[環境省第２回ＰＯＰｓ対策検討会資料]

参考資料６

農薬（Level 1 Pesticides）のPBT国家行動計画（ドラフト）
米国環境保護庁 PBT物質 農薬WG
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Draft

PBT National Action Plan

For the Level 1 Pesticides

Public Review Draft

Prepared by

The USEPA Persistent, Bioaccumulative and
Toxic Pollutants (PBT) Pesticides Work Group

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EXECUTIVE SUMMARY

On November 16, 1998, the U.S. Environmental Protection Agency (EPA) released its Agency-wide Multimedia Strategy for Priority Persistent, Bioaccumulative, and Toxic (PBT) Pollutants (PBT Strategy). The goal of the PBT Strategy is to identify and reduce risks to human health and the environment from current and future exposure to priority PBT pollutants. This document serves as the Draft National Action Plan for the Level 1 Pesticides, which includes six of the Level 1 priority PBT pollutants identified for initial action under the PBT Strategy: aldrin, dieldrin, chlordane, p,p-dichlorodiphenyltrichloroethane (DDT), mirex, and toxaphene.

Aldrin, dieldrin, chlordane, DDT, mirex, and toxaphene are all highly chlorinated, persistent organic pesticides that were once widely used in large quantities in the United States. They were used for a variety of applications, including: insect control on agricultural crops and cotton, treatment of livestock, control of ants, termite control in houses, and control of insect carriers of human diseases such as malaria. Because of evidence supporting the adverse environmental and human health effects of these substances, including their probable carcinogenicity, the pesticide uses of all of the Level 1 pesticides were canceled in the U.S. in the 1970's and 80's. In general, the remaining sources of Level 1 pesticides in the United States include:

- unused stocks of these canceled pesticides;
- contaminated reservoirs such as sediments, soil, and localized contaminated industrial and dealership sites;
- atmospheric transport and deposition (from both regional and international sources); and
- DDT present as an impurity (<0.1%) in Dicofol, a pesticide currently used in the U.S. and Canada. (Despite the presence of DDT as an impurity in Dicofol, current Dicofol usage data indicate that DDT releases to the environment from this source are likely to be small.)

Human exposure to the Level 1 pesticides occurs mainly through the food chain, and for the most exposed populations, is probably due to the consumption of contaminated fish. Potential risk and health consequences due to the Level 1 pesticides are of particular concern for certain human populations who have increased exposure (e.g., subsistence fishers) and/or increased susceptibility (e.g., the developing embryo/fetus, nursing infants, and children).

The Agency's programmatic baseline for reducing risk of exposure to the Level 1 pesticides has historically focused on the control of product manufacture and use. In the U.S., the manufacture and distribution of all the Level 1 pesticides has been prohibited, registered pesticide uses have been canceled, and food tolerances revoked. Voluntary pesticides collection programs, which are primarily maintained by states and other non-EPA entities to collect unused stocks of waste pesticides, are also currently important mechanisms for reducing potential risk associated with the Level 1 pesticides.

Although uses of the Level 1 pesticides have been canceled, production facilities have been closed, and intentional releases have been effectively controlled, current research indicates that human and ecological health risk still exists from exposure to Level 1 pesticides. Data gathered in current multi-media monitoring efforts provide substantial evidence that the Level 1 pesticides are still ubiquitous in the environment, and at concentrations that may be of concern for both humans and wildlife. In addition, available information suggests that significant quantities of unused, obsolete pesticide stocks may be stored throughout the U.S. and overseas, which would have the potential to cause serious environmental contamination and human health risk if they were accidentally released or not disposed of properly. Therefore, to address these remaining risks, the Agency will focus on:

1. Preventing accidental releases by facilitating, encouraging, and supporting programs to collect and properly dispose of unwanted pesticides;

2. Facilitating, to the extent possible, the remediation or containment of non-point and reservoir sources including sediments, contaminated industrial sites, agricultural chemical dealer/storage sites, and past use sites on a priority basis.

3. Reducing human exposure through public education, fish advisories, and other outreach;

4. Working internationally to reduce or phase-out production and use of these substances, and to encourage environmentally sound management, disposal and/or destruction of stockpiles of these chemicals in other countries, with the goal of elimination of the risks from long-range transport; and

5. Continued monitoring of the Level 1 pesticides in all relevant environmental media, fish and wildlife, and humans with the goal to provide information regarding continued and emerging problems and to serve as the basis for measuring progress.

Agency activities to support states, tribes, and local governments in their pesticide collection programs will include continuing to supply technical assistance, helping to resolve regulatory issues and barriers, helping identify options for financing Clean Sweep programs, supporting program outreach, and facilitating the collection of pesticides from households and urban businesses.

The Agency's specific strategy for addressing reservoir sources and for monitoring environmental pollutants will not be limited to a focus only on the Level 1 pesticides. Rather, it will be part of broader Agency and other federal efforts, including: the Agency-wide contaminated sediment management strategy, the Agency's Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and Resource Conservation and Recovery Act (RCRA) programs, ongoing monitoring efforts, and Agency research on the sources and pathways of human exposure to toxic pollutants.

Recognizing that the consumption of contaminated fish is currently considered a primary route of human exposure, the Agency will continue to promote exposure reduction through public outreach with a focus on fish consumption advisories. This will include: working with state, federal, and tribal agencies to ensure adoption of consistent methods for developing and communicating fish consumption advisories, working with the Agency for Toxic Substances and Disease Registry on the development of outreach materials, and maintaining the National Listing of Fish and Wildlife Advisories.

The Agency will also continue to work on and coordinate with multiple international efforts including: 1) the United Nations Environment Programme Prior Informed Consent Procedure, Obsolete Pesticides Program, and Global Persistent Organic Pollutants treaty; 2) the United Nations Economic Commission for Europe Convention on Long-Range Transboundary Air Pollution (LRTAP); 3) the North American Commission for Environmental Cooperation Sound Management of Chemicals Program, and Regional Action Plans for Chlordane and DDT; 4) the North American Free Trade Agreement Technical Working Group on Pesticides; and 5) the World Health Organization's DDT phase-out activities as part of the Rollback Malaria Program; and 6) the Great Lakes Binational Toxics Strategy.

EPA considers stakeholder involvement essential to reaching the goals of the PBT Strategy. EPA will seek stakeholder input and invite comment on this draft national plan, as well as encourage all interested partners to join in implementing the key actions contained in this plan to reduce risks to human health and the environment from exposure to Level 1 pesticides. EPA is announcing the availability of this action plan in the Federal Register. Additional details on the Federal Register schedule are available at the PBT internet site: www.epa.gov/opptintr/pbt/. The Agency is soliciting public comment and information or data on the following topics and issues related to the PBT pesticides (Level 1):

- quantities of domestic unused stocks of pesticide products;
- historical trends or current soil residue levels (urban and agricultural);
- information on sites with significant Level 1 pesticide contamination that have not been identified in Appendix D;
- current indoor levels of pesticides used in residences;
- alternative disposal and soil/sediment remediation methods, and performance information;
- other sensitive or highly exposed human subpopulations;
- meaningful and feasible ways to address the problem of canceled pesticides in the environment;
- meaningful PBT goals, performance measures, and time frames for such accomplishments.

