; and
- Promoting education and information distribution regarding pesticide VOC emissions and their control.

**Regulatory Measures:** If VOC reduction goals are not met by voluntary actions, DPR will adopt regulatory measures to reduce pesticide emissions. These measures could include seasonal restrictions on use or prohibitions of use of high-VOC emission pesticides for which alternatives exist that would result in lower VOCs and no increased environmental risks.

### Protecting Water Quality

DPR has a Ground Water Protection Program and a Surface Water Protection Program. These programs, under the lead of Environmental Monitoring Branch and administered locally by Commissioners, address both agricultural and nonagricultural sources of pesticide residues in water and include pollution prevention and response elements.

The Ground Water Protection Program is based on general authority in the FAC to protect the environment from harmful pesticides, and specific authority in the Pesticide Contamination Prevention Act (PCPA, AB 2021, FAC sections 13142 through 13152) that establishes a process to prevent further pollution of ground water by agricultural pesticides. The Ground Water Protection Program focuses on developing reduced-risk practices for pesticides identified as having moved through soil to ground water, research designed to evaluate pesticide use practices and irrigation methods that reduce movement of pesticides from application sites, outreach through training programs for pesticide users, and implementation of the PCPA. Chemicals found in ground water or soil due to nonagricultural use, such as uses in urban areas, and that have been determined to present a hazard or potential adverse effect, will be considered for review as part of the reevaluation process. (*See Chapter 4 for discussion of Reevaluation Program.*)

The DPR Surface Water Protection Program has preventive and response components that reduce the presence of pesticides in both agricultural and urban surface water. The program's preventive component includes local outreach to promote management practices that reduce pesticide runoff. It also includes DPR's registration process in which potential adverse effects to surface water quality, particularly those in high-risk situations, are evaluated. The response component includes mitigation options to meet water quality goals, recognizing the value of self-regulating efforts to reduce pesticides in surface water as well as regulatory authorities of DPR and the State and Regional Boards.

In California, both DPR and the State and Regional Water Boards have mandates and authorities bearing on pesticides and water quality. DPR is the lead agency for regulating the registration, sales and use of pesticides in California. The SWRCB is the lead agency for coordinating and controlling water quality in California. The SWRCB and the nine Regional Water Quality Control Boards (RWQCBs) also carry out statewide and regional programs, as well as federal programs mandated under the Clean Water Act.

**Management Agency Agreement:** In 1991, DPR and the SWRCB signed a memorandum of understanding that identified primary areas of responsibility and authority and provided methods to assure ongoing coordination of activities at the State and local

*The full potentialities of a new product for pest control or for injury to plants or animals are seldom realized until its effects have been thoroughly investigated over several seasons. Marketing of many new chemicals follows so closely after their discovery that investigation must be made of all pertinent scientific information to determine whether they are of sufficient value for the purpose intended to warrant registration, and to determine what precautionary handling may be necessary to avoid injury. Unless adequate information can be obtained, registration of a new product must be withheld pending development of the necessary data.*

– 1947 Department annual report

**Conservation of human well-being is of utmost importance. The commercialization of an insecticide poison often is attempted as soon as the new toxicant has emerged from the laboratory, frequently with little or no pharmacological information. Before there is commercial exploitation and introduction into homes for intimate contact with unsuspecting users, more data as to acute or chronic intoxication should be available. The determination of toxicities of pesticides is imperative.**  
 – 1943 Department annual report

levels. A more formal, management agency agreement (MAA) was developed and signed by the two agencies in 1997.

**The management agency agreement is designed to:**

- Ensure that all pesticides registered in California are used in a manner that protects water quality and the beneficial uses of water while providing effective pest management. (The beneficial uses include municipal and domestic drinking water, ground water recharge, freshwater habitat, wildlife habitat, endangered species protection, and fish spawning.)
- Identify the roles of both agencies regarding water quality protection and pesticide regulation.
- Coordinate local and State authorities to solve water quality problems relating to pesticide use by promoting development and use of preventive practices through both voluntary and when necessary, regulatory efforts.
- Promote interagency sharing of information relating to the study of pesticides and regulatory efforts.

The MAA is carried out by the California Pesticide Management Plan for Water Quality, which describes in detail a comprehensive program for protection of surface and ground water quality. The plan encompasses the development and use of preventive activities and practices, ranging from voluntary to regulatory, to protect the beneficial uses of the State’s waters from the potentially harmful effects of pesticides. It identifies the roles of the water boards regarding water quality protection and the role of DPR in pesticide regulation, and promotes interagency sharing of information relating to the study of pesticides and regulatory efforts.

**Protecting Ground Water**

DPR began addressing pesticide contamination of ground water in the early 1980s, spurred by the discovery of widespread contamination of ground water from the legal application of the fumigant DBCP. Between 1979 and 1983, the pesticides 1,2-D and ethylene dibromide (EDB) were also found in wells in several counties, and aldicarb was reported in ground water in Del Norte County.

In 1983 the first comprehensive report on pesticides in California ground water — the “Ramlit Report” — found that more than 50 pesticides had been found in 23 counties. DBCP alone had been found in more than 2,000 wells.

In 1984, CDFG began developing a long range plan to selectively control the application of ground applied pesticides. The goal was to compile localized data — such as an inventory of results of well sampling for pesticides and the amount of pesticides applied to soil — on factors that influence movement of pesticides to ground water. These data would be provided as successive “layers” of information to County Agricultural Commissioners. CACs could use the information to make local regulatory decisions or to condition CDFG regulatory decisions at the local level.

At the same time, reports of pesticides in ground water also caught the attention of the Legislature. In 1985, the Assembly Office of Research published “The Leaching Fields,” which reported that 57 pesticides had been found in ground water, 22 of which were due to agricultural use. The report hypothesized widespread contamination and recommended more sampling be done to determine its extent.

**The Pesticide Contamination Prevention Act (AB 2021):** “The Leaching Fields” also contained the first draft of AB 2021, the Pesticide Contamination Prevention Act (PCPA), which was modified and adopted in 1985. The purpose of PCPA was to prevent further pollution of ground water aquifers of the State which may be used for drinking water supplies. “Pollution” was defined as the introduction into the ground waters of the State of an active ingredient, other specified product, or degradation product of an active ingredient of [a pesticide] above a level, with an adequate margin of safety, that does not cause adverse health effects. The statute was based on a then-untested scientific assumption that certain physicochemical and environmental fate characteristics of pesticides could be used to predict movement to ground water.

***The PCPA requires DPR to do the following:***

- Require pesticide registrants to submit environmental fate data for agricultural use pesticides.<sup>5</sup>
- Use that data to identify pesticides with the potential to pollute ground water.
- Conduct well sampling to determine if potential leachers have moved to ground water.
- Establish a database of well sampling results that must be reported to DPR by all local, county, and State agencies monitoring for pesticides in ground water.
- Submit an annual report to the Legislature that summarizes the reported monitoring results, and the actions taken by DPR for nonpoint sources and by the State Water Resources Control Board for point sources to prevent further contamination of ground water.
- Examine the use of pesticides found in ground water due to legal agricultural use (i.e., applications according to the label) to determine if continued use should be allowed.

By the end of 2000, 16 pesticide active ingredients (or their breakdown products) had been found in ground water as a result of routine agricultural use. This included pesticides found before the passage of the PCPA. Formal reviews had been conducted for still-registered pesticides found in ground water as a result of legal agricultural use. (See separate article in this Chapter for discussion of review process.) Pesticide contamination resulting from “point” sources of pollution such as mixing and loading sites, or illegal disposal and detections of pesticides that are no longer registered are referred to the SWRCB for further investigation.

Based on the circumstances of each contamination situation, DPR imposed restrictions on the use of the detected pesticides. All were placed on DPR’s restricted material list. For five of the pesticides, DPR focused additional restrictions in one-square-mile areas containing wells with detections. These areas are called pesticide management zones (PMZs). PMZs are identified in regulation by their geographic base meridian, township, section, range number and are specific for the pesticide(s) detected in the area. Specific restrictions on use vary with the pesticide, and include statewide use requirements, prohibiting all uses in their respective PMZs or prohibiting only noncrop uses.

While specific chemicals detected within PMZs are regulated, the program does not address potential pesticide movement into ground water outside PMZs. The 1985 law emphasized identification of pesticides with characteristics that made them a potential threat to ground water. During the 1990s, DPR scientists conducted studies and gathered and analyzed a tremendous amount of data to improve understanding of the mechanisms of pesticide movement to ground water and the management practices that will minimize such movement. They found that identifying areas vulnerable to ground water contamination was just as important as identifying potential problem pesticides. DPR data suggested that soil and climatic conditions often play a critical role in ground water contamination. Using this data, DPR scientists constructed a computer model that identifies areas vulnerable to ground water contamination. They also developed mitigation measures tailored to the mechanisms of contamination in these areas.

Building on this technical and scientific analysis (see article page 82), DPR plans to implement a new regulatory approach designed to put the ground water program on a more preventive basis. This change would replace the patchwork of PMZs with designations of contiguous vulnerable areas. Management practices designed to prevent contamination and tailored to the specific mechanism of movement would be implemented in these areas. Ground water protection measures would be required not only in areas where pesticides have been detected but also in all areas identified as sensitive to pesticide movement to ground water.

***Pesticide Management Plan:*** U.S. EPA has proposed a program that would require states to develop “pesticide management plans for pesticides and ground water protection.” Under that program, use of certain problematic pesticides would be allowed  
*continued on page 81*



***It is the purpose of this law to prevent further pesticide pollution of the ground water aquifers of this state which may be used for drinking water supplies.***

*– The Pesticide Contamination Act of 1985*



5 California’s definition of “agricultural use” is broad, and includes not only pesticide use in production agriculture, but also on turf (e.g., golf courses, cemeteries) and along rights-of-way.

## The Pesticide Contamination Prevention Act Review Process

When a pesticide is found in ground water or soil, and after the detection is verified in a second test, a well-defined process established by the Pesticide Contamination Prevention Act (PCPA) is triggered. This process allows for comprehensive review of the finding and is separate from DPR's suspension or cancellation process.

DPR first determines if the source of reported pesticide contamination is the result of routine agricultural use (application to crop, for example). If levels of contamination in public water systems exceed levels considered safe, the Department of Health Services may take immediate corrective action. In addition, DPR may impose use restrictions regardless of the level of contamination. Actions could include revocation of permits to use pesticides, modification of use practices, or suspension of pesticide product registration.

Pesticide contamination resulting from "point" sources of pollution (such as a spill into a well) and detections of unregistered pesticides are referred to the SWRCB for further investigation. If the pesticide contamination is the result of illegal use of the pesticide, the incident is reported to the County Agricultural Commissioner for investigation.

