H.R. 1749, PEST MANAGEMENT AND FIRE SUPPRESSION FLEXIBILITY ACT

(109–33)

HEARING

BEFORE THE

SUBCOMMITTEE ON
WATER RESOURCES AND ENVIRONMENT

OF THE

COMMITTEE ON
TRANSPORTATION AND
INFRASTRUCTURE
HOUSE OF REPRESENTATIVES

ONE HUNDRED NINTH CONGRESS

FIRST SESSION

SEPTEMBER 29, 2005

Printed for the use of the
Committee on Transportation and Infrastructure

U.S. GOVERNMENT PRINTING OFFICE

25–913 PDF WASHINGTON : 2006

For sale by the Superintendent of Documents, U.S. Government Printing Office
Internet: bookstore.gpo.gov Phone: toll free (866) 512–1800; DC area (202) 512–1800
Fax: (202) 512–2250 Mail: Stop SSOP, Washington, DC 20402–0001

COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE

DON YOUNG, Alaska, *Chairman*

THOMAS E. PETRI, Wisconsin, *Vice-Chair*
SHERWOOD L. BOEHLERT, New York
HOWARD COBLE, North Carolina
JOHN J. DUNCAN, JR., Tennessee
WAYNE T. GILCHREST, Maryland
JOHN L. MICA, Florida
PETER HOEKSTRA, Michigan
VERNON J. EHLERS, Michigan
SPENCER BACHUS, Alabama
STEVEN C. LATOURETTE, Ohio
SUE W. KELLY, New York
RICHARD H. BAKER, Louisiana
ROBERT W. NEY, Ohio
FRANK A. LOBIONDO, New Jersey
JERRY MORAN, Kansas
GARY G. MILLER, California
ROBIN HAYES, North Carolina
ROB SIMMONS, Connecticut
HENRY E. BROWN, JR., South Carolina
TIMOTHY V. JOHNSON, Illinois
TODD RUSSELL PLATTS, Pennsylvania
SAM GRAVES, Missouri
MARK R. KENNEDY, Minnesota
BILL SHUSTER, Pennsylvania
JOHN BOOZMAN, Arkansas
JIM GERLACH, Pennsylvania
MARIO DIAZ-BALART, Florida
JON C. PORTER, Nevada
TOM OSBORNE, Nebraska
KENNY MARCHANT, Texas
MICHAEL E. SODREL, Indiana
CHARLES W. DENT, Pennsylvania
TED POE, Texas
DAVID G. REICHERT, Washington
CONNIE MACK, Florida
JOHN R. 'RANDY' KUHL, JR., New York
LUIS G. FORTUÑO, Puerto Rico
LYNN A. WESTMORELAND, Georgia
CHARLES W. BOUSTANY, JR., Louisiana
JEAN SCHMIDT, Ohio

JAMES L. OBERSTAR, Minnesota
NICK J. RAHALL, II, West Virginia
PETER A. DEFAZIO, Oregon
JERRY F. COSTELLO, Illinois
ELEANOR HOLMES NORTON, District of Columbia
JERROLD NADLER, New York
ROBERT MENENDEZ, New Jersey
CORRINE BROWN, Florida
BOB FILNER, California
EDDIE BERNICE JOHNSON, Texas
GENE TAYLOR, Mississippi
JUANITA MILLENDER-MCDONALD, California
ELIJAH E. CUMMINGS, Maryland
EARL BLUMENAUER, Oregon
ELLEN O. TAUSCHER, California
BILL PASCRELL, JR., New Jersey
LEONARD L. BOSWELL, Iowa
TIM HOLDEN, Pennsylvania
BRIAN BAIRD, Washington
SHELLEY BERKLEY, Nevada
JIM MATHESON, Utah
MICHAEL M. HONDA, California
RICK LARSEN, Washington
MICHAEL E. CAPUANO, Massachusetts
ANTHONY D. WEINER, New York
JULIA CARSON, Indiana
TIMOTHY H. BISHOP, New York
MICHAEL H. MICHAUD, Maine
LINCOLN DAVIS, Tennessee
BEN CHANDLER, Kentucky
BRIAN HIGGINS, New York
RUSS CARNAHAN, Missouri
ALLYSON Y. SCHWARTZ, Pennsylvania
JOHN T. SALAZAR, Colorado

SUBCOMMITTEE ON WATER RESOURCES AND ENVIRONMENT

JOHN J. DUNCAN, JR., Tennessee, *Chairman*

SHERWOOD L. BOEHLERT, New York
WAYNE T. GILCHREST, Maryland
VERNON J. EHLERS, Michigan
STEVEN C. LATOURETTE, Ohio
SUE W. KELLY, New York
RICHARD H. BAKER, Louisiana
ROBERT W. NEY, Ohio
GARY G. MILLER, California
HENRY E. BROWN, JR., South Carolina
BILL SHUSTER, Pennsylvania
JOHN BOOZMAN, Arkansas
JIM GERLACH, Pennsylvania
TOM OSBORNE, Nebraska
TED POE, Texas
CONNIE MACK, Florida
LUIS G. FORTUÑO, Puerto Rico
CHARLES W. BOUSTANY, JR., Louisiana, Vice-Chair
JEAN SCHMIDT, Ohio
DON YOUNG, Alaska
(Ex Officio)

EDDIE BERNICE JOHNSON, Texas
JOHN T. SALAZAR, Colorado
JERRY F. COSTELLO, Illinois
GENE TAYLOR, Mississippi
BRIAN BAIRD, Washington
TIMOTHY H. BISHOP, New York
BRIAN HIGGINS, New York
ALLYSON Y. SCHWARTZ, Pennsylvania
EARL BLUMENAUER, Oregon
ELLEN O. TAUSCHER, California
BILL PASCRELL, JR., New Jersey
RUSS CARNAHAN, Missouri
NICK J. RAHALL, II, West Virginia
ELEANOR HOLMES NORTON, District of Columbia
JOHN BARROW, Georgia
JAMES L. OBERSTAR, Minnesota
(Ex Officio)

CONTENTS

TESTIMONY

PREPARED STATEMENTS SUBMITTED BY MEMBERS OF CONGRESS

PREPARED STATEMENTS SUBMITTED BY WITNESSES

ADDITIONS TO THE RECORD

H.R. 1749, PEST MANAGEMENT AND FIRE SUPPRESSION FLEXIBILITY ACT

Thursday, September 29, 2005

HOUSE OF REPRESENTATIVES, COMMITTEE ON TRANSPORTATION AND, INFRASTRUCTURE, SUBCOMMITTEE ON WATER RESOURCES AND ENVIRONMENT, WASHINGTON, D.C.

The committee met, pursuant to call, at 10:00 a.m. in room 2167, Rayburn House Office Building, Hon. John J. Duncan, Jr. [chairman of the committee] presiding.

Mr. DUNCAN. Since we have Congressman Otter here and we have Ms. Johnson here, we are going to go ahead and start. I would like first to welcome everyone to our hearing on H.R. 1749, the Pest Management and Fire Suppression Flexibility Act.

H.R. 1749 is aimed at addressing regulatory uncertainties that have recently been created for farmers, foresters, irrigators, water resource managers, and public health agencies that utilize pesticides or other products in or around water bodies. All Americans want to do everything possible to protect public health, protect the natural resources and have a safe and ample food supply.

In order to meet these goals, pesticide products and other materials sometimes need to be used to eradicate mosquito-borne illnesses, protect forests and control forest fires, and enhance crop production. Pesticide products also are used to protect lakes, reservoirs and irrigation canals from noxious weeds and in some instances to control invasive or non-native species.

If we did not control these weeds and non-native species, we could lose our ability to fish and boat in our lakes, store drinking water, operate hydropower facilities, transport irrigation water to farms, protect native species and really help feed millions and millions and millions of people, even billions of people in this Country and around the world.

Pesticide products are regulated under the Federal Insecticide, Fungicide and Rodenticide Act, commonly known as FIFRA. Under this act, before a pesticide product is used, the Environmental Protection Agency must make sure that use of the pesticide will not result in unreasonable adverse effects on the environment.

FIFRA prohibits the sale of any pesticide unless it is registered and labeled indicating approved uses and restrictions. It is a violation of Federal law to use a pesticide product in a manner that is inconsistent with the product's FIFRA label instructions.

As long as a pesticide is applied according to this label, it has been EPA's longstanding interpretation that no other permit is required. Over the last few years, however, a series of lawsuits have

been filed to require a Clean Water Act permit while applying pesticides and fire suppressants in or around water bodies. These lawsuits have created uncertainty over how agriculture or silviculture, water resource and municipal public health activities are to be regulated.

Farmers, foresters and local officials are now afraid they may face a lawsuit unless they go through the burdensome process of getting a Clean Water Act permit before using a pesticide product. The lawsuits have gotten so out of hand that one local mosquito control district actually sued EPA to confirm that they did not need a Clean Water Act permit to apply a pesticide.

Requiring a permit under the Clean Water Act, in addition to an approval under FIFRA, adds delays, costs and other burdens on both the regulatory agencies which have to issue the permits and those who need to get a permit without increasing environmental protection.

The problem is the way all this regulatory burden acts on the smallest of our landowners, the smallest of our farmers, the smallest operators in any area. The big giants can always manage, but the ones that are being hurt by this regulatory over-burden are the smallest of our landowners, the smallest of our farmers and other small cities and municipal agencies.

Recognizing the overlap and redundancy and the costs between FIFRA and the Clean Water Act, Congressman Otter and Congressman Cardoza have decided to take action and have introduced H.R. 1749. The objective of H.R. 1749 is to try to put common sense back into the Federal regulatory process by eliminating the duplicative regulation of pesticide products under both FIFRA and the Clean Water Act.

H.R. 1749 aims to ensure the Clean Water Act is directed at its intended purpose: regulating the disposal of waste and not the proper use of a product. We first will hear today from Congressman Butch Otter and Congressman Dennis Cardoza, two of the original sponsors of this bill. I want to commend them for their efforts and also welcome them to this hearing today.

We will also hear today from the Environmental Protection Agency and the State Forestry Agency and from representatives of the agricultural community, the irrigation community, mosquito control districts and a public interest group about their views on this bill.

Let me now turn to my good friend, the Ranking Member, Ms. Johnson for her opening statement.

Ms. JOHNSON. Thank you very much, Mr. Chairman, and thank you for conducting today's hearing on the relationship between the Clean Water Act and the Federal Insecticide, Fungicide and Rodenticide Act, more commonly referred to as FIFRA. I look forward to a comprehensive examination of whether the Nation has adequate programs to protect public health and safety and the environment from unintended consequences arising out of the lawful use of pesticides and other chemicals.

Today, several interest groups will request that we approve legislation exemption pesticides and certain other chemicals from the Clean Water Act regulatory program. Exemptions from the Clean Water Act for known sources of water quality impairment should

carry the highest burden of proof. The focus of the Federal-State commitment to water quality cannot be lost.

Just last month, as part of the Energy Bill, the President signed into law a Clean Water Act exemption for some 30,000 construction sites for the oil and gas industry. The exemption was enacted without consideration by this Committee and notwithstanding that sediment run-off rate from construction sites are typically 10 to 20 times greater than those from agricultural lands and 1 to 2,000 times greater than those of forest lands.

During a short period of time, construction activity can contribute more sediment to streams than would be deposited naturally over several decades, causing severe degradation of water and water quality. Now the Committee is being asked to create an exemption for the application of pesticides, fire retardants and other chemicals. Proponents seek this exemption even though pesticides are a leading polluter in nearly 6,000 square miles of estuaries and over 630,000 acres of lakes.

Fifteen States report that pesticides are a major source of groundwater contamination. The water quality reports submitted by the States clearly indicate that pesticides in waters are a problem. Any Clean Water Act exemption must address these shortcomings in current programs.

Proponents of the legislation contend that much of the justification for exempting pesticides and other chemicals from the Clean Water Act derives from what is referred to as the Talent case out of the Ninth Circuit Court of Appeals. While the court determined that a Clean Water Act permit was necessary, critics of that decision tend to ignore the facts of that case.

I also point out that the Ninth Circuit just three weeks ago issued an opinion where the use of FIFRA-registered pesticide did not require a Clean Water permit. In Talent, the argument was made that application of magnacide H in accordance with the label obviates the need of a Clean Water permit. However, in Talent, the application of the pesticide was not in accordance with the label. The label specifically warned against any release of magnacide-H or its toxic residue for six days into fish bearing waters or where it will drain into them.

These label instructions were not followed, and the subsequent death of 92,000 steelhead in nearby Bear Creek was not in accordance with the pesticide label. I do not believe that killing 92,000 steelhead is a justification for relaxing the protection of water quality.

Instead of focusing on creating additional exemptions from environmental laws, I intend to work to see that protection of water quality, human health and the environment remains this Committee's focus. Whether that involves the Clean Water Act or FIFRA, or a combination of both, the goal of protection cannot change.

Mr. Chairman, I will be pleased to pursue effective programs to address our water quality needs, as well as our need to control pests, noxious weeds, non-native species and fires in the most efficient means. I look forward to today's testimony. Thank you.

Mr. DUNCAN. Thank you, Ms. Johnson.

We are honored to have with us the two primary sponsors of this legislation, as I mentioned in my opening statement, Congressman

C.L. "Butch" Otter, and Representative Dennis A. Cardoza. It is an honor to have each of you here with us in this Subcommittee on a members panel.

We will let you place your full statement in the record, we will let you say anything you want to say, and then we will let you move on, because we know how busy your schedules are, and we have a chance to ask you questions on the floor or at other points. We move on into other witnesses, so we won't subject you to a lot of questions. We will just let you make your statements and thank you once again for your good work on this legislation.

We always proceed in the order the witnesses are listed on the call of the hearing. That means, Congressman Otter, we will go with you first.

TESTIMONY OF THE HONORABLE C.L. "BUTCH" OTTER, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF IDAHO

Mr. OTTER. Thank you very much, Mr. Chairman. It is good to be back in this Committee room with you. While I am no longer a member of this Subcommittee, I certainly appreciate all your help in holding this hearing today and working with me on this important piece of legislation.

I also want to welcome a fellow Idahoan, Scott Campbell, who is the Chairman of the Water Quality Task Force of the National Water Resources Association. He will be testifying later today. I am proud to represent Scott here in Congress, and I know that I could not have done half the job that I have done in Congress without the information and the ideas that I have received from Scott and his associations over the years. I hope you will all listen closely and take heart to what we has to say.

I am also pleased to be sharing the table with Congressman Cardoza. I appreciate all his help in getting support for the Pest Management and Fire Suppression Flexibility Act, which currently has 70 members who have signed on as co-sponsors.

House Resolution 1749 or the Pest Management and Fire Suppression Flexibility Act codifies the Environmental Protection Agency's rulemaking and longstanding policies regarding the Clean Water Act and pesticides application, fire suppression and other pest management activities. In doing so, H.R. 1749 reaffirms Congressional intent and the long-held positions of Republican and Democrat administrations.

Congress passed the Federal Clean Water Act in the early 1970s in an attempt to account for an more closely regulate discharges of municipal waste and pollutants into our national waterways from large industrial facilities. More than 30 years later, however, Federal courts have expanded the scope of the Clean Water Act far beyond that original intent of Congress.

Today, family farmers, mosquito abatement and pest control districts, irrigators, rural water districts, Federal and State agencies, foresters, pest and lawn care control operators and many others are subject to the unnecessary bureaucratic permitting requirements and nuisance lawsuits based upon misguided interpretation of the Clean Water Act by the Ninth U.S. Circuit Court of Appeals.

In the Talent case that was referred to earlier, the court ruled that persons applying a pesticide according to the federally ap-

proved label directly to or above a body of water must first obtain a Clean Water Act permit. The court's viewpoint in Talent blatantly disregards the comprehensive pesticide registration process required by the primary Federal pesticide statute, the Federal Insecticide, Fungicide and Rodenticide Act, FIFRA, and the EPA review environmental effects in water quality data and approved specific uses and directions for pesticides based upon the information that it has evaluated, a factor the district court in Talent relied heavily upon in rejecting the suit.

Failing to use a pesticide in accordance with the EPA approved labeling is a violation of both Federal and State laws. It has been the operating approach of the EPA that the application of agricultural and other pesticides in accordance with label directions is not subject to Clean Water Act permitting requirements. EPA has never stated in any general policy or guidance that a permit is required for such application. EPA recently issued rulemakings specifically exempting pesticide application, performed according to the label instructions, directly to, above or near bodies of water from the Clean Water Act permitting requirements.

While rulemaking is helpful, I fear it will not stop the lawsuits. In my home district, in Gem County, Idaho, the Gem County Mosquito Abatement District is being sued, not for having a Clean Water Act permit before spraying. Yet the EPA refused to grant the application for such a permit. The agency explained to the county that no permit is necessary. But the county now has to use its scarce resources to defend its position in court.

I would like to submit a letter from the Gem County Board of Commissioners and have that letter submitted for the record, Mr. Chairman.

[The referenced document follows:]

Board of Commissioners

Chairman:
SHARON PRATT
District I
MICHELE SHERRER
District III
LAN SMITH
District II

415 E. Main Street
Emmett, ID 83617
(208) 365-4561
Fax 365-7795
commissioners@co.gem.id.us

September 28, 2005

Pest Management and Fire Suppression Flexibility Act

Testimony submitted September 28, 2005
United States House of Representatives
Committee on Transportation and Infrastructure

Mr. Chairman and Distinguished Members of the Committee:

The Board of County Commissioners for Gem County, Idaho strongly supports the Pest Management and Fire Suppression Flexibility Act (HR 1749) as introduced and under discussion today. This legislation will immediately and directly impact Gem County and its residents.

First, let us provide a brief history of why Gem County is providing testimony today. June 15, 2003, Gem County and the Gem County Mosquito Abatement District (GCMAD) were served notice by a local resident alleging violation of the Clean Water Act (CWA) under the citizen's lawsuit provisions.

Gem County and GCMAD are both independent governmental entities created by either the Constitution of the State of Idaho (Gem County) or Idaho Code (GCMAD) with very specific statutorial responsibilities and areas of authority. In order for GCMAD to properly abate mosquitoes, chemicals regulated by Federal Insecticide, Fungicide and Rodenticide Act ("FIFRA") are required. Chemicals are not the only method used, but are certainly central to a successful program. As such, knowledge of FIFRA regulations and label instructions are adhered to religiously.

As a result of the "60 Day Notice of Intent to Sue", GCMAD attempted to obtain an NPDES permit from EPA, even though they did not believe they were legally obligated to obtain such a permit. Their request was denied, as the EPA does not issue NPDES permits to such entities. They were referred instead to the "Statement of Interim Guidance" issued by EPA. This placed Gem County and GCMAD in an impossible situation. While either entity did not believe a permit was needed, an attempt was made to obtain one from EPA; and yet the issuing agency (EPA) would not provide them with a permit. The result was Gem County and GCMAD facing a certain lawsuit without a remedy.

On July 11, 2003, EPA issued a "Statement and Interim Guidance" on the subject of FIFRA and the CWA. Due to various court cases in several different federal circuit courts, there was not clear delineation between the CWA and FIFRA. However, the Interim Guidance spoke clearly to this issue.

Meanwhile, Gem County and GCMAD filed a Declaratory Judgment against the EPA and the local resident in order to request the D.C. Circuit Court to intervene and rule on, not the merits of the case, but simply to either enjoin the resident from suing the governmental bodies or force the EPA to issue the permit. The Circuit Judge indicated she was sympathetic to our plight, but dismissed the case on the grounds of incorrect jurisdiction.

The local resident filed a CWA lawsuit in the Idaho District Court and is currently stayed until the end of 2005 pending issuance by EPA of the Final Guidance. The threat of continued litigation and the potential of award of attorney's fees to the other party is a real threat. Additionally, Gem County has recently experienced our first West Nile Virus (WNV) cases in mosquitoes, equine, bird and human. As you all know, WNV is transmitted by mosquitoes.

The impact of this court case has been immense. All aerial adulticide mosquito abatement has been eliminated from the program. Special deference has been given to all "Waters of the United States" pending resolution of the court action. Additionally, this case has cost our local property tax payers nearly $150,000 in legal fees. Gem County's population is 16,000; which equates to $9,375 for every resident in our County. Our median income per year in Gem County is slightly above $25,000. Clearly, we cannot afford to be caught within the federal government's web of rulemaking and decision-making, and yet that is exactly where we are.

Gem County and GCMAD are law-abiding, law-enforcing entities and yet, we are expending incredible amounts of precious resources on attorney's fees when we are simply trying to fulfill our statutory obligations as defined by the Idaho Constitution, and thus the U.S. Constitution. We find it irresponsible that the 9th Circuit Court (via the *Headwaters v. Talent Irrigation District)* has allowed the CWA to be transformed into a regulation not intended or contemplated by the authors of the original legislation.

We respectfully request the Committee to give its full attention to this matter and understand the ramifications of not passing or acting upon this legislation.

Should any committee members have specific questions regarding this matter, we would gladly be available for questions.

Most sincerely,

Sharon Pratt
Gem County Commissioner

Michele Sherrer
Gem County Commissioner

Lan Smith
Gem County Commissioner

Mr. OTTER. By transferring regulatory primacy over pesticide use from FIFRA to the Clean Water Act, the Ninth Circuit has authorized attorneys for activist groups to bully and intimidate farmers, mosquito abatement districts and others in deceasing long and widely practiced activities that have been authorized and already are closely overseen by Federal and State agencies.

An equally important but less frequently discussed part of the bill involves fire suppression, which is terribly important out west. It aims to protect State and Federal firefighters from nuisance litigation by reaffirming that the use of fire retardant by or in conjunction with Federal and State firefighting agencies is not subject to NPDES permitting requirements. This provision was necessitated by the Ninth Circuit Forsgren decision. In that case, the court misinterpreted a longstanding EPA rule clearly stating that the fire control activities do not require such a permit.

My district is home to the National Interagency Fire Center, the Country's support center for wildland firefighting. The National Interagency Fire Center is comprised of seven Federal agencies and State agency networks that work together to coordinate and support wildland firefighting and disaster operations.

In developing H.R. 1749 I learned that activist groups had threatened to file a Clean Water Act lawsuit against the U.S. Forest Service for its use of fire retardants in Montana and Idaho. Montana and many other western States are very vulnerable to dangerous, destructive and potentially deadly wildfires. I feel strongly that the redundant red tape and mischievous litigation should not delay efforts to combat these outbreaks.

Moreover, the use of fire retardants already is heavily regulated. Before approving any fire retardant for use, the Forest Service conducts an intensive two-year procedure that includes testing for the product for aquatic toxicity. In addition, the Forest Service and the Bureau of Land Management require a 300 foot buffer zone for use of fire retardants near aquatic environments.

The court's misinterpretation gives license to activist groups to intimidate farmers, Federal agencies, State agencies and mosquito abatement districts and to discontinuing well-established, expressly approved and heavily regulated activities. H.R. 1749 provides needed protection against such costly and needless lawsuits.

Thank you again, Mr. Chairman and Ranking Member, for holding this hearing today. I look forward to working with the Committee to pass this legislation into law.

Mr. DUNCAN. Thank you very much. Any letter or documentation you wish to supplement your statement with can be placed into the record. Congressman Cardoza wasn't here, we started two or three minutes early. But I did say in my opening statement some of the same things that you said, that the problem with these rules and regulations and red tape is, they hit the little guy the hardest; the small farmer and the small water districts.

These lawsuits are always brought by people who, most of the time have never set foot on a farm or who have never worked with a small water district. They really don't understand the costs and the problems. The big giants can take care of themselves. But a lot of these people in these smaller rural counties and so forth, they

don't have the money and the staff and the resources to fight all this.

All right, Congressman Cardoza, we certainly want to welcome you here and we are pleased to have you with us. You may begin your statement.

TESTIMONY OF THE HONORABLE DENNIS A. CARDOZA, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF CALIFORNIA

Mr. CARDOZA. Thank you, Mr. Chairman and Ranking Member Johnson. I appreciate the opportunity and invitation to be here.

I would just like to start out by saying I couldn't agree more with the statement you just made, Mr. Chairman. The small farmers in my area get buried in paperwork on a repeated basis. Even when they are complying with the laws and the label requirements, as you will see in my testimony, they just get, they are always getting into situations where they have a very difficult time.

I also want to acknowledge and thank my colleague, Mr. Otter, for his statement at the opening and his hard work on this issue and I want to associate myself with his remarks with regard to the Ninth Circuit. I come from California, out west, where we have regular challenges with that particular court.

Mr. Chairman, as you may know, in the early 1970s, Congress enacted both the Clean Water Act and the Federal Insecticide, Fungicide and Rodenticide Act to better protect our environment and human health. The Clean Water Act authorized EPA to safeguard our Nation's waterways from pollutants while FIFRA governed the proper labeling, distribution, sale and use of pesticides, insecticides, herbicides in order to protect people and the environment against adverse effects of pesticide use.

For years, these two laws worked in tandem to provide a regulatory framework for polluters and pesticides with little conflicts, since pesticide users were exempt from obtaining Clean Water Act permits if they were applying the product according to label directions, devised from a rigorous EPA registration process, a process whose goal is to allow for use of a pesticide in the most environmentally friendly manner.

Unfortunately, due to two recent court decisions, as has already been discussed, the way these two pieces of legislation interact is now under scrutiny. In the 2001 Headwaters v. Talent Irrigation District case, the court ruled that the irrigation district, applying a pesticide into an irrigation canal, according to label directions, was in violation of the Clean Water Act because it did not have a discharge permit. A 2002 case, League of Wilderness Defenders v. Forsgren, the court narrowed a longstanding EPA rule that exempted pest and fire control and other forestry activities from obtaining a permit for applying pesticides and fire retardants near waterways.

The legislation before you today, introduced by my colleague, would clear up the confusion from these court cases and other ones that are pending and clarify that using products registered under FIFRA and applied according to the label directions do not require the user to obtain a Clean Water Act permit. It would not give any user additional authority or clearance to circumvent the permit,

but would only maintain the status quo that has been in effect without problem for over 30 years.

As Congressman Otter touched on the impacts of these recent court cases on agricultural uses and fire prevention, so I would like to direct my comments toward pest control, specifically mosquito abatement, in order to show another sector of the economy that has been affected by these cases.

For those of you from urban centers, you might not be as familiar with mosquito abatement districts, but in rural counties throughout the United States, like my Congressional district, mosquito abatement districts play an absolutely critical role in protecting residents, crops and livestock from mosquito-borne illnesses. My daddy spent 32 years on the local mosquito abatement board before he died. I am very aware of some of the challenges that these boards have.

This is especially important in California, as we are facing the second and more deadly year of West Nile Virus infection outbreak. As of September 23rd, 54 counties in the United States have reported West Nile Virus activity in California this year. Seven hundred and thirty-five individuals have been infected with the virus and of that 735, there have been 15 fatalities. In addition to the human cases, 405 horses, 2,534 birds, 832 chickens have all tested positive for West Nile Virus.

I will tell you that just last week, one of our colleagues on the floor came up to me and told me that one of her family members who lives in her district had just contracted the virus. So it hits close to home.

We are facing an epidemic in California, and it is absurd to think now that after 30 years of regulation under FIFRA, our 61 mosquito abatement districts should be required to engage in a costly and duplicative permitting process under the Clean Water Act in order to continue the practice of protecting human lives.

In addition, I want to clarify that FIFRA is not the only regulatory mechanism mosquito abatement districts must comply with. In fact, in California, mosquito abatement districts are regulated under a number of State, Federal and local agencies, including EPA, U.S. Fish and Wildlife, the California Department of Health Services, the California Department of Pesticide regulation, the California Department of Fish and Game, and each county department of agriculture, weights and measures, not to mention Proposition 65.

In January this year, EPA published a rule that attempted to address uncertainty in the regulated community of whether or not they were required to obtain a Clean Water Act permit by clarifying that the application of pesticides in or near U.S. waters does not require a permit because those products are regulated under FIFRA and are not considered chemical wastes or biological materials as declared under the Clean Water Act.

While Congressman Otter and I are both very supportive of EPA's recent ruling, we feel that legislation from Congress is needed in order to ensure farmers, irrigators, mosquito abatement districts, firefighters, Federal and State agencies, pest control operators, or foresters, can continue performing the longstanding prac-

tice of pest management techniques and public health protection activities.

I hope this Subcommittee can support the bill and provide those entities that have a responsibility to protect the public health to continue to do their work without threat of litigation.

Thank you very much, Mr. Chairman, thank you very much, Ms. Johnson. I look forward to working with you.

Mr. DUNCAN. Thank you very much.

Ms. Johnson, is there anything you wish to say?

Ms. JOHNSON. No, thank you, Mr. Chairman.

Mr. DUNCAN. As I said earlier, we don't generally ask questions of members' panels, so they can move on. In addition to what I have already said, that these things hit the smallest farmers and landowners and smallest counties, and those least able to fight all these lawsuits, these costs have to be passed on to the public in the form of higher prices or higher taxes. It is just, it is really sad that we are hitting the poor and the lower income and the working people hardest of all.

Thank you very much for being with us.

We will go ahead and start now with the first panel. The first panel will be testimony from the U.S. Environmental Protection Agency, represented by the Honorable Benjamin H. Grumbles, former staff director of this Subcommittee, who is Assistant Administrator for Water at the EPA. And also testimony from the National Association of State Foresters, and they are represented today by Mr. Steven W. Koehn, who is the Director and State Forester of the Maryland Department of Natural Resources, from Annapolis, Maryland. We are certainly honored to have both gentlemen with us.