1.0 INTRODUCTION

The U.S. Environmental Protection Agency (EPA) created the Persistent, Bioaccumulative and Toxic (PBT) Chemical Initiative and developed an agency-wide PBT strategy to address the remaining challenges of priority PBT pollutants in the environment. These pollutants pose risks because they are toxic, persist in ecosystems, and accumulate in fish and up the food chain. The challenges remaining for PBT pollutants stem from the fact that many of them tend to be transported long distances in the air, transfer rather easily among air, water, and land, linger for generations, and span boundaries of programs and geography, making EPA's traditional single-statute approaches less than the full solution to reducing risks from PBTs. Due to a number of adverse health and ecological effects linked to PBT pollutants, and the fact that fetuses and children are especially vulnerable to health damage from PBT pollutants present in the food supply and the environment, EPA must aim for further reductions in PBT risks. To achieve further reductions, a multimedia approach is necessary. Accordingly, through the PBT Strategy, EPA has committed to create an enduring cross-office system that would address the cross-media issues associated with priority PBT pollutants.

The goal of the PBT Strategy is to identify and reduce risks to human health and the environment from current and future exposure to priority PBT pollutants. To attain this goal, EPA has identified several guiding principles:

- Address problems on multimedia bases through integrated use of all Agency tools
- Coordinate with and build on relevant international efforts
- Coordinate with relevant Federal programs and agencies
- Stress cost-effectiveness (e.g., amount of PBT removed for dollar spent)
- Involve stakeholders
- Emphasize innovative technology and pollution prevention
- Protect vulnerable sub-populations
- Base decisions on sound science
- Use measurable objectives and assess performance

A key element of the PBT Strategy is developing and implementing national action plans for priority PBTs. These action plans are to draw upon the full array of EPA's statutory authorities and national programs, build on voluntary efforts under the Great Lakes Binational Toxics Strategy, and use regulatory action where voluntary efforts are insufficient. The action plans are to consider enforcement and compliance, international coordination, place-based remediation of existing PBT contamination, research, technology development and monitoring, community and sector-based projects, the use of outreach and public advisories, and opportunities to integrate efforts across chemicals.

This document serves as the Draft National Action Plan for Level 1 Pesticides, which includes six of the Level 1 priority PBT pollutants identified for initial action under the PBT Strategy: aldrin, dieldrin, chlordane, p,p-dichlorodiphenyltrichloroethane (DDT), mirex, and toxaphene. This draft action plan will first look at the environmental and human health baseline

for the Level 1 pesticides and the strategic questions that arise from considering this baseline. The plan will then look at the existing programmatic baseline of how EPA has been addressing the Level 1 pesticides as an agency. Finally, the plan will outline proposed goals and actions specifically aimed at reducing risk associated with current and future exposure to Level 1 pesticides, but which will in some cases also aid in reducing human exposures to other priority PBT pollutants. In accordance with the goals of the overall PBT strategy, the actions have been evaluated in terms of their potential to effect reductions in Level 1 pesticides, as well as other PBT pollutants, from various sectors, and across all environmental media.

2.0 GENERAL DESCRIPTION OF THE LEVEL 1 PESTICIDES

Aldrin, dieldrin, chlordane, DDT, mirex, and toxaphene are all pesticides that were once widely used in large quantities in the U.S. for a variety of applications, including: insect control on agricultural crops and cotton, control of ants, termite control in houses, and treatment of livestock. Mirex was also used as a flame retardant. DDT was, and still is in many countries, used for control of insect carriers of diseases such as malaria and typhus. Past usage of these pesticides was large enough to cause significant environmental contamination during the years of their use. In general, the remaining sources of Level 1 pesticides in the United States include:

- unused stocks of Level 1 pesticide products;
- contaminated reservoirs such as sediments, soil, and localized contaminated industrial and dealership sites;
- atmospheric transport and deposition (from both regional and international sources); and
- DDT present as an impurity (<0.1%) in Dicofol, a pesticide currently used in the U.S. and Canada. (Despite the presence of DDT as an impurity in Dicofol, current Dicofol usage data indicate that DDT releases to the environment from this source are likely to be small.)

All of the Level 1 pesticides are highly chlorinated organic compounds, with five or more chlorine atoms per molecule. This high degree of chlorination makes these compounds degrade very slowly, and as a result, generally persistent in the environment. In soils, the Level 1 pesticides generally bind strongly to particles, and may remain in surface soils anywhere from a few months to many years.

Many of the Level 1 pesticides are known to volatilize from surface soils (e.g., dieldrin, chlordane, toxaphene), which may be a significant source of these substances to the atmosphere. In addition, volatilization of pesticides (most notably chlordane) from treated soils around homes may increase concentrations of these pesticides in indoor air. Pesticides associated with eroded particulate matter may also be suspended into the air by wind. Once in the atmosphere, pesticides have been known to travel long distances and have been detected in many remote locations, including the Arctic. The potential transport distance depends on the atmospheric residence time (an estimate of the partitioning, reaction and deposition rates of a particular chemical based on its chemical properties) and on whether the dominant removal pathway from the atmosphere is via deposition (e.g., instead of chemical reaction). Where such deposition is reversible, cycles of

deposition and re-emissions can result in transport distances that far exceed expectations based on atmospheric residence time – known as the grasshopper effect.

The Level 1 pesticides reach surface waters primarily as runoff (pesticides associated with eroded soil particles) or via atmospheric transport and deposition. In aquatic systems, most of the Level 1 pesticides are not very soluble in water, and typically tend to accumulate in the solid phase (suspended particulate matter and bottom sediments) due to their tendency to bind to particles. The Level 1 pesticides may persist for years in aquatic sediments. As the Level 1 pesticides generally bind strongly to soil particles as well as sediment, concentrations in groundwater (due to leaching) and the dissolved phase in surface water are typically low. Concentrations of dieldrin in surface waters, however, have been observed to be higher than those of many of the other highly persistent organochlorine pesticides, primarily due to its greater preference for the water phase, relative to other compounds in this class.

In biota, the Level 1 pesticides tend to accumulate in biological tissues, especially the fatty tissues of fish and piscivorus (fish-eating) wildlife, such as marine mammals and predatory birds, as well as humans. As these substances are taken up by shellfish and fish from contaminated water and sediments, they tend to biomagnify (accumulate in increasing larger amounts) through the food chain. This bioaccumulation and biomagnification can result in high levels of the Level 1 pesticides in fish, aquatic mammals, and other fish-consuming species.