If the chemical is an active ingredient and does not pose an immediate health threat, and its presence in ground water is due to legal agricultural use, its detection triggers a review by a subcommittee of the Department's Pesticide Registration and Evaluation Committee. (If the detected chemical is an inert or breakdown product of a pesticide, the detection is subject to further regulatory action if toxicological data on file reveal possible adverse health effects for the breakdown product.) The three-member subcommittee consists of one representative each from DPR, OEHHA, and SWRCB. The subcommittee is not

intended as a policy-making body but rather, like the committee itself, acts in an advisory capacity to DPR's Director.

The subcommittee conducts an extensive review of toxicological and environmental fate data on the detected chemical. Registrants of products containing detected chemicals may request a public hearing before the subcommittee to present evidence to demonstrate that the detected chemical has not polluted and does not threaten to pollute ground water. Public comments are also solicited. If registrants do not request a hearing, the product's registration is cancelled.

The subcommittee makes one of three findings: (1) that a detected chemical has not polluted and/or does not threaten to pollute the ground water of the State; (2) that the agricultural use of the chemical can be modified to prevent further ground water pollution; or (3) that modification or cancellation of the chemical's use will cause severe economic hardship on the State's agricultural industry, that there are no feasible alternative products or practices that would prevent further ground water pollution, and that a level of the detected chemical can be established which does not significantly diminish the margin of safety recognized by the subcommittee to not cause health effects. The subcommittee submits its findings and recommendations to DPR's Director, who either concurs or makes contrary findings.

Modifications in use ordered by DPR may include prohibition of uses in certain areas. Alternatively, use may be allowed with certain restrictions, for example, prohibiting use on certain crops or during certain seasons.

*continued from page 79*

in a state only if that state has adopted a pesticide management plan that has been submitted to and approved by U.S. EPA. The philosophy behind the plan is that there are too many local situations and variables to address the use of these pesticides on the label to keep them out of ground water. The plan would require states to implement more preventive actions to protect ground water than the program long implemented under the PCPA. For example, under U.S. EPA's draft proposal, states would have to adopt preventive measures that apply even in the absence of pesticide detections. Under DPR's regulatory framework adopted under the PCPA, California adopted mitigation measures only for pesticides actually found in ground water and these measures largely applied only in areas where the pesticides have been found. (The overhaul of the program planned in 2001 would put the ground water program on a more preventive basis.)

### Surface Water Programs

**Rice Pesticides Monitoring Program:** The objective of this program has been to decrease concentrations of selected pesticides in surface water of the rice-growing regions, with emphasis on Sacramento Valley waterways. In 1999, about 550,000 acres of rice were grown in California, primarily in the Sacramento Valley. The primary pesticide application period is from mid-April through July. Water quality problems can arise during and following pesticide applications, and when rice paddy water seeps through rice levees, or is released from fields, and enters agricultural drains flowing into the Sacramento River.

In the early 1980s, the SWRCB documented that large fish kills in Sacramento Valley agricultural drains were caused by the rice herbicide molinate (Ordram). At the same time, the herbicide thiobencarb (Bolero) was found to be the source of taste complaints in the City of Sacramento's drinking water supply. Beginning in 1983, California's pesticide regulatory agency (now DPR, then a CDFG division), the County Agricultural Commissioners, the California Department of Fish and Game (DFG), SWRCB, Central Valley RWQCB, and the rice industry worked together to develop and implement a plan to control discharges of pesticides from rice fields. Agencies agreed that by holding water in the rice fields, the pesticides in the water could degrade sufficiently to reduce toxicity to acceptable levels in receiving waters.

In 1990, the objectives of these control efforts were clarified, following the adoption of amendments to the Central Valley RWQCB's water quality control plan. This plan established performance goals for molinate and thiobencarb, beginning in 1990, and for the insecticides carbofuran, methyl parathion, and malathion, beginning in 1991. (Performance goals are target concentrations developed to protect the beneficial uses of surface water from rice pesticide contamination and provide a level by which compliance with a monitoring program could be measured.)

DPR's Rice Pesticides Monitoring Program annually monitors for rice pesticides in adjacent agricultural drains and the Sacramento River receiving rice field water. Through a combination of mandated restricted materials permits issued by County Agricultural Commissioners, and voluntary management practices implemented by rice growers, this program has been successful in reducing concentrations of targeted pesticides, and pesticide loading in affected waterways receiving rice field water runoff.

DPR's Environmental Monitoring, Enforcement, and Registration branches work together to continually evaluate proposed rice pesticides for possible environmental fate problems. Many issues related to old and new rice pesticides including pesticide drift, phytotoxicity to non-target crops, weed resistance to rice herbicides, aquatic toxicity, sediment accumulation, and drinking water concerns continue. Past, present, and future success of the Rice Pesticides Program depends on maintaining collaborative relationships that have been established over the years within DPR, and with external stakeholders including the State and Regional Water Boards, DFG, the commissioners, pesticide registrants, California rice industry, and rice growers.

**Dormant Spray Water Quality Program:** Use of organophosphate insecticides on dormant fruit and nut trees is extensive in the Central Valley. Use of these chemicals in winter may reduce the need for pesticides during the growing season, but pesticide

***In addition to cautions specifically required by law, a registrant should warn of any danger involved in the use or misuse of his product. This promotes satisfactory use of his products .... Any precautions with regard to proper storage should be given. No invitation may be made to the purchaser to experiment with the material.***  
— 1944 Department annual report

## Preventing Ground Water Contamination

Scientific data evaluated by DPR during the 1990s gave DPR the basis to put its ground water program on a more preventive basis. The main scientific hurdle was to characterize vulnerable areas. DPR found many pre-emergence, soil-applied herbicides in ground water, with wells frequently containing residues for three different herbicides. Since the use patterns for these herbicides are similar, this suggested that identifying the factors that make an area sensitive to ground water pollution would be as important as identifying which pesticides have the potential to pollute ground water.

### Determination of Sensitive Areas

Early attempts by DPR to correlate pesticide detections in ground water with various factors were frustrated by insufficient and inadequate data for analysis. Before the early 1980s, soil studies of pesticide movement typically focused on product efficacy and only analyzed residues from shallow soil depths. This information was only useful to determine whether or not active ingredients remained in the root zone in sufficient concentrations to affect their biological targets, or to determine if they had dissipated in time to prevent injury to later crops. Most soil studies failed to test for soil residues below three feet.

Since 1986, DPR scientists have been collecting and identifying data to better characterize vulnerable areas and other factors that influence pesticide movement to ground water. The evaluation allowed for the development of ground water protection measures based on the best available scientific information.

#### *A variety of data were evaluated, including:*

- DPR's well inventory database, with results from sampling of more than 20,000 wells.
- DPR's use reporting database. Beginning in 1990, all agricultural uses of pesticides are reported to DPR, usually by township, range, and section.
- Soils information published by the USDA Natural Resources Protection Service (formerly the Soil Conservation Service).

- California weather and evapotranspiration data collected by the California Irrigation Management Information System (CIMIS) and the U.S. National Oceanic and Atmospheric Administration.

With this and other data, DPR constructed a database of soil types by township, range, and section. The data enabled DPR to develop a method or model to predict where pesticide contamination of ground water is most likely to occur. Using the additional soils and climatic databases, DPR scientists used multivariate statistical techniques to determine if there are relationships between these data and pesticide detections. (Multivariate statistics provide the ability to analyze complex sets of data and look at the pattern of relationships between several variables simultaneously.) That analysis demonstrated that most sections of land with wells containing pesticide residues can be grouped into clusters based on soil type. These clusters appear to be related to the mechanism of pesticide movement to ground water. For example, in the coarse soil cluster (sandy soils), pesticides probably move to ground water via leaching, whereas in hardpan soils, residues move offsite via runoff into drainage or dry wells, abandoned wells, poorly sealed pumping water wells or other more direct pathways to ground water.

This meant that mitigation measures could be potentially customized for each soil cluster. To prevent leaching, good irrigation management is the key because excess irrigation causes leaching. In contrast, leaching is not a problem in hardpan soils, but runoff containing pesticide residues is. Wellhead protection is one of the keys on hardpan soils so that runoff can't easily move to ground water.

Another key is soil incorporation of the pesticide so that residues cannot be carried off by rainfall or irrigation and subsequently move to ground water in adjacent coarse soil areas or via wells or similar direct conduits.

DPR used the cluster analysis to develop a model (called "Calvul" model for "California vulnerable") that identifies areas sensitive to pesticide movement to ground water based on soil type. This new tool has been used to identify many additional areas that have soil types similar to areas where pesticides have been found in ground water.

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runoff from orchards has been detected in the Sacramento and San Joaquin watersheds. Some dormant spray levels in waterways have been high enough to cause toxicity to aquatic organisms. To deal with the problem, DPR established the Dormant Spray Water Quality Program in 1996.

Rather than immediately move to mandatory restrictions, DPR, working in concert with the County Agricultural Commissioners, first asked local resource conservation districts, farmers, and pesticide manufacturers to develop methods to control offsite movement of these chemicals. Risk reduction measures are focused on orchards near rivers and streams, and can include avoiding mixing and loading near streams, reducing rates of application, shutting off spray rigs at the end of rows near streams, and using alternative pesticide products.

DPR is using monitoring and other data to evaluate the success of the voluntary efforts toward achieving water quality compliance. As long as progress continues toward compliance with the water quality objectives established by the RWQCBs, regulations will be unnecessary. However, if aquatic toxicity persists from dormant sprays, DPR will impose regulatory controls to lower dormant spray residues to acceptable levels.

DPR is also working with the Sacramento River Watershed Program, a stakeholder-driven effort to promote stewardship in the watershed and improve aquatic habitat, and to develop a water quality management strategy for diazinon, a key dormant spray. Under contract, DPR is working with stakeholders and the Central Valley RWQCB to help develop water quality targets, identify important sources of diazinon, evaluate available management practices including pest management alternatives, determine how new management practices could improve water quality, and develop a plan for promoting water-enhancing practices.

***Establishing a Wide-Ranging Surface Water Program:*** In the 1999-2000 and 2000-01 State Budgets, the Legislature appropriated significant, ongoing resources to DPR to establish a surface water protection program consistent with the Department's longstanding ground water program. New scientific and technical staff were added, and funds became available to monitor the impact of pesticides on impaired water bodies identified by the SWRCB. Impaired water bodies are those that are degraded by specific pollutants, including pesticides. The U.S. Clean Water Act requires a cleanup strategy for each impaired water body; key to developing a strategy is determining total maximum daily loads (TMDLs) for each pollutant. A TMDL is a calculation of the maximum amount of a pollutant that a water body can receive from all contributing sources and still meet water quality standards. A TMDL also contains the reductions needed to meet water quality standards and allocates those reductions among the sources in the watersheds.

The goal of DPR's surface water program is to characterize pesticide residues in surface water bodies (including rivers, streams, and agricultural drains), identify the sources of the contamination, determine the mechanisms of off-site movement of pesticides to surface water, and develop site-specific mitigation strategies. This is done primarily through surface water monitoring in consultation with other agencies (including the SWRCB and RWQCBs), and research to characterize the factors that lead to off-site movement and to develop use practices to prevent such movement. Research is facilitated by contracting with the University of California, California State universities and the private sector. DPR also maintains a comprehensive database of surface water monitoring results.