In this Subcommittee, we set the time limit for six minutes. We ask that you come with a five minute prepared statement, but we know five minutes sometimes, or usually, more often, takes six minutes to get completed. We do ask that you stop, though, when the red light comes on, in consideration of other witnesses. So Mr. Grumbles, we will begin with you. You may give your statement. And your full statements will be placed, all the witnesses' full statements will be placed in the record, along with any supplementary material that they wish to attach to their statements.

Mr. Grumbles.

TESTIMONY OF THE HONORABLE BENJAMIN H. GRUMBLES, ASSISTANT ADMINISTRATOR FOR WATER, UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, ACCOMPANIED BY: JAMES J. JONES, DIRECTOR, OFFICE OF PESTICIDES PROGRAM, UNITED STATES ENVIRONMENTAL PROTECTION AGENCY; AND STEVEN W. KOEHN, DIRECTOR AND STATE FORESTER, MARYLAND DEPARTMENT OF NATURAL RESOURCES-FOREST SERVICE, THE NATIONAL ASSOCIATION OF STATE FORESTERS

Mr. GRUMBLES. Thank you, Mr. Chairman. Thank you, Congresswoman Johnson, as well. It is always an honor to appear before the Subcommittee.

I would just like to say how much we appreciate, the agency appreciates the leadership that this Committee has taken on this par-

ticular issue. Quite some time ago, you brought to our attention the importance and the need for greater clarity and the reduction of duplication in the regulatory process that delays or confusion could lead to unnecessary litigation. We support your efforts to help to prevent that, and to also ensure that water quality is protected.

I want to also note that we appreciate the efforts of Congressman Otter and Congressman Cardoza on their legislation, bringing it to your attention and to ours, about the need for improvement in the regulatory process.

I am accompanied by Jim Jones. Jim is the Director of the Office of Pesticide Programs at EPA.

I would just like to say, in the brief oral statement before the Committee, that EPA has two offices, two programs that are involved in this issue, and my office, which has jurisdiction over the Clean Water Act and water quality programs, and the Office of Prevention, Pesticides and Toxic Substances with duties under FIFRA, the statute. Our goal, Mr. Chairman, with you and your committee members, is to reduce the potential for confusion or duplication and to also meet the requirements of the Clean Water Act and of FIFRA.

The overarching goal and the mission for the pesticide regulatory programs is to protect human health and the environment from potential pesticide risks while ensuring that pesticides meet today's more stringent safety standards and offer benefits to society. The focus through the regulatory programs is to ensure that pesticides, when used according to label directions, can be employed without posing unreasonable risks to human health and the environment.

I know that many of you are aware of this, and Jim is the expert on this, but the FIFRA regulatory process offers a thorough review of pesticides before they are sold, distributed or used. There is a registration process, there is a re-registration process. Environmental impacts are very much taken into account and that certainly includes water and aquatic impacts.

I think one of the issues that people are right to raise is the extent to which localized concerns about water quality impacts on a particular lake or water body that is not necessarily mentioned or contemplated in a label, how can local and State and other officials ensure that those water bodies are protected. For us, the key is working together using tools under FIFRA, as well as the Clean Water Act.

But the bottom line that I would say to the Committee is that for us, and what we have captured in our proposed rule, in our interpretive statement, is that if you are using a registered pesticide in accordance with the label, and all the relevant requirements accompanying that process under FIFRA, you don't need to get a Clean Water Act permit. Because the Clean Water Act permit is for discharging wastes, chemical wastes, biological materials, the focus is on wastes. When you are using as lawfully applied and according to the label a FIFRA product, that does not trigger the permitting requirement under the Clean Water Act.

But the thing I want to emphasize to members, particularly this Committee with jurisdiction over the Clean Water Act, is that there are other tools under that Act that we fully intend and continue to use in coordination with State and local water quality offi-

cials through the water quality standards programs, through criteria, through pollution reduction and TMDL programs. Those are still in place.

What I would like to say is that we are very much focused in the EPA, in the pesticides office, on ensuring that aquatic factors are taken into account in the registration and re-registration processes, and as labels are developed. As well, EPA is reassessing tolerances, pesticide residue limits in food, to ensure they meet safety standards under other statutes.

With respect to the Clean Water Act, as you know, we have issued an interpretive statement. We have also proposed a rulemaking, Mr. Chairman, to help clarify the regulatory requirements and their relationship to FIFRA. We hope to finalize that rule very early in the next year, or by the beginning of next year.

The guidance focuses on two specific circumstances. It basically says that if you are lawfully applying a pesticide, and it is a direct application to waters of the U.S., or if it is an application to control pests over or near waters of the U.S., you don't need a Clean Water Act permit. We very much appreciate the efforts of the members of Congress in proposing the legislation.

I would note, I would just simply conclude by noting that we are supportive of the efforts to provide greater clarity with respect to flame retardants. We are still working on components of the legislation and reviewing it, because it does go broader than our proposed rule, particularly in the areas of spray drift and also biological controls under the Plant Protection Act. But we appreciate your efforts in those, the members of Congress, in moving this effort forward.

Thank you very much, Mr. Chairman. I would be happy to answer any questions you may have.

Mr. DUNCAN. Very fine testimony, Mr. Grumbles.

Mr. Koehn.

Mr. KOEHN. Yes, good morning, Mr. Chairman, members of the Committee. My name is Steve Koehn, and I am the Director and the State Forester of Maryland's Department of Natural Resources Forest Service. On behalf of the National Association of State Foresters, I am pleased to have this opportunity to testify before you today on the Pest Management and Fire Suppression Flexibility Act, introduced by Congressmen Otter and Cardoza.

As you know, H.R. 1749 would codify the Environmental Protection Agency's longstanding position that forestry activities, aerial use of fire retardant and application of pesticide in accordance with its labeling do not require a National Pollution Discharge Elimination System Permit. The National Association of State Foresters strongly endorses the bill as it would ensure our continued ability to manage and protect State and private forest resources across the Nation.

In 1976, EPA issued a regulation that specifically excluded nonpoint source silvicultural activities from the NPDES permitting requirements and delegate the authority for the enforcement to the individual States. Over the past 30 years, State forestry agencies and their local partners have developed and implemented a strong, efficient and workable process for ensuring forestry activities, pri-

marily timber harvesting, would not significantly degrade water quality.

Collectively, these regulations and guidelines are known as forestry best management practices, or BMPs. These programs are updated regularly and the States are constantly monitoring the implementation and effectiveness of their forestry BMP programs with steadily improving progress.

In my State, in Maryland, controlling non-point source water pollution from forestry activities is a top priority of my agency. The Maryland Forest Service, along with the Maryland Department of the Environment, oversees the implementation of a highly effective forestry BMP program.

My staff of more than 50 State foresters and forest rangers work closely with land owners, loggers and the forest industry to ensure timber harvesting meets our State's BMP standards. The process works efficiently and effectively, allowing loggers and landowners to accomplish their goals while simultaneously protecting water quality.

I am concerned that without this legislation, future legal action may require landowners to obtain an NPDES permit prior to initiating any forestry activities. This scenario would have several detrimental effects. The permitting process would be redundant with respect to current State forestry BMPs and it would be a prohibitively expensive step for many small family forest landowners who only harvest timber once, possibly twice in their lifetime. The income gained from these timber harvests is often pivotal to ensuring that landowners keep their land in forest as opposed to selling it for development.

I am sure that many of you have seen pictures and television reports of aircraft dropping water and fire retardants on wildfires in order to slow their spread. Fire managers often use this tool to protect houses and other properties in those areas where forests and communities are intermingled. These areas are commonly known as the wildland-urban interface, and are increasingly becoming more common across the landscape in both the eastern and western parts of our Country.

The aerial application of water and fire retardant is often an essential tool to protect life and property in these communities. This technique is also valuable when fighting fires in more remote areas, where initial attack access is limited. That can be a problem.

The National Interagency Fire Center, a coordination group of seven Federal and numerous other State agencies, has developed guidelines for the application of fire retardant to wildland fires. These guidelines are published in the interagency standards for fire and aviation operations guidebook, specify that aircraft must not apply fire retardant within 300 feet of a waterway, which includes lakes, rivers, streams and ponds.

Retardant drops are usually supervised by ground personnel who also ensure that these guidelines are followed. These guidelines provide sufficient protection to waterways while allowing fire managers to work quickly. Once again, applying for the NPDES permitting process to fire suppression would be redundant with current protections that are already in place, and wildly unrealistic, given the emergency nature of firefighting in the west.

As the stewards of more than 500 million acres of State and private forest lands across the Country, State foresters take an active role in detecting, controlling and eradicating invasive forest pests and pathogens. When controlling insect and disease outbreaks, it is often very difficult or impossible to treat trees from the ground due to their height and inaccessibility. The aerial application of pesticides is often the best and only method for treatment in many cases.

An example of successful aerial application in eastern forests is our effort to control the gypsy moth caterpillar, a problem in my State since the 1980s through the use of an organism known as Bacillus thuringiensis, or commonly known as Bt. This naturally-occurring bacterium is a parasite of the caterpillar and is effective only during a short time during the gypsy moth's life cycle. The larvae consume vast quantities of foliage, especially from oaks, and weakening the trees often to the point where they become susceptible to other insects or disease.

The Maryland Forest Service, along with the Maryland Department of Agriculture's Forest Pest Management section, works closely with private landowners and other government agencies to initiate an aerial spray program to control gypsy moth in our hardwood forests. Since the advent of the spray program, defoliation of gypsy moth has decreased dramatically.

The success of the program is due in large part to our ability to move quickly and be nimble to guarantee that our window for opportunity is not missed. This bill will ensure that we are able to continue to effectively control this and other forest pests.

We strongly support EPA's development of a new rule to clarify the NPDES process. But we feel that it does not go far enough. The Otter-Cardoza bill would remove uncertainty, redundancy and complexity from the process of protecting clean water. State foresters believe the current suite of regulatory processes is sufficient, effective and workable, and more importantly, it has successfully protected the Nation's water for nearly three decades.

Thank you for the opportunity to testify. I would be happy to answer any questions.

Mr. DUNCAN. Thank you very much. I have already made extensive comments in my opening statement and in my remarks to Congressmen Otter and Cardoza. So I am going to yield at this time to Dr. Boozman, who was the first member here. Dr. Boozman.

Mr. BOOZMAN. Thank you very much, Mr. Chairman. And thank you for holding this hearing.

My brother was the head of the health department in Arkansas. Fighting the West Nile virus was and is still a major undertaking. This issue is very, very important.

Does the pesticide statute of FIFRA provide EPA with the comprehensive, effective authorities to regulate the use of pesticides?

Mr. GRUMBLES. Congressman, I would say the FIFRA statute does provide important and necessary authorities. The Clean Water Act provides authorities as well, and those help supplement with respect to protecting water bodies. But when it comes to the NPDES permitting program, what we are saying is that when the pesticides are being applied, based on all the work and review that

has gone into the FIFRA program and the FIFRA label, then you don't need a Clean Water Act permit under these specific circumstances, because it is really not a waste that is being applied, it is a product.

But the Clean Water Act still has tools that are very important in ensuring water quality and protection to supplement the FIFRA program.

Mr. BOOZMAN. So I guess in light of EPA's extensive and rigorous program, is there any reason to regulate under the Clean Water Act pesticides the EPA has registered under FIFRA, and if there is, I think you are answering this, but I just want to make it clear so I understand, and we have it for the record, is there any circumstance that we need to do that?

Mr. GRUMBLES. I think our position, and just to make sure everyone understands, we issued an interpretive statement, which I will summarize, and we also have a proposed rulemaking to codify that, to give it greater stature. We are going through the public comments on that. So that hasn't been finalized yet.

But Congressman, you are right, the basic position we are taking is that Clean Water Act permits, that type of regulation under the Clean Water Act, is not required in these circumstances when you are directly applying and you are using the pesticide as a product and you are following the FIFRA program.

Mr. BOOZMAN. Thank you very much. Thank you, Mr. Chairman.

Mr. DUNCAN. Thank you very much.

Ms. Johnson.

Ms. JOHNSON. Thank you very much, Mr. Chairman.

Let me ask EPA, if this Act was enacted, would it become easier or harder to ensure safe and reliable drinking water supply?

Mr. GRUMBLES. This Act, meaning the bill, H.R. 1749?

Ms. JOHNSON. Yes.

Mr. GRUMBLES. Would it be easier or harder to ensure safe water supply? Well, I think, I have to say there are three or four different pieces of the bill, and a few of those pieces, we are still reviewing. They involve more than just a FIFRA-Clean Water Act permitting connection.

But on the FIFRA-Clean Water Act permitting connection, we feel that source water protection is important, and using tools under the Clean Water Act and the State authorities under the Clean Water Act that would still be preserved in the legislation, it allows for an appropriate and protective approach.

Also, the important point is that it will help provide greater clarity and reduce confusion that local health officials combatting West Nile virus or agricultural producers need in order to get their products to the market.

Ms. JOHNSON. What tools are you speaking of?

Mr. GRUMBLES. I am talking about, one of the key tools and approaches that we have as an agency and that we fully embrace, and that is also reflected in the proposed bill, is that if a State or local authority feels they want to have additional water quality protections or use other aspects, separate from the Clean Water Act permitting program, they can do so.

I am thinking about additional tools, though, Congresswoman, under the Clean Water Act that are extremely important, and

those are science-based criteria that we develop and are in the process of developing more with respect to pesticides, so that we know and in coordination with the FIFRA program can incorporate the latest scientific information about debate on transport and impacts of pesticides.

Ms. JOHNSON. Are you aware that the Association of Metropolitan Water Agencies has taken a position against this bill?

Mr. GRUMBLES. I am not aware of their position on this bill, no. I know the important role they play in looking at source water protection and other matters, but I haven't seen their specific approach on the bill, no.

Ms. JOHNSON. Mr. Chairman, I ask unanimous consent to submit this letter for the record.

Mr. DUNCAN. That may be placed in the record.

[The referenced document follows:]

Sep-29-05 09:22 From-AMWA 2027851845 T-087 P.002/003 F-616

Association of Metropolitan Water Agencies
Serving the nation's largest publicly owned drinking water agencies
Washington, DC 20005
(202) 331-2820 • fax 785-1845
www.amwa.net

September 29, 2005

Hon. John J. Duncan, Jr., Chairman
Hon. Eddie Bernice Johnson, Ranking Member
House Committee on Transportation and Infrastructure
Subcommittee on Water Resources and the Environment
B-376 Rayburn House Office Building
Washington, DC 20515-6262

Re: H.R. 1749, the "Pest Management and Fire Suppression Flexibility Act"

Dear Chairman Duncan and Ranking Member Johnson:

The Association of Metropolitan Water Agencies (AMWA) appreciates the opportunity to express our concerns with H.R. 1749, the "Pest Management and Fire Suppression Flexibility Act." AMWA is a non-profit organization comprised of the nation's largest municipal water suppliers from Alaska to Florida. AMWA members serve more than 125 million people with clean, safe drinking water. AMWA opposes H.R. 1749. This bill undermines the purpose and aim of the Federal Water Pollution Control Act (Clean Water Act), which in turn could be detrimental to protecting water quality and the integrity of drinking water sources that rely on the nations waterways for their water supply.

The Clean Water Act (CWA) and the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) are two very different environmental laws that were developed with two specific, different goals in mind. While these two laws may complement each other in that they address pesticides, they do so at different entry points into the environment (i.e., application and runoff). Accordingly, compliance with one statute should not be a substitute for compliance with the other. Similarly, laws governing silviculture activities and the use of fire suppression chemicals or biological control organisms were developed to address their application and not to address their environmental impacts to waterways. Therefore, providing a blanket exemption of pollutants such as pesticides, fire suppression chemicals and biological control organisms from National Pollutant Discharge Elimination System (NPDES) permits endangers waters that are used for public water supply and weakens the CWA.

FIFRA was developed to give the Environmental Protection Agency (EPA) authority to require all pesticides sold or distributed in the U.S. to be registered with the agency and labeled for their use. The objective of the CWA is to "restore and maintain the chemical, physical and biological integrity of the Nation's waters." Whereas FIFRA regulates the use and application of the pesticide, the CWA regulates the discharge of environmental pollutants, such as pesticides, chemicals for fire

suppression, and biological control organisms, into waters of the United States. The CWA defines pollutant very broadly to include any type of industrial, municipal and agricultural waste.

As authorized by the CWA, the NPDES permit program controls water pollution by regulating point sources that discharge pollutants into waters of the United States. In most cases, states administer the NPDES program by considering the water quality of the waterways in their states and restricting concentrations of chemical, biological and agricultural pollutants that are discharged into those waterways. Since its introduction in 1972, the NPDES permit program has been responsible for significant improvements to our Nation's water quality.

EPA has stated that protecting public health and likewise protecting public water supplies are critical elements of the CWA's mission. As EPA's Assistant Administrator for Water wrote in a October 3, 2003 memorandum "relying solely on drinking water treatment imposes an unfair burden on communities to address preventable problems caused by man-made sources of pollution." AMWA encourages the committee to keep in place the tools given to EPA and states to protect our waterways and the drinking water sources that rely on them from pollutants, including pesticides, fire suppression chemicals and biological control organisms.

Sincerely,

Diane VanDe Hei
Executive Director

Ms. JOHNSON. Are the pesticides a water quality problem?

Mr. GRUMBLES. Pesticides can in fact be a water quality problem if they are not applied properly. That is one of the major messages that we want to send, both the Pesticide Office and the water offices, that if pesticides are not applied according to the label and approval process that they have gone through, they are subject to penalties and fines under relevant statutes, including the Clean Water Act.

Ms. JOHNSON. How is that supervised?

Mr. GRUMBLES. How is what supervised?

Ms. JOHNSON. How do you make the determination as to whether someone is following the label or not? Would you say that pesticides do or do not affect the quality of water?

Mr. GRUMBLES. I am going to say one thing, then I will turn to Mr. Jones with the Pesticide Program. One of the things we do at the Federal level is work closely with State authorities, water quality authorities, and local authorities in requiring them to list impaired water bodies on a regular basis, and then to track and identify the potential sources of pollution.

So a very important part of our mission and the Clean Water Act is to, setting aside from just the permitting program, is monitoring and assessing the status of water bodies across the Country, and to follow up, to see if there are problems and how best to reduce the pollution if there is.

Jim, did you want to add on?

Mr. JONES. The pesticide labels are enforced under FIFRA largely by States. State agencies are designated and have the responsibility for enforcing pesticide use in the United States. Periodically EPA regional offices will be involved. But the vast majority of the enforcement occurs by States in the United States.

Ms. JOHNSON. And you depend—I think my time is about up—but you depend on the States to monitor?

Mr. JONES. The States do enforcement of labels with EPA oversight.

Ms. JOHNSON. Thank you. I will wait for a second round.

Mr. DUNCAN. Mrs. Kelly.

Mrs. KELLY. Thank you.

Mr. Grumbles, I appreciate your joining us today to talk about the use of pesticides and fire suppressants near drinking water. It is an important issue and I think it deserves a lot of attention, especially what it is getting today.

But the constituents in my Congressional district are concerned with a different, troubling drinking water industrial contaminant, TCE. As the Assistant Administrator for Water, I am sure you are familiar with the toxicity and the detrimental effects of exposure to TCE. Drinking or breathing in TCE may cause nausea, liver damage, unconsciousness, impaired heart function and bring on near death.

In fact, in 2001, the EPA determined that TCE is actually 5 to 65 times more toxic than previously believed. Yet in spite of this determination, and the risks that I just cited, the EPA has passed the buck and asked the National Academy of Sciences to re-review the finding of its 2001 assessment.

My constituents who live at a recently-named Superfund site in Duchess County are forced to live every day with contaminated groundwater, soil and air. They really can't afford to wait the years it is going to take for an outsourced re-review. They need a clear, national standard for addressing the TCE contamination, and they need it now. They can't wait, Mr. Grumbles.

The Hopewell Junction Citizens for Clean Water is a coalition that was formed by the residents of this Superfund site. They want the EPA to do everything within its authority to investigate and respond to this TCE contamination based on protective, provisional standards and to finalize the draft assessment for TCE.

Let me read from a letter one of my constituents sent. She said, "People who are breathing this stuff can't wait for the Federal bureaucracy to take action at its normal pace." I want to know why we would let red tape get in the way of a good governmental policy which has already been established by your agency. My constituents and I feel that the EPA in New York, on the ground, has been very helpful in working with us. The EPA here in Washington, however, is not finalizing this draft assessment for the TCE as urgently as it needs to be done.

I am uncertain as to why this was outsourced for one more re-review. I think Americans across, I know, and you do, too, Americans across this Nation are exposed every day to TCE in their water and air. There is no clear EPA standard for these exposures.

Can you tell me why there is not a greater sense of urgency to finalize some sort of a national standard on TCE, and why this can't be expedited in relationship to the terrible health risk assessment that we already have on TCE?

Mr. GRUMBLES. Congresswoman, I appreciate your remarks and the sense of urgency and the concerns of your constituents and others. What I can tell you is that I will certainly relay that sense or urgency with my colleagues in the Superfund office and the Administrator's office. I think we share your passion for source water protection and protecting water quality and the drinking water, because it involves the health of citizens. It is a public health statute and program.

I know that we are committed to science-centered, results-oriented approaches to these water quality issues. I know that your concerns about red tape have caused us to act in similar areas to try to reduce regulatory confusion or uncertainty in the context of this FIFRA NPDES permitting issue. But on this important one of TCE, I can't speak to the specifics of the scientific questions. But I certainly understand the need for urgency and to try to get resolution. I would be happy to follow up with you directly on that and confer with those in the agency who are more closely working on the TCE challenge.

Mrs. KELLY. Mr. Grumbles, you have been in my district. You know our water quality issues. You know that we protect one-third of all the drinking water for New York City. You also probably know that in this area, this new Superfund area that I am speaking of, it is part, the plume of this TCE is headed in that direction. I know you know this district that I represent, and I know you didn't come here this morning to talk about TCE.

But I hope we can work with you to get a very rapid determination. TCE is affecting many more people than just my people that are living in this Superfund site. Those people have been fighting for a long time. We need help, and we need help fast. I hope that you will give it to me, and I hope that we can work, maybe you can find something out and send me a letter, put something in writing so we get some kind of a determination.

Mr. GRUMBLES. Certainly.

Mrs. KELLY. Thank you very much. I appreciate your consideration.

Mr. GRUMBLES. Thank you.

Mr. DUNCAN. Thank you very much. Mrs. Kelly is correct, her issue is important, very important to her constituents and to her. Actually, TCE does not, it is more of a Superfund issue and is not really involved with this legislation, but I appreciate her raising it at this point and I appreciate your response.

Mr. Carnahan.

Mr. CARNAHAN. I have no questions, Mr. Chairman.

Mr. DUNCAN. No questions. All right. Let me ask you, Mr. Grumbles, how long does it take a typical on average for a pesticide or a herbicide to be approved by the EPA, on average? Should I ask Mr. Jones?

Mr. GRUMBLES. I would defer to Mr. Jones.

Mr. DUNCAN. Sure. Mr. Jones.

Mr. JONES. If it is an altogether new chemical, one that we have not before approved in the United States, it takes between two and three years. Although recent legislation passed by the previous Congress gave EPA a mandate to make such decisions in two years. We fully expect to be in that situation very shortly.

If it is you are adding a new use, for example, the product may already be approved for use on corn, and you are trying to add oats to the label, that would take anywhere from six months to twelve months.

Mr. DUNCAN. So the main point though is that EPA already has a very extensive process that they put these proposed chemicals or pesticides through now, and it has been taking two to three years to get approval?

Mr. JONES. That is correct. We require for all pesticides to either be registered, or if they were registered some time ago, for them to be re-registered, a wealth of information, not just environmental impacts, but the human health impacts of that pesticide. So for every pesticide registered in the United States, we have a vast array of data particular to this issue on aquatic effects of that product, probably more information around the aquatic effects of these pesticides than exists anywhere in the world.

Mr. DUNCAN. And I understand that most of these pesticides, or many of them, at any rate, require certified people to even apply them. Is that correct?

Mr. JONES. If the pesticide has been designated as restricted use, then you cannot apply, you can't purchase, in the first place, or apply the pesticide unless you are a certified applicator, which requires you to go through a certification program that is managed by the State lead agency, the agencies I was referring to before as being the chief enforcement agency for pesticide use.

Mr. DUNCAN. And before you approve them, you of course are making sure that they wouldn't be harmful to the environment or to clean water, and also if there is any danger at all, you put restrictions or limitations on some of them. Is that correct?

Mr. JONES. The standard we apply under FIFRA is unreasonable adverse effect, which involves the evaluation of the safety of the product for both aquatic environments, terrestrial environments and human health.

Mr. DUNCAN. Mr. Koehn, are you aware of any data showing any kind of widespread or significant deterioration of water quality caused by pesticides?

Mr. KOEHN. Again, as was testified to earlier, if they are mis-applied, that certainly can happen. But again, as the testimony has already been stated, most States, I know in my State, the Maryland Department of Agriculture regulates the use of pesticides and enforces the labeling of the pesticides. Unless they are mis-applied, there normally is not a problem with the application of herbicides or pesticides.

Mr. DUNCAN. So there is not only Federal regulation already, there is State regulation as well?

Mr. KOEHN. Yes, Mr. Chairman.

Mr. DUNCAN. Do you know of any cases of people that are using pesticides or herbicides that have not been approved?

Mr. KOEHN. Not in my experience. I mean, when we are talking about dealing with forest pests, we are normally dealing with contractors, larger outfits, they are all licensed, they are all bonded, they know the regulations, they are very familiar with the application of procedures and processes. So that has been an experience that I have had.

Mr. DUNCAN. How long have you been working in this field?

Mr. KOEHN. Twenty-one years.

Mr. DUNCAN. All right, well, thank you very much, you have all been very helpful and informative witnesses. Ms. Johnson?

Ms. JOHNSON. Yes, Mr. Grumbles, does the EPA favor enacting this legislation for clarity?

Mr. GRUMBLES. Does the EPA favor enacting this legislation?

Ms. JOHNSON. Yes.

Mr. GRUMBLES. Congresswoman, we don't have a formal or official position on the legislation. Parts of it involve other agencies, and those other agencies are continuing to review it.

I can tell you that I think—

Ms. JOHNSON. I am just speaking about EPA.

Mr. GRUMBLES. Yes. From my perspective, there are pieces of this legislation that would be helpful. There are components of it that are also, to the extent they are consistent with our proposed rulemaking, we are supportive of.

We are still reviewing other pieces of it and we do support the overall notion of harmonizing, better harmonizing the two statutory programs while ensuring water quality is protected.

Ms. JOHNSON. What other agencies are you speaking about?

Mr. GRUMBLES. Well, the Department of Agriculture has certainly an important role in the lot of the provisions and aspects of this bill. And we certainly want to coordinate. We are also interested in getting views of the stakeholders.

We find it is important, as we read through the 1,500 plus comments on our proposed rulemaking, to be able to look at the lessons from those comments and use those to inform us in our review of the proposed legislation.

Ms. JOHNSON. Does any other agency besides EPA have the authority to enforce the Clean Water Act?

Mr. GRUMBLES. The Army Corps of Engineers certainly does. We also work very closely with the Department of Justice. We work closely, there are other agencies that are involved in implementing the Clean Water Act that we work closely with, the Department of Agriculture and Department of Interior.

Ms. JOHNSON. But EPA has the authority to enforce the Clean Water Act?

Mr. GRUMBLES. Yes, we do, and it is an important part of our mission.

Ms. JOHNSON. Thank you.

Mr. DUNCAN. All right, well, thank you very much. You can see from the more than 1,500 comments you have received and various other things, this is a much more important issue than a lot of people realize. We appreciate your being here with us this morning. Thank you very much.

We will now call up the second panel. This panel consists of a representative of the American Mosquito Control Association, Mr. David Brown, who is manager of the Sacramento-Yolo Mosquito and Vector Control District, from Elk Grove, California; representing the National Water Resources Association, Mr. Scott Campbell, who is chairman of the Water Quality Task Force from Boise, Idaho; representing the American Farm Bureau Federation is Mr. Edward R. Flanagan, who is the president and CEO of the Wyman Farms; and representing Beyond Pesticides/NCAMP is Ms. Shawnee Hoover, who is the special projects director for that organization. She is from this city, Washington, D.C.

We are appreciative that all of you would take time out of your very busy schedules to be with us today, especially those of you who have traveled long distances to be here. We do proceed with the witnesses in the order they are listed on the call of the hearing.

I will say, as I said earlier, all of your full statements will be placed in the record. Every other subcommittee asks that witnesses limit their statements to five minutes. In this Subcommittee, we give six minutes. But we do expect you to quit after six minutes in consideration of other witnesses and also the members.

So if you see me pick up this and start waving it, I usually try not to pound it, but if you see me waving it, that means stop.

[Laughter.]

Mr. DUNCAN. Thank you very much. Mr. Brown.

TESTIMONY OF DAVID BROWN, MANAGER, SACRAMENTO-YOLO MOSQUITO AND VECTOR CONTROL DISTRICT, AMERICAN MOSQUITO CONTROL ASSOCIATION, ACCOMPANIED BY: KARL MALAMUD-ROAM, CHAIRMAN, LEGISLATIVE AND REGULATORY COMMITTEE; AMERICAN MOSQUITO CONTROL ASSOCIATION; SCOTT L. CAMPBELL, CHAIRMAN, WATER QUALITY TASK FORCE, NATIONAL WATER RESOURCES ASSOCIATION, INC., ACCOMPANIED BY: NORM SEMANKO, PRESIDENT, NATIONAL WATER RESOURCES ASSOCIATION AND EXECUTIVE DIRECTOR, IDAHO WATER USERS ASSOCIATION; EDWARD R. FLANAGAN, PRESIDENT AND CEO, JASPER WYMAN AND SON, AMERICAN FARM BUREAU FEDERATION; AND SHAWNEE HOOVER, SPECIAL PROJECTS DIRECTOR, BEYOND PESTICIDES/NATIONAL COALITION AGAINST THE MISUSE OF PESTICIDES

Mr. BROWN. Good morning, Mr. Chairman and Congresswoman Johnson. My name is David Brown and I am the past president of the AMCA, or American Mosquito Control Association. I am also the manager of the Sacramento-Yolo Mosquito and Vector Control District in California.