Because of evidence supporting the adverse environmental effects and human health effects, including the probable carcinogenicity of these substances, the pesticide uses of all of the Level 1 pesticides were canceled in the U.S. in the 1970's and 80's. The flame retardant uses of mirex were curtailed in the 1970's and replaced by more effective products. Production facilities have closed and manufacturing of all six Level 1 pesticides has ceased in the United States.

While domestic production has ceased and pesticide uses have been canceled, these pesticides continue to have an environmental presence, which is the combined result of the large quantities of these pesticides used in the 1960's and ‘70's and their inherent persistence. The detection of some of the Level 1 pesticides in remote locations where they were never used, indicates that atmospheric deposition from regional volatilization and long range sources may also be an important contributor to continued environmental presence in some areas. In addition, some of the Level 1 pesticides continue to be produced, used and/or improperly stored in other countries, potentially contributing to atmospheric transport and deposition. Although environmental concentrations of these pesticides have, with few exceptions, shown a general decline in most media over the years due to their cancellation in the U.S., current contamination levels remain a concern. This concern is reflected in water concentrations that exceed national water quality standards, sediment concentrations that exceed sediment guidelines, and recurring fish consumption advisories based on unacceptable levels of these pesticides in sport, subsistence and commercially harvested fish.

Appendix B contains more detailed information on the specific uses and sources, chemical properties, and environmental fate and transport of each of the Level 1 pesticides.

3.0 HUMAN HEALTH EFFECTS

Aldrin, dieldrin, chlordane, DDT, mirex, and toxaphene have all been linked to several adverse health effects in humans. Most knowledge of human health effects of the Level 1 pesticides is based upon poisoning episodes and background exposure, as well as occupational and animal studies.

The possible short-term health effects of the Level 1 pesticides include: neurological disruptions (e.g., headaches, dizziness, nausea, vomiting, irritability, confusion, ataxia, tremors, convulsions, and general malaise); and eye, nose, mouth and throat irritation. Large doses can cause death. Long-term health effects of the Level 1 pesticides can include: central nervous system damage and neurological system disruption; damage to the reproductive system; liver, kidney and thyroid damage; and damage to the digestive system. Some of these pesticides (e.g., chlordane) may also cause neurological and behavioral disorders in children who are exposed before birth or while being nursed, and may increase the chance of miscarriage. Many of these pesticides are suspected endocrine disruptors, and all are classified by EPA as probable human carcinogens based on sufficient evidence from animal studies.

Appendix B contains more detailed information on the specific human health impacts of each of the Level 1 pesticides.

4.0 HUMAN EXPOSURE

The General Population. Due to their stability, widespread historical use, and continued use overseas, small amounts of the Level 1 pesticides may be found in most outdoor and many indoor environments. While people may be directly exposed to these pesticides by inhaling pesticide-contaminated air (e.g., in homes previously treated with chlordane) or by coming into contact with or ingesting contaminated soil or water (e.g., as may occur from direct contact or proximity to highly contaminated land reservoir sources, such as hazardous waste sites and former pesticide mixing and loading sites), exposure via these routes is considered relatively infrequent. Rather, human exposure to the Level 1 pesticides occurs mainly through the food chain, and for the most exposed populations, is probably due to the consumption of contaminated fish. Elevated concentrations of many of the Level 1 pesticides (e.g., chlordane) have been the cause of fish consumption advisories in many water bodies.

As most of the Level 1 pesticides are fat-soluble, they also tend to accumulate in the fatty tissues and breast milk of humans and animals. For example, levels of DDT and metabolites were measured in the breast milk of 300 women in rural, suburban, and urban areas of Veracruz, Mexico in 1996 and 1997. Residues of p,p,'-DDE and p,p'-DDT were found in over 99 % of the samples. Calculated daily intakes of total DDT for breast-fed infants were estimated to be over twice the World Health Organizations acceptable daily intake for total DDT (20 μg/kg body weight/day) (Pardio et al., 1998). However, another study, using compiled and standardized data from 130 previous studies in order to review global trends in average levels of DDT in breast milk, documents a downward trend in DDT concentrations in breast milk since about 1970. For

the U.S. and Canada, the data suggest an 11% to 21% per year reduction in average levels of DDT in breast milk since 1975. Together with similar reductions observed in other countries with restriction on DDT use, this analysis suggests that placing bans on persistent pollutants such as DDT can produce significant and measurable reductions in human body stores in fatty tissues after several years (Smith, 1999).

Sensitive Populations and Geographic Areas. Research has shown that the risk and potential health consequences due to Level 1 pesticide exposure are of particular concern in certain human populations who have increased exposure and/or increased susceptibility. Increased exposure levels are mainly an issue for certain subpopulations who consume fish and wildlife as a main staple of their diets, including: indigenous (e.g., Alaskan and Arctic) populations who subsist on fish, caribou, and marine mammals; culturally-oriented fishers; and low-income communities which may have a disproportionately high incidence of subsistence angling and hunting. Increased sensitivity or susceptibility to Level 1 pesticides exposure is of greatest concern for the developing embryo/fetus, nursing infants, and children.

Finally, because historical use of some of the Level 1 pesticides was higher in certain areas of the country, concentrations, and thus exposures, may also be increased in certain geographical locations. For example, because chlordane was primarily used to control termites, concentrations of the chemical are highest in the southeast portion of the country where termite infestations are a serious problem. In addition, populations living in certain areas of the country may have the potential for higher exposure to the Level 1 pesticides due to local fish consumption. Appendix B contains more detailed information on the specific human exposure routes for each of the Level 1 pesticides.

5.0 ENVIRONMENTAL BASELINE

5.1 SCOPE OF THE PROBLEM AND CURRENT STATUS AND TRENDS

While intentional use of the Level 1 pesticides in the U.S. has been largely controlled, concentrations of these substances in the environment, including food sources, remain a concern for both humans and wildlife. In addition, evidence suggests that there are still large quantities of obsolete waste pesticides stored throughout the United States. These unused stocks, if accidentally released to the environment, could potentially pose a non-trivial ecological and human health risk. In addition, the accumulation of obsolete stocks of some Level 1 pesticides in other countries is currently thought to be a large problem. Due to the potential for the Level 1 pesticides to undergo atmospheric transport and deposition, as well possible contamination of the worldwide food-chain (e.g., marine fish), these international waste stocks could also be contributing to environmental contamination and human exposure in the United States.

These long-canceled pesticides have been detected throughout various environmental media, including air, soil, water, sediments, and wildlife. As discussed in previous sections, most of the Level 1 pesticides ultimately tend to reside in the solid phase in soils or sediments, or to bioaccumulate in animals. Accumulations in soils and sediments, in turn, effectively function as long-term sources (reservoirs) re-releasing relatively small but constant quantities of the substances to water through runoff processes and sediment release, and to the atmosphere through volatilization.

Quantitative and qualitative data gathered in current multi-media monitoring efforts and discussion of issues regarding the quantities of unused Level 1 pesticide products remaining are detailed in Section 5.2 below.