Under the terms of agreements between DPR and the SWRCB, DPR will investigate pesticides of concern and help develop recommended pesticide use practices designed to reduce or eliminate the impact of pesticides on surface water quality. Management practices designed to reduce contamination are implemented initially through voluntary and cooperative efforts. Depending on the source of the residue problems, mitigation may include outreach programs to educate the public on ways to reduce pesticides in urban waters as well as programs targeted at modifying use practices among agricultural pesticide users.

If the revised use practices (which do not have the force of law but are voluntarily adopted by pesticide users) do not adequately mitigate the impacts, then DPR must use

DPR's surface water program was greatly expanded in 2000. Its goal is to characterize pesticide residues in rivers, agricultural drains, and other water bodies, identify where the contamination originated, determine the mechanisms involved, and develop site-specific ways to keep the pesticides out of surface water.



DPR's Endangered Species Project Web site, established in 1996, features an interactive database that allows pesticide users to select where in the state they want to use a pesticide – down to a square-mile grid – and get a detailed, customized report on the endangered species restrictions that apply.

its wide-ranging regulatory authority to impose use restrictions. DPR may modify the use of pesticides by regulation or permit conditions to prevent excessive amounts of residues from reaching surface water and to assure compliance with the RWQCBs' water quality objectives. Evaluating the feasibility of these modifications and conditions and promulgating regulations is the role of Environmental Monitoring and Enforcement Branches. If those restrictions are not adequate, then the SWRCB and the Regional Boards could be required to implement waste discharge requirements for discharge entities (e.g., reclamation districts, farms) which may potentially discharge waters containing pesticide residues.

Future surface water projects expected to be made possible by continuing appropriations include validation of management practices for runoff reduction, demonstration and promotion of management practices, and collaboration with the SWRCB and RWQCBs as they implement their Nonpoint Source Pollution Control Program.

### Emergency Projects Monitoring

Aerial treatment with malathion bait is used by CDFA to eradicate Mediterranean and Mexican fruit fly infestations in California. DPR conducts monitoring of these treatments to provide information about the amount of malathion and malaoxon (a breakdown product of malathion) reaching the ground, and the concentrations of these chemicals in air, surface water, and rain runoff. These results are used to ascertain that the public and the environment are being protected and that the correct rate of malathion baits are being applied to assure efficacy in eradicating the fruit flies.

In 1999, DPR's Environmental Monitoring Branch began a program to monitor residues of insecticides used in the State's red imported fire ant (RIFA) treatment project. Red imported fire ant, a pest long established in the southeastern U.S., was discovered in late 1998 in several Southern California counties. To manage infestations, CDFA and county and local agencies apply insecticides to RIFA mounds. The wholesale and production nurseries in the infested areas also treat their nursery stock before plants can be shipped under the federal quarantine requirements. DPR monitors representative samples of air, turf, soil and water with the highest priority to determining insecticide concentrations in surface water from irrigation and storm runoff. DPR selected sampling sites on surface waterways, such as local streams and channels in consultation with the County Agricultural Commissioners, Department of Fish and Game, the RWQCB and other stakeholders. DPR routinely shares information and monitoring results with other government agencies, insecticide users, and other stakeholders. If monitoring should indicate levels of concern, DPR works cooperatively to identify the sources of the problem and to investigate how to best resolve them.

### Endangered Species Program

In California, DPR has been studying endangered species protection issues with federal funding since 1988. DPR activities include mapping sites occupied by federally listed species, evaluating pesticide exposure risks to inhabited sites, classifying risk and developing protection strategies to minimize risk as needed.

The risks of pesticide exposure to non-target species in general and endangered species in particular are evaluated from registered use patterns, any history of fish or wildlife impacts attributed to a pesticide, or pesticides of similar toxic potential and a comparison of the biology of the non-target species with the pesticide use pattern. A non-target pesticide exposure hazard may exist when a pesticide demonstrates high toxic potential to species in the same general taxonomic group (e.g. birds, fish, mammals, etc.) and the life cycle or behavior of the species and the formulation, site, crop or vegetation stage, season, time and method of application of a pesticide is likely to result in exposure.

Protection strategies for endangered species rely on the differences between endangered species and the species that are the target of pesticide applications. Differences in the size, activity patterns, food preferences, seasonal presence and behavior can be used to selectively expose pest species to a pesticide while minimizing the risk of exposure to endangered species.

As of early 2001, there were 276 federally listed endangered or threatened species in

California, and 18 additional proposed endangered and proposed threatened species. Of all federally listed species, the nine listed populations of salmon and steelhead occupy the most area, defined as watersheds that cover approximately 40 percent of the State, including several entire coastal counties. All other terrestrial and inland aquatic species cover approximately 20 percent of the State, overlapping to some extent with the salmon and steelhead watersheds. Of the terrestrial species, San Joaquin kit fox has by far the greatest overlap with agricultural areas, accounting for about 10 million acres over 14 counties, mostly in the agriculturally rich southern San Joaquin Valley. Other species that are interspersed with agricultural areas include birds, mammals, reptiles, amphibians, crustaceans, insects, and many plants.

Since endangered species are not economic pests, there is no essential conflict between using pesticides and protecting endangered species, provided that non-target hazards of pesticides are understood and adequate protection strategies are developed and used to avoid non-target exposures.

DPR's endangered species program (part of the Pest Management and Licensing Branch) coordinates endangered species protection strategies with the Department of Fish and Game, the Department of Food and Agriculture, and the County Agricultural Commissioners (in accordance with a State Plan). Alternative protection strategies and the State Plan developed under this project are subject to U.S. EPA authorization and U.S. Fish and Wildlife Service approval.

### Mapping Endangered Species Habitat

The distribution of most endangered species has not been officially defined. Surveying for the presence of many species is problematic, expensive and unreliable. The mobility of some species and even the dispersal of seeds confound efforts to define habitat. In most cases, the best estimate of current distribution comes from past sightings and current evaluations of land use in these areas. Changing land uses, including field rotations, land development and natural variables such as food supply, droughts, floods and wildfires cause many species to redistribute faster than surveys can be completed. Surveying for the current distribution of species is therefore reserved for special cases where no other approach is feasible to limit pesticide exposure to non-target species.

It is generally adequate and preferable to rely on ongoing interpretations of the best available information on species distribution rather than investing in new surveys. The best available compilation of sightings for federally listed species (and other species of special status) in California is the Department of Fish and Game's Natural Diversity Database (NDDDB). Sites in the NDDDB are often defined by a central point and a radius (up to one mile) that define the general area of an occurrence of a species. More precise information is used where available.

As a starting point for protecting endangered species, DPR is converting the NDDDB data into a list of sections (a species-section database) where these species may be found. Within these sections, a description of habitat (where practical to define) accompanies protection strategies to limit protection strategies to areas that meet the conditions of habitat for a particular species. The species-section database includes links to the NDDDB or other citations that document the sections as probable habitat. A procedure is being developed to update the species-section database as needed to ensure that the database includes sections that are necessary and sufficient for species protection.

DPR's species-section database can be readily mapped to show the overall distribution of one or more species in a county or other area of interest. However, the database may be more useful to pesticide users in the ability to support Web-based queries by section. Such queries can be used to determine:

1. if there are any protected species in any user-selected section(s).
2. a list of active ingredients of pesticides that have use limitations for protection of the species triggered by the user-selected section.
3. the use conditions that apply to user-selected sections and active ingredients.

The results of these queries may be printed by the user to guide the application of selected pesticides in selected sections.

***When DDT was first released for civilian usage in 1945, a stampede of applicants descended upon the Department seeking registration for products containing the much-publicized insecticide.... Neither the scope of effectiveness of insecticides containing DDT, nor the dangers involved in their use, have been fully explored and, until the hazards have been adequately established, these products should not be used carelessly or in any manner other than recommended for each type.***  
– 1946 Department annual report



# Reducing the Risks of Managing Pests

Understanding and evaluating pest management practices are essential to making appropriate regulatory decisions on pesticides. The Department also has a legal mandate to encourage the use of more environmentally sound pest management systems, including integrated pest management (IPM, *see Glossary*). Many of DPR's programs emphasize a reduced-risk approach to pest management. DPR programs facilitate risk reduction through information, encouragement, incentives, and community-based problem-solving.

The Pest Management Analysis and Planning program (PMAP) within the Pest Management and Licensing Branch assumes the lead role in implementing the Department's Pest Management Strategy, manages the Department's IPM Innovator Program, administers pest management grants and the Alliance program, performs pest management analyses, and maintains a pest management database.

## Pest Management Strategy

In 1995, after more than a year of effort and consultations with staff and diverse stakeholders, DPR completed its Pest Management Strategy. The Pest Management Strategy provides strategic direction for the Department to increase its use of pest management information in decision-making and determine how it can encourage the voluntary adoption of reduced-risk practices by pest managers. The Pest Management Strategy allows the Department to identify its appropriate role, as well as areas where a regulatory agency should not be involved such as education and research.

***The Pest Management Strategy has four goals:***

- Incorporate reduced-risk pest management philosophy throughout the California pesticide regulatory program. This involves:
  - Ensuring employees and County Agricultural Commissioners understand the pest management strategy and what it means to their activities.
  - Identifying DPR functions and work processes to show where and how pest management considerations will be emphasized in the pesticide regulatory program.
  - Evaluating how increased emphasis on reduced-risk pest management will affect the pesticide regulatory program.
- Advocate and assist with the adoption of economically viable reduced-risk pest management practices. This involves:
  - Developing appropriate criteria and identifying higher risk use patterns.
  - Identifying and eliminating impediments to the adoption of reduced-risk pest management practices.
  - Creating incentives to support the voluntary adoption of reduced-risk pest management practices.
  - Using regulatory authority — as appropriate — to facilitate the adoption of targeted practices.
- Provide leadership in working cooperatively with other interested parties to promote research, education, and demonstration of reduced-risk pest management practices. This involves:
  - Consulting with a broad cross section of interested groups and individuals for advice on appropriate priorities and activities.

***The control of the pests of agricultural crops is a problem of greatest importance in California, not because the state is more pest-ridden than the others, but because California is a land of high-priced products of the soil.***  
– 1919 Department annual report

- Coordinating the goals and activities of key organizations and establishing partnerships aimed at facilitating the adoption of reduced-risk pest management practices.
- Evaluate the effectiveness of DPR’s efforts to expedite the adoption of reduced-risk pest management practices.

### Pest Management Advisory Committee

DPR, in cooperation with the California Department of Food and Agriculture (CDFA), established the Pest Management Advisory Committee (PMAC) in June 1992 to advise the DPR Director on issues pertaining to reduced-risk pest management. Legislation in 1994 (Chapter 545, SB 1752) formally recognized the PMAC in law and gave it the task of evaluating applications for grants under DPR’s Pest Management Grants program (*see below*), and making funding recommendations to the DPR Director.