I have with me today as well Dr. Karl Malamud-Roam, who is the chairman of our legislative and regulatory committee, and may offer some help in terms of answering some questions later.

The district I represent in California has been sued for alleged Clean Water Act violations regarding our district's response to a West Nile virus outbreak in California. The suit concerns the very issues which this Committee is considering today.

The AMCA supports H.R. 1749, because mosquito control districts have seen a significant number of legal challenges, at least four, involving a number of circuit courts, to mosquito control efforts that are needed, that are recommended by Centers for Disease Control, and use products that are approved by EPA to combat West Nile virus.

The proposed legislation would clarify for the courts that Congress recognizes that our pesticide applications, when made in accordance with the relevant provisions of the EPA-approved labeling, are not pollutant discharges, and do not need an NPDES permit.

To be clear, the AMCA also supports the goals of clean water. However, the NPDES permit process of the CWA is not the best way to protect water quality relative to the approved and authorized applications of pesticides. In fact, since the inception of both FIFRA and the CWA in 1972, the two Acts have worked remarkably well together. Therefore, we believe NPDES permits are not required for the applications of pesticides for the following reasons.

First, the current system works. Modern mosquito control pesticides, applied by trained and certified technicians in California, have been repeatedly evaluated and have been shown to not cause detrimental impacts on aquatic ecosystems. Mosquito control products are environmentally benign, both because of their low inherent toxicity and because they are applied in such small quantities, often not more than one ounce per acre.

Larvacides applied directly to water have minimal non-target effects, and adulticides applied over or near waterways either do not

enter the water or do so in negligible quantities when applied according to the labels.

Second, the FIFRA label system is flexible enough to accommodate change when needed to ensure that aquatic sites are protected by the labels. For example, the mosquito adulticide labels are currently being updated to clarify droplet sizes and reapplication periods. The risk assessments for these products under FIFRA are frequently updated with the best available science, and EPA's Office of Pesticide Programs has significantly expanded its review of potential impacts on threatened and endangered aquatic organisms.

Third, the NPDES system would be duplicative of FIFRA protections, expensive and inappropriate for our pesticide applications. We apply pesticides not at single points of discharge, such as industrial outfalls, but at thousands of different sites relative to effective mosquito control.

As an example, my district's monitoring costs this summer exceeded $50,000, even though the pesticides used were at or below the detection limits of the chemical test, which is much lower than the levels where they would cause harm.

As you heard previously, EPA has recently issued an interpretive memo on proposed rulemaking on this issue, outlining its position that our pesticide applications for mosquito control are not pollutant discharges and do not require NPDES permits. AMCA strongly supports the adoption and finalization of this rulemaking.

Unfortunately, not everyone has agreed with EPA on this position, which leads us to the biggest problem for mosquito control and the need for prompt action. The courts require clarity on the relationship between pesticide regulation and the protection of water quality because of abuses of the citizen suit provisions of the Clean Water Act. This Subcommittee recently heard testimony on the potential for frivolous lawsuits abusing the Clean Water Act, forcing government agencies that were performing critical work and complying with appropriate laws to spend time and money defending themselves in Federal courts.

Unfortunately, this problem has not gone away. For example, when New York City was faced with the first cases of West Nile virus on the western hemisphere in an outbreak in 1999, the city responded in a manner which CDC and all reputable public health officials have supported. To this day, the city is still in the Federal courts, defending itself against the charge that they sprayed without an NPDES permit even though no government agency ever had required such a permit for mosquito control spraying in the long history of the Clean Water Act and FIFRA.

Even thought U.S. EPA has repeatedly stated that no permit is needed for the work done by New York City, and even though no harm was shown to aquatic organisms from the spraying, the city is still in court, spending time and money defending the use of emergency actions it undertook. More recently, Gem County, Idaho was sued for mosquito control spraying and threatened with $25,000 per day fines if they used pesticides to protect their citizens from mosquitos and West Nile virus.

Unfortunately for Gem County, it is impossible to obtain an NPDES permit for the use of aquatic pesticides in Idaho because the State does not issue NPDES permits and because U.S. EPA,

which does issue the permits in the State, has held that mosquito control spraying does not require permits. Thus, a small public health agency faced with a potential outbreak of fatal disease and seeking to follow CDC's recommendations to stop the outbreak is caught between the proverbial rock and hard place.

Finally, this summer, the district I manage had to respond to an outbreak of West Nile virus that had placed dozens of citizens in local hospitals. My job is to prevent a massive outbreak of the disease in the epicenter of the epidemic here in California. I provided extensive information on where and when we would spray, so that people could avoid the spraying if they had particular concerns. But I was sued in Federal court the day we planned to start the spraying, because I did not have an NPDES permit for my aerial applications of pesticides to control infected adult mosquitoes with West Nile virus.

As an aside, if the conditions that currently exist in New Orleans happened in California, we would not be able to treat for the mosquitos coming from those flood waters without threat of litigation or restraining orders.

In summary, my colleague Joe Cowan told you three years ago about the West Nile virus outbreak that was spreading across our Country and how the good intentions of the Clean Water Act were obstructing the reasonable response to the disease. Unfortunately, though other news has dominated the national media over the intervening years, the disease has continued to sicken thousands and kill hundreds of Americans. Also unfortunately, the Clean Water Act is currently being interpreted by the courts as still an impediment to protecting our public health.

Thank you for the opportunity to voice my concerns, and I will look forward to questions.

Mr. DUNCAN. Thank you very much.

Mr. Campbell.

Mr. CAMPBELL. Thank you, Mr. Chairman, members of the Committee. My name is Scott Campbell, I am a resident of Boise, Idaho and have been a licensed attorney for 27 years. I have practiced in the areas of water rights, natural resources and environmental law for over 20 years. I presently serve as the chairman of the Water Quality Task Force of the National Water Resources Association and am appearing on behalf of the Association and all of its 17 western State member associations.

I also have sitting behind me Mr. Norm Semanko, who is president of the National Water Resources Association, and executive director of the Idaho Water Users Association.

H.R. 1749 is critically important legislation. Because of activists' litigation and inaccurate judicial reasoning, Federal appeals court decisions over the last four years have produced a number of erroneous interpretations of the language of the Federal Water Pollution Control Act.

Agriculture has been dramatically impacted in the States where the Ninth Circuit has rendered these decisions. Irrigated agriculture production suffers the most direct and costly impacts. The effective delivery of water requires periodic treatment of surface water canals and ditches to reduce growth of moss and other aquatic plants. Non-treatment will force water delivery reductions,

resulting in crop loss or crop failure, water blockage, which can cause flooding of facilities and adjoining lands, and the inability to operate regulation devices to properly control water.

The so-called Talent decision concluded that EPA-approved aquatic herbicides, used in irrigation canals, were required to have an NPDES permit. Before the Ninth Circuit decision, an NPDES permit for such activities had never been required by the Environmental Protection Agency.

In Idaho, because it is a non-delegated State, that is, the State does not have the delegated regulatory authority under the Clean Water Act, it is impossible to get an NPDES permit for the application of these aquatic herbicides, because EPA does not believe the Clean Water Act should require such permits. Consequently, in Idaho, a Ninth Circuit State, any applicator of those chemicals is subject to a Clean Water Act violation, yet they cannot obtain the permit. The same Gem County situation: rock and a hard place.

Because of these erroneous decisions by the Ninth Circuit and other circuits of this Country, personnel costs have increased due to the extremely stringent monitoring requirements where they can obtain permits in some of the other States. Additionally, the large expenditures of funds for attorneys and consultants to assist irrigation entities and private landowners in obtaining the permits, an unnecessary cost that just places unnecessary burden upon production agriculture and individuals. Any violation of an NPDES permit that is issued results in a violation of the Clean Water Act and subjects the person to enforcement actions by the State agencies or citizen environmental activist organizations that pursue many of these cases just to obtain the citizen suit attorney's fees and the publicity.

In addition to the impacts to these entities, water delivery systems for municipalities and recreational water bodies are affected by these incorrect judicial interpretations. Any open storage reservoir for municipal water systems are subject to these decisions, thereby mandating NPDES permits for treatment of water in those facilities.

Most significantly for the general public, lakes, ponds and other water bodies for recreation are less likely to be treated for nuisance aquatic vegetation or invasive aquatic plant species. Without effective herbicide treatment, these non-native invasive plant species can totally destroy the recreational value of water bodies. Additionally, they restrict and diminish the quality of aquatic habitat for native fish and aquatic life.

Congress has the opportunity to solve the problems created by these erroneous judicial interpretations. H.R. 1749 provides unambiguous clarification of the meaning of the Clean Water Act to counter this spate of inaccurate decisions.

I encourage the members of the Subcommittee and the full Committee to restore the Clean Water Act to the proper balance which existed since its adoption until these judicial misinterpretations tilted the playing field so dramatically. Common sense suggests that the wise use of beneficial chemical products, in accordance with label restrictions previously adopted by EPA, is more than adequate to protect the environment and allow the human population to obtain the benefits of these pest control substances.

Control of West Nile virus, protection of forest health, continued functioning of vastly productive irrigated farm lands and preservation of recreational water bodies are beneficial goals which should not be unnecessarily precluded or hindered simply because of activist litigation and mistaken judges.

On behalf of my clients and the member State associations of the National Water Resources Association, I strongly urge passage of H.R. 1749. Thank you for the opportunity to address you on this critically important piece of legislation.

Mr. DUNCAN. Very fine testimony. Thank you very much.

Mr. Flanagan.

Mr. FLANAGAN. Chairman Duncan, Ranking Member Johnson and members of the Committee, my name is Ed Flanagan. I am the president and CEO of Jasper Wyman and Son, a family-owned blueberry operation founded in Milbridge, Maine in 1874. Wyman's is also a grass roots member of the American Farm Bureau Federation, the Nation's largest general farm and ranch organization.

I am grateful for the chance to present this testimony on behalf of thousands of threatened farmers nationwide. Let me get right to it.

Wild blueberries are wild because they have never been planted. They are a root system that has been indigenous to the sandy glacial souls of downeast Maine for thousands of years. A wild blueberry crop takes two years to grow, so in any given year, half of our land is cropping and the other half is sprouting for the following year.

Wild blueberries are not a high chemical use crop. The fruit has natural disease resistance due to its high acidity. However, weeds compete for nutrients and block efficient harvesting, so the use of herbicides is imperative to commercial crop success.

Pesticides are needed to control outbreaks of leaf-eating caterpillars and fruit fly infestation that can reduce yield and quality. Further, because wild blueberries grow low to the ground, they are vulnerable to fungal diseases during the wet weather of the spring. A crop with two years worth of investment can be lost to blight in two weeks of wet weather in May unless the fields are quickly and efficiently treated with a fungicide.

During the 1980s, the wild blueberry industry became early adopters of integrated pest management. Through field scouting and target applications, our industry reduced the use of pesticides by 80 percent. To put it in perspective, a wild blueberry field now receives 300 to 400ths of an ounce of total chemicals per square foot over the course of two years.

For the 2005 crop, pesticide residual testing, which we do each year, indicated that the highest level of chemical found in any sample was 45 times below the EPA's limit for that chemical.

When Wyman's uses aerial application for crop protection, we also employ ground scouts to communicate with the pilots in wind speeds and air inversions. The planes spray no more than 10 to 15 feet from the ground and do not fly at wind speeds in excess of 10 miles an hour.

A key advantage of aerial spraying is the ability to use one licensed chemical handler to handle all treated acres. Another key

advantage of aerial is the fact that wild blueberries do not grow in rows, and the wheels of ground-based sprayers crush the fruit.

In 2000, Wyman's participated voluntarily in a State board of pesticide control study of aerial spray drift into waterways. Detections varied from zero to values of 11/110ths to 94/100ths of 1 part per billion, and 3,400 nanograms, which is a billionth of a gram. We believe these results to be positive evidence of our stewardship of our land.

The BPC published the results on a web site and a group of environmental organizations issued notice of 60 day intent to sue for violating the Clean Water Act, regardless of the amount detected. We asked ourselves, if we can get sued for voluntarily working with Government, why would we? Furthermore, by filing a citizen suit, the environmentalists can have their legal expenses paid by us if they prevail. But if we prevail, we cannot petition for our legal expenses. That is tremendously discouraging bias and should not be the way.

The very day that the environmentalists received notice that the Maine Department of Environmental Protection, that no permit under the Clean Water Act was legally required, we received their notice of intent to sue. In other words, Wyman's was to become the guinea pig in the activists' attempt to gain power over agriculture through litigation.

Aware that the EPA was in the process of rulemaking and that Congress was finally looking seriously into this issue, we discontinued aerial spraying, we leased two boom sprayers and we introduced our growers to a helicopter spray service to replace the coverage we offered. After a disastrous 2004 crop and booming sales in blueberries, we desperately needed a good crop in 2005. When a very wet month of May ensued, two critical treatments for blight were necessary in a very narrow window of time. Wyman's was able to get most of its fields covered with its boom sprayers.

Maine's small growers, of which there are 400 in Maine, unable to afford or coordinate with aerial sources and handicapped from using mist blowers due to wet fields and availability, suffered losses to their crop of 50 percent or more, mostly due to blight. In addition, we estimate our loss to the wheels of the boom sprayers at 6 percent of our crop.

Adding up the impact on the State of Maine, we estimate a farm gate loss of $10 million and a critical inability to meet a demand that we have worked years to create. In our opinion, the environmentalist agenda goes beyond the elimination of aerial spraying. It seeks the elimination of pesticides.

Let me give you an analogy. At age 54, I now see a cardiologist each year. His profession recommends an 81 milligram aspirin each day for heart health. And if you have a headache or body aches, two aspirin has given relief for over 100 years. You take 50 aspirin, though, you're dead.

The environmentalist perspective applied to aspirin is, if 50 will kill you, then 81 milligrams is bad, too. And that is as wrong for aspirin as it is for the safe, regulated use of pesticides. Congress owes it to American farmers and consumers to not leave us vulnerable to abuse of the Federal citizen suit privileges and blackmail by litigation. The plight of Maine's wild blueberry growers is evi-

dence this year enough that Congress must step in and take fast, decisive action to clarify Federal law and preserve a farmer's right and ability to provide a safe, affordable food supply.

On behalf of Wyman's, Maine blueberry growers and farmers throughout the Nation, please pass the Pest Management and Fire Suppression Flexibility Act this year so that agriculture can get back to business without fear of litigation. Thank you for listening to our story, and I am happy to answer any questions.

Mr. DUNCAN. Thank you, Mr. Flanagan. Thank you for coming down from Maine to represent the American Farm Bureau Federation.

Ms. Hoover.

Ms. HOOVER. Mr. Chairman and members of the Subcommittee, thank you for the opportunity to appear before the Subcommittee today. I am Shawnee Hoover, Special Projects Director of Beyond Pesticides.

Beyond Pesticides was founded almost 25 years ago, and is a national environmental health organization with a grass roots membership base representing thousands of people, with partners extending well into the hundreds of thousands.

The legislation we discuss today turns on the central question of whether or not the Federal Insecticide, Rodenticide and Fungicide Act, or FIFRA, through its registration and labeling process of pesticides, can adequately replace the role of the Clean Water Act and its regulatory enforcement mechanism, the National Pollutant Discharge Elimination System, or NPDES, permit process.

More than three decades after the Clean Water Act was enacted, the Nation's waters continue to be polluted. Pesticides are one of the main sources of this pollution, as State monitoring and the U.S. Geological Survey reports continue to inform us. We feel that neither pesticide users, the public nor the environment are well served or better protected by this bill.

There are three main reasons why sole reliance on FIFRA does not offer adequate protection of water, the environment or communities across the Country. Under FIFRA, EPA does not take into account unique, local conditions when regulating risk and designing labels, and has no official mechanisms to do so. Direct deposition of pesticides to waters occurs even when the label is properly followed. Third, the risk assessment process used to register pesticides under FIFRA has admitted limitations that create the need for complementary laws.

Before proceeding, I would like to ask the members of the Subcommittee to keep in mind that I am but a messenger. I speak on behalf of my organization, but my views are representative of a much larger network of stakeholders that include community residents, health professionals, scientists, farmers, sport fish and bee associations, public health officials and of course, water groups and those seeking to protect our environment.

As mentioned, there have been several Federal court cases concerning this precise issue. Those who have ruled have ruled in favor of the use of NPDES permits. I will not go over the specifics of each statute, though it is important to note that EPA did submit an amicus brief in the Talent case agreeing that a NPDES permit was required in addition to following the FIFRA label.

EPA's risk assessment process that determines label requirements under FIFRA operates in a national context, using probabalistic modeling that averages risk factors and assumes full label compliance that does not include non-target impacts that occur from pesticidal drift, runoff, and other unintentional exposure. The Clean Water Act NPDES permits work in tandem with FIFRA to consider local environmental conditions and the specific impacts of pesticide application to local water bodies.

NPDES permits under the Clean Water Act are highly local and specific and include monitoring and reporting requirements that contract which pesticide applications may occur and when. FIFRA has no tools to monitor local situations that are happening on the ground and to collect such information.

The Congressional Research Service report on this issue plainly stated that the NPDES permits under the Clean Water Act are undertaken by States to protect water quality "because the Federal Government lacks the resources for day to day monitoring and enforcement." EPA's risk assessment process by nature is insufficient to protect waterways for a multitude of reasons. The labels for the vast majority of chemicals do not address off-site, non-target effects, sub-lethal effects or pesticidal drift that can be more deleterious than the lethal concentrations stated on the label. These limitations can, however, be mitigated with enforcement of other statutes, such as the Clean Water Act.

The EPA risk assessment also considers only the effect of the active ingredient and not the synergy of the multiple ingredients in the actual pesticide formulation or between pesticides. NPDES by nature of its monitoring and reporting provisions can assess the effect of the actual pesticide formulation on local water body ecosystems.

Third, the re-registration of pesticides under FIFRA is a lengthy and ongoing process, as you have heard today. Hundreds of pesticides currently registered and commonly used unfortunately still lack a full assessment of their potential short and long term effects on human health, particularly on children and the environment. Case in point is the lack of EPA evaluation of pesticide's capacity to cause endocrine or hormonal disrupting effects.

Section 2 of the FIFRA statute furthermore denotes that EPA may consider the risks and benefits of the public health uses of pesticides separately from the risks and benefits of other pesticides. It must be made clear, however, that to date the agency has never done such an assessment of public health uses. In addition, the agency also has not evaluated the efficacy of the pesticides used in the context of public health as required by law.

EPA, under FIFRA, presumes that if the label is complied with, there will not be any unintentional pesticide exposure to water, such as runoff and drift. NPDES permits under the Clean Water Act can assess the realities of pesticide runoff, drift, harm to specific local species and ecosystems and other issues central to overall water quality.

While we do not underestimate the importance of protecting the public from mosquito-borne disease, we do believe that there are many ways to do this, as supported by the Centers for Disease Control and Prevention, without removing the vital protections af-

forded by the Clean Water Act. I have attached for the Subcommittee Appendix A which gives some examples of mosquito management techniques that have served to simultaneously protect the public from mosquito-borne disease as well as exposure to pesticides.

It should be noted that a related recent guidance by EPA to change the labels of mosquito pesticides without having completed its legal obligation to determine if the label changes will result in unreasonable harm to human health or the environment has further weakened our confidence in the protections—

Mr. DUNCAN. Ms. Hoover, I have let you go one minute longer than any other witness, so I will ask that you use 30 seconds to wrap it up.

Ms. HOOVER. Okay, very good, thank you, Mr. Chairman.

Finally, it is important to note that the EPA Assistant Administrator for Water has stated that drinking water will be adversely affected by the spill and that the burden of cost will fall unfairly on local communities to do cleanup of these pollutants.

Thank you for the opportunity to testify today. I value the exploration of the Subcommittee to seek improvements in public health and pest management approaches. Thank you.

Mr. DUNCAN. Thank you very much for your testimony.

Ms. Johnson.

Ms. JOHNSON. Thank you very much.

Mr. Flanagan, you indicated that small farmers were the ones who were going to be affected most in a negative fashion. We have had, I have had some correspondence from small farmers that complain about drift from others. And the organic farmers are not supportive of this legislation. Have you had any conversation with any of them?

Mr. FLANAGAN. With organic farmers, no, I have not. There are not many organic wild blueberry farmers in Maine. But I can tell you there was an article in the Bangor Daily News at the very beginning of August on the leading organic farmer. His basic comment was, the story was that he wasn't opening for business this year, because nature took his crop. I would say he has perfectly got his right to farm organically and incur that risk.

When a crop only happens every two years, you don't get another shot at your crop for two years, then. For us, we would love to do organic farming if it was commercially viable. But with the way blueberries grow, low to the ground, we don't see this as feasible.

Ms. JOHNSON. Thank you. That's all for now, Mr. Chairman.

Mr. DUNCAN. All right, Dr. Boozman.

Mr. BOOZMAN. Mr. Brown, with the aftermath of Hurricane Katrina, including the stagnant water, can you comment about the breeding grounds, what is going on to address this potentially serious problem?

Mr. BROWN. Certainly with the life cycle of mosquitoes, they require water to start their life cycle. With the amount of acreage that has been flooded there, I am aware that CDC has already gone out there and started to conduct mosquito control efforts to try to reduce the mosquito population. I know there have been reported incidents of biting rates of over 100 per minute. Clearly, the need for effective mosquito control is not only being endorsed by

Centers for Disease Control right now, but is being performed in conjunction with Centers for Disease Control right now in that area.

Mr. BOOZMAN. So you feel like those steps are adequate?

Mr. BROWN. I think relative to what this Committee is hearing, and perhaps to put it in context that if that were to happen out in California, I am not sure that we would be able to conduct those exercises that are being conducted right now out there without threat of litigation or restraining orders, in light of NPDES permit processes.

In terms of it being adequate, I haven't seen the results of the treatments, but I have the confidence in Centers for Disease Control as they are conducting those that they will be able to reduce the adult mosquito population by conducting both aerial adulticiding and larvaciding operations.

Mr. BOOZMAN. Mr. Campbell, is the NPDES permitting process practical for pesticide users?

Mr. CAMPBELL. I would say that it is, practical is a very general term. If you mean practical in the sense of, can a pesticide user eventually get an NPDES permit in the States that have delegated authority, maybe, if they are willing to spend thousands, tens of thousands of dollars and wait, in some cases years, before they can get the permit.

Now, in reality out there, that kind of a circumstance will put people out of business or will, if they are successful in getting a permit, foster additional litigation. For example, in the State of Oregon, where they do have NPDES permits issued by the State, the Talent case came from Oregon. In that particular State, after they got an NPDES permit for all of the irrigation uses of magnacide-H and other aquatic herbicides, the environmental activists sued the State, claiming the NPDES permit was illegal.

So even though they complied with the new judicial interpretation, which I think is erroneous, that wasn't good enough. So the reality is, is it practical? I think it just engenders more litigation and more costs for the productive members of society. As a lawyer, from my professional standpoint, it is wonderful news. But from the standpoint of society as a whole, and the economics of this Country, I think it is a travesty. I think Congress needs to do something about it.

Mr. BOOZMAN. Thank you, Mr. Chairman.

Mr. DUNCAN. Thank you very much, Dr. Boozman.

Mr. Baird, you don't have any questions?

Mr. BAIRD. No, thank you, Mr. Chairman.

Mr. DUNCAN. Ms. Norton?

Ms. NORTON. No questions, thank you, Mr. Chairman.

Mr. DUNCAN. Ms. Johnson, do you have any other questions or comments?

Ms. JOHNSON. Nothing, thank you, Mr. Chairman.

Mr. DUNCAN. Let me ask you, Mr. Brown, the West Nile virus has become quite a problem in California and a lot of western States. We have a comment here from the California State health chief who has said she is quite certain there would have been more illness and death or there will be more illness and death associated with the West Nile virus.

Has that disease rate decreased since you began to more aggressively treat for adult mosquitos?

Mr. BROWN. Based on the results that we received, and I can relate that to Sacramento and Yolo County, that's were my district exists, we were seeing an increased case load. When we did perform the adult mosquito control operations, we did see a significant reduction in both the infected mosquitos and in the adult mosquito counts within the areas where we did our treatment.

In answering your question directly, in terms of the caseloads, were they reduced, we believe that based on the information we were getting we will see that. However, because of the lag time between when a case is, the onset of a case and when it is report, I can't give you a specific or definitive answer on that yet. We are certainly tracking that very closely with our health officer as well.

Certainly by implications of reducing both the adult mosquito counts and the infected mosquitos in the area, we do believe we will see a reduction in the human case load after our treatment.

Mr. DUNCAN. I guess you never thought you would be sued by environmentalists for trying to keep them from getting West Nile virus.

Mr. BROWN. No, sir. In fact, in California, we do have an NPDES permit process, and in fact, after intense negotiations with the State of California, my district has an application, or has an NPDES permit for the application of aquatic larvacides.

However, when I needed to make an adulticide application to immediately and effectively reduce an infected adult mosquito population, I was sued in Federal court because I could not get an NPDES permit because I am not making direct applications to water. So yes, it was a bit disconcerting to try and protect public health in the most effective and efficient means and in the endorsed methods from both CDC and using approved products by EPA, and find myself in Federal court, trying to protect public health.

Mr. DUNCAN. How common is the misapplication of pesticides in the control of mosquitos? Is it common?

Mr. BROWN. The short answer is, it is not common at all. We all undergo extensive training and certification through, as has been mentioned earlier, in the State of California through the Department of Health Services, in conjunction with the local agricultural commissioners. So it is not often at all, if at all, those mis-applications of pesticides occur from trained and certified mosquito applicators.

Mr. DUNCAN. Mr. Campbell, expanding on Dr. Boozman's question about is it practical to get an NPDES permit; you basically said it's cumbersome, costly, and very time-consuming. You said that it would take many thousands of dollars, and probably several years. That's the point I was trying to make earlier when I said maybe the big giant companies and operations and farmers and others can go through that. But these regulations are the hardest and hit the small landowners, the small farmers, the rural counties; the very people who are least able to go through that process. Is that not correct?

Mr. CAMPBELL. Mr. Chairman, I can say that is absolutely correct from my own personal experience. I represent irrigation dis-

tricts, farmers, ranchers, other water users in the State of Idaho on water resource issues. After the Talent case came out initially, I was contacted by one of my clients who operates a small ditch company, less than 1,000 acres of irrigated crop land, with major concerns about their liability under this decision. They said, well, we have to treat or we can't get water delivered. What do we do?

The fact that they had to come to an attorney who specializes in water resource issues for advice was troubling enough to them. But when I told them that until there is some clarification from EPA as to whether or not this applies in the State of Idaho, which is not a delegated State, and has the authority to issue the permits. In Idaho, you can't go to the State Department of Environmental Quality and get one of these NPDES permits.

So they would have to go to EPA to get the permit and EPA says no, they are not required. So like Gem County, you are in a situation where you either use the chemical so you can continue to deliver water the same way you've done for 100 years, and face liability from a citizen suit, because of the Ninth Circuit decision, or on the other hand, not make the application and not get your water.

So it is a completely inappropriate circumstance. It is something that Congress never intended when it passed the Clean Water Act. The reality is, the requirement to force an NPDES permit for all these applications is, it is not because the users of pesticides are abusing the system or causing problems out there, it is because the Clean Water Act provides the mechanism for citizen suits to shut down these activities, the irrigated agriculture, the protection of forest health, etc. I think that is the real agenda out there.

If Congress had intended this result, it could have clearly specified that. It did not. It passed FIFRA instead.

Mr. DUNCAN. Well, also, there was some mention about invasive species and the problems that occur there. Is that messing up or making our water bodies worse?

Mr. CAMPBELL. Well, Mr. Chairman, exactly. In fact, the invasive plant species, Eurasian milfoil, purple loosestrife, are choking lakes and other water bodies, so that they cannot be used for recreation, they cannot be used for habitat of native fish species the way they previously have been. If you eliminate the ability to use FIFRA-approved aquatic products to control these invasive species, you will dramatically change the environment, because you haven't used the tool that has been approved by EPA for the control of these invasive species. If Congress wants that to continue, then you should not pass the bill.

Mr. DUNCAN. Mr. Flanagan, you mentioned that you are representing a little over 400 blueberry farmers from Maine, and that they suffered losses of $10 million because of problems in this regard. And I mentioned that it is the smallest operations that have the most trouble.

But also, if we don't use these pesticides, you cited the example of the organic farmer that you know about who lost his crop entirely. That is going to decrease the availability of blueberries and other crops. What is that going to do? That is going to drive up the prices on blueberries or other crops that we have. And who is that going to hit the hardest? It is going to hit the poor and the lower

income people, because they are going to have a harder time paying those higher prices. Is that correct?

Mr. FLANAGAN. No question that is correct. Blueberries right now are at an all-time record high price due to basically supply and demand imbalance.

Mr. DUNCAN. All right, thank you very much.

Ms. Norton?

Ms. NORTON. No questions, Mr. Chairman, thank you.

Mr. DUNCAN. All right, well, thank you very much. You have been a very good panel. It is just hard to believe that you have people who call themselves environmentalists but who do things that greatly increase the number of people catching West Nile virus and other diseases, that allow invasive species to choke our bodies of water and make them worse, and who run small farmers out of business. They really should be ashamed of themselves.