5.2 QUANTITATIVE AND QUALITATIVE DATA ON CURRENT SOURCES AND RESERVOIRS

5.2.1 Level 1 Pesticide Products

Although no quantitative data are available on the magnitude of unused, uncollected Level 1 pesticide stocks remaining in the U.S., the following observations of the results of waste pesticide collection and disposal programs (commonly known as Clean Sweep programs) support the idea that there are large (but unquantified) amounts of pesticides remaining, which could pose a serious environmental and human health threat if released:

- Seven states account for about half of the 18 million pounds of all pesticides that have been collected by Clean Sweep programs through 1998 (with some 1999 data). Only sixteen states account for about 85 percent of this total.

- Minnesota, which has collected over 1.5 million pounds through a state-wide, well-organized program since 1990, found that 82 percent of their participants in 1998 were first-time participants.

- During the development of this action plan, outreach efforts with state officials consistently confirmed that states throughout the country believe that there are still significant quantities of unused Level 1 pesticide stocks in their respective states. However, absent requirements for reporting specific pesticides, many states can only provide qualitative estimates. Nonetheless, Level 1 pesticides have continued to be collected in certain Clean Sweep Programs, even after multiple collection events over several years in the same geographical areas. Clean Sweep program managers also consistently report that one of the biggest challenges they face is gaining the trust of the participants. Program coordinators have indicated that it may take several collection events in the same area before the less trusting participants come to an event.

! With the exception of toxaphene and mirex, the amounts of the Level 1 pesticides collected in the Clean Sweeps Programs (1990-1998) far exceeds the amounts currently estimated to be in the waters of the Great Lakes. Table 5-1 below shows estimates of the total amount of the Level 1 pesticides in each of the Great Lakes along with 1990-1998 estimates of the total amounts collected in Clean Sweeps Programs in the Great Lakes States. The amount collected for DDT+ metabolites was 27 times the amount estimated to be in the waters of all the Great Lakes combined. The amounts collected for aldrin/dieldrin and chlordane were approximately 2 and 10 times, respectively, the total Great Lakes loadings. It should also be noted that the estimated amount of pesticides collected most likely represents a conservative estimate of total amounts collected since data was not available for all years.

Table 5-1. Comparison of Post 1990 Great Lakes Water Column Loads of Level 1 Pesticides to Masses Collected in Clean Sweeps

Pesticides	Lake Superior	Lake Michigan	Lake Erie	Lake Huron	Lake Ontario	Estimated Total Pesticide Load in kgs	
Lake Volumes (Km^3)	**12,100**	**4,920**	**484**	**3,540**	**1,640**		
	Total Water Column Loading (kg)	Total Water Column Loading (kg)	Total Water Column Loading (kg)	Total Water Column Loading (kg)	Total Water Column Loading (kg)	Total Water Column Loading (kg)	Total Clean Sweep Collections in Great Lakes Basin (kg) [(a)]
Aldrin + Dieldrin	1936	--	368	--	443	2747	5,772
Chlordane	133	--	121	--	426	680	7,888
DDT+ Metabolites	363	25	145	7	410	950	26,047
Mirex	121	--	10	--	115	246	0
Toxaphene	13,552	1,870	111	1,664	279	17,476	1,540

Source: USEPA, 2000. *BNS Great Lakes Pesticides Report*

[(a)] Clean sweep collections include all States in the Great Lakes Basin and represent total collections between 1990 through 1998. Based on reports and communications from states as of 11/16/98; compiled by Margaret L. Jones, U.S. EPA Region 5. Some data are estimates, and may be revised up or down with more complete analysis.

The information currently available regarding the Level 1 pesticides in other countries suggests that internationally, the problem of obsolete pesticide stocks is also large. For example, the Food and Agriculture Organization (FAO) of the United Nations estimated the quantities of obsolete stocks of aldrin, dieldrin, chlordane, and DDT in Africa and the near east in 1999 to total

20,631 kg (aldrin), 576,856 kg (dieldrin), 34,993 kg (chlordane), and 285,368 kg (DDT). Mirex and toxaphene were not listed in the 1999 FAO inventory. FAO also reports that, exacerbating the problem, many of these stocks are kept in substandard stores in deteriorating condition, and are often located in urban areas or near bodies of water such as rivers and irrigation water sources. This situation is often more serious in developing countries because there is typically little awareness of the inherent danger of pesticides, and because many of these countries have neither the capacity or facilities for disposal, nor the financial resources to handle problems related to obsolete pesticides (FAO, 2000).

5.2.2 Land / Soils

The Level 1 pesticides are found throughout U.S. soils. While, for the most part, the presence of the Level 1 pesticides in soils is diffuse and primarily due to past agricultural use for pest control on crops, there are some sites with heavy contamination. High concentrations of one or more of the Level 1 pesticides may be found in surface soils at former pesticide manufacturing and formulating facilities, storage facilities, pesticide retailers, and pesticide mix/load sites. Because the Level 1 pesticides generally bind strongly to soil particles, leaching of these substances from soils is minimal in most cases.

Each of the Level 1 pesticides has been identified at hazardous waste sites on the National Priorities List (NPL), which includes the most serious hazardous waste sites in the U.S. as identified by the Agency for long term federal cleanup activities under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, also known as Superfund). According to the Superfund data base in December 1999, there were 1,227 sites on the Superfund National Priorities List (NPL). Although it should be noted that there is ongoing addition and removal of sites listed for a particular chemical and thus some of these statistics may currently vary, 380 of these sites reported pesticides as a contaminant. For many of these sites – including military facilities, landfills, most of the open dumps, and drum reconditioning facilities – pesticides were not listed as the primary toxic contaminant (i.e., the sites did not necessarily have heavy pesticide contamination). However, the following 55 facilities are identified as NPL sites where pesticides are a significant portion (or all) of the contamination (sites may have more than one chemical contaminant, and chemicals may be present in multiple media):

- 14 current or former pesticide manufacturing facilities;
- 20 current or former pesticide formulating facilities;
- 11 sites associated with wood preserving activities; and
- 10 other sites, including five disposal areas, a pesticide storage facility, a pesticide retailer, a grain storage area, an aerial applicator work area, and some mixing and loading sites.

Appendix C, Table 1 provides the location, site name and a brief description of these 55 sites. Appendix C, Table 2 provides a more detailed characterization of the fourteen present or former pesticide manufacturing sites. Although some of these NPL sites described are not specifically contaminated with Level 1 pesticides (e.g., some of the wood preserving facilities are

primarily contaminated with pentachlorophenol or creosote), this comprehensive overview does help to characterize the extent of heavy pesticide contamination at certain sites in the United States.