***In 2000, the Department restructured the PMAC to broaden its membership and give it a wide-ranging advisory function. The PMAC’s functions include:***

- To advise DPR on regulatory development and reform initiatives, evolving public policy and program implementation issues, and science issues associated with evaluating the use of pesticides.
- To identify and evaluate proposed modifications to current policies and procedures employed by DPR to reduce the potential risks posed by pesticides, and to facilitate the exchange of ideas and information among the interested parties.
- To assist DPR in identifying, facilitating, and promoting reduced-risk pest management practices and pest management systems. Activities include, but are not limited to, reviewing proposals for pest management research and recommending to the DPR Director which proposals should be funded. Funds in the DPR Fund may be expended, upon appropriation, for pest management research purposes to carry out the recommendations of the PMAC.
- To promote the IPM Innovator Program to existing and potential participants and, along with the County Agricultural Commissioners, CDFA, University of California including Cooperative Extension, California State University system, the Natural Resources Conservation Service, local resource conservation districts, and others, to help locate groups employing innovative pest management systems.
- To provide leadership in working cooperatively with other interested parties to promote research, education, and demonstration of reduced-risk pest management practices in accordance with the Pest Management Strategy.

The DPR Director chairs the committee, and the CDFA Secretary (or his or her representative) is vice chair. Under regulation (3CCR 6256), the PMAC includes representatives of the University of California, California State University system, U.S. EPA Region 9, and the County Agricultural Commissioners. There are also 24 at-large members, appointed by the DPR Director based on their relevant expertise and diversity of perspectives on pesticide issues, and representing various categories of external stakeholders: six representatives from agricultural production; five from academia and public foundations; four representing registrants and trade associations; four from environmental and public interest groups; one from a farm labor organization; two from nonagricultural pesticide user groups; one representing the general public and consumer advocacy; and one representing pest control advisers. (The Pesticide Registration and Evaluation Committee is DPR’s other major advisory body. With an interagency membership, it fulfills the consultation mandates of the pesticide regulatory program’s functional equivalency under CEQA. (*See Index for other functions of the PREC.*))

### IPM Innovators Program

In the fall of 1994, DPR presented its first “IPM Innovator” awards to acknowledge agricultural and urban organizations demonstrating leadership and creativity in new methods of pest management. DPR hosts an annual event where Innovators are recognized. DPR developed the program to recognize pioneering pest control managers for

***In general, a pesticide salesman should not advocate treatment when the pest is not known to be present.***  
– 1938 Department annual report

their leadership in voluntarily implementing reduced-risk pest management systems and for their work in sharing those solutions with others.

The IPM Innovator typically has a history showing the concept is economically viable, uses a pest management system to reduce the risks posed by the use of traditional pest control practices, and documents that system so that others can learn and apply the system to their own situation. An IPM Innovator also demonstrates a willingness to share information with others.

Another characteristic of an effective IPM Innovator system is the reliance on sound scientific principles of pest management, including a preference for using beneficial organisms and cultural practices for pest control when feasible. Pest problems are addressed as part of the overall situation, rather than pest by pest or at only one time of the year. An IPM Innovator system also has a research and development component to find new ways for managing pests. This may include a range of activities from contracted research with academic institutions to on-site trials of participant-identified techniques.

The organizational structure of the IPM Innovator may be very formal, such as a commodity advisory board, a resource conservation district, or a school district, or it may be less formal, such as a community organization that promotes reduced-risk pest management. Many successful IPM Innovators also have representatives from federal, state, or local government, academia, and the business community as advisors to, or members of their organization.

In addition, many IPM Innovators have a well-developed organization — and an educational component responsible for coordinating and working with participants to encourage the sharing of ideas and information. Many innovators provide training and educational programs for participants. Their outreach programs identify potential new participants and encourage them to join the system.

### Grant Programs

DPR's grants program was established in 1996 with the Pest Management Grants and was expanded in 1998 with the Pest Management Alliance grants. DPR's approach is a problem-solving continuum that begins with the funding of small, localized projects that help groups take research results and move them into the field via applied research and demonstration projects that, if successful, can be funded for broad geographic implementation. Together, they form a step-wise progression from applied research and demonstration projects, funded by the Pest Management Grants, to Alliance grants for regional or statewide implementation of multi-disciplinary reduced-risk practices.

**Criteria used to award grants:** Commodity groups, trade associations, and others are encouraged to submit reduced-risk pest management proposals in key areas of regulatory concern. Priority areas have included reduced-risk alternatives to pesticides targeted by regulatory action; prevention of pesticide contamination of ground and surface water; reduction of human exposure due to drift; reduction of field worker exposure; alternatives to highly toxic pesticides, including organophosphates, methyl bromide and other fumigants; and development of IPM for urban environments, particularly schools and public buildings.

The Pest Management Grants (PMG) program helps non-profit organizations, private groups, university researchers, government entities, and others address pest management challenges on a local or regional scale. They are funded by the Food Safety Account and other funds (see *Alliance section below and Chapter 15, Funding*). With this program, DPR can encourage voluntary projects to develop reduced-risk pest management practices through the cooperative efforts of local and regional groups. Emphasis is on projects that (1) clearly demonstrate reduced-risk qualities, and (2) develop alternatives to critical pest management systems that face disruption due to regulatory action, the development of pesticide resistance, or infestations of new pests. As required by law, proposals are first reviewed by the PMAC, which then makes funding recommendations to the Director. Grants typically range from \$10,000 to \$50,000, and successful projects may receive funding for up to three years.



DPR's IPM Innovator awards, established in 1994, honor those who demonstrate leadership and creativity in developing and sharing reduced-risk methods of pest management.

These grants are awarded to provide support for groups to work with university researchers, private industry, and consultants to perfect reduced-risk practices through applied research grants and to demonstrate the practices locally or regionally through demonstration grants.

The Pest Management Alliance program supports projects designed to implement interdisciplinary reduced-risk pest management across a broad geographic region. The Alliance is intended to help a variety of public and private groups: marketing orders and commodity groups, trade associations, schools, and cities address urgent pest management issues resulting from pesticide use. Stakeholders within each group form a collaborative, interdisciplinary team that uses a systems approach toward pollution-preventing pest management. During an Alliance project, DPR staff and members of the Alliance team establish a dialogue. Alliance projects also link pest control advisers (PCAs) and university outreach efforts. The assumption is that team members have already solved pest problems through applied research or practical experience (perhaps through a Pest Management Grant), but have not adequately shared the research results.

Applying for an Alliance grant is typically a two-year cycle that begins with a pest management evaluation. In the first year, interested groups apply for DPR assistance to evaluate their existing pest management systems. The evaluation describes key pests and current pest management practices the group uses statewide, outlining conventional pest management, innovative approaches to risk reduction, and any regional variations. Applicants can apply for a one-time grant of up to \$10,000 to develop this evaluation and establish a potential Alliance team.

Recipients then work with DPR staff to complete their evaluations, which are a prerequisite for Pest Management Alliance proposals in the second year. With the evaluation as a foundation to pursue full Alliance grant funding, the team develops a work plan that outlines a sequence of steps to resolve pest management problems faced by the group. Ideally, the work plan should focus on existing reduced-risk practices already used by the most innovative growers or other stakeholders. Based on the scope of the work plan, the group requests up to \$100,000 per year to demonstrate and implement adoption of innovative pest management practices. The work plan proposals are next reviewed by the PMAC. Groups may reapply annually for funding for up to three years. They must also provide matching funds or in-kind services equal to the monetary amount of each year's grant. The groups must update their evaluation annually and must revise the work plan if they wish to reapply for funding.

The Alliance program began in 1997 with a one-time \$1 million appropriation to fund reduced-risk pest management. Following the first grant cycle in 1998, another one-time appropriation was made for grants awarded in 1999. In 1999, a legislative augmentation for the Alliance program provided \$1 million of annual support for both Pest Management Grants and the Alliance program. (A portion of the continuing appropriation is used to augment Food Safety Account funding of the Pest Management Grants to provide the tools needed as a step toward future successful Alliances.)

### Other Risk Reduction Activities

The best way to mitigate a pesticide or pest management problem often combines regulatory action and voluntary adoption of improved pest management techniques. DPR relies on the Pest Management Analysis and Planning program (PMAP, part of the Pest Management and Licensing Branch) to provide the in-depth evaluations required for policy making. PMAP works closely with agriculture and the public to identify pest management strategies that reduce pesticide hazards to health and the environment.

**Pest Management Analyses:** The decision to impose use restrictions or to prohibit uses of pesticides cannot be made in a vacuum. Regulators must calculate and compare pesticide-related risks before and after a prospective regulatory action. If this is to be done meaningfully, consideration must be given to how pesticide users are likely to respond when a pesticide is restricted or canceled. Pesticide regulators must be cognizant of the fact that pest management takes place within an ecosystem. It is important to understand the net effect of removing a pesticide from the system. Substituting one chemical for another may only shift the problem from one area of concern to another. For example, as fewer chemical alternatives are available, resistance to the remaining

**The development of remedies to control insects and diseases has become, during recent years, a highly specialized industry. It has been found also that more enters into the case than just the destruction of the pest. Remedies which are effective against a specified insect in many cases have been detrimental to the host plants.**  
– 1931 Department annual report

pesticides is more likely to develop among targeted pests. Or there may be situations when loss of a particular pesticide may result in the use of others that are more toxic to beneficial organisms and thus more disruptive of natural forces at work in the system to regulate pests. In both cases, the net effect is likely to be more pesticide use.

When regulatory action may severely restrict or eliminate use of a pesticide, PMAP analyzes the alternatives. To ensure that the impacts of regulatory action are understood, DPR needs to know how the particular pesticide is used, what pests it controls, and what alternatives exist to control those pests. PMAP provides information on other existing registered pesticide products, as well as nonchemical controls such as cultural practices or biological control strategies.

PMAP is the lead group in compiling these analyses. Other DPR branches and programs develop information on physical and chemical properties of pesticides (Registration Branch and Environmental Monitoring Branch); medical considerations (Medical Toxicology and Worker Health and Safety Branches); amounts of pesticides historically used (Enforcement and Pest Management and Licensing Branches); environmental fate, and environmental considerations (Environmental Monitoring Branch).

CDFA's Agricultural Statistics Branch and the County Agricultural Commissioners are also consulted for information on production and value of affected commodities. Commissioners, growers, UC researchers, and Cooperative Extension staff are consulted on pest management options and their relative efficacy. This information is evaluated by PMAP and relayed to DPR management for regulatory decisions. This information is also used by grower organizations, UC Cooperative Extension staff, and academic scientists to determine the need for new pest management strategies.

Before making its recommendations, PMAP may also conduct a thorough review of IPM practices that may be affected. Other considerations include risk to workers, environmental degradation, and grower objectives for producing a marketable commodity.