Thank you very much.

[Whereupon, at 11:44 a.m., the subcommittee was adjourned.]

H.R. 1749, the "Pest Management and Fire Suppression Flexibility Act"

HEARING BEFORE THE

U.S. HOUSE OF REPRESENTATIVES
COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE
SUBCOMMITTEE ON WATER RESOURCES AND ENVIRONMENT

TESTIMONY
OF
DAVID BROWN
SACRAMENTO-YOLO MOSQUITO & VECTOR CONTROL DISTRICT

ON BEHALF OF
THE AMERICAN MOSQUITO CONTROL ASSOCIATION
681 US HIGHWAY 1 SOUTH
NORTH BRUNSWICK, NJ 08902

SEPTEMBER 29, 2005

Good morning, Mr. Chairman and Members of the Subcommittee. My name is David Brown. I am a member and recent Past President of the American Mosquito Control Association (AMCA), a nonprofit organization dedicated to enhancing health and quality of life through the suppression of mosquitoes and other vectors of public health importance, and I speak today as a representative of our Association. I have chaired the AMCA's Clean Water Act subcommittee for the last two years. I am also the Manager of the Sacramento-Yolo Mosquito and Vector Control District, in the Central Valley of California, and in this role I was recently sued for alleged Clean Water Act (CWA) violations regarding our District's response to a West Nile Virus outbreak in California, which brings me to you today.

The AMCA supports the Otter bill, H.R. 1749, because local health departments and mosquito control districts have in recent years seen a significant number of legal challenges to mosquito control practices that are needed and that are recommended by CDC and approved by EPA to combat West Nile Virus and other mosquito-borne disease and discomfort. The proposed legislation would clarify for the courts that Congress recognizes that our pesticide applications, when made in strict compliance with the EPA-approved label, are not pollutant discharges under the Clean Water Act, and thus do not require National Pollutant Discharge Elimination System (NPDES) permits.

The AMCA also supports the goals of the Clean Water Act, and our commitment to minimizing pesticide risks associated with mosquito control has been recently recognized by EPA's Pesticide Environmental Stewardship Program. However, it has been our experience that the NPDES permit system of the CWA is not the best way to protect water quality relative to the approved application of pesticides in and around water. Instead, appropriate labels and strict enforcement of the labels is preferable.

Regulating pesticide use for mosquito control through the NPDES system is not appropriate for several reasons:

1. The current system, based on the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), works well to protect water quality and aquatic resources, and additional regulation is not needed. Modern mosquito control pesticides have been repeatedly evaluated and have not been shown to cause detrimental impacts on aquatic ecosystems. Mosquito control products are environmentally benign both because of their low inherent toxicity and because they are applied in such small quantities. Larvicides, which are applied directly to water, have minimal non-target effects, and the FIFRA registration process explicitly evaluates the effects that do exist when setting application requirements on the labels. Mosquito adulticides, which can be sprayed near or over wetlands and other water bodies, either do not enter the water or do so in negligible quantities when applied according to the labels. These products are typically applied at concentrations of about one ounce of active ingredient per acre, and studies consistently show that only minimal amounts actually impact water. It is rare that any pesticide at all can be detected in water following a mosquito control application.

2. The FIFRA label system is flexible enough to accommodate change when needed to ensure that aquatic resources are protected by the labels. For example, the mosquito adulticide labels are currently being updated to clarify allowable droplet size and reapplication periods, the ecological risk assessments for these products under FIFRA are frequently updated with the best available science, and the EPA's Office of Pesticide Programs has recently significantly expanded its review of potential impacts on threatened and endangered aquatic organisms. In addition, a recent Supreme Court case (Bates v Dow 2005) has clarified that EPA has authority to approve supplemental labels for specific geographic areas if this is necessary.

3. While the NPDES program exists to eliminate the discharge of waste products and other pollutants into waters of the U.S., pesticides applied to, over, or near water to control mosquitoes and other vectors of human disease are not waste products or pollutants which can or should be eliminated -- they are useful and necessary tools for managing aquatic ecosystems and protecting public health. Similarly, aquatic herbicides, pesticides used in fisheries management, and other aquatic peticides are also critical tools for natural resource managers.

4. The NPDES program was designed for sewer plants, industrial discharges, and other fixed point sources of pollutants, and is not appropriate for mosquito control programs which might apply pesticides at thousands of distinct sites in a season, and which must make spray decisions with little advance notice if they are to be effective. For example, in my district, which covers two California counties, we have over 10,000 identified mosquito sources which might require pesticide applications, and we typically apply the pesticides once mosquito populations exceed control thresholds - a condition that can occur in three to four days during summer heat. For another example, the U.S. Air Force is currently spraying to protect the citizens affects by Hurricane Katrina from mosquito-borne diseases, and there was no way to obtain an NPDES permit prior to initiating this work. Simply put, obtaining site-specific permits prior to mosquito spraying, or monitoring all sites after spraying, is impossible or involves permits that are so general that they accomplish nothing.

5. Obtaining and complying with NDPES permits can be difficult, time-consuming, and expensive. In my case, I have obtained an aquatic pesticide NPDES permit from the State of California, and I spent over $50,000 this summer on monitoring for pesticide residues this summer even though previous research indicated that our spraying was extremely unlikely to result in residues in water. In fact, none of the monitoring found signficant pesticide concentrations relative to concentrations that can cause damage, most monitoring found no detectible pesticides at all, and no impacts to water quality or any aquatic resources have been found by any regulatory agency. Yet I was still sued for allegedly not having an adequate permit. In other states, water agency staff with no expertise in mosquito control have developed NPDES permit requirements that are unworkable or contrary to the recommendations of CDC and USEPA.

Finally, this summer, the District I manage had to respond to an outbreak of West Nile Virus that had placed dozens of citizens in local hospitals. My job was to prevent a massive outbreak of disease in the epicenter of the epidemic. I provided extensive information on where and when we would spray so that people could avoid the spraying if they had particular concerns, but I was sued in federal court the day we planned to start the spraying because I did not have an NPDES permit for my aerial applications of pesticides to control infected adult mosquitoes. As we speak, I am still awaiting a resolution to my case. This case was particularly frustrating because I faced a clear and immediate threat to public health that could only be stopped by judicious pesticide use, I followed CDC and California Department of Health Services recommendations, I used only EPA- and state-approved pesticides, I carefully followed the labels, I have obtained all existing permits from the state for the application of aquatic pesticides, and I spent over $50,000 testing for residual pesticides in the water, none of which were detected.

In summary, ladies and gentlemen, my colleague Joe Conlon told you three years ago about the West Nile Virus outbreak that was spreading across our country, and how the good intentions of the Clean Water Act were obstructing a reasonable response to the disease. Unfortunately, though other news has dominated the national media over the intervening years, the disease has continued to sicken thousands and kill hundreds of Americans. And, also unfortunately, the Clean Water Act, as currently interpreted by the courts and by some state regulatory agencies, is still an impediment to protecting public health.

Thank you for the opportunity to voice these concerns.

Testimony of:

Scott L. Campbell
Chairman, Water Quality Task Force
NATIONAL WATER RESOURCES ASSOCIATION, INC.
and
Attorney at Law
MOFFATT THOMAS BARRETT ROCK & FIELDS, CHTD.

Submitted to:

United States House of Representatives
Committee on Transportation and Infrastructure
Subcommittee on Water Resources and Environment

September 29, 2005

Pest Management & Fire Suppression Flexibility Act (H.R. 1749)

Please contact:
Scott L. Campbell
Moffatt, Thomas, Barrett,
Rock & Fields, Chartered
Post Office Box 829
Boise, Idaho 83701-0829
208-345-2000
slc@moffatt.com

I am a resident of Boise, Idaho, and have been a licensed attorney for 27 years. I am a shareholder in the Boise office of Moffatt, Thomas, Barrett, Rock, and Fields, Chartered. I have practiced in the areas of water rights, natural resources, and environmental law for over 20 years. I presently serve as Chairman of the Water Quality Task Force of the National Water Resources Association and am appearing on behalf of the Association and all of its 17 western state member associations. I am also appearing on behalf of three of my individual Idaho clients: 1) the Payette River Water Users Association which represents approximately 160,000 acres of irrigated farm land; 2) the Pioneer Irrigation District which serves approximately 34,000 acres of irrigated farmland and suburban/urban developments; and 3) the Settlers Irrigation District which serves approximately 13,000 acres of irrigated farmland and suburban/urban developments.

H.R. 1749, The Pesticide Management and Fire Suppression Flexibility Act is critically important legislation. As a result of activist environmental litigation and inaccurate judicial reasoning, federal appeals court decisions over the last four years have produced a number of erroneous interpretations of the language of the Federal Water Pollution Control Act, 33 U.S.C. Section 1251 *et seq.*, ("Clean Water Act"). The most significant of these incorrect decisions have concluded that authorized applications of beneficial, EPA approved, insecticides and herbicides violate the Clean Water Act if these beneficial substances come into contact with any water body or wetland area and a National Pollutant Discharge Elimination System Permit ("NPDES") has not been first obtained. These inaccurate interpretations of the Clean Water Act strayed far from the original intent of Congress in its adoption of the Act and subsequent amendments.

The consequences of these erroneous decisions have been dramatic. Spraying for West Nile Virus infected mosquitoes has been stopped in all of the states within the federal circuits where the decisions apply. In some instances, such as the small, rural community of Emmett, Idaho, the mosquito abatement district has been threatened with litigation by concerned residents because it has not sprayed, yet it has also been sued by an environmental activist for past spraying without an NPDES permit. But, after being requested by the district, the EPA refuses to issue an NPDES permit. EPA will not issue the permit because it has never done so, does not believe one can be issued under the Clean Water Act if the mosquito larvicide is applied in accordance with label restrictions, and it has adopted a national guidance to that effect.

This circumstance is being repeated throughout the states impacted by these erroneous judicial decisions. In California, environmental activists are suing a vector control district for aerial spraying over forest canopies because some particles of the mist of the insecticide may eventually contact surface streams of water within the areas sprayed. The same theory was used against the United States Forest Service which was spraying forested areas in Washington state to suppress an infestation of moths which were killing trees. Because some of the insecticide particles might settle in surface streams or rivers, the Ninth Circuit Court of Appeals agreed with the environmental activists argument that such activities required an NPDES permit. The spraying to save the trees from death caused by the insect infestation was halted.

Agriculture has been dramatically impacted in the states within the Ninth Circuit because of these decisions. Irrigated agricultural production suffers the most direct and costly impacts. Effective delivery of water requires periodic treatment of surface water canals and ditches to reduce growth of moss and other aquatic plants. Non-treatment will force water delivery

reductions, water blockage which can cause flooding, and inability to operate water regulation devices. A decision issued by the Ninth Circuit in 2001, produced the incorrect reading of the Clean Water Act which concluded application of EPA approved aquatic herbicides to irrigation canals and ditches required an NPDES permit to avoid violations of the Act. Now, every application of those herbicides must be covered by an NPDES permit in those states in which EPA has delegated Clean Water Act authority to the state. Before the Ninth Circuit decision, an NPDES permit had never been required by EPA for such activities. Even today, in Idaho, a state which does not have delegated authority for the Clean Water Act, the EPA policy is that an NPDES permit is not required for use of aquatic herbicides, as long as label restrictions are followed. However, this EPA policy does not protect Idaho water delivery entities from citizen suit exposure.

Yet in the other Ninth Circuit states, the impacts of the erroneous judicial interpretation are being felt in dramatic ways. Personnel costs have increased due to extremely stringent monitoring and reporting requirements under the new permits.

Acquiring the permits in the first instance required large expenditures of time and money for attorneys and consultants to assist the irrigation entities and private landowners. The costs of required water quality monitoring equipment and sample testing was enormous and continues to be added unnecessary costs, imposed upon production agriculture because of the misinterpretation of the Clean Water Act. Finally, any violation of the terms of the NPDES permit may be considered a violation of the Act, thereby subjecting the individual or entity to enforcement actions by the state agencies or a citizen suit by an environmental activist organization. A federal court judgment which mandates fines, payment of plaintiff attorney fees, and potential criminal penalties, can be the end consequence of these circumstances.

In addition to these impacts, water delivery systems for municipalities and recreational water bodies are effected by these incorrect judicial decisions. Any open storage reservoir for municipal water systems are subject to these decisions, thereby mandating NPDES permits for treatment of water within the reservoirs. More significantly, lakes, ponds, and other water bodies used for recreation are less likely to be treated for nuisance aquatic vegetation or invasive aquatic plant species, such as purple loosestrife. Without effective herbicide treatment, these non-native, invasive plant species can totally destroy the recreational value of water bodies. Additionally, they restrict and diminish quality aquatic habitat for native fish and other aquatic life.

Congress has the opportunity to solve the problems created by these erroneous judicial interpretations of the Clean Water Act. H.R. 1749 provides unambiguous clarification of the meaning of the Act to counter this spate of incorrect decisions. I encourage the members of the Subcommittee and the full Committee to restore the Clean Water Act to the proper balance which existed since its adoption until these judicial misinterpretations tilted the playing field so dramatically. Common sense suggests that wise use of beneficial chemical products, in accordance with the label restrictions previously adopted by EPA, is more than adequate to protect the environment and allow the human population to obtain the benefits of these pest control substances. Control of West Nile Virus, protection of forest health, continued functioning of vastly productive irrigated farmlands, and preservation of recreational water bodies are beneficial goals which should not be unnecessarily precluded or hindered simply because of activist litigation and mistaken judges.

On behalf of my clients and the member state associations of the National Water Resources Association, I strongly urge passage of H.R. 1749.

Thank you for the opportunity to address you on this critical piece of legislation.

Congressman Dennis Cardoza
STATEMENT
To the Subcommittee on Water Resources and the Environment
Regarding: H.R. 1749, the Pest Management and Fire Suppression Flexibility Act
Thursday, September 29, 2005

Thank you Chairman Duncan and Ranking Member Johnson for the invitation to testify on behalf of H.R. 1749, the Pest Management and Fire Suppression Flexibility Act.

As many of you know, in the early seventies, Congress enacted both the Clean Water Act and the Federal Insecticide, Fungicide, and Rodoenticide Act to better protect our environment and human health. The Clean Water Act authorized EPA to safeguard our nation's waterways from pollutants while FIFRA governed the proper labeling, distribution, sale and use of pesticides, insecticides and herbicides in order to protect people and the environment against adverse affects of pesticide use.

For years these two laws worked in tandem to provide a regulatory framework for pollutants and pesticides with little conflict since pesticide users were exempt from obtaining a Clean Water Act permit if they were applying the product according to label directions devised from a rigorous EPA registration process—a process whose goal is to allow for use of a pesticide in the most environmentally friendly manner. Unfortunately, due to two recent court decisions, the way these two landmark pieces of legislation interact is now under scrutiny.

In the 2001 *Headwaters, Inc. v. Talent Irrigation District*, the court ruled that an irrigation district applying a pesticide into an irrigation canal according to label directions was in violation of the Clean Water Act because it did not have a discharge permit. And in the 2002 *League of Wilderness Defenders vs. Forsgren* case the Court narrowed a longstanding EPA rule that exempted pest and fire control and other forestry activities from obtaining a permit for applying pesticides and fire retardants near waterways.

The legislation before you today, H.R. 1749 introduced by my colleague Congressman Otter, would clear up the confusion from these court cases, and other ones that are pending, by clarifying that using products registered under FIFRA and applied according to the label directions does not require the user to obtain a Clean Water Act permit. It would not give any user additional authority or clearance to circumvent a permit, but would only maintain the status quo that has been in effect, without problem, for over 30 years.

As Congressman Otter touched on the impacts of these recent court cases on agricultural uses and fire prevention, so I would like to direct my comments towards pest control—specifically mosquito abatement in order to show another sector of the economy that has been affected by these cases.

For those of you from urban centers you might not be as familiar with Mosquito Abatement Districts but in rural counties throughout the United States like my Congressional District, Mosquito Abatement Districts play an absolutely critical role in protecting residents, crops and livestock from mosquito borne illnesses. This is especially important in California as we are facing the second more deadly year of West Nile Virus infections.

As of September 23rd, 54 counties in California have reported West Nile Virus activity in California this year, 735 individuals have been infected with the virus and of that 735 there have been 15 fatalities. In addition to the human cases, 405 horses, 2,534 birds and 832 chickens have tested positive for West Nile Virus.

We are facing an epidemic in California and it is absurd to think that now, after 30 years of regulation under FIFRA, our 61 Mosquito Abatement Districts should be required to engage in a costly duplicative permitting process under the Clean Water Act in order to continue the practice of protecting human lives.

In addition, I want to clarify that FIFRA is not the only regulatory mechanism Mosquito Abatement Districts must comply with. In fact, California Mosquito Abatement Districts are regulated under a number of federal, state and local agencies including EPA, U.S. Fish and Wildlife, the California Department of Health Services, the California Department of Pesticide Regulation, the California Department of Fish and Game, and each County Department of Agriculture, Weights and Measures.

In January of this year, EPA published a rule that attempted to address uncertainty in the regulated community on whether or not they were required to obtain a Clean Water Act permit by clarifying application of pesticides in or near U.S. waters does not require a permit because those products that are regulated under FIFRA are not considered chemical wastes or biological materials as defined under the Clean Water Act.

While Congressman Otter and I are both very supportive the EPA's recent ruling, we feel that legislation from Congress is still needed in order to ensure farmers, irrigators, mosquito abatement districts, fire fighters, federal and state agencies, pest control operators or foresters can continue performing long-practiced pest management and public health protection activities.

I hope this Subcommittee can support H.R. 1749, the Pest Management and Fire Suppression Flexibility Act and provide those entities that have a responsibility to protect the public health to continue their work without the threat of litigation.

Thank you again Mr. Chairman and Ranking Member Johnson for the opportunity to testify today.

STATEMENT OF THE
AMERICAN FARM BUREAU FEDERATION
TO THE
HOUSE COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE
SUBCOMMITTEE ON WATER RESOURCES AND ENVIRONMENT
REGARDING
H.R. 1749, THE PEST MANAGEMENT AND FIRE SUPPRESSION FLEXIBILITY ACT

September 29, 2005

Presented by,
Edward R. Flanagan
President & CEO of Jasper Wyman & Son

Chairman Duncan, Ranking Member Johnson and members of the committee, thank you for the opportunity to speak to you today on behalf of American agriculture and for your attention to our concerns.

My name is Ed Flanagan. Today I represent Jasper Wyman & Sons blueberry farm in Maine, as president and CEO, as well as the nation's largest general farm and ranch organization, the American Farm Bureau Federation (AFBF), of which I am a grassroots member. I am pleased to present this testimony on behalf of hundreds of thousands of threatened farmers nationwide. Operating at all levels and scales of production, Farm Bureau members across the country and in Puerto Rico grow, raise and market crops, livestock and poultry, as well as forest and value-added products.

AFBF joins with other grower groups in strongly supporting and urging Congress' immediate passage of H.R. 1749, the "Pest Management and Fire Suppression Flexibility Act." Farmers and ranchers rely on the reasonable use and ready availability of affordable, safe pesticides and pest management tools. We believe it is fundamentally wrong and inconsistent with congressional intent, to blur the line between historical non-point source activities such as the label-approved application of pesticides and point source discharges justifying federal permits.

Background
In 1972, Congress enacted the Clean Water Act (CWA) and the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA). CWA authorized the Environmental Protection Agency (EPA) to protect the nation's waterways by regulating discharges of large industrial operations and wastewater facilities through the National Pollutant Discharge Elimination System (NPDES). FIFRA provided the EPA with the authority to regulate the sale and use of pesticides through a comprehensive registration and labeling protocol.

Until recent court decisions, the application of agricultural and other pesticides in full compliance with labeling requirements did not require NPDES permits. Because pesticides undergo lengthy testing under FIFRA, including tests to ensure water quality and aquatic species preservation, a NPDES permit was considered unnecessary and duplicative.

The cases include:

- 2001 – Headwaters, Inc vs. Talent Irrigation District – The court ruled that an irrigation district applying a pesticide into an irrigation canal according to label directions was in violation of the CWA because it did not have a NPDES permit.
- 2002 – League of Wilderness Defenders vs. Forsgren – The court greatly narrowed a longstanding EPA rule that exempted pest and fire control and other forestry activities.

Similar cases are pending. Groups are now using the notice of intent to sue to intimidate farmers, mosquito abatement districts and federal and state agencies into stopping or reducing West Nile virus prevention and crop loss and rangeland protection operations.

In February 2005, EPA responded to the court cases by issuing a proposed rule that reiterated that an NPDES permit is not required when a pesticide is applied, consistent with its label, to, near or over a waterway. While this proposal is helpful, it does not fix the problem for pesticide users; only Congress can affirmatively clarify the law for the courts.

The EPA rule is a step in the right direction, but it does not go far enough because it is not fully consistent with the agency's longstanding policy that the application of agricultural and other pesticides, in accordance with their label, does not require an NPDES permit. Moreover, the rule does not protect farmers, irrigators, mosquito abatement districts, fire fighters, federal and state agencies, pest control operators or foresters vulnerable to citizens' suits, simply for performing long-practiced, expressly approved and already heavily regulated pest management and public health protection activities.

In order to provide a graphic example of why Farm Bureau supports H.R. 1749, here is my personal story of the magnitude of the negative impacts imposed by applying CWA permit requirements to FIFRA compliant pesticide applications.

Wyman's Story

Jasper Wyman & Son, a Maine company founded in 1874 and still owned by the Wyman family, is a fully integrated-grower, processor, marketer-wild blueberry concern. Twenty to 25 percent of Maine's crop is grown on Wyman's land and about 33 percent of Maine's crop is processed and marketed by Wyman's. We also grow and process cranberries. While we are an operation of significant size and scale, comparatively our approximately $40 million in total sales makes us a small company among our competitors within the global food distribution and marketing chain.

Market Realities

Farming the world over is a challenge and growing wild blueberries in Maine is no exception. Too much inventory, too little inventory; too much rain, too little rain; cold winters, wet springs, dry summers – all are risks of the business, and they are enough. For Maine blueberry growers, you must add to the list subsidized Canadian competition (our largest competitor has received $52 million in loans from the Nova Scotia government, including $10 million this spring for working capital. United States blueberry producers receive no such assistance). When compared to our Canadian competition, growers in Maine are at a competitive disadvantage for labor, energy and litigation costs, while also shouldering the costs of workmen's compensation and health benefit cost inflation. Despite these challenges, we continue our work. But we have our limits. A misguided attack on farming by the environmental community looms as a fatal competitive blow to Maine's blueberry industry and to agriculture nationally.

The Unique Growing Characteristics of Maine Wild Blueberries
Wild blueberries – also called "lowbush" – grow low to the ground. It takes two years to grow a crop, so while half of the land "crops," the other half bears sprouts for the following year. Maine's wild blueberries are "wild" because they have never been planted. They are derived from an indigenous root system that has thrived for thousands of years in the thin sandy, glacial soil of coastal Maine. In that way it resembles a mineral deposit as much as a crop. The vast fields of Washington County, where we are located, are called "the barrens" because the glacial character of the soil makes it relatively infertile for all but alders, scrub growth, weeds and wild blueberries. Wyman's is fortunate that a commercial crop can be realized on such ground.

Due to the nature of the soil, wild blueberry growers became early practitioners of sustainability. For example, post harvest, fields are mostly mowed (some burning occurs on rockier fields) with the organic mulch left to assist the soil.

Wild Blueberries and Crop Protection
Wild blueberries are not considered to be a high chemical-use crop. The fruit has natural disease-resistance due to its high acidity. However, weeds compete for nutrients and block efficient harvesting of fields so use of herbicides is imperative for commercial crop success. Pesticides are needed to control outbreaks of leaf eating caterpillars or fruit fly infestation that can reduce yield and fruit quality during May to August of the cropping year.

Further, because the plants grow quite close to the ground, wild blueberries are very susceptible to fungal diseases during the wet weather of early spring. Without the use of fungicides, a crop with two years of investment can be lost to blight in two weeks of wet weather in May unless the fields are quickly and efficiently treated.

The wild blueberry industry became early adopters of Integrated Crop/Pest Management (ICM/IPM). Using a field scouting system to monitor for pest and disease, growers are more selective and targeted in their use of crop protection chemicals. Using IPM, Wyman's and others in our industry have reduced our use of chemicals by over 80 percent.

To put it in perspective, over the course of the two year growing cycle, Wyman's fields receive 0.03 to 0.04 ounces (3 to 4 hundredths of an ounce) in total of chemicals per square foot. The fruit is then thoroughly washed and sanitized before freezing. For 2005, pesticide residual testing indicated the highest detection for any sampled residue was 40 times below EPA's maximum allowable residue limit for that chemical.

Aerial Spraying
Like other businesses, blueberry growers and processors live in the communities where we operate. Despite the fact that growers are morally and financially motivated to carefully monitor their crop protection practices very carefully, public concerns and misunderstanding about aerial applications are nothing new.

When Wyman's used aerial application for crop protection, we employed on-the-ground scouts to monitor wind speeds and air inversions – we followed or exceeded the FIFRA label guidelines

for all our applications. The planes spray no more than 10 to 15 feet from the ground. The pilots are highly trained, dedicated and know careless application practices jeopardize their business livelihoods. Aerial application's most important advantage is that one licensed chemical handler can focus on handling and preparing chemicals for spraying as opposed to multiple people and equipment being responsible for mixing chemicals.

Wild blueberries do not grow in rows so ground-based "boom sprayers" with wheels automatically reduce crop yield by crushing plants. By using aerial application for treatment, Wyman's and other large-scale growers in our area provided the scale and coordination for aerial application services to justify offering services to smaller growers in the community. The activists' success at intimidating the our area's two largest growers (Wyman's and Cherryfield Foods) into not applying aerially also means a reduction in smaller growers access to this very effective, safe crop protection technique.

Exposure to Activist's Attacks
When the Atlantic salmon was declared an endangered species in the mid 1990's, the state of Maine worked with the agricultural community to document any influences on the rivers that were the salmon's traditional habitat. In 2000, Wyman Farm's voluntarily participated in a state Board of Pesticide Control (BPC) effort to establish a database measuring the level of chemical residues in nearby waterbodies during/after aerial spraying. The BPC published the monitoring results on its public web page. The monitoring revealed a small number of detections, at levels well below allowable legal limits. Detections ranged in value from 11/100's to 94/100ths of one part per *billion* and 3425 nanograms (i.e., a billionth of a gram). Wyman's and others believed these results to be positive news and further evidence of our careful stewardship of our land.

Unfortunately, activist groups issued 60-day notices of intent to sue first against Cherryfield Foods in October 2004, then five months later against Wymans. Activists alleged that the detections of pesticides in the water, regardless of amount or risk, amounted to a violation of the Clean Water Act. We now ask ourselves and everyone else, "if we can get sued for voluntarily working with government even when that cooperation shows compliance with the law, why would we or anyone ever voluntarily participate in any program to evaluate stewardship efforts?" The litigation exposure threatened by the activists contributes to skepticism in the agricultural community and totally undermines the spirit of cooperation that the government tries to encourage.

Our Conundrum
In late November of last year, prior to the activists officially filing their notice of intent to sue, Wyman's agreed to informally meet the groups and explain our practices in detail, especially our genuine belief that aerial spraying is safer and more precise than the alternative techniques. Apparently our discussion with the activists fell on deaf ears. On March 3, 2005, Wyman Farm's received the activists' 60-day notice of their intention to file suit against us unless we applied for an NPDES permit under the Clean Water Act to aerially apply pesticides. On the same day, the activists' attorney received a letter from the Maine Department of Environmental Protection that no such permit was legally required. In other words, Wyman's became the guinea pig in a precedent-setting lawsuit to gain control over legitimate agriculture practices.

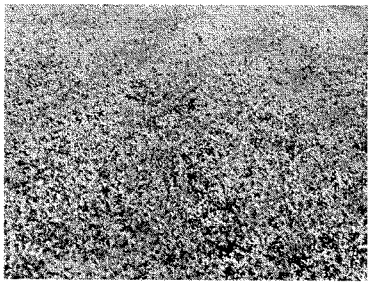
By filing a citizen suit under the Clean Water Act, the activists could have their legal expenses paid by Wyman's if they prevailed. However, if Wyman's prevailed in the lawsuit, we could not pursue reimbursement for our legal expenses from the plaintiffs. Under such a scenario, how can folks like Wyman's ever really win? **In order to avoid a drawn out, costly lawsuit, our**

only option was to give in and get an NPDES permit that the state of Maine and EPA say we don't need?

Aware that the EPA was in the process of moving from an interpretive statement to a final rulemaking sometime later in 2005 and also aware that Congress was looking into the issue, Wyman's put its faith in the wisdom of the federal government and chose to avoid litigation by agreeing to stop aerially chemical applications until such time as the law was fully clarified for the courts. Wyman's leased two boom sprayers for ground applications to our land, and introduced our smaller growers to a helicopter service that was willing to step in to provide aerial spray services to replace the fixed wing aerial support we usually provided.

Consequences on the 2005 Crop
In 2004, Maine suffered the worst crop in 14 years at a time when demand for blueberries was booming. The 2005 crop had to be above average for the industry to sustain the demand momentum and maintain our market share.

This year's winter bud count was very good and we had a very wet May. A critical brief window of time is vital in order to apply two treatments on the fields to prevent blight on the plants. For Wyman's, some fields were too wet to bear the ground application equipment, but we managed to treat most fields with the ground applicators. In the case of Maine's 400 or so small growers, most could not afford the new costs for the helicopter application service, they did not have adequate "mist blowers," and most were overwhelmed by the challenges of managing crop protection without access to traditional aerial application. Basically, they hoped for a dry spring to control the threat of blight. But, the spring was wet and blight was the principal contributor to a crop disaster for small-scale growers: they suffered losses of up to 50 percent or more compared to prior years' yields.