Pesticide residues in soils have been assessed on a limited basis at several pesticide mixing and loading (mix/load) sites. For example, a study conducted of eighteen mix/load sites on farms in Florida found detectable levels of chlordane, DDT/DDD/DDE and toxaphene, in different combinations and at varying concentrations, present at 14 of the 18 sites sampled (Florida Department of Environmental Protection, 1996). In this study, three samples were taken from each site – a composite surface soil sample, a vertical composite soil sample up to a depth of 5 feet below land surface, and a water sample from deep irrigation wells at the sites. All of the samples were tested for a number of pesticides, including four of the Level 1 pesticides (aldrin, chlordane, DDT, and toxaphene). None of the Level 1 pesticides were detected in the water samples. Aldrin was not detected in any of the soil samples. The frequency of detects and ranges of concentrations for the Level 1 pesticides in soil samples is summarized in Table 5-2 below. At three of the 18 sites (17%) chlordane and toxaphene were found at concentrations that exceeded the Florida Department of Environmental Protection's guidelines for maximum acceptable soil concentrations based on human health risks associated with residential land use. Four other sites exceeded soil leaching criteria for at least one of the RCRA-regulated pesticides (chlordane, DDT/metabolites, or toxaphene). None of these Level 1 pesticides had recently been mixed, loaded, or used at these sites.

Table 5-2. Summary of Soil Analysis Results at Florida Farm Mix/Load Sites

Pesticide	Number of Sites with Detect (out of 18)	Number of Surface Samples with Detect (out of 18)	Number of Depth Samples with Detect (out of 18)	Minimum Conc. (ppb)	Maximum Conc. (ppb)
chlordane	8	7	4	4.7 K	10,000
DDD	5	5	3	1.3 K	830
DDE	9	9	7	0.93 K	1200 J
DDT	6	6	3	1.9 K	250
toxaphene	6	5	6	42	540,000[1]

Source: Florida Department of Environmental Protection, 1996
(K) The value reported is less than the minimum quantitation limit and is greater than or equal to the minimum detection limit.
(J) Estimated value, due to matrix interferences.
(1) Method detection limits elevated due to matrix interference.

Pesticide dealer sites have been studied in Illinois (Illinois Department of Agriculture, 1993). Table 5-3 below presents an estimate of the presence of Level 1 pesticides at 49 dealer sites. The study used four borings per site to a depth of 4.5 meters (15 feet) at targeted locations (loading areas, burn piles, wash areas, etc.) plus an additional sample at the site drainage-way.

Five of the Level 1 pesticides were among the 62 analytes tested, and all were found at least once; mirex was not included based upon rare usage in Illinois. However, leaching studies using the RCRA Toxicity Characteristic Leachate Procedure (TCLP) indicated that the RCRA hazardous waste rules would generally not apply. Hence, remediation would be based upon the major pesticides found, which are the corn and soybean herbicides atrazine, alachlor, metolachlor, etc. Land spreading of remediated soil would be at calculated rates below allowed label rates for the active ingredients present. From these results, an estimated 1,336 tons of soil per site would need to be removed and land spread on agricultural land. These 1,336 tons would carry with it some quantities of the Level 1 pesticides, as shown in Table 5-3. However, because these dealer sites will not be remediated all at once, the annual burden from land spreading would be small, allowing biological, chemical and other natural attenuation processes to assist in the disappearance of these substances.

Other potentially significant sources of direct exposure from contaminated land reservoirs are individual residences that have been treated with chlordane, aldrin, or dieldrin. Prior to their cancellation, organochlorine termiticides, particularly chlordane were used to treat many homes, soils, and building structures.. These reservoir sources have potential to be significant sources, particularly during demolition or other disturbances. In addition, a growing body of research has found a strong association between house dust and chlordane and other pesticide residues. Thus, an important urban source of chlordane, aldrin, and dieldrin exposure may also be the respiration of indoor air and house dust in previously treated structures, given that research has found levels in indoor air and dust to be as much as 10-100 times higher than in outdoor air and surface soil (Lewis et al., 1988; Whitmore et al., 1994; USEPA, 2000b).

5.2.3 Air

As discussed in section 2.0, all of the Level 1 pesticides can enter the atmosphere as a result of volatilization from surface soils at contaminated sites or where past use occurred, from surface waters via air-water exchange, from past and current international sources, and/or as pesticide contaminated eroded particulate matter that is suspended into the air by wind. In addition, there may be other specific practices, such as sediment drying from remediation activities, that may serve as important regional sources of pesticides to air.

Once in the air, the Level 1 pesticides (particularly mirex, DDT and toxaphene) may be subject to atmospheric transport, both regionally and over long distances, as estimated by Cohen, 1997, and documented by numerous researchers. For example, monitoring and modeling efforts during the 1980s (USDHHS, 1998), as well as the detection of high levels of toxaphene in the tissues of fish taken from a remote lake on Isle Royale in Lake Superior (De Vault et al., 1996), established the potential importance of atmospheric pathways for toxaphene inputs to regions in the upper latitudes, far removed from regions where it was heavily used as an agricultural pesticide. Other research, including back air-trajectory analyses for dieldrin, toxaphene and DDT conducted by the Integrated Atmospheric Deposition Network (IADN) in the Great Lakes region, has also demonstrated that airborne pesticides have the potential for long-range transport to and from the Great Lakes (IADN, 1998). Although much of the data available at this time regarding

long-range transport of the Level 1 pesticides is for the Great Lakes region, it is not unlikely that similar patterns would be observed in other areas of the nation.

Table 5-3. Level 1 Pesticides Found at Agrichemical Facilities in the Illinois Department of Agriculture / Illinois State Geological Survey Site Contamination Study - July 1993.

Pesticide[1]	Sites where Detected (Of 49 Sites)		Samples where Detected (of 822)		% of Specific Pesticide Detections found in Various Layers[2] & Drainage-way of Site[3]					Mean Conc. µg/Kg	Soil Screening Guidance Levels[4] µg/Kg		Potential Quantities that might be land-spread for remediation in Illinois[5]		
	No.	%	No.	%of 822	% in A	% in B	% in C	% in D	% in Drain		Natural Attenuation	No Attenuation	Av site Kg	Hi Est Kg	Lo Est Kg
Aldrin	14	28.6	31	3.8	41.9	22.6	12.9	9.7	12.9	46	500	20	0.056	67	19
Dieldrin	34	69.4	94	11.4	55.3	23.4	5.3	2.1	13.8	75	4	0.2	0.09	109	76
Chlordane	18	36.7	47	5.7	70.2	17.0	6.4	2.1	4.2	855	10,000	500	1.04	1,243	456
DDT	15	30.6	37	4.5	51.4	29.7	8.1	2.7	8.1	11	32,000	2,000	0.013	16	5
DDE	12	24.5	25	3.0	28.0	52.0	4.0	0.0	16.0	22	54,000	3,000	0.027	32	8
DDD	7	14.3	11	1.3	9.1	63.6	9.1	0.0	18.2	8.6	16,000	800	0.01	13	2
Toxaphene	1	2.0	1	0.12						1,743	31,000	2,000	2.11	2,535	52