**Advisory services:** DPR staff provide their expertise in advising local agencies on how to effectively implement reduced-risk pest management strategies. For example, during the 1990s, DPR staff worked with the cities of Santa Monica and San Francisco on development and implementation of their IPM programs. In Santa Monica, DPR staff helped develop an innovative contract bidding process to identify pest control companies with superior IPM services. In San Francisco, the Department serves as an advisor to city agencies implementing San Francisco's ordinance mandating adoption of IPM for public agencies. Additionally, DPR has participated in workshops to set up urban IPM programs for local agencies in San Luis Obispo, Marin and Santa Barbara counties.

Schools have been a special focus for DPR and its staff. In 1993, DPR staff began working with school districts across the state to implement reduced-risk pesticide programs. In 1994, DPR sent to each of the state's 1,000-plus school districts a 43-page booklet designed to encourage and assist school officials in examining and improving their pest management practices, and to help them set up an IPM program. In 1996, DPR reported on its two-year survey of the State's school districts about their pest management practices, policies and programs. It found that public school districts throughout the State are developing and adopting innovative ways to control weeds, insects, rodents and other pests. However, DPR also found that progress is sometimes stymied by technical, institutional or economic constraints.

In response, DPR scientists moderated several urban IPM workshops, which led to helping three school districts with their IPM programs: Fontana, Pajaro Valley, and Los Angeles Unified.

DPR also recognized several school districts with "IPM Innovator" awards for their pioneering work in finding reduced-risk solutions to school pest problems.

In 1998, DPR awarded a \$77,000 Alliance grant to a consortium of school districts to develop pesticide solutions and resources for school district administrators. The project provided guidance for reduced-risk IPM programs in schools by developing a training curriculum for administrators, staff, and school workers; developing a record-keeping system on pesticide use; and distributing pest management education videos to each county in the State.

*Numerous requests for licenses were made during 1931 for the sale of "Cure Alls," which are claimed will eliminate all insect pests and diseases and provide enough plant food for years.*  
– 1931 Department annual report



In 2000, DPR expanded its program to assist schools around the state in adopting IPM policies and practices to meet the challenge of managing pests while maintaining the highest environmental and health standards.

In the 2000 Alliance grant cycle, DPR awarded \$100,000 for a new project to develop model school IPM programs in Marin, Ventura, Los Angeles, San Diego, and San Luis Obispo counties. The project will allow IPM experts to conduct site assessments that can be used for specialized training of facility managers. Additionally, regional and local alliances will be developed to foster IPM in schools. Concurrently, critical information about pesticides and pest control will be provided to all levels of school staff. Finally, information developed by the previous schools alliance will be used to provide decision-makers at schools with alternatives to conventional practices.

In addition, DPR is working with other boards and departments of Cal/EPA and the California Department of Education to tie IPM into related areas such as school gardens and environmental education.

**School IPM Program:** In the 2000-01 fiscal budget cycle, DPR received \$634,000 to establish a statewide voluntary program for school IPM. DPR is committed to facilitating voluntary establishment of IPM policies and programs in schools throughout California by:

- Establishing contacts with school districts and constituents. School districts that want to reduce use of toxic pesticides will be able to contact DPR for assistance.
- Identifying IPM coordinators for school districts. DPR will conduct training programs to ensure that all coordinators (typically managers of maintenance operations) understand principles of IPM. DPR will also host regional IPM workshops for IPM coordinators and others associated with schools.
- Surveying schools to determine pest management practices before and after DPR's program. This will help DPR know if the program is working.
- Developing an IPM guidebook. DPR will tailor existing guidebooks (many have already been done elsewhere) to conditions in California. Pests covered will include insects, vertebrates, diseases of landscape plants and turf, weeds, and microorganisms found in kitchens and bathrooms. The guidebook will consider pests found in all the diverse regions of California—the coast, valleys, deserts, and mountains.
- Establishing an IPM in Schools Web site. DPR will borrow the best ideas from other school IPM Web sites and adapt its site to specific conditions in California. DPR will emphasize user friendliness and will constantly update links to other helpful sites.
- Participating in statewide conferences. DPR staff will publicize its school IPM program at meetings attended by school administrators, educators, parents, and maintenance and grounds staff.

# The Public and Pesticides: Addressing Conflicts and Concerns

## Reducing Friction at the Agricultural-Urban Interface

As California's population continues to expand, increasing numbers of people live and work near agricultural operations. Farmland has value to urban-oriented Californians for the open space it provides. To growers, California farmland is a vital economic resource supplying food and fiber to the world, as much a business enterprise as any high-tech manufacturing plant.

During the 1990s, the State saw increasing pressure on agriculture as suburban development moved into what were traditionally agricultural communities. These new residents were often not as understanding nor accepting of the facts of farming — the noise of tractors at night, odors of animals, dust during plowing, and pesticides and fertilizers being sprayed near their homes and schools. From the farmer's viewpoint, encroaching development often means restraints on routine operations (for example, pesticide applications), liability for trespassers, problems with theft and vandalism, damage from dogs, and urban drivers on rural roads.

California has the nation's strictest pesticide laws and regulations. Pesticide sales and use are very tightly controlled. Yet, for many of agriculture's newest suburban neighbors, these controls have been insufficient. These newcomers are concerned about toxic chemicals — including pesticides — and want a say in decisions on what will be used, and when. Farmers view this as unwarranted interference in their business operations.

The resulting friction has escalated at times into hostility and conflict between competing values and land uses. The long-term solution is better land use planning, including firmer urban growth boundaries and, where appropriate, use of buffer zones between agricultural and urban uses. If California farmland is to be maintained and agriculture is to remain a critical component of the State's economy, decisions must be made at the local level that place developments far enough from agricultural production that the two do not come into conflict. Equally important is improving understanding between farmer and urban resident of the problems and concerns that each has. Since pesticide use is often the flashpoint of ag-urban conflict, DPR has initiated several projects to promote better understanding and cooperation among neighbors.

DPR has provided training to CAC staff on how to hold public meetings on volatile issues. DPR also contracted with the University of California Agricultural Issues Center to hold a workshop to address conflicts and solutions in those controversy-prone parts of California where urban development lies next to commercial agriculture. About 50 persons attended the 1995 workshop to address the increasing number of "ag-urban edge" conflicts.

The Agricultural Issues Center published a report, *Farmers and Neighbors: Land Use, Pesticides, and Other Issues*, which among other things, recommended that DPR:

- collect and disseminate the lessons of successful regulatory programs at the local level, describing workable community programs;
- develop a handbook for agricultural commissioners and public health officers as a tool to coordinate pesticide use, community safety, and public agency response;
- provide citizens simple, clear information about where to go and what to do in cases of perceived exposure to pesticides; and
- provide an informational "hot line" to help clear up issues and possible misunderstandings as quickly as possible.

—  
*Since the margin between control of pests and injury to host plants frequently is small, more attention should be given to following directions as to dosage and hazard of application.*  
— 1941 Department annual report

The consensus was that DPR should concentrate on “complementing or reducing the emphasis on regulations by more flexible and open techniques at the community level,” with the focus on “voluntary and proactive steps that are open to citizen participation and cooperation, and can serve to create and maintain good neighbors across the ag-urban edge.”

### People and Pesticides Quality Team

In its 1997 strategic plan, the Department identified several issues it needed to address to enhance its overall effectiveness in achieving its mission. One key strategic focus was to improve responsiveness to community concerns about pesticide applications and their potential impacts, and where possible, to facilitate voluntary cooperative community measures to avoid future problems. Consequently, in March 1998, the Department formed a Quality Team to evaluate different systems for improving DPR and CAC responsiveness to public concerns about pesticides. To ensure a diversity of perspective and broad expertise, Team members were appointed from various DPR branches and the California Agricultural Commissioners and Sealers Association (CACASA). By including CACASA members on the Team, the Department underscored the essential role that commissioners play at the local level in addressing community concerns.

The “People and Pesticides” Quality Team delivered a report to DPR management in late 1999. It emphasized that DPR and the CACs must, among other things, improve public understanding of the regulatory process, listen to the public and discuss their concerns with them, and have mechanisms in place for improving regulatory programs in response to public concerns. The Team recommended that DPR improve internal communication systems, establish a correspondence database to better respond to citizen letters, improve outreach to the public and stakeholders, and improve the Department’s external Web site. The Team’s detailed recommendations were incorporated into DPR’s 2000 Strategic Plan.

### Northwestern California Tribal Territories Herbicide Monitoring Project

In California, approximately 50 percent of the State’s 32 million acres of forested lands consists of timber stands of harvestable quality. Government agencies, private companies, and private individuals own these lands, and may manage some or all of their lands for commercial timber production. An integral part of forestry management includes the use of herbicides to control vegetative competition to new seedlings during reforestation programs and stand improvement. In northwestern California, Native Americans have voiced concern over the use of reforestation herbicides on private and public forest land, as well as the general use of pesticides in agricultural areas adjacent to Native American ancestral territorial lands, and the use of herbicides along rights-of-way (e.g., roadsides). Concerns have focused not only on the impact direct applications may have on forest plants that are the source of traditional foods, medicines, and basketry materials, but also on the impact that off-site movement may have on rivers, streams, and other sources of drinking water, and fish and wildlife habitats. These unique exposure scenarios are not specifically addressed in risk assessments conducted by regulatory agencies. Although the U.S. Forest Service and the California Department of Transportation (CalTrans) have established programs to work with tribal representatives to identify and protect designated areas from herbicide spraying, not all Native Americans participate in these programs, and may collect plant materials in unidentified locations. Additionally, Native Americans are concerned that the protective measures are not sufficient.

At the request of several Native American tribes in this region, DPR began working with U.S. EPA to resolve the concerns of residents. U.S. EPA Region 9 provided funds to DPR and the County Agricultural Commissioners to hold a series of community meetings with Native Americans to identify joint projects to address concerns regarding the impact of pesticide use on Native American communities.

After working with the Native American representatives to identify areas of concern, Environmental Monitoring Branch began a multi-year project in 1996 to monitor surface waters, plants and other natural resources for herbicides and other pesticide residues

*Meetings were held with local groups of pest control operators or agricultural aircraft pilots to discuss problems applying to local conditions.... At one meeting it was pointed out to the pilots that there were certain jobs, particularly those adjacent to residential properties, that should not be attempted as the home owners would complain, not only of the noise of the airplane, but also against drift of the pest control materials....The matter was thoroughly discussed by the various pilots present and all indicated they understood that they...would be subject to disciplinary action if complaints were made against them.*  
– 1952 Department annual report

from their uses in reforestation, weed control, and agriculture practices in that region. Concurrent with monitoring, DPR Worker Health and Safety Branch began evaluating analytical models and other assessment tools to estimate exposure of Native Americans, particularly persons gathering traditional plants for basket making and other cultural activities. The goal was to determine if unacceptable exposures were occurring and to develop recommendations for Native Americans to reduce pesticide exposure. (See Chapter 6 for discussion of exposure assessment.)