Wyman's took in an average crop. We estimate that six to eight percent of our crop was lost to the wheels of the ground boom applicators – approximately one million pounds of wild blueberries with a wholesale value this year of $1.3 million. The loss to Wyman's small growers is estimated to be a farm gate revenue of over $3 million. In total, we estimate this year's farm gate losses from the altered pesticide applications within the wild blueberry industry in our area to be nearly $10 million.

Conclusion
A growing number of environmental activists have a relentless agenda – the ultimate elimination of pesticide use altogether regardless of benefits or safety. Their war against agriculture is based on the unfounded proposition that all man-made chemicals are harmful regardless of the care or quantity. Wyman's knows our consumers and our crops. If we believed that growing our blueberries without pesticides was safer and more commercially viable we would, but it is neither.

Historically, environmental laws like the CWA and FIFRA have served this country well. Our water and air are cleaner, our ecosystems are protected and we have the safest, most cost-efficient food supply in the world. But, I take it as a personal insult when I am portrayed as a

reckless polluter. Activists would like you to believe they know best and they alone care for the environment. The fact is, agricultural producers are the people who live closest to our natural resources. It is wrong and unfair for them to be threatened with lawsuits when they are actively working to protect our natural resources.

Now, environmental extremists are trying to maintain their political influence by holding American agriculture hostage. Congress owes it to American farmers and consumers to not leave us vulnerable to abuse of federal citizen suit privileges and coercion by litigation. Maine's wild blueberry growers' plight this year is evidence enough that Congress must take fast decisive action to clarify federal law and preserve a farmer's right and ability to reasonably provide a safe, affordable food supply.

On behalf of Wyman Farms, Maine blueberry growers and farmers throughout the nation, please pass the Pest Management and Fire Suppression Flexibility Act this year so that agriculture can get back to business without fear of blackmail.

Chairman Duncan, Ranking Member Johnson and members of the committee, thank you for listening to our story and for your time and attention to this very important problem. I'm happy to answer any questions you may have.

V:\stm\pesticides05.929

TESTIMONY OF
BENJAMIN H. GRUMBLES
ASSISTANT ADMINISTRATOR FOR WATER
U.S. ENVIRONMENTAL PROTECTION AGENCY
BEFORE THE
SUBCOMMITTEE ON WATER RESOURCES AND ENVIRONMENT
COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE
U.S. HOUSE OF REPRESENTATIVES

September 29, 2005

Introduction

Good morning, Mr. Chairman and members of the Subcommittee. I am Ben Grumbles, Assistant Administrator for Water at the U.S. Environmental Protection Agency (EPA).

I am pleased to have the opportunity to discuss EPA's efforts to coordinate the Federal Insecticide, Fungicide, and Rodenticide Act ("FIFRA") and the Clean Water Act (CWA) and to clarify the responsibilities of pesticide applicators. Jim Jones, Director of the Office of Pesticide Programs, accompanies me today.

EPA appreciates this Subcommittee's leadership in reducing potential duplication and confusion that can lead to unnecessary litigation, while ensuring continued water quality protections. We also thank Representatives Otter and Cardoza for their hard work in crafting legislation to address the challenges that come with responsible pesticide use.

Federal Pesticide Regulatory Program

The Environmental Protection Agency is responsible for protecting human health and the environment from potential pesticide risks and ensuring that pesticides meet today's more stringent safety standards and offer benefits to society. Under the statutory framework of the Federal Insecticide, Fungicide, and Rodenticide Act ("FIFRA"), EPA regulates the sale, distribution, and use of pesticides in the United States to ensure that the pesticide, when used according to label directions, can be employed without posing unreasonable risks to human health and the environment. All new pesticides must undergo a rigorous registration procedure where EPA assesses a variety of potential human health and environmental effects associated with use of the product. EPA examines the ingredients of a pesticide, the intended application site and directions for use, and supporting scientific studies for human health and environmental effects and exposures. The applicant for registration or the registrant of the pesticide must provide data from tests done according to EPA guidelines.

The Agency is also continuing to review older pesticides – those initially registered prior to November 1984 – to ensure that they meet current scientific and regulatory standards under a process called "reregistration." EPA has a program for re-evaluating previously approved pesticides to determine if any changes in pesticide use or labeling are necessary. In reassessing these products, the Agency applies the most current scientific standards, and gives special consideration to potential exposure risks to children who may be more vulnerable to risks from pesticides.

We are taking steps to improve the label language on pesticide products. The new language will help public health and vector control officials, such as the mosquito control professionals on the front lines, "optimize application techniques" while ensuring that use of these products will not pose unreasonable risks to public health or the environment.

Furthermore, EPA is reassessing tolerances – pesticide residue limits in food – to ensure that they meet the safety standard established by the Federal Food Drug and Cosmetic Act as amended by the Food Quality Protection Act of 1996 (FQPA).

Pesticides and the National Pollutant Discharge Elimination System

In the past few years, questions have arisen regarding the appropriate role of the Clean Water Act in addressing application of pesticides to water. The CWA prohibits anyone from discharging pollutants through a point source into waters of the United States unless they have a National Pollutant Discharge Elimination System (NPDES) permit. The NPDES permit includes limits on what can be discharged, monitoring and reporting requirements, and other provisions to ensure that the discharge does not adversely affect water quality.

The application of a pesticide to waters of the United States requires an NPDES permit only if it constitutes the "discharge of a pollutant" within the meaning of the Clean Water Act. Pesticides are EPA-evaluated products designed, purchased, and applied to perform their intended purpose of controlling target organisms in the environment. Thus, certain pesticide

applications consistent with FIFRA are not "pollutants" and do not require NPDES permits. Recent citizen lawsuits have further focused attention on this matter. In addressing these concerns, the Agency, in August 2003, issued an interim guidance on circumstances under which NPDES permits are not required for applying pesticides to water.

Earlier this month, the Ninth Circuit Court of Appeals in the case of *Fairhurst v. Hagener* found that the State of Montana's use of a pesticide for the purpose of eliminating a non-native nuisance fish species did not require an NPDES permit. The court evaluated EPA's Interim Guidance as applied to the facts of the case and found that our guidance was reasonable and did not conflict with Congressional intent.

At the time we issued this guidance, the Agency solicited public comment. In response to the comments received, EPA modified the guidance. EPA issued a final Interpretive Statement and proposed a regulation to codify the substance of the Statement. The proposed rule, published on February 1, 2005, covers applications to control pests, including but not limited to mosquito larvae and aquatic weeds. The final Interpretive Statement and proposed rule state EPA's position that, for pesticides applied to waters of the United States in compliance with FIFRA, an NPDES permit is not required in two circumstances:

> "(1) The application of pesticides directly to waters of the United States in order to control pests. Examples of such applications include applications to control mosquito larvae, aquatic weeds, or other pests that are present in the waters of the United States.
>
> (2) The application of pesticides to control pests that are present over waters of the United States, including near such waters, that results in a portion of the pesticides being deposited to waters of the

> United States; for example, when insecticides are aerially applied to a forest canopy where waters of the United States may be present below the canopy or when pesticides are applied over, including near, water for control of adult mosquitoes or other pests."

EPA is completing its review of comments received on the proposed rule. We plan to finalize the rule by early next year. In the meantime, the Agency continues its important efforts to integrate and coordinate FIFRA and CWA actions. We are evaluating information and case studies to help ensure continued achievement of public health protection and environmental goals while reducing potential duplication or confusion. For example, the Office of Water is working closely with the Office of Prevention, Pesticides and Toxic Substances when products are registered or are being reevaluated.

The Need for Clarification

EPA believes there is a need to clarify the relationship between FIFRA and CWA. Courts have taken differing approaches to this issue, and additional cases are still pending. These decisions have created uncertainty among pesticide applicators. Such uncertainty could impede the ability of local officials to quickly control pests, such as mosquitoes that may carry communicable diseases such as the West Nile virus, or invasive species that may damage natural resources. EPA's current rulemaking is an effort to reduce this uncertainty by clarifying pesticide users' legal responsibilities under two discrete circumstances where pesticides are properly applied to or over (including near) water. Our current rulemaking is focused on these two situations; but, it is

important to note, as reflected in our final Interpretive Statement, that the agency's operating approach has been and will continue to be that the proper application of agricultural and other pesticides in accordance with relevant FIFRA requirements is not subject to NPDES permitting requirements.

Comparison of H. R. 1749 with EPA's Current Rulemaking

H. R. 1749 would also clarify the interaction between FIFRA and the CWA. As mentioned previously, EPA's proposed rulemaking addresses pesticides applied under two specific circumstances. The legislation moves beyond the scope of EPA's current rulemaking. For example, the legislation would cover all pesticides used in accordance with relevant FIFRA label provisions including those agricultural land applications that result in pesticide spray drift into waterbodies. EPA's current proposal is not intended to address the broader issue of spray drift. However, the Agency recognizes the need for greater clarity on this issue and is evaluating options. The bill would also more broadly exempt activities for the prevention, control, or eradication of plant pests or noxious weeds than the EPA's proposed rule. In addition, the legislation would exempt the use of fire retardants applied in accordance with relevant federal guidelines by or in cooperation with the federal or State governments and silvicultural activities. Although our proposed rule does not address fire retardants, it continues to be our position that proper application of fire retardants for their intended purpose does not require an NPDES permits because the fire

retardants are not "chemical wastes" and therefore are not pollutants in those circumstances.

H. R. 1749 and EPA's current rulemaking are similar in that under both approaches, States could not require NPDES permits for the applications within the scope of coverage. However, neither EPA's interpretation nor the legislation would prohibit States from requiring and enforcing non-NPDES permits under State law.

Conclusion

Mr. Chairman, our work on the safe and healthy recovery of the Hurricane and flood-ravaged Gulf Coast region underscores the importance of improving regulatory efficiency and certainty. Local and State health officials need to act quickly and effectively to reduce risks from mosquitoes and other disease vectors. Our continued efforts on the integration of FIFRA and NPDES permitting will help.

In closing, Mr. Chairman, I would like to thank you and the Subcommittee for inviting EPA to participate in this hearing. I would be happy to answer any questions that you may have.

* * *

BEYOND PESTICIDES
701 E Street, SE ▪ Washington DC 20003
202-543-5450 phone ▪ 202-543-4791 fax
info@beyondpesticides.org ▪ www.beyondpesticides.org

STATEMENT OF
SHAWNEE HOOVER, SPECIAL PROJECTS DIRECTOR
BEYOND PESTICIDES
ON
H.R. 1749
PEST MANAGEMENT AND FIRE SUPPRESSION ACT
TO AMEND THE
FEDERAL WATER POLLUTION CONTROL ACT (33 U.S.C. 1342(1))
aka CLEAN WATER ACT
BEFORE THE
SUBCOMMITTEE ON WATER RESOURCES AND ENVIRONMENT
U.S. HOUSE OF REPRESENTATIVES

SEPTEMBER 29, 2005

Mr. Chairman and members of the Subcommittee. Thank you for the opportunity to appear before the Subcommittee today. I am Shawnee Hoover, Special Projects Director of Beyond Pesticides, formerly known as the National Coalition Against the Misuse of Pesticides (NCAMP). Beyond Pesticides is a national, environmental health organization with a grassroots membership base that represents thousands of diverse people seeking to improve protections from pesticides and promote alternative pest management solutions that reduce a reliance on pesticides. Our membership spans the 50 states with partners around the world.

We are here today to discuss legislation that seeks to remove from the purview of the *Clean Water Act* (CWA) potentially harmful pesticide uses registered under the *Federal Insecticide, Fungicide, and Rodenticide Act* (FIFRA). The bill seeks to redefine "point source" under CWA to exclude public health protection, pest management, and silvicultural activities. We feel that neither

pesticide users, the public nor the environment are well-served or better protected by this bill.

There are 3 main reasons why reliance on FIFRA alone does not adequately protect users, water, the environment, and the community.

1. Under FIFRA, EPA does not take into account unique local conditions when regulating risk and designing labels.
2. Direct deposition of pesticides to water occurs even when the label is properly followed.
3. The risk assessment process used to register pesticides under FIFRA has admitted limitations that create the need for complimentary laws.

Before proceeding I would like the members of the Subcommittee to keep in mind that I am but a messenger. I speak on behalf of my organization, but my views are representative of a much larger network of stakeholders that include community residents, health professionals, scientists, farmers, sport fish and bee associations, some public health officials, and of course, water groups, and environmentalists.

At the heart of this critical issue is the question of whether or not FIFRA, through its registration and labeling process of pesticides, can adequately replace the role of the Clean Water Act and its regulatory and enforcement mechanism, the National Pollutant Discharge Elimination System (NPDES) permit process. More than three decades after the CWA was enacted, the Nation's waters continue to be polluted. Pesticides are one of the main sources of this pollution. (Clean Water Act § 303(d) 2000, 2002 listings nationwide.)

There have been five federal court cases concerning this precise issue. Two ruled in favor of NPDES permits, one ruled that a NPDES permit would be

required if the application left pesticide residues or had unintentional effects, and the other two are still pending. My testimony today will demonstrate how, in various cases, brought before a court or not, FIFRA alone is ill-equipped to carry out the essential functions and protections afforded by CWA and NPDES permits. In fact, the statutes are complementary and together address issues regarding the impacts of pesticides on users, water, the environment, and the community.

I. LIMITATIONS OF FIFRA ARE COVERED BY CWA

FIFRA regulates the distribution, sale, use and licensing of pesticides. Its mandate is to protect human health and the environment from unreasonable adverse effects of pesticides. Unreasonable is essentially defined by considerations of the economic, social and environmental costs and benefits of the use of any pesticide. The U.S. Environmental Protection Agency (EPA) does this by using probabilistic modeling of national use, and toxicology data supplied by the manufacturer. It then establishes a nationally uniform labeling system. Once the label is determined, there are no further monitoring and reporting requirements under FIFRA.

The mandate of CWA is to "restore and maintain the chemical, physical, and biological integrity of the Nation's water." It does this by primarily using the NPDES permit process, which evaluates if a discharge of pollutants will harm the specific water body in question and at what amount. It is highly local and specific. It also includes monitoring and reporting requirements that can track which pesticide applications may occur when.

As the Court in the Headwaters v Talents case explains, "...a FIFRA label and a NPDES permit serve different purposes. FIFRA establishes a nationally uniform labeling system to regulate pesticide use, but does not establish a system

for granting permits for individual application of pesticides. The CWA establishes national effluent standards to regulate the discharge of all pollutants...but also establishes a permit program that allows, under certain circumstances, individual discharges. FIFRA's labels are the same nationwide, and so the statute does not and cannot consider local environmental conditions. By contrast, the NPDES program does just that." Headwaters (9th Cir. 2001).

Clearly stated, the FIFRA label has a national scope based on national averages. CWA NPDES permits consider local environmental conditions and specific impacts to water bodies, which the FIFRA label inherently does not.

EPA itself has stated that compliance with a FIFRA label does not ensure compliance with all other laws, such as the CWA. In its Amicus Brief filed in the Headwaters case, the agency stated, "[A] person who seeks to discharge a pesticide into the water of the United States from a point source must comply with both statutes by following instructions on the pesticides labels and by obtaining an NPDES permit when required by the CWA. The district court erred in concluding that compliance with the approved instructions on a pesticide label satisfies both statutes." Headwaters, 243 F.3d at 531. (9th Cir. 2001).

The EPA tried to reconcile its recent guidance removing the need for NPDES permits with its earlier Amicus brief stating both NPDES and label compliance are necessary by later issuing a memo. According to the Congressional Research Service (CRS) report on this issue dated April 25, 2005, the memo, "...acknowledged that there could seemingly be inconsistencies in previous government positions but that, on detailed examination, differences are based on the specific facts of that litigation, not the general policies now being addressed." (Pesticide Use and Water Quality: Are the Laws Complimentary or in Conflict, April 25, 2005. RL32884, p. 11.)

That explanation however does not add up given our understanding of the specific facts of that litigation. The facts of the case are not any different from precisely the kind that are proposed by this bill. If anything, the Headwaters case may be demonstrative of exactly how a NPDES permit can thwart major harm. The Headwaters case arose because an aquatic pesticide, used according to its FIFRA label, resulted in an estimated death of 92,000 juvenile steelhead fish in a canal. Either way, the EPA's reversal of its prior position remains unjustified.

Relying solely on FIFRA labels and registration does not necessarily work in favor of farmers either. Farmers depend on good water quality as much as anyone in the community.

The CWA statute, with its local orientation, seeks to prevent contamination of non-target waterways. To do that, CWA § 301 establishes a "zero discharge" standard, meaning *any* amount of pollutant discharge, without a permit, constitutes a violation. (Natural Resources Defense Council v Costle, 568 F.2d 1369, 1374 (1972)). EPA's risk assessment process under FIFRA, on the other hand, operates in a national context that averages risk factors and assumes full label compliance that does not include non-target impacts. In cases of public health pesticide uses, EPA, under FIFRA, does not generally evaluate the health and environmental impacts of pesticide exposure in its risk assessments. In addition, the agency has not in practice evaluated the efficacy of the public health use.

Under the jurisdiction of the CWA, changes in the chemical composure of specific waterways are monitored, measured, and generally protected from adverse affects from the application of pesticides. FIFRA, on the other hand, has little information or power over the actual use of a pesticide once it is registered, except that its use must comply with the warnings and instructions on the label. The warnings on the label certainly do not address in any way, specific water

quality issues, accumulations of toxins specific to a certain site, concerns for the local habitat or sensitive population species that may be being monitored locally. There is simply no feedback loop within FIFRA like there is in CWA that helps inform local and state officials of immediate or long-term situations that may be of concern to a locality.

The CRS report plainly stated that the NPDES permits under CWA are undertaken by states to protect water quality, "...because the federal government lacks the resources for day-to-day monitoring and enforcement." (Pesticide Use and Water Quality: Are the Laws Complimentary or in Conflict, April 25, 2005. RL32884, p. 4.)

II. SUPREME COURT RULES THAT FIFRA IS NOT THE FINAL WORD ON PESTICIDE PROTECTION

The Supreme Court ruling in April 2005 in Bates v Dow, supports the underlying premise that FIFRA is not and should not be the only and final mechanism for evaluating and, if necessary, restricting pesticides. In other words, FIFRA does not occupy the entire field on pesticides.

In the Bates case, the court addressed the question of whether farmers harmed by pesticides could use state courts to seek redress. The Supreme Court states, "The long history of tort litigation against manufacturers of poisonous substances adds force to the presumption against preemption [of law suits by farmers harmed by pesticides]...." Implicitly, the Supreme Court recognizes that FIFRA and the risk assessment review process by definition does not consider all aspects of potential harm from pesticides and therefore as the sole instrument is not adequately protective of users, the community, or waterways. In this context, the CWA provides an incredibly important locally-based evaluation taking into

account issues and impacts that are of concern to pesticide users, farmers, and the communities they share.

III. FIFRA LABELS BASED ON THE RISK ASSESSMENT PROCESS ARE INSUFFICIENT TO PROTECT WATERWAYS

The risk assessment process by nature is insufficient to protect waterways for five main reasons.

1. The label for the vast majority of chemicals do not address off-site non-target, sublethal effects or pesticidal drift that can be more deleterious over time than the lethal concentrations stated on the label. EPA has recognizes these limitations of the risk assessment process. Additionally, the U.S. Fish and Wildlife Service, notably concerning silvicultural activities among others, and several courts have also openly recognized these limitations of the risk assessment process. These are limitations that can be overcome with the enforcement of other statutes such as the CWA.

2. The EPA risk assessment considers only the effects of the active ingredient. It does not consider the synergy of the multiple ingredients in a pesticide formulation, or between two pesticides used in conjunction, or between pesticides and pharmaceuticals and other chemicals. This critical data gap results in considerable uncertainty when predicting the risks posed by a pesticide and has been recognized by the U.S. Fish and Wildlife Service. In contrast, by nature of its monitoring and reporting provision, CWA can assess the effects of the actual pesticide formulation on water body ecosystems.

3. The reregistration of pesticides under FIFRA is a lengthy and ongoing process with outstanding and missing health and environmental data associated with a pesticide's review that fails to fully assess the short and long-term impacts

on human health, particularly on children, and the environment for hundreds of pesticides. Case in point is the lack of EPA evaluation of a pesticide's capacity to cause endocrine (hormonal) disrupting effects. Scientific studies are increasingly finding endocrine effects at extremely low doses (as low as 1 part per billion, see Appendix C, Go, et al.). These effects are also being discovered in wildlife.

4. EPA does not track pesticide poisonings, including short- and long-term adverse effects, as pointed out by the U.S. General Accounting Office (GAO) among others. (GAO, *Pesticides: Use, Effects, and Alternatives to Pesticides in Schools*, November 1999, p.6.) Under the former federal Pesticide Incident Monitoring System (PIMS), dismantled in the early-1980s, pesticide poisonings used to be an important indicator of real world applications and inform the agency of problems with uses. Without such a monitoring system, the agency is reliant on industry to volunteer when there are label/use issues.

5. EPA under FIFRA presumes that if the label is complied with, there will not be any unintentional pesticide exposure to water. The risk assessment process therefore does not evaluate terrestrial pesticides for their impact on water quality. It attempts to broadly evaluate an active ingredient's toxicity to fish based on one or two types of sensitive species and its capacity to leach into surface and ground water and thereby contaminate drinking water. Beyond toxicity to fish and contamination of drinking water, there are no further evaluations of the realities that arise from pesticide use. U.S. Geological Survey (USGS) makes clear that pesticides, presumed to be used properly, are getting into waterways via run off and drift, and from there must be examined. NPDES permits on the other hand can assess the realities of pesticide run off, drift, harm to specific local species and ecosystems (not tested by manufacturers) and other issues central to overall water quality.

FIFRA is by nature ineffective at making fast changes on the ground. Scientific studies must be collected and evaluated and the whole issue must go through a rather lengthy rereview process. Such delays can cause serious problems. In Washington Toxics v EPA, August 14, 2003, the U.S. Federal District Court in Seattle found the EPA has a legal obligation under ESA to review the impacts of pesticide use and curtail uses that are harmful to endangered salmon. This ruling underscores EPA's limitations through the pesticide registration process under FIFRA to consider effects of pesticides in specific waterways.

IV. NPDES PERMITS DO NOT CREATE UNNECESSARY BURDENS

This bill is asking Congress to put at stake this Nation's hard-fought complimentary laws that help to protect water, ecosystems and human health from pesticide exposure. The argument for this bill is that the NPDES process is too much of a burden for pest managers and will present costs, operational difficulties, and delays to applicators. At the same time, the bill is put forth in the context of mosquito control when in fact it includes a wide range of pest management activists, if not all. As the two statutes demonstrate their usefulness and purpose as originally intended, so perhaps it is important to weigh the real risks of sole FIFRA reliance by comparing pest managers' perceived or actualized costs with the costs to localities and society as a whole of losing water quality, ecosystems, species, and health.

A recent case concerning two blueberry farmers in Maine perfectly demonstrates several of the issues I am raising today.

Two blueberry farms regularly applied pesticides by plane that drifted into the nearby waterway containing endangered Atlantic Salmon. For years, townspeople complained to the company and to the State Board of Pesticides Control in charge of upholding FIFRA to no avail. So much concern was raised

that one town, Addison, even passed a local ordinance prohibiting aerial crop-dusting in its jurisdiction but came under pressure from the State Department of Agriculture.

Finally, the townspeople joined with state and national environmental and environmental health groups that threatened to sue the companies under the CWA for not obtaining a NPDES permit. A NPDES permit, they argued, would have at least determined if the pesticides were or were not a concern to the local aquatic ecosystem. The process would have also saved the companies from intense contention with the community and a lot of bad press. Threatened with a lawsuit, both companies eventually agreed to switch to ground-based spraying and to date, there has been no evidence or complaint by the companies that the change in practice resulted in crop loss or major difficulties.

There are several issues this case brings out:

The case was to be filed under CWA, not the Endangered Species Act. Why? Because it was unknown what effects if any the pesticides were actually having on the aquatic environment or the species without an assessment provided by the NPDES permit process. The bill being discussed today would make it so that serious damage would have to occur before solutions could be implemented. It just so happens that this case involved endangered species and perhaps therefore was monitored more closely, but overall it shows how NPDES permits address a range of water quality issues that can prevent the escalation of a problem.

Also, compliance with the FIFRA label was not at issue but rather the effects from drift, which are not adequately covered by the FIFRA label. In this case, EPA, under FIFRA, assumed that drift would never occur. Not only did it occur, but it had the potential to kill off the last of the U.S. Atlantic salmon.

Lastly, and perhaps most importantly, the change in practices did not appear result in major costs or operational difficulties to the growers.

V. THE IMPORTANCE OF QUALIFIED OVERSIGHT

We recognize that the push for this bill originates in the EPA's laudable effort to ease the burden for mosquito control officials to combat mosquito-borne disease such as West Nile virus (WNV). While we do not underestimate the importance of addressing mosquito-borne disease, we believe there are many ways to do this without removing the vital protections afforded by NPDES permits that are not afforded under FIFRA alone. (See Appendix A.)

The Centers for Disease Control and Prevention (CDC) make clear that there are numerous instruments available to mosquito control officials. CDC states that "spraying adulticides, pesticides intended to kill adult mosquitoes, is usually the least efficient mosquito control technique." (Centers for Disease Control and Prevention. 2001. Epidemic/Epizootic West Nile Virus in the United States: Revised Guidelines for Surveillance, Prevention, and Control. Atlanta, GA. (accessed 7/1/04).)

Although the uses of adulticides have low efficacy rates (See APPENDIX B), we do not argue that they should never be used. Rather, as stop-gap measures, their use should be considered locally on a case-by-case basis. Something the FIFRA label cannot provide. CWA protections nationwide are critical to public policy in that they help to maintain a balanced approach to the management of mosquito-borne diseases and the short and long-term effects to public health and the environment from pesticide exposure.

Without oversight of water quality experts, can water quality really be protected? At a 2001 mosquito control conference, EPA noted that, "[T]he goal of aquatic hazard statements is not to prevent absolutely any residues from ever reaching water and possibly harming some aquatic organisms. Rather the purpose is to enable the user to recognize and minimize risks, in the context of carrying out an effective public health pest control program." (EPA 2001 Region II Inter-Regional Mosquito Control Conference Issue III, Recommendation 3.)

Central to this statement is the notion that the pesticide applicator has the capacity to make a determination of risks to the local waterway without actually knowing the details that may exist around that waterway. The NPDES permit process offers the expert analysis necessary to determine how to minimize risks.

If NPDES permit delays in emergency situations are at the heart of the matter, then that is what should be discussed. But that is not what this bill proposes. This bill extends far beyond the issue of public health mosquito control and simply assumes that permits for all pesticide applications are unwarranted. An assumption clearly not substantiated by case law.

VI. EPA LABEL CHANGES LESSEN FAITH IN FIFRA

As this bill is being proposed, it should be noted that the EPA has issued guidance ("Labeling Statements on Products Used for Mosquito Control" PR Notice 2005-1, March 9, 2005) to change the labels to harmonize them without regard to the toxicities and hazards identified in the pesticide's last risk assessment. This guidance further weakens the label protection of human health and the environment from exposure to pesticides.

In the guidance, EPA claims that mosquito spraying protects public health "while ensuring that use of these products [pesticides] will not pose

unreasonable risks to the environment." The statement is an assumption however, and is made without the fulfillment of the agency's legal obligation to evaluate the impacts of use patterns using sound science.

Such assumptions are dangerous. Consider the mounting scientific evidence that synthetic pyrethroids, increasingly the most popular mosquito pesticide, are capable of disrupting the endocrine (hormonal) system in both wildlife and humans at extremely low doses, (1 part per billion in some cases). (See Appendix C.) Endocrine disruption in both wildlife and humans can adversely affect the proper development and function of the neurological, respiratory, reproductive, and immune systems, cause cancer, as well as changes in behavior. Consider also a recent peer-reviewed study out of U.C. Berkeley showing that synthetic pyrethroids are not breaking down as assumed by the EPA but are instead accumulating in creek sediments to levels that are toxic to freshwater bottom dwellers. (See Appendix D.)

On this issue, lastly, Section 2 of FIFRA provides the definition of "unreasonable adverse effects on the environment" and denotes that EPA may consider the risks and benefits of public health pesticides separate from the risks and benefits of other pesticides. It must be made clear that, to date, the agency has never done such an assessment. Again, the agency is acting on assumptions devoid of the use of sound science, which would at minimum require a call for more data from both manufacturers and the independent, peer-reviewed scientific community. Granted, the agency is in process of creating an evaluation protocol. However, I understand it is still an estimated five or more years away.

Thank you for the opportunity to testify today. We value the exploration of the Subcommittee to seek improvements in public health and pest management approaches. I appreciate your consideration of my points that this bill has fatal flaws. Relying on FIFRA as the sole protector of water quality and

the monitor of deposition of pesticides into local waterways would result in the opposite of this bill's intention.