Source: *Agricultural Facility Site Contamination Study.* Illinois Department of Agriculture, July, 1993. Per U.S. EPA Region 5 / D. P. Macarus / 11/30/99

1. Mirex was not one of 62 analytes tested.
2. 'A' layer is top gravel fill. ' B' layer is 0.5 meter below A. 'C' layer is next 0.5 meter. 'D' layer is from 4.0 to 4.5 meters in depth.
3. Soil surface (0-0.5 m) samples were collected from a prominent drainage way at the site
4. Superfund Guidance: EPA/540/R-95/128
5. These are boundary values. Site remediation would normally be based upon major contaminants, which in Illinois are the major corn & soybean herbicides: atrazine, alachlor, metolachlor, etc. However, the Level 1 pesticides would be carried along and land spread. These calculation estimate the quantities of Level 1 pesticides that might be spread over the years for the entire 1200 dealer sites. (Note, there are many ways to use the results - be careful how calculations are interpreted)

Av site: Kg of pesticide per site based upon 1,336 tons (2,000 lb tons) remediated per site and the geometric mean concentration at sites where detected only.

Hi Est: Assumes all 1200 sites will have average concentration, even sites with no-detects.

Lo Est: Assumes only fraction of sites with detects (column 3 above) will carry Level I pesticides at mean concentration.
Note: Remediation is generally only performed when real estate transfer or ground water contamination indicates a need.

From the atmosphere, the Level 1 pesticides may be deposited onto natural water bodies and surface soils through the processes of wet deposition, dry deposition, and gas exchange. Gaseous exchange of organic compounds at the air-water interface is known to be an important phenomenon in the balance of pollutants occurring in air and water (USEPA, 1997). Also, air-water and air-soil exchange can extend the cycle of deposition and re-emission of these compounds thus increasing the distance which they can travel by what is known as the "grasshopper effect". For example, before cancellation of the Level I pesticides and use reductions of other organochlorine chemicals, the relatively high pollutant concentrations in the atmosphere caused net absorption of pesticides to the Great Lakes at the water surfaces (USEPA, 2000). At present, however, for some pesticides, the Lakes are now a source to the atmosphere (IADN, 1998; Hillery et al., 1998). Using several years of IADN data, Hoff et al. (1996) estimated atmospheric loadings of dieldrin and DDT (+metabolites) for the five Great Lakes. Estimates of dieldrin and DDE showed a net loss from the lakes to the atmosphere via volatilization, while analysis suggested that p,p'-DDT is still being loaded into the lakes from the atmosphere.

Also of potential concern, particularly in terms of children's exposure to Level 1 pesticides, volatilization may also contribute to increased concentrations of some of the Level 1 pesticides in indoor air. Soils previously treated with termiticides such as chlordane are known to off-gas for many years. For example, as discussed in section 5.2.2 above, research has found levels in indoor air and dust to be as much as 10-100 times higher than in outdoor air and surface soil (Lewis et al., 1988; Whitmore et al., 1994; USEPA, 2000b).

5.2.4 Water and Sediments

Many of the nation's waters are contaminated with one or several of the Level 1 Pesticides. Section 303(d) of the Clean Water Act requires States to develop lists of impaired and threatened waters and submit them to EPA every two years. In the June 23, 1999 303(d) report, 12 States listed 98 water bodies or segments for chlordane; 6 states listed 98 water bodies or segments for DDT; 7 states listed 52 water bodies or segments for dieldrin; 4 states listed 27 water bodies or segments for toxaphene; 1 state listed 3 water bodies or segments for aldrin; and 1 state listed 4 water bodies or segments for mirex.

The 1998 National Sediment Quality Survey Report to Congress, which included sampling data collected from 1980 to 1983, reported DDT, chlordane, and dieldrin contamination at sediment sampling stations throughout the nation. For example, DDT was found at 803 out of 11,462 sampling stations (where DDT could be evaluated) at a level where adverse affects to either human health or the environment are probable. Although this sampling data likely has a bias towards contaminated areas, it provides an indication of the magnitude of pesticide contamination in sediments.

Data collected by the U.S. Geological Survey (USGS) National Water Quality Assessment Program (NAWQA) also show that DDT, chlordane, and dieldrin are still present at levels of concern in our nation's surface and ground waters, sediments, and fish ("The Quality of Our

Nation's Waters", USGS, 1999). DDT, dieldrin, and chlordane were all found to contaminate streams in both agricultural and urban areas, emphasizing the widespread distribution of pesticides in aquatic environments. Urban streams were observed to have the highest frequencies of occurrence of DDT, chlordane, and dieldrin in fish tissue and sediment, and the highest concentrations of chlordane and dieldrin. Pesticides were also observed in some ground water supplies. Although USGS data show dieldrin was found in ground water in only 1-2% of wells, exceedances of the USEPA Risk Specific Dose of 0.02 µg/l (corresponds to cancer risk of 1 in 100,000) occurred more often in some areas, such as metropolitan Atlanta, where 5 of 37 shallow wells exceeded the Risk Specific Dose. Although the wells were not drinking water sources, the results are indicative of the persistence of dieldrin and the potential for human exposure.

Under the Great Lakes Water Quality Agreement (GLWQA), the U.S. and Canada have identified forty-six highly polluted Areas of Concern (AOCs) within the Great Lakes. As shown in Table 5-4 below, some of the Level 1 pesticides have been designated as chemicals of concern (i.e., chemicals that contribute to impairment of beneficial use or the area's ability to support aquatic life) at several AOCs.

Table 5-4. Great Lakes Areas of Concern (AOCs) with Pesticides Listed as Pollutants of Concern

State	AOC	Pollutant
New York	Buffalo River	Chlordane, DDT
	Niagara River	Mirex, Chlordane, DDT, DDE, dieldrin
	Oswego Lake	Mirex
	Rochester Embayment	Mirex, DDT, Chlordane
	St. Lawrence River/Massena	Mirex, DDT
Ohio	Black River	DDT
	Cuyahoga River	DDT
Wisconsin	Menominee River	Pesticides
	Milwaukee Estuary	Pesticides

Source: USEPA, 1998. Access: www.epa.gov/glnpo/aoc.

Recent local case studies also demonstrate significant site-specific pesticide contamination of surface waters. For example, relatively high concentrations of several of the Level 1 pesticides, including chlordane, DDT, dieldrin and toxaphene have been found in Lake Apopka in Florida. Loss of surrounding wetland areas and heavy agricultural use has resulted in this lake's designation as the most polluted lake in Florida. The lake and surrounding habitat has also been the site of numerous bird deaths. Additional monitoring (as part of a criminal investigation) is ongoing to pinpoint a cause, or identify the source for the cause of the bird deaths in Lake Apopka.