### Lompoc Interagency Work Group

In 1993, DPR began investigating health concerns of residents in the Santa Barbara community of Lompoc and the surrounding valley (population approximately 42,000). Residents were concerned that pesticide applications in the valley — a vegetable- and flower-growing region — were causing a variety of health problems. Working with the County Agricultural Commissioner, DPR staff had several community meetings to discuss health symptoms, pesticide exposure, exposure to dust and pollen, effectiveness of regulatory restrictions in protecting citizens from pesticide exposure, quantities of pesticides used in the area, and available alternatives to pesticides. To help allay community concerns, the CAC had placed a number of restrictions on pesticide applications in the area, including buffer zones around schools and residences. In 1995, DPR staff completed a report on pest management practices in the Lompoc Valley, with an emphasis on crops grown, their associated pests, and pest control practices, including use of pesticides and alternative pest control methods. In 1998, DPR completed an analysis of weather patterns in Lompoc. This analysis compared weather conditions in Lompoc to 11 other coastal areas in California. The analysis indicated that pesticide air concentrations could be higher than the comparison areas due to differences in weather, during some periods of the year.

In 1997, DPR formed the Lompoc Interagency Work Group (LIWG) to better coordinate efforts to determine whether Lompoc residents suffered a disproportionate rate of illness and if so, to determine the cause. The LIWG is composed of scientific staff from federal, state, and county agencies as well as community representatives. The LIWG formed several subgroups to develop recommendations addressing health concerns, to conduct a pesticide air monitoring strategy, and to consider potential exposures from other environmental factors found in the area, such as crystalline silica, radon, pollen and mold. The pesticide exposure subgroup developed a workplan that recommended comprehensive air monitoring near agricultural areas during the growing season to determine whether pesticides migrate by air to adjacent residential areas. In 1998, DPR conducted preliminary monitoring for 12 pesticides. In 2000, DPR conducted more extensive monitoring for 29 pesticides (and breakdown products) widely used in the area and of potential health concern. Cal/EPA's Air Resources Board planned to monitor for crystalline silica in late 2000. (Diatomaceous earth is mined in the Lompoc Valley.) Final reports on monitoring and analysis were not expected until the end of 2001.

At DPR's request, Cal/EPA's Office of Environmental Health Hazard Assessment evaluated if illnesses in the Lompoc area were occurring at a higher rate than would normally be expected. OEHHA examined 1991 through 1994 hospital discharges, birth defects rates, and cancer incidence and reported in 1998 that respiratory illnesses, in particular asthma and bronchitis, appeared to be elevated in Lompoc with respect to comparison areas. However, a subsequent analysis which included data through 1997 found few significant differences in illness rates between the Lompoc area and similar communities.

### Environmental Justice

Environmental justice is a term used to describe the fair treatment of people of all races, cultures, and incomes with respect to the implementation and enforcement of environmental laws and regulations. A number of studies have determined that minorities and low-income populations face disproportionate risks associated with exposure to toxic substances. A federal Executive Order has directed federal agencies — and state agencies delegated with responsibilities for implementing federal laws — to incorporate

***Less than five percent of the registrants cause more than 95 percent of the enforcement problems. It is believed that in time uniformly handled regulations not only will outlaw the bad practices of the few but will protect the many from unscrupulous competition and in addition provide a bulwark of consumer confidence throughout the agricultural chemical business.***

*— 1934 Department annual report*

environmental justice into their programs. Chapter 690, Statutes of 1999 (SB 115) made Cal/EPA the lead agency in State government for environmental justice programs, and required the Agency and its boards, departments, and offices, to: (1) ensure their programs are conducted in a manner that provide fair treatment of all races and income levels, (2) promote greater public participation in the development and implementation of environmental policies, and (3) improve research data collection for environmental programs related to the health and safety of minorities and low-income populations.

DPR participates in a statewide effort to work with U.S. EPA on the development of guidelines for environmental justice under Title VI of the federal Civil Rights Act, and participates in an agency-wide working group to draft a model environmental justice mission statement and other plans to implement SB 115.

DPR has also identified environmental justice as a high priority in its Enforcement Initiative. (See Chapter 7 for overview of Enforcement Initiative.) Consistent with SB 115, DPR will adopt, and will recommend that the CACs adopt, an environmental justice mission statement intended to assure the fair treatment of people of all races, cultures, and income levels. A key element is for DPR and the CACs to ensure greater public participation in the development, adoption, and implementation of environmental regulations and policies. Beyond the environmental justice distinctions of race, culture, and income, the Enforcement Initiative states that DPR and the CACs will adopt a mission statement “to serve all customers, regardless of occupation, community standing, or pesticide bias with respect, patience, and due diligence.” The Enforcement Initiative also calls for DPR to monitor statewide compliance with this policy and include it in the contracts it negotiates with each county for pesticide enforcement.

*We try to treat each problem as constructively as possible and at the same time enforce the law equally against all offenders. We must avoid special actions as they might be construed as partial.*  
– 1936 Department annual report

# Information Management and Access

In fulfilling its statutory role regulating the sale, possession and use of pesticides in California, the Department collects extensive data on pesticide active ingredients and pesticide products. These data must be catalogued and stored to make them accessible to not only DPR staff, but also to individuals outside the Department, including County Agricultural Commissioners, pesticide users, scientists, other stakeholders, and the public. The growth of the Internet and particularly the World Wide Web in the late 1990s made managing information and ensuring access both a dynamic challenge and tremendous opportunity.

## Data Library

The Pesticide Registration Branch manages the pesticide data library. Library staff catalog, index, and maintain data volumes received from pesticide registrants. The library houses some 50,000 volumes of data containing more than 163,000 studies. This includes studies which have been submitted to U.S. EPA; additional efficacy, safety and environmental data required by California; registration-related correspondence; and the original evaluation memoranda. Archived data are periodically referenced and reviewed as similar products are registered.

Although some data kept in the DPR library duplicate information housed at U.S. EPA, information on file at U.S. EPA headquarters in Washington, D.C., is not easily accessible to scientists at DPR and other state agencies for review, evaluation, and formulating recommendations and decisions. Library staff also responds to public requests for data and other information pursuant to special provisions of the California Public Records Act.

## Label Resource Center

The Registration Branch also manages the Label Resource Center, which maintains all product files for pesticides registered in California, including Section 24(c) and Section 18 files. Only authorized persons may directly access these files since they contain proprietary information (primarily statements of formulation of pesticide products, which are considered confidential business information under federal law). However, Label Resource Center staff makes non-confidential information available to the public, registrants, County Agricultural Commissioners, DPR staff, poison control centers, the Legislature, and other government agencies. The center receives approximately 1,000 requests per month for copies or explanations of labels; registration status of products; and computer-generated label information searches for specific crops, commodities, sites, and methods of application. The center also provides information on U.S. EPA notices and registration standards. Inquiries on label interpretations are referred to the Pesticide Enforcement Branch.

## Department Databases

Various computer programs, developed by DPR information technology staff in all branches, provide pesticide and registration information to DPR staff, other government agencies, and interested members of the public. DPR employs various databases in decision-making processes that involve the review and acceptability of pesticide data, the tracking of registration activities and mandated time frames, and the dissemination



Number of pesticide products registered in California:

- 1935: 3,500.
- 1945: 7,136
- 1950: 9,070
- 1956: 11,904 (about the same as in year 2000)

of information to governmental, private, and public sectors. To meet DPR's goals, objectives, and responsibilities for statewide pest management, DPR and County Agricultural Commissioners must have access to up-to-date information for all products registered for use in the State. In addition, to comply with recent legislation, DPR requires increasingly sophisticated and complex analyses of pesticide products. Databases associated with these tasks include:

**Product/Label:** Since the early 1970s, DPR has maintained a database on all pesticide products currently (and previously) registered for use in California. The database contains information on approximately 33,000 pesticide products. There are approximately 11,000 active products at any given time. An average of 1,000 new products are added to the database annually, and a similar number of products are inactivated due to nonrenewal, suspension, or cancellation. Between 2,000 and 2,500 label amendments are processed annually. Data fields in the product label database include: U.S. EPA or California registration number, product name, type of registration, type of pesticide, formulation, active ingredients, percent of each active ingredient, specific gravity, all commodity/crop/sites on which the product may be used, health and environmental hazards, target pests, and application instructions. Other information includes preharvest and reentry intervals, environmental hazards, and special application instructions. The product/label database is available to all DPR staff and the public via the Internet.

**Chemical Ingredient:** Queries for ingredients using name or chemical code, as well as registrants, pesticide products, and a daily report on registered active ingredients and product counts.

**Chemical Company Name or Number and Chemical Company Address Information:** Queries for names, addresses, product information, and the name of a DPR registration specialist assigned to the company's application requests.

**U.S. EPA/OPP Queries:** In cooperation with U.S. EPA's Office of Pesticide Programs (OPP), DPR provides access to brief registration information on approximately 89,000 federally registered products. The data include product number and name, company number and name, registration date, cancellation date and reason (if cancelled), and product manager name and phone number. In addition, OPP's databases containing chemical ingredient and firm information are now available. The chemical data is searchable by common, technical, synonym, chemical abstract (CAS) numbers, or trade names. The firm data is searchable by firm number, name, or portions thereof.

These chemical, firm, and product databases have complementary links and are searchable by multiple variables. The data is updated weekly and available on DPR's Internet site.

**Section 18 Emergency Exemptions:** Lists current emergency pesticide registration exemptions in California, their date of issue and expiration, and an Adobe Acrobat image file of DPR's letter of approval and label. (See Chapter 3 for discussion of Section 18s.)

**Volatile Organic Compounds (VOC) Emissions Inventory:** Data on emissions from agricultural and commercial structural pesticide applications, used in the State Implementation Plan (SIP). (See Chapter 11 for discussion of VOC program.)

**Chemical Dictionary:** This file is the central repository for basic information on chemicals contained as either active or inert ingredients in pesticidal products registered in California. Maintained by the Registration Branch, the database contains trade names and synonyms useful when dealing with nomenclature problems, CAS numbers, and links to other data sets. This database is also available on DPR's Web site and links to U.S. EPA's master chemical database

**Pesticide Registration Tracking:** Maintained by Pesticide Registration Staff, this database tracks all business transactions performed on submissions received from pesticide registrants. The database has been active since 1986 and has tracked an average of 5,000 to 7,000 submissions each year, monitoring the status of 3,000 to 4,000 submissions at any given time. The database is used to assess workload, monitor time frames, and is also used to produce required California Environmental Quality Act (CEQA) notices to stakeholders. This database was converted to a Web-based format in 1999 and is available throughout the Department on DPR's intranet.

Representations must be  
restricted to facts.

– 1936 Department annual report

**Pesticide Registration Licensing/Renewal:** This Web-based application is used to generate yearly renewals and licenses for all products registered in California. The Permit Reform Act requires the Pesticide Registration Branch to track renewal processing performance relative to mandated time frames and report yearly on said performance. This application acts as the front-end to the Product/Label Database and provides licensing status and license images to staff via the Department's intranet.