##

APPENDIX A

- In 2003 the city of **Boulder, CO** did not use adulticides to combat the presence of West Nile virus (WNV) and showed an 80% reduction in mosquito populations reporting as many as 94 million mosquitoes killed prior to becoming biting adults. The city also reported lower attack rates (or rates of serious illness) per population than surrounding cities where adulticiding took place.[1]

- Despite high mosquito counts and large percentages of infected birds, **Shaker Heights, Ohio** refused to adulticide, like its neighboring cities in Cuyahoga County, due to concerns of health hazards and efficacy. 2002 results showed that Shaker Heights had only 2 human WNV cases out of the county's 219 cases.[2]

- The counties of **Goshen and Plate, WY** rely heavily on adulticides and in 2003 counted 80 WNv cases, 8 fatalities and 77 cases, 3 fatalities, respectively. The neighboring county of **Cheyenne**, with 2 times the population and 3 times the landmass, used only larvicides and had 20 cases of WNv and 1 fatality.[3]

- **Lyndhurst, Ohio**, passed a landmark ordinance in 2003 prohibiting the spraying of pesticides for WNv. During a Task Force sponsored forum, a panel of experts discussed the hazards and low efficacy of adulticides. The Council stated, "[T]here is substantial belief that the more effective way of controlling the mosquito populations is by larvacide treatment and thorough education..." Concluding that, "[T]he dangers of WNV are minimal and affect a very small segment of the population and that the long-term health and environmental risks of spraying with synthetic pesticides poses a much greater risk."[4]

- **Washington, DC** health officials continue their no-spray policy stating that pesticide spraying is inappropriate in a heavily populated area with asthmatics. Instead, officials focus on larval control and pubic education, with education materials distributed in four languages. The Department of Health is also implementing a Tire Round-Up program for residents to discard old tires, a major breeding site for mosquitoes.[27]

- In **York County, Virginia**, officials distribute the mosquito eating fish, *Gambusia holbrooki,* to residents in order to decrease pesticide use for mosquito control. Several thousand of the fish have been bred by the county's fishery as part of its mosquito prevention program.[5]

---

[1] City of Boulder WNV Surveillance and Control Plan, 2003 Season.
[2] Lynch, Joe. Cuyahoga County Board of Health, and Ryan Sullivan, Shaker Heights WNV Task Force. Personal Communications, June/July 2004, Beyond Pesticides.
[3] Lee, Robert A. Director Environmental Management, City of Cheyenne and Larimer County. Personal Communication, April 2004, Beyond Pesticides.
[4] Beyond Pesticides. 2003. "Ohio City Adopts Landmark Law to Stop Pesticide Spraying for West Nile Virus." *Daily News*. Washington, DC. July 14.
[5] York County Environment and Development Services. Div. Drainage and Mosquito Control. Hhttp://www.yorkcounty.gov/eds/fishhatchery.htmH (July 2, 2004)

- In **Dallas, Texas**, the City Council's Health, Environment and Human Services Committee adopted a mosquito control plan in 2003 that calls for more public education and allows the use of pesticide sprays only as a last resort and upon approval of the pertinent council member.[6]

- **Ft. Worth, Texas** has not sprayed for mosquitoes since 1991. In 2003, Ft. Worth had 3 WNV cases and no deaths. Brian Boerner, Director of Environmental Management, states, "the spraying of chemicals also has the potential of contaminating our waterways, killing the beneficial fish and organisms that feed on mosquito larva, adding harmful volatile organic chemicals to the atmosphere-a precursor chemical to ozone formation-and providing a potential inhalation or ingestion hazard to residents."[7]

- **Nassau County, New York** joins others in using predacious fish in hard to reach salt-water marshes.[8]

- **Marblehead, MA** has a WNV Response Plan that requires a town hall meeting before the use of adulticides (and only after a locally-acquired human death).[9]

- In 2003, **Boulder, Colorado** focused on larviciding, surveillance and public education without the use of adulticides and offered free WNv information workshops for neighborhood groups and distributes free samples of Mosquito Dunks, a least-toxic larvacide product, for use in stagnant water.[14]

- In preparation for WNv, **Lane county, OR** have an easy to read public educational flyer that is put in local newspapers and distributed with utility bills early in the season.[10]

- In 2003, **Seattle, Washington** adopted an Integrated Pest Management Plan for Mosquito Control, which identifies public education, personal protection, and breeding source reduction on public property as, "...the most effective and appropriate techniques for the City to use."[11]

---

[6] Beyond Pesticides. 2003. "Virginia and Texas Towns Find Alternatives for West Nile Virus Control." *Daily News*. June 12, 2003.
[7] Ft. Worth Public Health Department, Mosquito Prevention and Control. Hhttp://www.fortworth.gov/health/HP/mosqinees.aspH (viewed July 6, 2004)
[8] Turrillion, G. 2002. Director of Mosquito Control Program in Nassau County, NY. Personal Communication. March.
[9] Town of Marblehead, MA West Nile Virus Protocol and Response Plan. 2002. Hhttp://www.beyondpesticides.org/mosquitoH (July 6, 2004)
[10] Northwest Coalition for Alternatives to Pesticides. July 2004. Personal Communication.
[11] City of Seattle. Office of Sustainability and Environment. February 20, 2002. Integrated Pest Management Plan for Mosquito Control. Hhttp://www.cityofseattle.net/environment/Documents/WNV%20IPM.pdfH (July 2, 2004)

APPENDIX B

West Nile Virus and Mosquito Control

David Pimentel
Cornell University, Ithaca, New York, U.S.A.

INTRODUCTION

The West Nile virus, which causes serious encephalitis in Americans, was introduced from Africa into northeastern United States in 1999. No one knows exactly how the virus was transported here, but with rapid air travel and large numbers of people and goods being moved throughout the world, the West Nile virus could have been carried to the United States by an infected bird, person, or even by a mosquito.

By the year 2003, the Centers for Disease Control (CDC) reported there were 8900 reported human infections of the West Nile disease with 218 deaths, with many of the infections and deaths occurring in Ohio. The rate of infections and deaths is running significantly ahead of last year, with most of the infections and deaths occurring in Colorado where the incidence has increased from only 14 infections in 2002 to 635 West Nile infections by August 2003.

BIRD RESERVOIRS

The prime reservoir of West Nile is the bird population. At least 125 species of birds have been reported infected with West Nile,[1] with crows, blue jays, sparrows, hawks, eagles, and others identified as reservoirs. Birds appear to be especially susceptible to the virus and are more likely to die of an infection than are humans. In some localities crows and blue jays have all but disappeared. Estimates are that 20,000 birds were killed last year from West Nile in the United States. Because birds travel long distances in their seasonal migrations, infected birds spread the disease to humans, horses, and other animals. Mosquitoes obtain the virus mostly from infected birds and in turn infect humans by biting them.

MOSQUITO VECTORS

In the Northeast, the prime mosquito vector between birds and humans is *Culex pipens*, the house mosquito. In New York and New Jersey, when 32,000 mosquitoes were examined by the CDC,[2] the great majority associated with West Nile were *Culex pipens*.[3] In Colorado, the prime mosquito vectors are *Culex tarsalis* and *Culex pipens*. Other mosquito species capable of transmitting the West Nile virus include other *Culex* species, *Anopheles* sp, *Coquilletidia* sp., *Ochlerotatus* spp., and *Psorophora* sp.

Male mosquitoes feed primarily on nectar and do not bite humans. The female mosquito requires a blood meal and when she bites an infected bird she then transmits the West Nile virus to humans by biting them.

The life cycle of *Culex* mosquito is about 14 days at temperatures of about 21°C (70°F). The female obtains her blood meal from birds, humans, and other animals. She mates either before or after her blood meal. Then she lays about 250 eggs in pools of water, including bird baths, flower pots, tin cans, old tires, as well as other pools of collected water. The egg stage lasts 1 to 2 days and the emerging larvae feed on algae, bacteria, and other organic matter in the water. The larval stage lasts 7 days followed by the pupal stage that lasts 2 to 3 days. Adult mosquitoes emerge from the pupae and the life cycle begins again. The adult mosquitoes normally live a week or two, but also hibernate in protected locations during the winter (Fig. 1).

Adult mosquitoes are not strong fliers and usually travel only a few hundred feet from the place of emergence. They may be carried by the wind several miles. In general, when the wind is blowing above 5 mph they will not fly. Female mosquitoes feed most often during the evening and morning.

MOSQUITO LARVAL CONTROL

The CDC advises that mosquito control should focus primarily on mosquito larval control and secondarily on the less efficient adulticiding.[4] Effective larval control curtails the supply of adult mosquitoes.

In aquatic habitats, mosquito larvae have many predators, but few parasites. The predators include damselfly larvae, back swimmers, dragonfly larvae, water boatman, dytiscid beetles, frogs, fishes, and salamanders. However, none of these predators is effective because they usually inhabit permanent water bodies, whereas most mosquito larvae live in temporary pools of water.

Encyclopedia of Pest Management
DOI: 10.1081/E-EPM 120009995

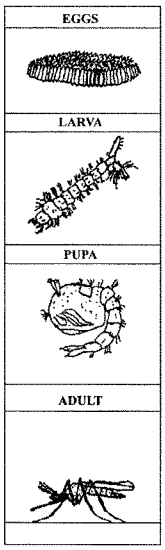


Fig. 1 *Culex* mosquito eggs, larva, pupa, and adult female.

Although mosquito larvae can be killed by bacteria, protozoans, nematodes, and fungi, none of these provides control for large mosquito populations. One exception, a strain of *Baccilus thringiensis isrraeliensis* or BT has proven effective. Various commercial formulations of this bacterium are available for application to ponds and pools where larvae are found.

In addition to eliminating all mosquito breeding sites, such as bird baths, flower pots, tires, ponds, and pools of water, such breeding habitats may also be treated, provided some water remains in them. BT is an effective larvacide that is safe for humans and pests, but it may kill some beneficial insects in water bodies.

In some small bodies of water, a thin layer of light oil can be spread over the surface. This will kill both mosquito larvae and pupae in the water. However, the oil also may have negative impacts on small fish and arthropods in the water.

Most insecticides are banned from water bodies because they are highly toxic to most aquatic organisms, such as fish, frogs, salamanders, and arthropods.

ADULT MOSQUITO CONTROL

Instead of focusing control efforts on larval mosquitoes as suggested by CDC, most homeowners and municipalities focus on adult mosquito control.

Adult Mosquito Control with Predators

Adult mosquitoes have relatively few predators because they are so small and not a large meal for a predator. Dragonflies, bats, and small birds such as purple martins feed on a few adult mosquitoes, but none of these animals can be counted on to control large populations of adult mosquitoes.

ULTRALOW VOLUME SPRAYING

Before municipalities spray for mosquitoes, the mosquito population should be measured for 5 days before spraying and 5 days after spraying using various mosquito traps. Such data will assist the government officials to determine whether the several thousand or millions of dollars spent in spraying was effective.

Homeowners should require warning 72 hr in advance of community spraying. During spraying, the windows and doors should be closed and the people should stay inside away from the insecticide spray.

When many West Nile infected birds are found and the mosquito population is relatively abundant, municipalities are often pressured into spraying pyrethroid insecticides for mosquito control. This spraying is carried out using trucks mounted with ultralow volume (ULV) sprayers. The insecticide spray produced from these units is like a smoke or fine mist and is carried downwind. Even assuming that the spraying is carried out in the evening when wind is minimal, the spray is carried downwind in an open area, for instance, on a golf course. Downwind, from 150 to 300 ft and at 3 ft height, the mosquito kill will range from 25% to 75%.[15] However, ZERO mosquitoes will be killed upwind by the insecticide spray. Thus the average upwind and downwind kill is only 21% to 45%. Note, the insecticide spray does not penetrate buildings, and mosquitoes behind buildings are not killed. Further, dense vegetation hinders spray treatment and desired mosquito control. For example, downwind in a dense stand of trees, mosquito kill is reported to be only 34% to 58%.[15]

For effective mosquito control, at least 90% of the adults must be killed. Only a few scientific studies of the effectiveness of spraying for mosquito control have been reported. These results are relatively discouraging. For

example, in Greenwich, CT, only a 34% mosquito population reduction was reported after ground spraying, and in Houston, TX, only a 30% reduction occurred after spraying.[6] Then in Cicero Swamp, FL, populations of disease-carrying mosquito populations increased 15-fold after spraying,[6] when the mosquito population was measured 11 days after spraying. However, it is doubtful that the insecticide spray caused the increase in the mosquito population, but clearly the insecticide provided insufficient adult mosquito control.

Aerial ULV Spraying

The aerial application of insecticides for adult mosquito control has some advantages over ground applications. Reports on the effectiveness of aerial ULV spraying range from 42% to 93%.[7,8] However, using ULV aerial equipment results in only 10% to 25% of the insecticide reaching the target area, whereas up to 90% drifts away from the target into the environment at large.[9,10] Aerial application covers a larger area faster than the ground application equipment, but it is more expensive than ground application, costing from $250 to $1000 per hour (truck spraying costs from $150 to $250 per hour). Also to be considered are the serious public health and environmental problems associated with the application of insecticides from aircraft.[11]

Insecticide Effectiveness in Reaching Target Mosquitoes

With ULV spraying, the spray particles are minute and measure from 7 to 22 μm. The lethal dose of a pyrethroid insecticide is one particle 18 to 20 μm. Based on the fact that many billions of spray droplets are produced per kilogram of insecticide for both ground and aerial spraying, less than 0.0001% of the insecticide applied is reaching the target mosquitoes.[12] Thus by both ground and aerial application 99.999% of the insecticide spreads into the environment, when it can cause public health and other environmental problems.

Because many adult mosquitoes remain after spraying and more adult mosquitoes will emerge, if the mosquito larvae are not controlled, then insecticide spraying is required every 7 days. Costs of spraying every 7 days are prohibitive.

PERSONAL PROTECTION

Homeowners should drain standing water in pools, gutters, and flower pots in the yard. Water in bird baths and wading pools should be changed every 3 days. If outdoors during dawn or dusk when mosquitoes are most abundant and the wind is not blowing, then long pants and a long-sleeve shirt made of heavy material, such as denim, should be worn. Adult mosquitoes easily bite through a light T-shirt.

Various adult mosquito traps and zappers are sold to homeowners for control, but rarely do these units provide continuous satisfactory control of mosquitoes.[13] While outside, homeowners may use an insecticide fogger or can of insecticide spray for temporary control of mosquitoes. However, if the wind is blowing sufficiently strong (5 mph or stronger), the mosquitoes will not be a problem because the mosquitoes will not fly in the wind.

Of the numerous chemical repellants, the most popular is the pesticide, DEET. DEET should be applied only to the outer layer of heavy clothes. The chemical should only be used, if there is a serious West Nile threat. DEET has been known to cause rashes, restlessness, lethargy, confusion, slurred speech, clumsiness, seizures, and in a few cases death.[14] For some individuals, the DEET pesticide is reported to cause allergic reactions and may interfere with the immune and endocrine systems for some people.

Located on a patio or other small area, a large fan blowing air about 5 mph or higher will discourage the presence of mosquitoes.

CONCLUSION

West Nile virus is a health hazard to humans, birds, horses, and other animals. *Culex* mosquitoes are important vectors in the United States. The prime method of control is the elimination of the breeding habitats for larval mosquitoes, such as water accumulating in bird baths, flower pots, old tires, and other containers.

Widespread ULV spraying from ground equipment or aircraft for control of mosquitoes and West Nile virus is relatively ineffective, costly, and has been associated with environmental and public health risks.

During the evening and early morning, repellants can protect humans from mosquito bites. However, the pesticide DEET and related chemicals should not be applied directly to the skin of children or adults, because they pose serious public health risks.

REFERENCES

1. Environmental Defense. *West Nile Virus on the Rise, Threatening Humans and Wildlife*; Environmental Defense: New York, 2003. http://www.environmentaldefense.org/article.cfm?ContentID=2871 (8/14/03).

2. CDC. *West Nile Virus: Statistics, Surveillance, and Control*; Centers for Disease Control: Atlanta, 2002. http://www.cdc.gov/ncidod/dvbid/westnile/surv&control-CaseCount02.htm (8/17/03).
3. Nasci, R.S.; White, D.J.; Stirling, H.; Oliver, J.O.; Daniels, T.J.; Falco, R.C.; Campbell, S.; Crans, W.J.; Savage, H.M.; Lanciotti, R.S.; Moore, C.G.; Godsey, M.S.; Gottried, K.L.; Mitchell, C.J. *Emerging Infectious Diseases*; Communicable Disease Center: Atlanta, 2001; Vol. 7. Past Issue. No. 4, Jul–Aug 2001. 10 pp.
4. West Nile Control. *West Nile Virus and Mosquito Control Practices*; 2002. http://skipper.physics.sunyb.edu/mosquito/mosquito2/Mosquito2.htm (8/16/03).
5. Mount, G.A. A critical review of ultralow-volume aerosols of insecticide applied with vehicle-mounted generators for adult mosquito control. J. Am. Mosq. Control Assoc. **1998**, *14* (3), 305–334.
6. Outcome. *Outcome Studies: Control Efforts for West Nile Virus and Mosquito Population*; 2003. http://www.cche-info.com/pdf/cche-wnv_outcome_studies.pdf (8/13/03).
7. Andis, M.D.; Sackett, S.R.; Carrol, M.K.; Bordes, E.S. Strategies for the emergency control of arboviral epidemics in New Orleans. J. Am. Mosq. Control Assoc. **1987**, *3* (2), 125–130.
8. Williams, R.E.; Knapp, F.W.; Clarke, J.L. Aerial insecticide applications for control of adult mosquitoes in the Ohio River Basin USA. Mosq. News **1979**, *39* (3), 622–626.
9. Bird, S.L.; Esterly, D.M.; Perry, S.G. Atmospheric pollutants and trace gases. J. Environ. Qual. **1996**, *25*, 1095–1104.
10. Pimentel, D.; McLaughlin, L.; Zepp, A.; Lakitan, B.; Kraus, T.; Kleinman, P.; Vancini, F.; Roach, W.J.; Graap, E.; Keeton, W.S.; Selig, G. Environmental and Economic Impacts of Reducing Agricultural Pesticide Use. In *Pesticide Question: Environment, Economics and Ethics*; Pimentel, D., Ed.; Chapman and Hall: New York, 1993; 223–278.
11. Pimentel, D. Environmental and Economic Costs of the Application of Pesticides in the U.S. In *Environment, Development and Sustainability*; *in press.*
12. Pimentel, D. Amounts of pesticides reaching target pests: Environmental impacts and ethics. J. Agric. Environ. Ethics **1995**, *8* (1), 17–29.
13. Mosquito Buzz. *Mosquito Magnet: Competitive Comparison Chart*; 2003. http://www.mosquitobuzz.com/control/comparisonchart2.html (8/16/03).
14. Marshall, L. Physicians urge caution with DEET. Daily Camera **2003**, 4A.

Marcel Dekker, Inc.
270 Madison Avenue, New York, New York 10016

APPENDIX C

There is mounting scientific evidence that synthetic pyrethroids, increasingly the most popular mosquito pesticide, are capable of disrupting the endocrine (hormonal) system in wildlife and humans at extremely low doses (ppb).

The following are a sample of studies to illustrate this point.

Aziz MH, Agrawal AK, Adhami VM, Shukla V, Seth PK. 2001. Neurodevelopmental consequences of gestational exposure (GD14-GD20) to low dose **deltamethrin** in rats. Neurosci Lett 300(3):161-165.
Abstract: Effect of low level in utero exposure to deltamethrin (DT) (1 mg/kg wt.) during gestation day 14-20 was studied on selected neurobehavioral, neurochemical, immunohistochemical parameters in rats at 6 and 12 weeks postnatal period. The significant increase in acetylcholinesterase activity and decrease in H-3-quinuclidinyl benzilate binding in the hippocampal region of DT exposed animals, suggesting impairment in cholinergic (muscarinic) receptors. A significant decrease in the learning and memory performances was also observed both at 6 and 12 weeks, which is directly correlated with decrease in muscarinic receptor binding. Immunohistochemistry and image analysis of growth associated protein-43, a neuron specific protein present in axonal growth cone and a marker for neuronal differentiation and synaptogenesis, exhibit aberrant increase in its expression in the hippocampus in DT exposed rats at both time periods. The data suggests that low level exposure to DT in utero during brain growth spurt period adversely affects the developing brain and the changes persist even upto 12 weeks postnatal period in rats. Although there is no significant recovery at 12 weeks assessment but still significant impairment persist on biochemical and behavioural parameters.
[Deltamethrin = Pyrethroid insecticide]

Berrill M, Bertram S, Wilson A, Louis S, Brigham D, Stromberg C. 1993. Lethal and sublethal impacts of **pyrethroid insecticides** on amphibian embryos and tadpoles. Environmental Toxicology & Chemistry 12:525-539.
Abstract: Amphibian populations are potentially sensitive to aquatic contaminants such as pesticides. We exposed embryos and larvae of five amphibians (the frogs *Rana sylvatica, Rana pipiens, Rana clamitans*; the toal *Bufo americanus*; the salamander *Ambystoma maculatum*) to one or both of the pyrethroid pesticides permethrin and fenvalerate. Concentrations ranged from 0.01 ppm to 2 ppm, and exposures lasted 22 or 96 h. No significant mortality of embryos, anuran tadpoles, or salamander larvae occurred during or following exposure to pyrethroids. However, tadpole growth was delayed following exposure, and tadpoles and salamander larvae responded to prodding not by darting away but by twisting abnormally. Both effects may result in greater vulnerability to predation. Recovery of normal avoidance behavior occurred more rapidly at 20 than at 15şC and following exposure to lower concentrations of the pesticides, indicating both temperature and dose effects. Tadpoles exposed later in development did not feed for a period of days following exposure but were still capable of metamorphosis.

Of the five tested species, *Ambystoma maculatum*, a tadpole predator, was particularly sensitive. An amphibian community is therefore likely to be sensitive to low-level contamination events.

Chen AW, Fink JM, Letinski DJ. 1996. Analytical methods to determine residual **cypermethrin** and its major acid metabolites in bovine milk and tissues. Journal of Agricultural & Food Chemistry 44(11):3534-3539.
Abstract: Several analytical methods were developed to determine cypermethrin and its acid metabolite residues in bovine milk, cream, kidney, liver, muscle, and fat samples. These methods used solvent extraction or acid reflux, liquid-liquid and/or solid phase extraction, with or without chemical derivatization, and quantitation by gas chromatograph with electron capture or mass selective detector. The LOQ and LOD for milk were set at 10 and 2 ppb, respectively. The average method recoveries for cypermethrin, cis-DCVA, trans-DCVA, and m-PBA in cow milk were 81% (n=39), 96% (n=22), 99% (n=22), and 106% (n=22), respectively. For bovine tissues and cream samples, the LOQ and LOD were 50 and 10 ppb, respectively. The overall average method recoveries for cypermethrin, cis-DCVA, trans-DCVA, and m-PBA in cream and tissue samples were 92% (n=27), 97% (n=25), 103% (n=25), and 98% (n=25), respectively. Satisfactory recoveries were also obtained with higher fortification levels for milk and fat samples.
[Cypermethrin = Pyrethroid insecticide]

Eriksson P. 1997. Developmental neurotoxicity of environmental agents in the neonate. Neurotoxicology 18(3):719-726.
Abstract: The development of an organism includes periods that can be critical for its normal maturation. One such appears to occur during perinatal development of the brain, the so-called 'brain growth spurt'. This period in the development of the mammalian brain is associated with numerous biochemical changes that transform the feto-neonatal brain into that of the mature adult. We have observed that **low-dose exposure** to environmental agents such as DDT; **pyrethroids, organophosphates**, nicotine paraquat and polychlorinated biphenyls (PCBs) during the 'brain growth spurt' can lead to irreversible changes in adult brain function in the mouse. The induction of behavioural and cholinergic disturbances in the adult animal appears to be limited to a short period during neonatal development, around postnatal day 10, and following doses that apparently have no permanent effects when administered to the adult animal. Furthermore, neonatal exposure to a low dose of a neurotoxic agent can lead to an increased susceptibility in adults to an agent having a similar neurotoxic action, resulting in additional behavioural disturbances and learning disabilities.

Eriksson P, Fredriksson A. 1991. Neurotoxic effects of two different pyrethroids, bioallethrin and deltamethrin, on immature and adult mice: changes in behavioral and muscarinic receptor variables. Toxicol Appl Pharmacol 108(1):78-85.
Abstract: We have recently shown that two **pyrethroids**, bioallethrin and deltamethrin, affect muscarinic cholinergic receptors (MAChR) in the neonatal

mouse brain when given to suckling mice during the period of rapid brain growth. Such early exposure to these pyrethroids can also lead to permanent changes in the MAChR and behavior in the mice as adults. In the present study, male NMRI mice were given bioallethrin (0.7 mg), deltamethrin (0.7 mg), or a 20% fat emulsion vehicle (10 ml) per kilogram of body weight per os once daily between the 10th and 16th postnatal day. The mice were subjected to behavioral tests upon reaching the age of 17 days and at 4 months. Within 1-2 weeks after the behavioral tests the mice were killed by decapitation and crude synaptosomal fractions (P2) were prepared from the cerebral cortex, hippocampus, and striatum. The densities of MAChR were assayed by measuring the amounts of quinuclidinyl benzilate ([3H]QNB) specifically bound in the P2 fraction. The proportions of high-affinity (HA) and low- affinity (LA) binding sites of MAChR were assayed in a displacement study using [3H]QNB/carbachol. The behavioral tests at an adult age of 4 months indicated a significant increase in spontaneous motor behavior in both bioallethrin- and deltamethrin-treated mice. There was also a significant decrease and a tendency toward a decrease in the density of MAChR in the cerebral cortex in mice receiving bioallethrin and deltamethrin, respectively. The proportions of HA- and LA-binding sites of MAChR were not changed. This study further supports that disturbances of the cholinergic system during rapid development in the neonatal mouse can lead to permanent changes in cholinergic and behavioral variables in the animals as adults.

Eriksson P, Talts U. 2000. Neonatal exposure to neurotoxic pesticides increases adult susceptibility: a review of current findings. Neurotoxicology 21(1-2):37-47.
Abstract: An environmental mischance commonly occuring in nature is the combination of neonatal exposure and later adult exposure to various toxic substances. During neonatal life, offspring can be affected by toxic agents either by transfer via mother's milk or by direct exposure. In many mammalian species the perinatal period is characterized by a rapid development of the brain--'the brain growth spurt' (BGS). We have observed that exposure to pesticides, such as DDT and **bioallethrin**, during the BGS in mice can potentiate susceptibility to bioallethrin or paraoxon in adult life. This combined neonatal and adult exposure caused spontaneous behavioural aberrations and changes in muscarinic cholinergic receptors and led to impairment of the faculties of learning and memory. Our studies indicate that neonatal exposure to pesticides--even in low doses--can potentiate and/or modify the reaction to adult exposure to xenobiotics, and thereby accelerate dysfunctional processes.
[Bioallethrin = Pyrethroid insecticide]

Go, V, Garey J, Wolff MS, Pogo BGT. 1999. Estrogenic Potential of Certain **Pyrethroid Compounds** in the MCF-7 Human Breast Carcinoma Cell Line. Environ Health Perspect 107(3):173-177.
Abstract: Estrogens, whether natural or synthetic, clearly influence reproductive development, senescence, and carcinogenesis. Pyrethroid insecticides are now the most widely used agents for indoor pest control, providing potential for human exposure. Using the MCF-7 human breast carcinoma cell line, we studied the estrogenic potential of several synthetic pyrethroid compounds *in vitro* using pS2

mRNA levels as the end point. We tested sumithrin, fenvalerate, *d-trans* allethrin, and permethrin. Nanomolar concentrations of either sumithrin or fenvalerate were sufficient to increase pS2 expression slightly above basal levels. At micromolar concentrations, these two pyrethroid compounds induced pS2 expression to levels comparable to those elicited by 10 nM 17ß-estradiol (fivefold). The estrogenic activity of sumithrin was abolished with co-treatment with an antiestrogen (ICI 164,384), whereas estrogenic activity of fenvalerate was not significantly diminished with antiestrogen co-treatment. In addition, both sumithrin and fenvalerate were able to induce cell proliferation of MCF-7 cells in a dose-response fashion. Neither permethrin nor *d-trans* allethrin affected pS2 expression. Permethrin had a noticeable effect on cell proliferation at 100 µM, whereas *d-trans* allethrin slightly induced MCF-7 cell proliferation at 10 µM, but was toxic at higher concentrations. Overall, our studies imply that each pyrethroid compound is unique in its ability to influence several cellular pathways. These findings suggest that pyrethroids should be considered to be hormone disruptors, and their potential to affect endocrine function in humans and wildlife should be investigated.

Greenlee AR, Ellis TM, Berg RL. 2004. **Low-dose agrochemicals and lawn-care pesticides** induce developmental toxicity in murine preimplantation embryos. Environ Health Perspect 112(6):703-709.

Abstract: Occupational exposures to pesticides may increase parental risk of infertility and adverse pregnancy outcomes such as spontaneous abortion, preterm delivery, and congenital anomalies. Less is known about residential use of pesticides and the risks they pose to reproduction and development. In the present study we evaluate environmentally relevant, low-dose exposures to agrochemicals and lawn-care pesticides for their direct effects on mouse preimplantation embryo development, a period corresponding to the first 5-7 days after human conception. Agents tested were those commonly used in the upper midwestern United States, including six herbicides [atrazine, dicamba, metolachlor, 2,4-dichlorophenoxyacetic acid (2,4-D)], pendimethalin, and mecoprop), three insecticides (chlorpyrifos, terbufos, and permethrin), two fungicides (chlorothalonil and mancozeb), a desiccant (diquat), and a fertilizer (ammonium nitrate). Groups of 20-25 embryos were incubated 96 hr in vitro with either individual chemicals or mixtures of chemicals simulating exposures encountered by handling pesticides, inhaling drift, or ingesting contaminated groundwater. Incubating embryos with individual pesticides increased the percentage of apoptosis (cell death) for 11 of 13 chemicals (p less than or equal to 0.05) and reduced development to blastocyst and mean cell number per embryo for 3 of 13 agents (p less than or equal to 0.05). Mixtures simulating preemergent herbicides, postemergent herbicides, and fungicides increased the percentage of apoptosis in exposed embryos (p less than or equal to 0.05). Mixtures simulating groundwater contaminants, insecticide formulation, and lawn-care herbicides reduced development to blastocyst and mean cell number per embryo (p less than or equal to 0.05). Our data demonstrate that pesticide-induced injury can occur very early in development, with a variety of agents, and at concentrations assumed to be

without adverse health consequences for humans.