5.2.5 Wildlife

Detectable quantities of the Level 1 pesticides have been found within a wide variety of animal species, and in some cases, at concentrations that have been known to pose serious risks to wildlife. For example, eggshell thinning as a result of DDT contamination (and biomagnification in the food chain) resulted in the Bald eagle, the Peregrine falcon, and the Brown pelican being among the first species to be listed as endangered or threatened under the Endangered Species Act of 1973 (ESA). Recent research has shown that pesticides such as DDT and its metabolites may be associated with low reproduction of nesting bald eagles even in remote, seemingly pristine environments (Anthony et al., 1999). In this study, conducted on the islands of the Aleutian Archipelago in Alaska, the researchers suggested that even though the contaminants affecting the bald eagles could have entered the food chain from local sources, such as possible undocumented use of DDT by the military, evidence indicates that they may well have arrived in the Aleutians from more distant sources. In fact, concentrations of organochlorine contaminants increased in eagle eggs from east to west along the Aleutian Island chain, which the researchers also suggest is a possible indication that Asia may be one potential source of the pollutants. Transport to the Aleutian Archipelago was also hypothesized to possibly occur biologically in the fat layers of migratory seabirds that nest at the Aleutians by the tens of millions.

Additional incidents of ongoing organochlorine pesticide poisoning in wildlife have been documented by the New York State Wildlife Pathology Unit (NYSDEC, 1997). In the 1996/1997 Annual Report, 21 poisoning deaths of birds were conclusively determined, based on autopsy and tissue analysis, to be due to one or more of the canceled pesticides chlordane, dieldrin, and DDT. This number was nearly twice that confirmed in the 1995/1996 Wildlife mortality report. Most of the incidents involved hawks, owls, and corvids (crows and jays). Although it was difficult in some cases to definitively link local contamination with mortality, a substantial portion of the pesticides were believed to originate locally from orchard and turfgrass areas that had received heavy historic pesticide application for grub and other invertebrate control. It was also hypothesized that some of the contaminants could have been picked up by the birds in their nesting or wintering grounds. The researchers in the Wildlife Pathology Unit suggested that because most or all of the pesticide poisoning incidents were related to historic use and persistence, and because most turfgrass areas contaminated with chlordane and dieldrin in New York state and other areas of the northeast remain unidentified, solutions to this sort of wildlife mortality may not be quickly or easily obtained.

The National Oceanic and Atmospheric Administration's (NOAA) Mussel Watch Project has documented the presence of the Level 1 pesticides in the tissues of mussels and oysters in the nation's Great Lakes, and estuarine and marine waters. Chlordane, DDT, and dieldrin were detected in mussels and oysters collected at all 186 sites (intended to represent large areas rather than "hot spots') that were sampled annually between 1986 and 1995. Statistical analyses indicate that, at the national level of aggregation, decreasing trends (see Table 5-5 below) exist for chlordane, DDT, and dieldrin contamination in mussel and oyster tissue. These trends are attributed to the fact that uses of these chemicals have been canceled. Although these data generally show decreasing contamination trends, information gathered in the Mussel Watch

program also reflects the ubiquity of Level 1 pesticide contamination in the nation's Great Lakes and coastal waterways.

Further, the occurrence and location of some fish consumption advisories indicates that at least some potentially ecologically sensitive water resource areas may have been affected by the Level 1 pesticides. For example, a number of the major estuaries listed in the National Estuary Program (NEP) and/or designated as National Estuaries Research Reserve System (NERRS) sites are under fish, waterfowl and/or shellfish advisories due to Level 1 pesticide contamination, as shown in Table 5-6 below.

Appendix B contains more detailed information on the specific ecological impacts that have been attributed to each of the Level 1 pesticides.

Table 5-5. Numbers of NOAA Mussel Watch Sites (out of 186) with Increasing, Decreasing, or No Trend in Concentrations of Chlordane, DDT, and Dieldrin, 1986-1995

Chemical	Number of sites with an increasing trend	Number of sites with a decreasing trend [1]	Number of sites with no trend
Total chlordane	1	81	104
Total DDT	1	38	147
Total Dieldrin	1	32	153

Source: NOAA. 1998 (on-line). Access: http://state-of-coast.noaa.gov/bulletins/html/ccom_05/ccom.html

[1] Chlordane, DDT, and dieldrin all showed significant decreasing trends, at the national level of aggregation, using statistical correlations developed for the median value of chemical concentrations among all sites (total = 186) sampled in each year from 1986 to 1995.

Table 5-6. Level 1 Pesticide Fish and Wildlife Consumption Advisories at National Estuary Program and National Estuaries Research Reserve System Sites

Waterbody	Cause of Advisory
Hudson River, NY	Chlordane (for waterfowl)
New York / New Jersey Harbor	Chlordane
Barnegat Bay, NJ	Chlordane
Jaques Cousteau-Great Bay and Mulica River, NJ	Chlordane
Delaware Estuary, DE/NJ/PA	Chlordane
Columbia River, OR/WA	DDT
San Francisco Bay, CA	Chlordane, DDT, dieldrin, other unspecified pesticides

Source: USEPA. 1999a. Access: http://www.epa.gov/ost/fish

5.2.6 Food and Food Commodities

In addition to impacting wildlife directly, elevated levels of organochlorine pesticides in the environment can pose a potential human health risk through contamination of the food chain. For example, USDA's Pesticide Data Program (PDP) monitors various pesticides, including DDT, aldrin/dieldrin and chlordane, on a variety of raw and processed fruits and vegetables and milk of domestic and imported origin. In recent years, this monitoring program has detected DDT and its metabolites in 3-5% of all samples, with winter squash (fresh and frozen), milk and spinach (canned and fresh) having most of the detections. Dieldrin and chlordane and metabolites were also found, predominately in winter squash samples of domestic origin. Detections of toxaphene and mirex were not reported (USDA, 1998).

Residues of aldrin/dieldrin, chlordane, DDT, mirex, and toxaphene have also been detected by the Food and Drug Administration's (FDA) pesticide residue monitoring program. For the past several years, DDT and dieldrin have been among the most commonly detected pesticides in FDA's Total Diet Study foods, which include 261 table ready representative foods of domestic and imported origin. Toxaphene and chlordane were also detected but to a lesser extent. In 1998, DDT accounted for 21 % of the total occurrences, more than any other pesticide, in foods monitored. Dieldrin accounted for about 10% of the total detections. The overall rate of detections of the Level 1 substances in the FDA data is generally higher than that of the PDP and may be due to the inclusion of a wider variety of foods, including meat and fish products, than the PDP tests (FDA, 1998).

As the PDP data suggest, the occurrence of detectable residues of the Level 1 pesticides is more frequent on samples of domestic origin than on imported samples. For DDT, dieldrin, chlordane, and mirex, detectable levels were four to eight times more likely to be found on

domestic samples than on imported. The amount of detections in the monitoring data suggest a continued persistence and ubiquity of the Level 1 pesticides. In fact, their occurrence in monitoring data exceeds that of many actively registered and used pesticides. Because the uses of the Level 1 pesticides have long been canceled in the U.S., the primary source of these residues on domestic food and feed is likely to be from reservoir sources and former use sites.