**Pesticide Residue:** Maintained by DPR's Enforcement Branch, this database records information collected by the Department's residue monitoring program about pesticide residues found on commercially available products grown in California and imported from other states and countries. In a typical year, more than 7,000 samples are collected and tested for multiple pesticides. (*See Chapter 8 for a discussion of the residue monitoring program.*)

**Pesticide Use Reporting (PUR):** Tracks all reported pesticide use in California since 1990. (*See Chapter 10, Pesticide Use Reporting.*) PUR data is released annually and is accessible to the news media, researchers, and the general public. Annual summaries of the statewide PUR data are available from DPR in hard copy or floppy disk formats for a nominal charge. A CD-ROM with the entire annual database (2.5 million records and associated tables) is also available. Statewide summaries of chemicals and commodities are available free online, and the database may be queried for county-by-county data as well. There is also a "top five" list of chemicals and commodities for each county, based on cumulative pounds of pesticides applied.

In May 2000, DPR sponsored a one-day seminar on uses of the PUR data, providing a forum for researchers and other data users. The Department also received funding in the fiscal 2000-01 budget to create a Web site that will provide interactive search-and-query capabilities to enable the public to get localized pesticide use information.

**Surface Water:** Provides an archive for more than 46,000 pesticide sampling results from surface waters throughout the state since 1984. Samples have been collected in fresh, estuarine, and saline waters, including rivers, streams, canals, ponds, lakes, bays, estuaries, sloughs, runoff from fields, tailwater recovery basins, and agricultural drains. Sampling data may be used for (1) designing monitoring programs, (2) exchanging information with other agencies, and (3) implementing, in part, an agreement between DPR and the State Water Resources Control Board (SWRCB).

DPR and the SWRCB signed a Management Agency Agreement (MAA) in March 1997 to protect water quality related to the use of pesticides. In order to implement the MAA, DPR and SWRCB staff developed the California Pesticide Management Plan for Water Quality. As outlined in the Plan, DPR and SWRCB staff agreed to exchange results of chemical analyses and biotoxicity tests for pesticides in samples from California surface waters. Further, DPR agreed to develop and maintain a database of those results. In 2000, DPR released the database on CD-ROM. (*See Chapter 11 for information on DPR's Surface Water Program.*)

**Well Inventory:** A unique archive of ground water sampling information which summarizes monitoring results conducted by State, local, and private sampling agencies. Maintained by the Environmental Monitoring Branch, this database in 2000 contained sampling results from 19,725 wells throughout California's 58 counties, including results for more than 300 chemicals. Data can be obtained for unique wells, geographic areas, chemicals, analytical results, or sampling agency. When known, well construction information is included. (*See Chapter 11 for discussion of DPR's Ground Water Program.*)

**Endangered Species Project:** Provides pest control operators and other interested parties with information on specific pesticide use limitations that protect listed species. The online, interactive database receives queries first by county, then by section, and finally by individual township. The results are displayed on screen as map images. Within sections, the database identifies listed species that may be present and provides a list of pesticides with use limitations for those listed species. Users query the database for pesticides they plan to apply, and the database provides use limitations that apply in each section. The report also includes a depiction of the species (if the species affects any pesticide use).



*These are good laws and everyone knows they work. Under them, the Department has endeavored to work with vision and does those things that are generally accepted as honestly sound by the best informed persons.*  
— 1938 Department annual report

The Endangered Species Project online pages also provide extensive background information from DPR, U.S. EPA, and other government agencies on threatened species and their habitat. These include county-by-county guideline documents on pesticide use limitations; land use maps for selected California counties that show urban development trends; reports on pesticide use near habitats, linking data from the California Department of Fish and Game with DPR's Pesticide Use Report; and the Endangered Species List Server, a free service for receiving e-mail announcements on new endangered species, interim measures bulletins for California, and other pesticide-related endangered species information. (See Chapter 11 for discussion of DPR's Endangered Species Program.)

**Enforcement Monitoring:** In 1997, the Legislature provided funding to create the Enforcement and Compliance Action Tracking System (EnfAct), a comprehensive database of compliance and enforcement actions on agricultural pesticide applicators, dealers, and advisers. The goal was to improve supervision of license and certificate holders ('licensees'), particularly those with multiple licenses who may also operate in multiple counties.

DPR expanded the database's scope beyond the initial four license categories to track enforcement and compliance actions in all nine licensing and certification programs managed by DPR's Enforcement Branch, in addition to the certified private applicator program administered by County Agricultural Commissioners.

In the project's first phase, all licensing records for an individual or business were consolidated into a single file management system, requiring the physical handling of some 15,000 individual and business records. Concurrently, the central license administration database was redesigned and updated to support the central filing system, and to ensure data compatibility and format consistency. This was completed in May 1998.

In the second phase, DPR began receiving compliance action summary data and partially implemented the installation of the wide-area network. Approximately 5,000 enforcement and compliance action summaries were collected the first year under the new reporting system.

When the system is completed in 2001, DPR will begin collecting and tracking incidents of noncompliance noted during pesticide inspections. All incoming data will be validated and uploaded to a central database at DPR headquarters. Regional Office staff will have access to all program information resources. Basic access to enforcement action tracking and central licensing databases (by individual, by business, by county, etc.) will be available to interested persons by Internet Web data query menus and Public Information Act requests.

DPR staff will use the database to review the compliance history of licensees before approving or renewing a State pesticide license. Tracking data will be also reviewed to monitor the performance of county enforcement and compliance programs at a statewide level in accordance with FAC Section 12844.

### DPR on the Web

In October 1995, DPR launched its Web site, <http://www.cdpr.ca.gov>. The site offers extensive information about the Department and its activities. Users may subscribe to e-mail delivery of news releases, notices to registrants, proposed rulemaking packages, and information on endangered species. Interested persons may also submit electronic comments on rulemaking.

The site also offers access to DPR database resources, including product/label information, chemical ingredient information, chemical company information, and product/chemical databases developed by the U.S. EPA.

**Other Web page features include:**

- Current and archived news releases
- Pesticide enforcement, licensing and certification requirements
- Consumer fact sheets
- DPR publications and reports
- Legislation, regulation, and planning documents



*Technology has the potential to revolutionize the internal operations of the State, and the way it serves citizens as customers... While not a panacea for all governmental and social problems, emerging technologies, wisely used, offer immense opportunities to address needs and provide services that up to now have been beyond the capacity of state government*

*– Little Hoover Commission, "Better Gov: Engineering Technology-Enhanced Government"*



- Details on reduced-risk pest management practices
- A directory of DPR staff and County Agricultural Commissioners
- Pesticide use reporting data
- Links to other government and educational pesticide Web sites.

### Establishing an E-Government Environment

In 1999, the Davis Administration made improving the efficiency and effectiveness of State government one of its priorities, with a key focus on electronic transactions and interaction to leverage technology to serve the needs of the State's residents. In September 2000, Governor Davis issued an Executive Order directing all State agencies and Departments to develop e-government implementation plans that "shall include a description of the most widely used services at each agency's departments, identify those best suited for electronic delivery, identify the population served by these services, and include a description of current or planned systems to measure the level of customer satisfaction with the identified services." The Executive Order defined e-government as "the provision of services and information by state government to the public through the Internet, integrated Internet-based technologies, and voice and data technologies dependent on the Internet." Furthermore, the Executive Order acknowledges that "appropriate implementation of e-government provides for enhanced access to government information, delivery of government services and participation in the democratic process through secure electronic technology designed to protect privacy" and that "the coordinated development of e-government will act as a catalyst to re-engineer current practices and aid State agencies and departments to design better ways to provide government services."

Months before the signing of the Executive Order, DPR began planning a major upgrade of its Internet presence to make better use of information technology to enhance the access to and delivery of its services to benefit citizens, the regulated communities, government partners, and employees. In September 2000, DPR engaged a consulting firm to conduct a business process analysis and management study and recommend selected business processes that could be migrated to the Internet. Understanding the new imperatives of establishing a virtual service delivery environment requires building rational structures around the needs of consumers, registrants, pesticide users, and others, moving from simple information sharing to more customer-oriented service, integrating technology across multiple functions and enabling a two-way flow of information. DPR's goal is to integrate the Internet into daily government operations and service delivery, applying information technology in a way that effectively integrates policy goals, organizational processes, information content, and technology tools so they work together to achieve programmatic and public policy goals. This new environment will allow DPR to put enterprise data, applications, and processes at the fingertips of Web-enabled employees and external stakeholders. The goal is to ensure that information provided and transactions made are clear, concise, timely, useful, cost-effective and secure.

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*Governments today have no choice but to aggressively pursue an all-encompassing shift from traditional to online service delivery. To do otherwise places them in jeopardy of falling below minimally acceptable standards of service.*

*– Janet Caldwell, Director,  
IBM Institute for Electronic  
Government*

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# Pesticide Regulatory Program Funding

The Department of Pesticide Regulation is supported by various fund sources, including the General Fund, Department of Pesticide Regulation (DPR) Fund, Federal Trust Fund and reimbursements.

## History of Program Funding

A long-standing policy of the Department of Food and Agriculture (of which the pesticide regulatory program was a part until 1991) was that the General Fund should be used for programs that directly benefitted the general public or agriculture in general, while programs that directly benefitted an identifiable segment of industry should be supported by special charges or fees. This distinction, while initially clear cut, became blurred over the years.

Pesticide and pest control legislation in the early part of the twentieth century was sponsored by the regulated industry and was clearly focused on preventing fraudulent practices and unfair competition. During these years, those activities clearly related to registration and product quality were fully funded by industry fees, which were increased as necessary to keep the programs self-supporting.

When the Department's first produce testing was authorized by the Chemical Spray Residue Act of 1927, consumer and public health protection was incorporated into the Department's pesticide regulatory program. The regulatory aspect of the residue monitoring program has been supported by the General Fund since its inception.

As the pesticide regulatory program grew through new statutory mandates, new mechanisms were created for funding industry-supported programs. Industry funding was consolidated in the Agriculture Fund, which was renamed the DPR Fund with the creation of Cal/EPA in 1991. Along with minor amounts from penalty assessments, earned interest, and other miscellaneous amounts, the DPR Fund revenues consist of three primary sources: mill assessments, annual certificates of product registration, and pesticide-related business licenses.

## Mill Assessment

In 1971, a mill assessment on pesticide sales was enacted (Chapter 1367, SB 825). For each dollar of sales of a pesticide registered and labeled for use in California (including spray adjuvants), a mill rate is assessed. (One mill is equivalent to \$0.001 or 1/10th of one cent.) The rate was set at 8 mills (\$.008), with County Agricultural Commissioners receiving 62.5 percent of these funds for local enforcement of pesticide laws.

The Food Safety Act of 1989 (Chapter 1200, AB 2161) increased the assessment to 9 mills. The bill authorized full pesticide use reporting and enhanced produce monitoring among other food safety measures. The increased revenue was to cover the additional costs of these programs at the county level.