Lazarini CA, Florio JC, Lemonica IP, Bernardi MM. 2001. Effects of prenatal exposure to **deltamethrin** on forced swimming behavior, motor activity, and striatal dopamine levels in male and female rats. Neurotoxicol Teratol 23(6):665-673.
Abstract: The effects of prenatal exposure of rat pups to 0.08 mg/kg deltamethrin (DTM) on physical, reflex and behavioral developmental parameters, on forced swimming and open-field behaviors, and on striatal monoamine levels at 60 days of age were observed. Maternal and offspring body weight, physical and reflex development were unaffected by the exposure to the pesticide. At 21 days of age, open-field locomotion frequency and immobility duration of male and female offspring were not different between control and exposed animals. However, male rearing frequency was increased in experimental animals. A decreased immobility latency to float and in general activity after the swimming test in male offspring was observed at adult age; no interference was detected in the float duration during the swimming test. In addition, these animals presented higher striatal 3,4-dihydroxyphenylacetic acid (DOPAC) levels without modification in dopamine (DA) levels and an increased DOPAC/DA ratio. These data indicate a higher activity of the dopaminergic system in these animals. Noradrenaline (NA) levels were increased, while MHPG levels were not detectable in the system studied. Serotonin (5-HT) and 5-hydroxyindolacetic acid (5-HIAA) levels, as well as the homovanillic acid (HVA)/DA ratio, were not modified by the exposure to the pesticide. No changes were observed in swimming and open-field behaviors nor were there any changes in striatal monoamines or their metabolites in the female experimental group. In relation to the pesticide formula, the present data showing that prenatal exposure to DTM alters latency to float and the activity of striatal dopaminergic system might reflect a persistent effect of the pesticide on animal motor activity, mainly in males. On the other hand, the decrease in general activity observed in experimental male rats suggests higher levels of emotionality induced by previous exposure to the swimming behavior test in relation to control animals. Data gathered in the present study may be important for the assessment of the safety of pyrethroid insecticides.
[Deltamethrin = Pyrethroid insecticide]

Leng G, Gries W. 2005. Simultaneous determination of **pyrethroid** and pyrethrin metabolites in human urine by gas chromatography-high resolution mass spectrometry. Journal of Chromatography B-Analytical Technologies in the Biomedical & Life Sciences 814(2):285-294.
Abstract: A new developed gas chromatographic-high resolution mass spectrometric method for the sensitive simultaneous determination of trans-chrysanthemumdicarboxylic acid, cis- and trans-3-(2,2-dichlorovinyl)-2,2-dimethylcyclopropane carboxylic acid, cis-3-(2,2-dibromovinyl)2,2-dimethylcyclopropane carboxylic acid, 3-phenoxybenzoic acid and 4-fluoro-3-phenoxybenzoic acid in human urine is presented. These metabolites are biomarkers for an exposure to pyrethrum, allethrin, resmethrin, phenothrin, tetramethrin, cyfluthrin, cypermethrin, deltamethrin or permethrin. Therefore, with the help of this method for the first time a complete assessment of exposure

to pyrethroid and pyrethrin insecticides is possible. After acid hydrolysis and extraction with tert-butyl-methyl-ether the residue is derivatized with 1,1,1,3,3,3-hexafluoroisopropanol and analyzed by GC/HRMS in electron impact mode (detection limits <0.1 mug/l) as well as in negative chemical ionization mode (detection limit <0.05 mug/l urine).

Monteiro-Riviere NA, Baynes RE, Riviere JE. 2003 Feb 1. Pyridostigmine bromide modulates topical irritant-induced cytokine release from human epidermal keratinocytes and isolated perfused porcine skin. Toxicology 183(1-3):15-28. Abstract: Gulf War personnel were given pyridostigmine bromide (PB) as a prophylactic treatment against organophosphate nerve agent exposure, and were exposed to the insecticide **permethrin** and the insect repellent N,N-diethyl-m-toluamide (DEET). The purpose of this study was to assess the effects of PB to modulate release of inflammatory biomarkers after topical chemical exposure to chemical mixtures containing permethrin and DEET applied in ethanol or water vehicles. Treatments were topically applied to isolated perfused porcine skin flaps (IPPSFs). Concentrations of interleukin-8 (IL-8), tumor necrosis factor-alpha (TNF-alpha) and prostaglandin E-2 (PGE(2)) were assayed in perfusate to probe for potential inflammatory effects after complex mixture application. IPPSFs (n = 4/treatment) were topically dosed with mixtures of permethrin, DEET, and permethrin/DEET, in ethanol. Each treatment was repeated with perfusate spiked with 50 ng/ ml of PB. Perfusate was also spiked with 30 ng/ml diisopropylfluorophosphate to simulate low level organophosphate nerve agent exposure. Timed IPPSF venous effluent samples (0.5,1,2,4, and 8 h) were assayed by ELISA for IL-8 and TNF-alpha and by EIA for PGE(2). Overall, PB infusion caused a decrease or IL-8 and PGE(2) release. Effects on TNF-alpha were vehicle dependent. To probe the potential mechanism of this PB effect, human epidermal keratinocyte HEK cell cultures were exposed to permethrin DEET permethrin/DEET, with and without PB in DMSO. IL-8 was assayed at 1, 2, 4, 8, 12 and 24 h. PB suppressed IL-8 in permethrin and ethanol treatment from 4 to 24 h confirming the IPPSF results. In conclusion, these studies suggest that systemic exposure to PB suppressed IL-8 release at multiple time points in two skin model systems. This interaction merits further study.

Nassif M, Brooke JP, Hutchinson DBA, Kamel OM, Savage EA. 1980. Studies with **permethrin** against bodylice in Egypt. Pesticide Science 11:679-684. Abstract: Approximately 350 people, the inhabitants of two villages in the Fayum district of Egypt, were individually dusted with 50 g of powder containing 2.5 or 5.0 g permethrin kg(-1). The inhabitants of a third village were left untreated as a control. Before treatment, approximately two-thirds of the population of all three villages were infested with bodylice. Fourteen days after treatment, the permethrin dust at the lower strength reduced the infestation by 98.8% and at the highest strength of residual control for at least 91 days. The other gave a lower level of control at this time. Urine samples, taken from subjects in each of the treated villages before and after dusting, were analyses for permethrin metabolites. Results indicated that the maximum amount of permethrin absorbed, orally, through the skin, or by inhalation, was 39 ug/kg(-1) body weight, 24 h

after treatment. No residue was found 30 days and 60 days after treatment. It was concluded that there was a very substantial safety margin when permethrin dusts were used on man for bodylice control.

Sheets LP, Doherty JD, Law MW, Reiter LW, Crofton KM. 1994. Age-dependent differences in the susceptibility of rats to **deltamethrin**. Toxicol Appl Pharmacol 126:186-190.
Abstract: Separate groups of weanling and adult rats were exposed to both behaviorally active and lethal doses of deltamethrin to examine age-dependent toxicity of a pyrethroid over a wide dose range. The acoustic startle response (ASR) was selected for comparison at low doses since it is a sensitive, quantifiable biological indicator of pyrethroid effects in rats. Acute mortality was included for comparison at the upper limit of the dose-response. Deltamethrin was administered by gavage as a single dose in corn oil for all tests. Effects on the ASR were comparable in 21- and 72-day-old rats, with a 4-mg/kg dose decreasing ASR amplitude by approximately 50% (ED50) at both ages. By comparison, LD50 values in 11-, 21-, and 72- day old rats were 5.1, 11 and 81 mg/kg, respectively. Thus, 11- and 21- day-old male rats were 16 and 7 times, respectively, more sensitive than adults to acute lethality. The concentration of deltamethrin was measured in whole-brain tissue from weanling and adult males treated with ED50 and LD50 doses. The brain concentration of deltamethrin at the ED50 dose of 4 mg/kg was higher in weanling rats than adults. This suggests a possible functional difference, with weanling rats being less susceptible than adults to a low dose. By comparison, there was an equivalent concentration of deltamethrin in brain tissue following an LD50 dose of 12 mg/kg in weanling rats and 80 mg/kg in adults. These results support age-related differences in pharmacokinetics as the basis for the markedly greater sensitivity of young rats to a lethal dose of deltamethrin.

van Haaren F, Haworth SC, Bennett SM, Cody BA, Hoy JB, Karlix JL, Tebbett IR. 2001 May-2001 Jun 30. The effects of pyridostigmine bromide, **permethrin** and deet alone, or in combination, on fixed-ratio and fixed-interval behavior in male and female rats. Pharmacol Biochem Behav 69(1-2):23-33.
Abstract: Concurrent exposure to pyridostigmine bromide (PB), permethrin (PERM) and/or N,N-diethyl-m-toluamide (DEET) may have contributed to the development of a syndrome that appears to have afflicted military personnel who served during the Gulf War. The present experiment sought to evaluate the behavioral effects of these compounds alone, or in various combinations, in male and female rats. Subjects were exposed to a multiple fixed-ratio (FR) 50, fixed-interval (FI) 2-min schedule of reinforcement. PB dose-dependently decreased FR and FI response rates. FR responding was disrupted by lower doses and there were no differences between the sexes. PERM vehicle administration decreased response rates maintained by both schedules of reinforcement; this was offset by an increase in response rate after the administration of the intermediate dose of PERM. The highest dose of PERM decreased both FR and FI response rates. FR rates in male rats were more disrupted than those in female rats. Only the highest dose of DEET decreased FR and FI response rates in male and female rats. FR

rates were more disrupted in female rats than in male rats. Synergistic effects were only observed when FI response rates decreased in male rats upon exposure to half the low dose of PB with half the low dose of PERM or half the low dose of PB with half the low dose of DEET. The results of this experiment thus show that small doses of PB, PERM and DEET disrupt well-established, schedule-controlled behavior in male and female rats in a schedule- and gender-dependent manner; schedule-dependent and gender-dependent synergistic effects were also observed. The mechanism by which the compounds exert these behavioral effects remains to be determined.

Walker AN, Bush P, Puritz J, Wilson T, Chang ES, Miller T, Holloway K, Horst MN. 2005. Bioaccumulation and metabolic effects of the endocrine disruptor **methoprene** in the lobster, *Homarus americanus*. Integrative & Comparative Biology 45(1):118-126.
Abstract: Methoprene is a pesticide that acts as a juvenile hormone agonist. Although developed initially against insects, it has since been shown to have toxic effects on larval and adult crustaceans. Methoprene was one of several pesticides applied to the Western Long Island Sound (WLIS) watershed area during the summer of 1999; the other pesticides were malathion, resmethrin, and sumethrin. These pesticides were applied as part of a county-by-county effort to control the mosquito vector of West Nile Virus. Subsequently, the seasonal lobster catches from the WLIS have decreased dramatically. The lethality of the pesticides to lobsters had been unknown. We studied the effects of methoprene while other investigators studied effects of the other pesticides. We questioned whether methoprene, through its effects on larvae, adults or both, could have contributed to this decline. We found that low levels of methoprene had adverse effects on lobster larvae. It was toxic to stage II larvae at 1 ppb. Stage IV larvae were more resistant, but did exhibit significant increases in molt frequency beginning at exposures of 5 ppb. Juvenile lobsters exhibited variations in tissue susceptibility to methoprene: hepatopancreas appeared to be the most vulnerable, reflected by environmental concentrations of methoprene inhibiting almost all protein synthesis in this organ. Our results indicated that methoprene concentrates in the hepatopancreas, nervous tissue and epidermal cells of the adult lobster. Methoprene altered the synthesis and incorporation of chitoproteins (cuticle proteins) into adult postmolt lobster explant shells. SDS PAGE analyses of adult post-molt shell extracts revealed changes in the synthesis of chitoproteins in the methoprene-treated specimens, suggesting that methoprene affects the normal pathway of lobster cuticle synthesis and the quality of the post-molt shell. Although it is likely that a combination of factors led to the reduced lobster population in WLIS, methoprene may have contributed both by direct toxic effects and by disrupting homeostatic events under endocrine control.

APPENDIX D

Provided below is an overview of the study to follow on page 5, Appendix D.

Toxic Synthetic Pyrethroid Pesticide Levels Found in Stream Sediments

***(Beyond Pesticides*, May 10, 2004)** A family of pesticides, synthetic pyrethroids, used increasingly nationwide in place of more heavily restricted organophosphate pesticides has accumulated in many creek sediments to levels that are toxic to freshwater bottom dwellers, according to a new study. The study, "Distribution and Toxicity of Sediment-Associated Pesticides in Agriculture-Dominated Water Bodies of California's Central Valley," Weston, D. P.; You, J. C.; Lydy, M. J.; Environ. Sci. Technol. (April, 2004), is available on line to members/subscribers of the American Chemical Society.

This study is believed to be the first to evaluate the effect of synthetic pyrethroids on sediment-dwelling organisms, such as midge larvae or shrimp-like amphipods, according to University of California, Berkeley, biologist Donald P. Weston, adjunct associate professor of integrative biology and lead author. Ironically, the two organisms studied, are used by the U.S. Environmental Protection Agency (EPA) as indicators of the health of fresh water sediment, according to the author.

Dr. Weston and colleague Michael J. Lydy of Southern Illinois University (SIU) in Carbondale collected sediment samples from 42 rivers, creeks, sloughs and drainage ditches in California's Central Valley and exposed amphipods and midge larvae to the sediments for 10 days. Twenty-eight percent of the sediment samples (20 of 71) killed amphipods at an elevated rate, and in 68 percent of these sediments, the pyrethroids were at levels high enough to account for the deaths. Thus, while other pesticides may well have contributed to the amphipod deaths in some sediment samples, pyrethroids alone explain the toxicity in the vast majority of the sediment samples, Dr. Weston said.

"About one-fifth of our Central Valley sediment samples are toxic to a standard testing species due to a class of pesticides no one has tested for before, for which there are little data on their toxicology when sediment-bound, and which are being promoted as an alternative to the increasingly restricted organophosphate insecticides," Dr. Weston said.

In the tests, the midge larvae died at higher rates when exposed to sediment from 13 percent of 39 collection sites, and 40 percent of these sediment samples contained enough pyrethroids to account for the deaths. Weston notes that these midges (Chironomus tentans) are known to be about three times less sensitive to pyrethroids than are the amphipods (Hyalella azteca), which explains the difference between the species results.

"Since the levels are high enough to be toxic to the standard 'lab rat' species, the next question is: What's happening with the resident species?" Dr. Weston said. "The concern is that invertebrates, particularly crustaceans, could have reduced populations, and these organisms are an important food for a variety of bottom-feeding fish."

Alternatively, the amphipods and midge larvae from areas of intensive agricultural or urban pesticide use may have adapted to live with normally toxic levels of the pesticide. Dr. Weston and his colleagues now are sampling these organisms from the rivers, creeks, sloughs and ditches to determine if they respond the same way as lab-raised organisms. Pyrethroids are a class of compounds represented by permethrin, first marketed in 1973, and various other chemicals usually ending in the suffix -thrin. Permethrin is found in home and garden pesticides ranging from RAID to flea killers and head lice creams, but permethrin and it's kin find broad use in agriculture, such as on cotton, fruit and nut orchards, and on lettuce and rice. California's Central Valley produces more than half the nation's fruits, vegetables and nuts.

Though pyrethroids are used far less than organophosphates like diazinon and chlorpyrifos, their use in California has risen rapidly in recent years because of increased regulation of the spraying of organophosphates, due to health threats to farm workers and increased toxic runoff from fields. According to Weston, pyrethroid use in California increased 58 percent from 2001 to 2002, if account is taken of the increased potency of newer pyrethroids such as cypermethrin. Over a quarter of a million pounds of pyrethroids were spread on California farm fields in 2002, while about 500,000 pounds were used for structural and pest control and landscape maintenance.

Despite this increased use, environmental monitoring still concentrates on organophosphates, he said. Monitoring also tends to focus on concentrations in the water column, under the assumption that sediment-bound chemicals like pyrethroids are unavailable. The current study shows that to be untrue.

"It's amazing that, after 20 years of use, there is not one published study on pyrethroids in sediments in areas of intensive agriculture," Dr. Weston said.

Part of the reason for a lack of data is that analytical methods to detect pyrethroids in sediment have not been broadly available or standardized. Lydy, an environmental toxicologist with SIU-Carbondale's Illinois Fisheries and Aquaculture Center, developed such a method.

"Prior to our study, scientists in area water-monitoring programs were seeing that if they placed aquatic invertebrates in their sediment samples, the animals would die, but they didn't know why - they'd attribute it to organophosphates or organochlorines (two pesticide ingredients being phased out because of environmental concerns), or they'd put it down to 'unknown causes,'" Dr. Lydy said.

He continued: "Where our study is unique is that we looked at the toxicity and tried to figure out what was actually causing it. We detected organochlorines, such as DDT and chlordane, in the sediments, but at concentrations not high enough to cause the toxicity we noted, whereas concentrations of pyrethroids were high enough to account for that toxicity."

The samples, over 70 in all, were obtained from two major rivers - the San Joaquin and the Feather - and 19 creeks or sloughs, 17 irrigation ditches and two tailwater ponds in 10 Central Valley counties, including the ones with the greatest pyrethroid use: Fresno, Madera, Stanislaus and Sutter. Each sample was placed in a jar and left with 10 test organisms for 10 days, and the death rate compared with similar organisms raised with pristine sediment. The levels of pesticides in each sediment sample also were measured, and 75 percent contained pyrethroids.

Weston, who focuses on freshwater and marine pollution and how it gets from sediments into creatures living on the bottom, noted that another chemical sometimes applied with pyrethroids may be making the situation worse.

Piperonyl butoxide, or PBO, is a synergist that shuts down the enzymes that detoxify pyrethroids, making them last longer in an organism and increasing their killing potential.

He and his colleagues are now trying to measure the level of pyrethroid that kills amphipods, which is around 3 parts per billion in sediments, and whether levels of PBO need to be considered in order to estimate the true toxicity of pyrethroid pesticides. UC Berkeley post-doctoral researcher Erin Amweg is conducting the latter study.

"I don't want to give the impression that pyrethroids are destroying the streams, since that has not yet been shown, but if we are serious about maintaining stream health, we have to consider the sediments and not limit our sampling just to the water above," said Dr. Weston. "While pyrethroids may be preferable to the organophosphates that preceded them, our work shows that the environmental effects of pyrethroids can not be ignored and have had too little study for too long. We need to know more about pyrethroids, because if we don't, how can we regulate them?"

Dr. Lydy said, "Best management practices,' such as introducing buffer strips and wetlands, may reduce pesticide loads in aquatic systems, which would reduce the risk to non-target species."

The study by Drs. Weston, Lydy and post-doctoral researcher Jing You in the Department of Zoology at SIU appeared in the April 8 online version of the American Chemical Society's journal Environmental Science & Technology and will be published later in hard copy.

For more information, contact Robert Sanders, rls@pa.urel.berkeley.edu, 510-643-6998, University of California – Berkeley, or find the study under:

Weston, D. P., J.C. You, M.J. Lydy. 2004. Distribution and Toxicity of Sediment-Associated Pesticides in Agriculture-Dominated Water Bodies of California's Central Valley. Environ. Sci. Technol. 38(10): 2752-2759.

Distribution and Toxicity of Sediment-Associated Pesticides in Agriculture-Dominated Water Bodies of California's Central Valley

D. P. WESTON,*,† J. C. YOU,‡ AND M. J. LYDY†

Department of Integrative Biology, University of California, 3060 Valley Life Sciences Building, Berkeley, California 94720-3140, and Fisheries and Illinois Aquaculture Center & Department of Zoology, Southern Illinois University, 171 Life Sciences II, Carbondale, Illinois 62901

The agricultural industry and urban pesticide users are increasingly relying upon pyrethroid insecticides and shifting to more potent members of the class, yet little information is available on residues of these substances in aquatic systems under conditions of actual use. Seventy sediment samples were collected over a 10-county area in the agriculture-dominated Central Valley of California, with most sites located in irrigation canals and small creeks dominated by agricultural effluent. The sediments were analyzed for 26 pesticides including five pyrethroids, 20 organochlorines, and one organophosphate. Ten-day sediment toxicity tests were conducted using the amphipod *Hyalella azteca* and, for some samples, the midge *Chironomus tentans*. Forty-two percent of the locations sampled caused significant mortality to one test species on at least one occasion. Fourteen percent of the sites (two creeks and four irrigation canals) showed extreme toxicity (> 80% mortality) on at least one occasion. Pyrethroid pesticides were detected in 75% of the sediment samples, with permethrin detected most frequently, followed by esfenvalerate > bifenthrin > lambda-cyhalothrin. Based on a toxicity unit analysis, measured pyrethroid concentrations were sufficiently high to have contributed to the toxicity in 40% of samples toxic to *C. tentans* and nearly 70% of samples toxic to *H. azteca*. Organochlorine compounds (endrin, endosulfan) may have contributed to the toxicity at a few other sites. This study provides one of the first geographically broad assessments of pyrethroids in areas highly affected by agriculture, and it suggests there is a greater need to examine sediment-associated pesticide residues and their potential for uptake by and toxicity to benthic organisms.

Introduction

The dominance of organophosphates (OPs) among agricultural insecticides over the past several decades has led environmental monitoring programs in California to focus on dissolved phase pesticides and their toxicity (*1*, *2*). The emphasis on OPs has diverted attention from more hydrophobic pesticides associated with soils and sediments. Legacy pesticides such as some organochlorines and some currently used pesticides such as the pyrethroids are strongly hydrophobic, and monitoring suspended or bedded sediments would be more appropriate. First generation pyrethroids (e.g., permethrin) have been available since the 1970s, and many second generation pyrethroids (e.g., bifenthrin, cyfluthrin, lambda-cyhalothrin) became available in the 1980s, yet there are little data on their concentrations in aquatic sediments. There have been several mesocosm studies (e.g., refs *3* and *4*), but published field data from agricultural areas are minimal. Given recent federal restrictions on residential and some agricultural applications of OPs, and a shift to pyrethroids as replacements, data are needed on realistic environmental concentrations of these compounds.

FIGURE 1. Location of California's Central Valley (shaded area) and the counties in which sampling sites were located. The counties shown are as follows: BU = Butte, YU = Yuba, SU = Sutter, CO = Colusa, YO = Yolo, SO = Solano, SJ = San Joaquin, ST = Stanislaus, MA = Madera, and FR = Fresno.

After gradual decline throughout the 1990s, agricultural use of pyrethroids in California increased 25% from 105 171 kg in 1999 to 131 422 kg in 2002 (data from California's Pesticide Use Reporting database; www.cdpr.ca.gov). In addition, the diversity of pyrethroids used is increasing, and the newer compounds have far greater toxicity to aquatic life. About half of agricultural pyrethroid use in California occurs in the Central Valley, a region lying within the watersheds of the Sacramento and San Joaquin Rivers (Figure 1) that produces more than half of the fruits, vegetables, and nuts grown in the United States. Our goal was to determine the concentrations of pyrethroids and other hydrophobic pesticides in sediments of agriculture-dominated water bodies of the Central Valley and to determine whether toxicity to aquatic life was associated with these residues.

* Corresponding author phone: (510)231-5626; fax: (510)231-9504; e-mail: dweston@ berkeley.edu.
† University of California.
‡ Southern Illinois University.

10.1021/es0352193 CCC: $27.50 Published on Web 00/00/0000

TABLE 1. Patterns of Pyrethroid Use in Those Counties Selected for Sampling in the PUR-Guided Study[c]

county	annual agricultural pyrethroid use (kg in 2001)	crops on which most pyrethroids used (% of total pyrethroid use in county)	primary pyrethroids used on specified crop (% of total annual pyrethroid use on crop)	months of greatest pyrethroid use on specified crop (% of total annual pyrethroid use on crop)
Fresno	14927	lettuce (32%)[a]	permethrin (87%)	Mar (31%)
			cypermethrin (6%)	Oct (37%)
		cotton (12%)[b]	cyfluthrin (77%)	July (51%)
			bifenthrin (8%)	Aug (38%)
			(s)-cypermethrin (7%)	
			lambda-cyhalothrin (5%)	
		alfalfa (7%)	lambda-cyhalothrin (44%)	Mar (32%)
			bifenthrin (38%)	July (33%)
			permethrin (16%)	
Madera	5224	pistachios (55%)	permethrin (100%)	May (38%)
				June (28%)
				July (22%)
Stanislaus	4809	almonds (46%)	permethrin (79%)	July (59%)
			esfenvalerate (21%)	
Sutter	3305	peaches (51%)	permethrin (89%)	May (41%)
			esfenvalerate (11%)	June (43%)

[a] Head and leaf lettuce data combined. Use of pyrethroids on head lettuce comprises 88% of total use on lettuce. [b] Sampling site selection was based on pesticide use data from the year 2000, the most recent data available at the time. In that year, lettuce and alfalfa were the primary crops in Fresno County on which pyrethroids were used, and sample sites in the vicinity of these crops were selected. A 7-fold increase in cyfluthrin usage on cotton between 2000 and 2001 resulted in cotton moving to the second ranked crop in Fresno County in this table, based on 2001 data. [c] Data from the California Department of Pesticide Regulation's pesticide use reporting database, year 2001.

Materials and Methods

Site Selection. We combined data from two studies with different site selection approaches. The first study used the California Department of Pesticide Regulation's Pesticide Use Reporting (PUR) database to identify Central Valley counties with the greatest agricultural use of pyrethroids. Three of the four counties with the greatest pyrethroid use in the San Joaquin River watershed (Fresno, Madera, Stanislaus) and the leading county in the Sacramento River watershed (Sutter) were selected for sampling. For ease of access to some water bodies, a few samples were taken across county lines into neighboring Butte, San Joaquin, and Yuba counties. We also used the PUR database to identify crops in each county on which the majority of pyrethroids were used, months of greatest pyrethroid use, and the compounds employed (Table 1). Sampling sites were located within the regions of each county where these crops were grown. A few additional sites were added in water bodies with anecdotal evidence of sediment toxicity. Sampling sites were located in two major rivers, 11 creeks or sloughs, eight irrigation canals, and two tailwater ponds.

Most stations were sampled twice, termed "peak use" and "winter". The peak use sampling occurred in the month immediately after the peak use of pyrethroids on the target crop(s) within each county. The time of peak use sampling ranged from July 2002 to November 2002, depending on the specific crop. We sampled all sites again in March 2003 following heavy rains ("winter" sampling).

In the second study, samples were obtained from an investigation of irrigation return flows. Farms in the region typically receive irrigation water through a network of canals, and excess irrigation water that flows off the soil surface (tailwater) is returned to the canal system. Sampling stations were located within these canals, termed "agricultural drains", or in creeks to which the canal systems discharged. The principal criteria for site selection was flow dominated by irrigation return water, with only minimal consideration of local pesticide use. Sites were sampled at the beginning (March/April 2003) and toward the end of the irrigation season (August 2003).

In total, the two studies sampled 42 locations, most twice, yielding 70 samples, or 81 including replicates (see Table S1 in Supporting Information).

Sampling Procedures. All sites were sampled from the bank, using a steel trowel to skim the upper 1 cm of the sediment column. In the PUR-guided study, two replicate samples were collected on each sampling occasion, with the second sample processed only if substantial toxicity was seen in the first replicate. In the irrigation return study, a second replicate was collected at only a few sites. All sediments were homogenized by hand mixing, then held at 4 °C (toxicity samples) or −20 °C (chemistry samples).

Analytical Procedures. Sediment samples were analyzed following the methods of You et al. (*5*) for five pyrethroids: *cis*- and *trans*-permethrin (summed in data presented), esfenvalerate, bifenthrin, and lambda-cyhalothrin. Organochlorine pesticides analyzed included alpha-, beta-, delta-, and gamma-BHC, heptachlor, heptachlor epoxide, alpha- and gamma-chlordane, alpha- and beta-endosulfan, endosulfan sulfate, *p,p'*- DDE, *p,p'*- DDD, *p,p'*- DDT, aldrin, dieldrin, endrin, endrin aldehyde, endrin ketone, and methoxychlor. Chlorpyrifos was the only organophosphate insecticide quantified. Briefly, analysis was performed on an Agilent 6890 series gas chromatograph with an Agilent 7683 autosampler and an electron capture detector (Agilent Technologies, Palo Alto, CA). Two columns from Agilent, a HP-5MS, and a DB-608 were used. Qualitative identity was established using a retention window of 1% with confirmation on a second column.

Grain size distribution was determined by wet sieving. Total organic carbon was determined on a CE-440 Elemental Analyzer from Exeter Analytical (Chelmsford, MA), following acid vapor treatment to remove inorganic carbon.