Data from U.S. and overseas sources, as reported in the Greenpeace Research Laboratories Report *Recipe for Disaster* (March 2000), suggest that levels of DDT and other Level 1 pesticide exposure from food have generally declined substantially since the 1970's, except in areas where usage has increased during the period. Populations with the highest fish consumption have a high intake of organochlorines and breast milk is a source of high organochlorine intake for infants.

Also indicative of the potential for human exposure to the Level 1 pesticides resulting from food contamination, as well as showing the extent of the existing reservoirs of contamination in various environmental media, are the recurring incidences of fish and wildlife consumption advisories due to Level 1 pesticides throughout the United States. According to EPA's National Listing of Fish and Wildlife Advisories database (http://www.epa.gov/ost/fish/), which is a compilation of all available information describing state-, tribal-, and federally-issued advisories in the U.S., numerous fish and wildlife consumption advisories can be attributed to each of the Level 1 pesticides. Lakes Superior, Michigan and Huron are all under lakewide fish consumption advisories for chlordane, and Lake Ontario is under an advisory for mirex (USEPA, 1999a). An overview of the relative numbers of fish and wildlife consumption advisories for the Level 1 pesticides, as of December 1998, is shown in Table 5-7 below. The geographical distribution of these advisories across the U.S. is shown in Figure 5-1. Additional data on the actual waterbodies affected and the fish and wildlife species of concern under each advisory are available on the NLFWA internet database, which is updated regularly to reflect the latest information submitted by states and tribes. Although these numbers should be interpreted with caution because states may vary with respect to criteria for issuing advisories, some states do not have active fish advisory programs, and some states do not actively monitor for chlordane in fish tissue, the data do indicate that Level 1 pesticide contamination of waterways occurs in many states, and that at least some populations and geographical areas may be at potential risk due to Level 1 pesticide exposure.

Table 5-7. Overview of Fish and Wildlife Consumption Advisories for the Level 1 Pesticides, December 1998.

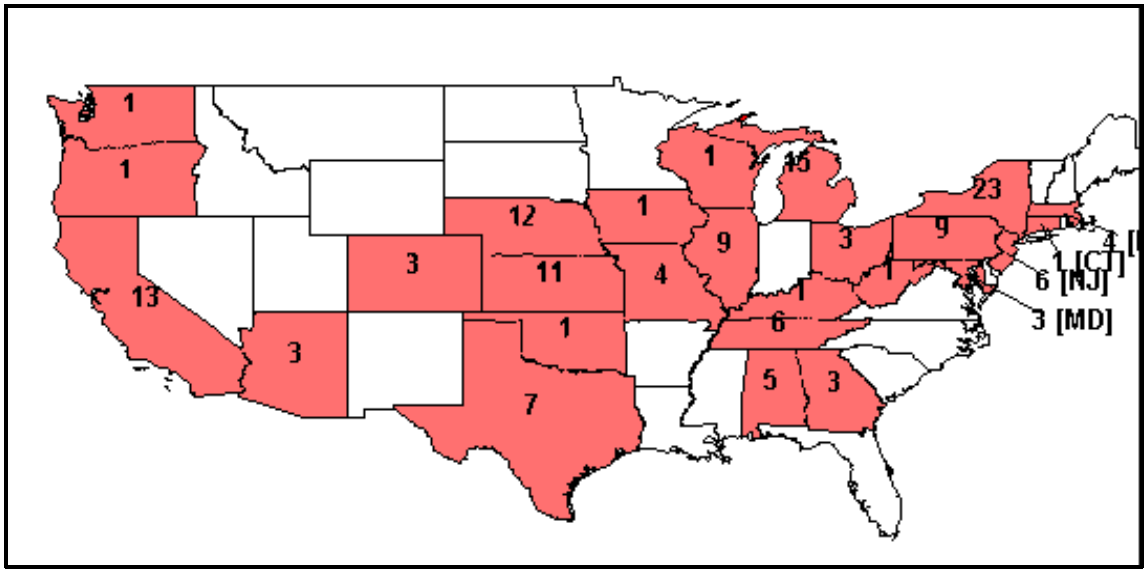
Level 1 Pesticide	Number of active consumption advisories [1]	Number of states with consumption advisories	% of all advisories issued in the United States [2]	Trend in number of advisories	Statewide or Regionwide advisories
Aldrin/dieldrin	23	6	0.92%	*information needed*	none
Chlordane	104[3]	22	4.1%	declining (117 in 1997)	NY statewide
DDT/DDD/DDE	34[3]	11	1.4%	increasing slightly (33 in 1997)	NY statewide
Mirex	11[3]	3	0.44%	*information needed*	NY statewide
Toxaphene	6	4	0.24%	relatively unchanged since 1993	none

Source: USEPA, 1999b. December 1998 Update to the National Listing of Fish and Wildlife Advisories. Access: http://www.epa.gov/ost/fish

[1] Number represents the total number of waterbodies under advisory; some waterbodies have multiple advisories (e.g., various fish and wildlife species, various restricted populations, various waterbody segments, various chemical substances). For information updates on advisory numbers, as they are released by states and tribes, see the internet website

[2] Total number of fish and wildlife advisories in the U.S. as of December 1998 was 2,506 (total number of waterbodies)

[3] Statewide advisory (New York) included in counts



Source: USEPA, 1999b. December 1998 Update to the National Listing of Fish and Wildlife Advisories. Access: http://www.epa.gov/ost/fish/

[1] The NLFWA database counts one advisory for each waterbody name or type of waterbody regardless of the number of fish or wildlife species that are affected or the number of chemical contaminants detected at concentrations of human health concern (in this case, the contaminants have been limited to the Level 1 pesticides).

[2] For the state of New York, the total count includes a statewide advisory (one) for waterfowl consumption for chlordane, mirex, and DDT in lakes and rivers. States without shading may indicate no fish advisories, no fish consumption advisory program, or no data available.

Figure 5-1. Total Number[1] of Fish and Wildlife Advisories Caused by Level 1 Pesticides in Effect in Each State[2] in 1998

6.0 EPA'S PROGRAMMATIC BASELINE

6.1 OVERVIEW OF CURRENT REGULATIONS AND PROGRAMS

Appendix B contains more detailed information on the specific statutes and regulations for each of the Level 1 pesticides. Because all of the Level 1 pesticides are, or were at one time, intentionally produced products, Agency efforts to reduce risk from these substances have historically focused on control of product manufacture and use. In the U.S., the manufacture and distribution of all the Level 1 pesticides has been prohibited, registered pesticide uses have been canceled, and food tolerances revoked. Voluntary pesticides collection programs, that are primarily maintained by states and other non-EPA entities to collect unused stocks of waste pesticides, are also currently important mechanisms for reducing potential risk associated with the Level 1 pesticides.