In 1990, DPR lost General Fund revenues as part of the State's effort to address a statewide budget crisis. To compensate for loss of General Funds, the mill assessment was increased (Chapter 1679, Statutes of 1990, AB 2419) from 9 to 18 mills, with counties receiving 31.25% of the revenues to keep their funding consistent with the amount they had been receiving. The legislation included a sunset clause to revert the mill assessment to 9 mills on July 1, 1992.

***The California agricultural chemicals laws are practical and effective. They serve those influenced; and each manufacturer, user, and official is doing his indispensable part.***

– 1940 Department annual report

In 1992, California continued to face large deficits and the Legislature further reduced General Fund support and increased the mill assessment (Chapter 706, SB 1850) to a total of 22 mills, with a sunset clause of July 1, 1997. Twenty-one mills continued to be divided between DPR and the counties. The 22nd mill was divided between CDFA and the counties. The counties received 32.5 percent of the additional mill to help fund costs associated with collection of pesticide use data. CDFA received 67.5 percent of one mill to fund its Pesticide Consultation and Analysis Unit. (The unit was formed when the pesticide program was moved from CDFA to Cal/EPA, to implement a requirement in the GRP-1 that DPR consult with CDFA on certain pesticide-related regulatory actions. GRP-1 established Cal/EPA in 1991.)

In 1993, legislation (Chapter 1176, AB 770) closed a loophole in the collection of the mill assessment by identifying the person who first sold the pesticide into or within the State, whether the registrant, a pesticide broker, or a pesticide dealer, as the responsible party for paying the assessment.

In 1997, legislation (Chapter 695, SB 1161) increased the mill assessment, which under the previous legislative sunset date had reverted to 9 mills two months before. As a result, the rate was 15.15 mills from January 1, 1998 through March 31, 1999 and increased to 17.5 mills (the maximum allowed under SB 1161) beginning April 1, 1999. Between January 1, 1998 and January 1, 2003, the Director has the authority to lower the mill rate, with certain restrictions. Without intervening legislative action, the rate again sunsets to 9 mills effective January 1, 2003. In addition, between January 1, 1998 and January 1, 2003, the Director may collect an additional assessment of up to three-fourths mill (from agricultural products only) to directly support or augment the funding of CDFA's pesticide consultation activities.

DPR distributes 6 mills of the assessment revenues to the CACs. State law limits expenditure of the remaining mill assessment revenues to the program areas authorized by Chapters 2, 3, and 3.5 of Division 7 of the FAC. Those program areas include, but are not limited to, the following major areas of activity: agricultural pest control research, pesticide registration, worker safety, collection of toxicology data and preparation of risk assessments, and regulation of the use of restricted materials and environmentally harmful materials.

Payment of the mill assessment is due quarterly. DPR must receive the funds no later than one month after the close of each calendar quarter. Products registered for reformulation (sold to someone who then repackages and registers the product) or products registered by governmental agencies are exempt from the mill assessment requirements.

### Certificates of Registration

Each year, to sell a pesticide for use in California, manufacturers of, importers of, or dealers in any pesticide must obtain a certificate of registration from DPR. The certificate expires December 31 of each year. Industry support of registration activities was increased in 1987 when product registration fees went from \$40 to \$200. Statute authorizes use of these fees for the same purposes as mill assessment revenues.

### Pesticide-Related Business Licenses

Statute requires various pesticide-related businesses (e.g., agricultural pest control business, maintenance gardener, qualified applicator) to be licensed by DPR and establishes the rate and term of the various licenses. The annual fees range from \$15 to \$200. Generally, licenses are issued for two years. Major exemptions from licensing requirements include: structural pest control business (licensed by the Structural Pest Control Board of the Department of Consumer Affairs); businesses performing preservative treatment of fabrics or structural materials; household or industrial sanitation services; treatment of seed when this activity is only incidental to the person's regular business; and removal of pests without the use of pesticides.

Generally, license fees may be used for the administration and enforcement of licensing activities, including the issuance of a license and the regulation of the activities of those licensed. Further, DPR distributes 60 percent of these funds to the counties, based on the share of license holders in each county.

**Whether a substance is a pesticide and under the jurisdiction of that law depends not only upon the nature of the substance and the information on the label, but also upon intended uses and upon printed, written, or oral claims. For example, petroleum oil sold for use solely as a fuel or lubricant is not a pesticide, but the same material is a pesticide when sold or intended for application to plants to control scale insects, or as a spray to control weeds, or for application to ponds to control mosquitoes.**  
— 1944 Department annual report

### Audits

DPR's Audit Branch performs audits of pesticide registrants, licensed dealers and brokers to ensure compliance with fee and registration requirements. The branch also investigates sales of unregistered pesticide products sold for use in California and helps provide a level playing field for registrants, licensed dealers and brokers, and consumers.

### Food Safety Account

California's Food Safety Act of 1989 (Chapter 1200, AB 2161) created a Food Safety Account, within the DPR Fund, supported by revenues collected from a surcharge on farm products and produce dealer and food processor annual license fees. Activities to be funded from this account include pesticide residue monitoring, review of pesticide residue analytical methods, research into alternative pest management practices, pesticide use reporting, and risk assessments on dietary exposure.

Legislation in 1997 (Chapter 727, AB 1559) redirected the surcharge back to the Department of Health Services effective December 31, 1998, and provided that after that date, sufficient monies will be transferred annually from the DPR Fund to the Food Safety Account to cover program activities.

### Other Fund Sources

Additional funding is also received from the U.S. EPA, U.S. Food and Drug Administration and U.S. Department of Agriculture. These funds support the Department's activities that are performed jointly or on behalf of these federal agencies.

A small percentage of the Departmental budget is provided by reimbursements, which are repayments of the cost of work or service performed or of other expenditures made for, or on behalf of, another governmental unit or department.

***Registrants of good products are encouraged to take pride in them and to help lead law enforcement against unfair competitors. It is plain stupidity when one tries to beat the law or to make a stake and leave California. In the end, he will likely suffer more than a customer to whom he makes an illegal sale.***  
– 1944 Department annual report



# Key Abbreviations and Terms

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**AB:** Assembly Bill

**active ingredient:** the chemical or chemicals in a pesticide product that kills or otherwise controls target pests

**adjuvant:** chemicals added to a pesticide product to improve its effectiveness, including wetting agents, emulsifiers, spreaders, and penetrants

**ARB:** California Air Resources Board

**BDPA:** Birth Defect Prevention Act of 1984 (SB 950)

**CAC:** County Agricultural Commissioner

**CACASA:** California Agricultural Commissioners and Sealers Association

**CAS:** Chemical Abstract Service; CAS Number, a numeric designation that is given to a specific chemical compound

**CCR:** California Code of Regulations

**CDA:** California Department of Agriculture

**CDFARS:** California Department of Food and Agriculture

**CEQA:** California Environmental Quality Act

**data gap:** when registrants fail to submit required health or environmental studies

**DFG:** California Department of Fish and Game

**DHS:** California Department of Health Services

**DPR:** California Department of Pesticide Regulation

**economic poison:** synonym for “pesticide”

**EF:** emission factor

**EHAP:** Environmental Hazards Assessment Program

**EnfAct:** Enforcement and Compliance Action Tracking System

**EUP:** experimental use permit

**FAC:** Food and Agricultural Code

**FIFRA:** Federal Insecticide, Fungicide and Rodenticide Act

**FQPA:** Food Quality Protection Act

**GIS:** geographical information system

**GRP-1:** Governor’s Reorganization Plan 1, which established Cal/EPA and DPR

**HAP:** hazardous air pollutant

**IPM:** integrated pest management

**MAA:** management agency agreement

**mitigation measure:** a pesticide use practice to reduce the risk of harm to people or the environment

**model:** mathematical equations that represent certain processes. These equations can be implemented in a computer program to facilitate calculations and test model predictions against measured data.

- **NOI:** notice of intent
- **nonpoint source:** contamination that cannot be traced to a small definable location  
(compare with *point source*)
- **OAL:** State Office of Administrative Law
- **OEHHA:** Cal/EPA Office of Environmental Health Hazard Assessment
- **PCA:** pest control adviser, a person licensed by DPR and registered with the CAC who  
makes pest control recommendations
- **PCO:** pest control operator
- **PCPA:** Pesticide Contamination and Prevention Act of 1985
- **pesticide:** includes many kinds of ingredients used in products, such as insecticides,  
fungicides, rodenticides, insect repellents, weed killers, antimicrobials, and swim-  
ming pool chemicals, which are designed to prevent, destroy, repel, or reduce pests of  
any sort
- **PHED:** Pesticide Handlers Exposure Database
- **PMA:** Pest Management Alliance
- **PMAP:** Pest Management Analysis and Planning Program
- **PMZ:** pesticide management zone
- **point source:** a source of contamination, such as a spill or at a waste site, that is initially  
deposited and concentrated in a small, well-defined area.
- **PPE:** personal protective equipment
- **PREC:** Pesticide Registration and Evaluation Committee
- **PUR:** pesticide use reporting
- **PWEP:** Pesticide Workplace Evaluation Program
- **range:** a single series or row of townships, each six miles square, extending parallel to  
and numbered east and west from a survey base meridian line
- **registrant:** a person or corporation that has registered a pesticide for use in California  
and has obtained a certificate of registration from the Department
- **registration:** formal licensing by DPR of a pesticide product; required before it can be  
sold or used in California
- **restricted material:** a pesticide that with certain exceptions may be possessed or used  
only by or under the supervision of licensed or certified persons, and only in accord-  
ance with an annual permit issued by the CAC. The CAC may require that users  
employ specific use practices to mitigate potential adverse effects, or may deny the  
permit with cause. Permits must be specific as to site and time of application and are  
usually issued for a season or year.
- **right-of-way:** the strip of land over which highways, railroads, and similar facilities are  
built
- **RO:** regional office
- **RWQCB:** Regional Water Quality Control Board
- **SB:** Senate Bill
- **section:** a land unit of 640 acres (one square mile) equal to 1/36 of a township
- **SIP:** State Implementation Plan
- **SPCB:** Structural Pest Control Board
- **SWRCB:** State Water Resources Control Board
- **TAC:** toxic air contaminant
- **TMDL:** total maximum daily load
- **tolerance:** the maximum amount of pesticide residue allowed to remain in or on each  
treated food commodity. The tolerance is the residue level that triggers enforcement  
actions. That is, if residues are found above that level, the commodity will be subject  
to seizure by DPR. The tolerance is set by U.S. EPA, which must make a safety  
finding that the pesticide can be used with “reasonable certainty of no harm.”

[ Key Abbreviations and Terms ]

**township:** a public land surveying unit which is a square parcel of land, six miles on each side

**U.S. EPA:** U.S. Environmental Protection Agency

**U.S. FDA:** U.S. Food and Drug Administration

**UC:** University of California

**USDA:** U.S. Department of Agriculture

**VOC:** volatile organic compound

**WH&S:** Worker Health and Safety Branch



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