Toxicity Testing. In the PUR-guided study, bulk sediments were tested with 7−10-d old *Hyalella azteca* and 10-d old larvae of *Chironomus tentans*, generally following the protocols of the U.S. Environmental Protection Agency (*6*). The irrigation return study samples were tested with only *H. azteca*. Testing was done in 400 mL beakers containing 50−75 mL of sediment and 250 mL of overlying water, with continuous aeration at 23 °C and a 16 h light:8 h dark cycle. Water was 80% replaced every 48 h using Milli-Q purified water (Millipore Corp., Billerica, MA) made moderately hard by addition of salts (*7*). Temperature, dissolved oxygen, pH, alkalinity, hardness, and ammonia were measured at days 2 and 10 prior to water replacement. Both species were fed by adding a slurry of 10 mg of Tetrafin Goldfish Flakes to

TABLE 2. Physical Properties and Pesticide Residues in the Sediments Sampled[a]

station	sampling time	% silt and clay	% organic carbon	Bif	Esf	Lam	Per	total BHC	total DDT	Diel	total Endr	total Endo	Met
AD2	Apr 2003	33.1	0.53	U	U	1.0	7.2	U	9.2	U	U	U	U
AD2, rep. 1	Aug 2003	67.2	2.35	U	9.7	U	15.1	2.2	20.1	U	U	U	U
AD2, rep. 2	Aug 2003	75.7	2.38	U	12.2	U	18.7	3.1	23.6	U	U	U	1.1
AD5	Aug 2003	68.0	1.65	U	10.9	U	129	1.3	14.3	1.1	U	U	U
AD6	Apr 2003	87.6	1.80	U	5.1	U	20.7	U	15.4	1.2	962	U	2.0
AD6	Aug 2003	91.2	1.49	U	27.5	U	U	1.3	13.5	1.2	U	U	U
AD8	Aug 2003	32.3	1.06	U	30.0	U	U	U	34.9	1.8	1.2	1.3	U
AD10	Mar 2003	14.0	0.47	U	U	U	1.3	U	1.4	U	345	U	U
AD11	Mar 2003	78.7	1.25	U	U	U	1.4	U	17.5	U	9.2	U	1.4
AD13	Aug 2003	56.0	1.81	U	U	U	U	8.5	2.1	U	U	U	1.1
AD16	Aug 2003	81.5	2.20	U	U	U	1.1	3.4	5.9	U	U	U	U
AD18	Apr 2003	69.1	0.85	U	U	U	U	U	13.8	374	U	U	190
AD19	Apr 2003	56.8	1.67	U	U	U	13.8	U	8.8	U	399	U	U
AD19	Aug 2003	66.3	0.86	U	U	U	U	U	16.2	U	U	1.1	9.0
AD21	Apr 2003	52.8	0.44	U	U	U	U	U	3.8	U	1.9	U	U
AD24	Apr 2003	69.6	0.97	U	U	U	U	U	23.6	U	1.0	U	117
AD24	Aug 2003	54.4	1.30	U	U	U	U	U	20.1	1.3	U	2.3	8.1
DC	July 2002	17.2	3.16	1.1	1.4	U	7.3	2.3	3.1	U	2.5	U	1.6
DP	Aug 2002	83.7	1.09	21.0	17.9	2.6	46.9	15.8	78.5	2.6	10.1	17.7	22.7
DP, rep. 1	Mar 2003	58.9	1.40	2.8	1.9	1.0	7.4	U	48.4	1.4	U	U	U
DP, rep. 2	Mar 2003	35.0	0.50	U	1.4	U	3.7	U	33.2	1.3	1.4	U	1.1
FA	Aug 2002	48.4	1.01	U	U	U	1.5	4.3	5.8	U	U	U	U
FL, rep.1	Nov 2002	54.7	0.48	U	U	U	224	1.1	85.6	1.9	9.8	22.3	1.7
FL, rep. 2	Nov 2002	56.5	0.65	2.6	1.3	U	133	1.3	97.4	1.7	10.3	23.2	4.3
FL	Mar 2003	72.6	0.88	U	U	U	14.1	U	76.1	1.2	1.2	12.6	U
FR, rep 2	July 2002	16.0	0.61	U	U	U	4.0	U	U	U	U	U	4.6
FS, rep. 1	Aug 2002	58.1	0.59	3.6	U	2.6	10.1	1.1	408	11.3	9.3	11.6	2.2
FS, rep. 2	Aug 2002	55.8	0.55	2.0	U	2.3	5.8	U	60.0	5.7	6.3	10.7	1.6
GS	Mar 2003	36.9	1.72	U	U	U	5.3	U	8.0	U	U	U	U
IC, rep.1	Mar 2003	77.9	0.80	1.4	2.2	1.6	6.8	U	228	2.7	3.5	1.7	U
IC, rep. 2	Mar 2003	49.8	1.25	U	7.3	1.5	14.1	U	155	5.3	9.2	2.3	U
JS	Mar 2003	55.8	2.05	U	U	U	3.2	U	4.8	4.7	U	2.7	U
LL, rep 1	Nov 2002	70.2	1.00	6.5	7.0	16.8	459	11.4	371	2.9	27.7	81.5	16.4
LL, rep. 2	Nov 2002	75.1	0.76	28.8	11.6	8.3	290	7.1	257	2.3	18.1	62.5	14.7
LL	Mar 2003	56.0	0.32	7.2	U	1.0	70.5	U	384	3.3	24.4	571	1.6
MA	Mar 2003	60.8	1.30	8.8	U	7.8	6.0	U	61.2	1.9	U	11.3	U
MS	July 2002	34.3	1.26	U	1.3	U	5.9	6.9	61.4	U	U	U	U
MS	Mar 2003	41.6	1.84	U	10.7	U	7.8	U	67.4	U	U	U	U
RC	July 2002	45.4	1.05	U	1.1	U	55.4	U	U	U	U	U	2.8
RC	Mar 2003	64.8	1.40	7.7	U	U	120	U	4.8	U	U	U	U
SJ, rep. 1	July 2002	57.4	0.78	1.2	2.7	1	U	U	54.5	U	2.2	2.2	6.3
SJ, rep. 2	July 2002	55.3		U	1.8	U	U	U	35.2	U	1.0	1.2	U
SS, rep. 2	July 2002	21.2	0.48	U	U	U	U	1.4	3.1	U	U	U	1.2
TL, rep. 1	Mar 20 03	57.6	1.36	10.4	U	U	U	U	7.5	U	U	1.0	U

[a] Pesticide concentrations as ng/g, dry weight basis, with <1 ng/g indicated by "U". The samples listed were in the highest 10th percentile for the concentrations of one or more analytes and/or were found to show toxicity to one or both test species. Analytical chemistry data for all samples is available in Table S2 of the Supporting Information. Bif = bifenthrin, Esf = esfenvalerate, Lam = lambda-cyhalothrin, Per = permethrin, Diel = dieldrin, Endr = endrin, Endo = endosulfan, and Met = methoxychlor. Total BHC = sum of alpha-, beta-, delta-, and gamma-BHC. Total DDT = sum of *p,p'*-DDT, *p,p'*-DDE, and *p,p'*-DDD. Total endrin = sum of endrin, endrin aldehyde, and endrin ketone. Total endosulfan = sum of alpha- and beta-endosulfan, and endosulfan sulfate.

each beaker daily. Survival was determined after a 10-d exposure period. Five to eight replicates per sample were tested. Sediment from San Pablo Dam Reservoir, El Sobrante, CA was used as a control. Control survival averaged 91% for *H. azteca* and 82% for *C. tentans*. Due to difficulties with *H. azteca* culturing, there was a significant delay in testing many of the PUR peak use sample set (18% of total samples) with this species. Testing could not be done for 5 months, with the sediment samples maintained in the dark at 4 °C during this time. This delay is noted below where it affects interpretation of results.

Spiked sediment tests were done with *H. azteca* and/or *C. tentans* to determine 10-d LC_{50} values for methoxychlor, endrin, and endosulfan. Control sediment containing 1% organic carbon was spiked with each pesticide and stored at 10 °C for 7 days before testing.

Data were analyzed using ToxCalc Version 5.0 (Tidepool Scientific Software, McKinleyville, CA). Dunnett's Multiple Comparison test was used to identify stations with significantly greater mortality than the control. Arcsin squareroot transformation was used when necessary to meet assumptions of normality and homogeneity of variance. Maximum likelihood regression using probit transformation was used when determining LC_{50} by dilution of test sediments.

Results

Sediment Chemistry. The tailwater ponds (stations FL and LL; Table 2) were the most contaminated of all sites, with sediments containing a wide variety of pesticides. These sediments had the highest observed concentrations of bifenthrin (28.8 ng/g), lambda-cyhalothrin (16.8 ng/g), permethrin (459 ng/g), and total endosulfan (571 ng/g), and the second highest concentrations of total BHC (11.4 ng/g) and total DDT (384 ng/g). The ponds received tailwater from adjacent lettuce fields, and their contents were recycled back onto the fields with no discharge to public waters. Many farms do not have tailwater ponds, and irrigation return flow reaches public waters either directly or indirectly via canals.

Nevertheless, since the lettuce tailwater ponds do not discharge to public waters and since sediment quality in the ponds was not typical of Central Valley surface waters in general, their data are excluded from the remainder of these sediment chemistry results.

At a detection limit of 1 ng/g, pyrethroids were detected in 75% of the samples. Permethrin was the most frequently reported pyrethroid, found in 66% of the samples. The median concentration was 1.5 ng/g, with highs of 129 ng/g in an irrigation canal (AD5); 55.4 and 120 ng/g in Root Creek adjacent to pistachio groves; and 46.9 ng/g in Del Puerto Creek, a small creek passing through orchards and diverse row crops. Bifenthrin was detectable in 18% of the samples, with a maximum of 21.0 ng/g in Del Puerto Creek. Two irrigation canals, sites MA and TL, also contained substantial amounts of bifenthrin (8.8 and 10.4 ng/g, respectively). Esfenvalerate was detectable in 32% of the samples. Highest concentrations were found in Little John Creek (30.0 ng/g), three irrigation canals (AD2, AD5, AD6; 9.7–27.5 ng/g), Del Puerto Creek (17.9 ng/g), and in Morisson Slough (10.7 ng/g) in an area of peach and plum orchards. Lambda-cyhalothrin was detectable in 12% of the samples. Maximum concentration was 7.8 ng/g in irrigation canal sediments from an alfalfa-growing area.

Total DDT was quantifiable in almost all samples. Median concentration was 6.9 ng/g and reached a maximum of 408 ng/g in an irrigation canal. DDE was the principal degradation product found, typically comprising about two-thirds of the total DDT. Dieldrin was rarely found at concentrations more than a few ng/g but reached 374 ng/g in one creek used for irrigation return. Endrin also had several atypically high concentrations (345–962 ng/g) in water bodies dominated by irrigation return flow. Total BHC reached 15.8 ng/g. Concentrations of the most toxic gamma isomer of BHC never exceeded 2 ng/g.

Endosulfan and methoxychlor are currently used organochlorines. Peak endosulfan concentrations were largely limited to the ponds adjacent to lettuce fields, but 17.7 ng/g was found in Del Puerto Creek. The most toxic form, alpha-endosulfan, typically comprised about 10% of the total endosulfan but reached 50% in some tailwater pond samples. Methoxychlor concentrations were usually low but reached 117 and 190 ng/g in two water bodies with high inputs of irrigation return flow.

Data are not presented for aldrin, alpha- and gamma-chlordane, chlorpyrifos, heptachlor, and heptachlor epoxide as they were rarely detected and were at low concentrations when measurable (<7 ng/g).

Toxicity Testing. Sediments of the tailwater ponds not only had the highest concentrations of many pesticides but also proved to be highly toxic. They were the only samples that caused statistically significant mortality in both *C. tentans* and *H. azteca*, with total or near total mortality in both species. A dilution series using sediments from LL (replicate 2, Nov 2002) and varying amounts of control sediments indicated a 10-d LC_{50} to *C. tentans* of 13% LL sediment (95% confidence interval = 10–16%). Dilution series with sediments from FL (replicate 2, Nov. 2002) indicated a *C. tentans* 10-d LC_{50} of 92% (c.i. = 89–94%) and a *H. azteca* 10-d LC_{50} of 69% (c.i. = 60–80%).

Excluding the tailwater ponds, toxicity to one of the test species was seen in 32% of the 77 samples tested (see Table S3 in Supporting Information). Five of the 39 samples tested with *C. tentans* showed toxicity, and 20 of 71 samples were toxic to *H. azteca*. No stations other than tailwater ponds were toxic to both species. Sites with particularly high or persistent mortality to *H. azteca* included Del Puerto and Ingram Creeks and 4 irrigation canals (AD2, AD6, MA, TL). A dilution series with the August AD6 sample provided a 10-d LC_{50} to *H. azteca* of 36% (c.i. = 25–49%), and the March MA sample indicated a 10-d LC_{50} of 26% (c.i. = 18–34%).

Investigating Causes of Sediment Toxicity. A toxicity unit (TU) approach was used to identify pesticides potentially responsible for observed toxicity. TU was calculated as the actual concentration divided by the LC_{50}, both on an organic carbon (oc) normalized basis. Sediment LC_{50} values (Tables 3 and 4) for both species were estimated as follows:

Pyrethroids. Cypermethrin 10-d LC_{50} values average 1.3 μg/g oc (range = 0.48–2.20) and 0.38 μg/g oc (range = 0.18–0.60) for *C. tentans* and *H. azteca*, respectively (*8*). Cypermethrin is not one of the major pyrethroids used in our study area and thus not among our analytes, but it is possible to use these data to estimate sediment LC_{50}s for other pyrethroids. Solomon et al. (*9*) plotted all water toxicity data for a wide variety of pyrethroids and noted that the 10th percentile of the toxicity distributions is a convenient criterion for characterizing relative toxicity. The 10th percentile LC_{50}s for cypermethin = 10 ng/L, lambda-cyhalothrin = 10 ng/L, bifenthrin = 15 ng/L, esfenvalerate/fenvalerate = 37 ng/L, and permethrin = 180 ng/L. Given the sediment toxicity of cypermethrin and the relative toxicity of other pyrethroids, sediment LC_{50} values for the other pyrethroids were estimated. This approach assumes that the other pyrethroids are comparable to cypermethrin in the bioavailability of particle-adsorbed residues. This assumption is reasonable, since the toxicity of pyrethroids to benthic organisms is predictable by the equilibrium partitioning-derived pore water concentration (*8*), and the pyrethroids in this study have K_{oc}'s comparable to cypermethrin (*10*).

Two published LC_{50}s are available as an independent check on the estimated LC_{50} values. The permethrin 10-d sediment LC_{50} for *C. riparius* is 21.9 μg/g oc (*11*), a value very close to our estimated permethrin 10-d LC_{50} for *C. tentans* (23 μg/g oc). The lambda-cyhalothrin 28-d EC_{50} for emergence of *C. riparius* is 6.8 μg/g oc ((*12*) given an oc content of the test sediment of 3.7% provided by J. Warinton (personal communication)), a value five times greater than our estimate of 1.3 μg/g oc.

DDE, DDD, DDT. 10-d LC_{50}s of DDT to *H. azteca* range from 100 to 470 μg/g oc and average 260 μg/g oc (*13, 14*). DDD and DDE are 5.2 and 32 times less toxic to *H. azteca*, respectively, in water exposures (averaging results of refs *15* and *16*), suggesting the sediment LC_{50}s for these organochlorine compounds are approximately 1300 and 8300 μg/g oc, respectively.

No sediment toxicity data are available for *C. tentans*, but in water exposures the species is 12 times less sensitive to DDT than *H. azteca* and 4.3 and 1.3 times more sensitive to DDD and DDE, respectively (*16*). These factors, when applied to *H. azteca* sediment LC_{50} values, yield the *C. tentans* sediment LC_{50} estimates of Table 3.

Dieldrin. Ten-day sediment LC_{50} values for *C. tentans* have been measured at 35 and 78 μg/g oc, averaging 57 μg/g oc. Values have ranged from 1100 to 3700 μg/g oc for *H. azteca* and average 2000 μg/g oc (*17*).

Endrin. Sediment 10-d LC_{50} for *C. tentans* was measured as part of this study and found to be 4.22 μg/g oc (c.i. = 0.70–8.11). Ten-day sediment LC_{50}s to *H. azteca* range from 54 to 257 μg/g oc and average 140 μg/g oc (*13, 14*). Information on the relative aquatic toxicities of endrin and its aldehyde and ketone degradation products was lacking, but all three compounds were summed when determining the TUs of endrin present. While the validity of this assumption is unclear, it is of little consequence since at those stations with the highest total endrin concentrations, endrin itself comprised >85% of the total.

Methoxychlor. Methoxychlor 10-d LC_{50} values were measured for this study and found to be 36.7 (c.i. = 27.2–46.8)

TABLE 3. *C. tentans* Toxicity Units (TU) of the Pesticide Analytes at All Stations Exhibiting Significant Toxicity to *C. tentans*[a]

		toxicity units of individual pesticides										
sample	Mort	Bif	Esf	Lam	Per	DDT	Diel	Endr	Met	Endo	BHC	ΣTUs
LL, Nov 2002, rep. 1	100 ± 0	0.3	0.2	1.3	2.0	*b*	*b*	0.7	*b*	4.7	*b*	9.2
LL, Nov 2002, rep. 2	100 ± 0	1.9	0.3	0.8	1.7	*b*	*b*	0.6	0.05	3.3	*b*	8.7
LL, Mar 2003	100 ± 0	1.1	*b*	0.2	1.0	*b*	*b*	1.8	*b*	74.6	*b*	78.7
FL, Nov 2002, rep. 1	98 ± 4	*b*	*b*	*b*	2.0	*b*	*b*	0.5	*b*	1.3	*b*	3.8
GS, Mar 2003	62 ± 8	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*
FL, Nov 2002, rep. 2	60 ± 17	0.2	*b*	*b*	0.9	*b*	*b*	0.4	*b*	1.0	*b*	2.5
FR, July 2002, rep. 2	58 ± 36	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*
FS, Aug 2002, rep. 2	54 ± 11	0.2	*b*	0.3	0.05	*b*	*b*	0.3	*b*	0.5	*b*	1.4
DC, July 2002	50 ± 28	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*
FS, Aug 2002, rep. 1	44 ± 24	0.3	*b*	0.3	0.07	*b*	*b*	0.4	*b*	0.6	*b*	1.7
# nontoxic samples with ≥0.5 TU (n=31)		1	0	1	0	0	0	1	0	0	0	
LC_{50} used to derive TUs (μg/g o.c.)		2.0	4.8	1.3	23	DDT = 3100 DDD = 300 DDE = 6400	57	4.2	36.7	α = 0.96 β = 3.2 sulf = 5.2	0.73	

[a] Mort = % mortality; Bif = bifenthrin; Esf = esfenvalerate; Lam = lambda-cyhalothrin; Per = permethrin; DDT = sum TU of DDT, DDD, DDE; Diel = dieldrin; Endr = endrin; Met = methoxychlor; Endo = sum TU of alpha- and beta-endosulfan and endosulfan sulfate; BHC = gamma-BHC. [b] <0.05 TU.

and 85.8 μg/g oc (c.i. = 72.1−102.6) for *C. tentans* and *H. azteca*, respectively.

Endosulfan. C. tentans 10-d LC_{50} values were measured for this study and found to be 0.96 (c.i. = 0.41−1.46), 3.24 (c.i. = 1.46−4.27), and 5.22 μg/g oc (c.i. = 3.23−5.82) for alpha- and beta-endosulfan and endosulfan sulfate, respectively. *H. azteca* 10-d LC_{50} values were measured as 51.7 (c.i. = 38.6−61.6), >1000, and 873 μg/g oc (c.i. = 660−1139) for the same compounds.

BHC. The 24-h sediment EC_{50} of gamma-BHC to *C. riparius* is 0.73 μg/g oc (*18*). This estimate is shown in Table 3 as the best available data, although the actual 10-d LC_{50} for *C. tentans* is likely to be less considering our 10-d exposure and the fact that *C. tentans* is more sensitive to gamma-BHC than is *C. riparius* (*19*). No sediment LC_{50} data were available for *H. azteca*, but in 10-d water exposures, the LC_{50} of the species is 75% of that of *C. riparius* (*20*), and that conversion factor was used to derive an estimated sediment LC_{50} for *H. azteca* of 0.55 μg/g oc. In calculating TUs present at the sampling sites, only the sediment concentration of the gamma-isomer was used since other isomers of BHC have much lower aquatic toxicities (*21*).

In most of the 10 samples toxic to *C. tentans*, the TU approach suggests that several of the measured analytes were present in concentrations that could account for the observed mortality (Table 3). In the tailwater pond samples (FL and LL) where near total mortality was observed, bifenthrin, lambda-cyhalothrin, permethrin, endrin, and endosulfan were all in sufficient concentrations in most of the samples so that any one of these pesticides alone could account for the toxicity. One sample (LL, March 2003) contained 78 TUs of endosulfan.

To account for cumulative effects of multiple pesticides, the TUs of individual pesticides were summed to determine a total TU in each sample. This approach implicitly presumes additivity of toxicity as is common among pesticides (*22*), though the data do not exist to demonstrate whether specific combinations of our analytes are greater or less than additive. The default presumption of additivity is made more defensible by the fact that since the organochlorines only had appreciable TUs at a few sites, the sum TU is largely a summation of TUs of the individual pyrethroids for which a common mode of toxic action is more likely.

Outside of the tailwater ponds, the combined effects of bifenthrin, lambda-cyhalothrin, and endosulfan may have contributed to the mortality in both replicates of station FS, since they together contribute nearly 1 TU. The combined concentrations of endrin and endosulfan account for about another TU at this site. DDT, dieldrin, and BHC most likely did not contribute to the observed toxicity to *C. tentans* in any sample. In 3 of the 10 toxic samples (GS, FR, DC) the measured analytes could not account for the toxicity.

TU calculations for samples not toxic to *C. tentans* are not shown in Table 3 to conserve space, but for each analyte the number of nontoxic samples that contained at least 0.5 TU is shown. The 0.5 TU threshold is arbitrary but suggests a strong likelihood that the analyte makes a substantial contribution to the observed mortality. Bifenthrin, lambda-cyhalothrin, and endrin were the only pesticides for which mortality was expected but not seen, with only one nontoxic sample for each compound having ≥0.5 TU.

A similar TU analysis for the *H. azteca* toxicity data (Table 4) indicates bifenthrin, lambda-cyhalothrin, and permethrin concentrations were sufficiently high (≥0.5 TU) that each compound individually could have had a substantial contribution to the mortality in six of the 23 toxic samples. Esfenvalerate concentrations were ≥0.5 TU in five samples. Cumulatively, pyrethroids were likely responsible for much of the toxicity in 17 of the 23 toxic samples. The most extreme cases were the tailwater ponds where the combined effect of all four pyrethroids created up to 12.9 TUs, and 98% mortality to *H. azteca* was observed.

As was the case for *C. tentans*, the TU calculations for *H. azteca* indicated that most of the legacy organochlorine compounds were present at concentrations far too low to account for the observed toxicity. The only exception to this generality was endrin, which was found at 0.4 TU in one irrigation canal toxic to *H. azteca* and at 0.5 TU in another nontoxic canal sample. Among the current use organochlorines, methoxychlor approached toxic thresholds in one creek (Stone Corral Creek, AD18), and endosulfan may have contributed to mortality in a tailwater pond. None of the measured analytes could explain toxicity at AD11 and AD21.

Among samples without significant *H. azteca* toxicity there were only rare instances of samples containing ≥0.5 TU of any pesticide (one sample for lambda-cyhalothrin and endrin, two for permethrin). The only exception was bifenthrin for which four samples contained ≥0.5 TU of the compound but were nontoxic. Nevertheless samples containing ≥0.5 TU bifenthrin were more than three times as likely to be toxic than nontoxic, suggesting our bifenthrin LC_{50} estimate, while perhaps slightly low, is not grossly in error. Overall, the

TABLE 4. *H. azteca* Toxicity Units (TU) of the Pesticide Analytes at All Stations Exhibiting Significant Toxicity to *H. azteca*[a]

		toxicity units of individual pesticides										
sample	Mort	Bif	Esf	Lam	Per	DDT	Diel	Endr	Met	Endo	BHC	ΣTUs
MA, Mar 2003	100 ± 0	1.2	*b*	1.6	0.1	*b*	*b*	*b*	*b*	*b*	*b*	2.9
LL, Nov 2002, rep. 1	98 ± 4	1.1	0.5	4.4	6.8	*b*	*b*	*b*	*b*	0.06	*b*	12.9
FL, Nov 2002, rep. 1	97 ± 5	*b*	*b*	*b*	6.9	*b*	*b*	*b*	*b*	*b*	*b*	6.9
AD2, Apr 2003	97 ± 7	*b*	*b*	0.5	0.2	*b*	*b*	*b*	*b*	*b*	*b*	0.7
DP, Mar 2003, rep. 1	90 ± 14	0.4	0.1	0.2	0.1	*b*	*b*	*b*	*b*	*b*	*b*	0.8
IC, Mar 2003, rep. 2	90 ± 14	*b*	0.4	0.3	0.2	*b*	*b*	*b*	*b*	*b*	*b*	0.9
IC, Mar 2003, rep. 1	85 ± 13	0.3	0.2	0.5	0.1	*b*	*b*	*b*	*b*	*b*	*b*	1.1
AD6, Aug 2003	85 ± 19	*b*	1.3	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*	1.3
AD2, Aug 2003, rep. 2	84 ± 9	*b*	0.4	*b*	0.1	*b*	*b*	*b*	*b*	*b*	*b*	0.5
FL, Nov 2002, rep. 2	83 ± 6	0.7	0.1	*b*	3.0	*b*	*b*	*b*	*b*	*b*	*b*	3.8
TL, Mar 2003, rep. 1	82 ± 18	1.3	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*	1.3
AD2, Aug 2003, rep. 1	81 ± 18	*b*	0.3	*b*	0.09	*b*	*b*	*b*	*b*	*b*	*b*	0.4
DP, Aug 2002	78 ± 16	3.4	1.2	0.6	0.6	*b*	*b*	*b*	*b*	*b*	0.2	6.0
LL, Mar 2003	76 ± 29	4.0	*b*	0.8	3.2	0.2	*b*	0.05	*b*	0.9	*b*	9.2
MS, Mar 2003	68 ± 33	*b*	0.4	*b*	0.1	*b*	*b*	*b*	*b*	*b*	*b*	0.5
AD8, Aug 2003	67 ± 18	*b*	2.0	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*	2.0
DP, Mar 2003, rep. 2	58 ± 16	*b*	0.2	*b*	0.1	*b*	*b*	*b*	*b*	*b*	*b*	0.3
AD5, Aug 2003	47 ± 27	*b*	0.5	*b*	1.2	*b*	*b*	*b*	*b*	*b*	*b*	1.7
AD6, Apr 2003	39 ± 25	*b*	0.2	*b*	0.2	*b*	*b*	0.4	*b*	*b*	*b*	0.8
AD18, Apr 2003	36 ± 28	*b*	*b*	*b*	*b*	*b*	*b*	*b*	0.3	*b*	*b*	0.3
AD11, Mar 2003	34 ± 27	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*
S.J, July 2002, rep. 2	34 ± 15	*b*	0.1	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*	0.1
AD21, Apr 2003	31 ± 17	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*
# nontoxic samples with ≥0.5 TU (n=51)		4	0	1	2	0	0	1	0	0	0	
LC_{50} used to derive TUs (μg/g o.c.)		0.57	1.4	0.38	6.8	DDT = 260 DDD = 1300 DDE = 8300	2000	140	85.8	α = 52 β = >1000 sulf = 870	0.55	

[a] Mort = % mortality; Bif = bifenthrin; Esf = esfenvalerate; Lam = lambda-cyhalothrin; Per =permethrin; DDT = sum TU of DDT, DDD, DDE; Diel = dieldrin; Endr = endrin; Met = methoxychlor; Endo = sum TU of alpha- and beta-endosulfan and endosulfan sulfate; BHC = gamma-BHC. [b] <0.05 TU.

rarity of high TU values among nontoxic samples for all analytes suggests our LC_{50} estimates are reasonable.

Discussion

There have been few measurements of pyrethroids in sediments of agriculture-influenced water bodies, and fewer still that have incorporated toxicity testing of these sediments. We found that pyrethroid residues can be widespread in sediments from regions of intensive agriculture, and in some locations are present in concentrations likely to cause toxicity to sensitive species. The tailwater ponds represented the most extreme instance, containing at least four pyrethroids that were present at concentrations that, even if considered individually, were capable of causing substantial mortality.

Sediments collected from creeks, rivers, and the irrigation canals that discharge to them did not show the extreme pesticide concentrations found in the tailwater ponds but nevertheless frequently showed toxicity to the test species. Statistically significant mortality to *C. tentans* or *H. azteca* was observed in 32% of the 77 sediment samples tested, and 42% of the locations sampled were toxic to at least one species on at least one occasion. Toxicity was seen on occasion in both major rivers sampled, eight of the 19 creeks and sloughs sampled, and seven of the 17 irrigation canals. Six sites (14% of those tested) showed >80% mortality in a test species on at least one occasion.

It appears the analytes we measured were at sufficient concentrations to explain the vast majority of observed mortality. Pyrethroids were likely to have contributed to the toxicity in 40% of samples toxic to *C. tentans* and nearly 70% of samples toxic to *H. azteca* (excluding tailwater ponds). Endrin, endosulfan, and methoxychlor may have been important in a few instances, but for the remaining toxic samples, it was not possible to determine if pesticides or other substances were responsible for the toxicity. There are over 130 pesticides used in the Central Valley, and since the concentrations of most are not measured in any monitoring program, their contribution to toxicity is unknown.

Our toxicity data are supported by an independent study that overlapped with two sampling locations. California's Central Valley Regional Water Quality Control Board sampled the Del Puerto Creek site three times from June to October of 2002 and found 39−100% mortality to *H. azteca* (J. Rowan, personal communication), compared to our observation of 78% mortality in August 2002. The same agency sampled the Orestimba Creek site in September 2002 and found 59% mortality to *H. azteca*, compared to our determination of 60% mortality in March, 2003.

In considering the frequency of toxicity and the sediment concentrations of pesticides, it should be recognized that sampling for the PUR-guided study was focused on areas of high pyrethroid use or water bodies where water quality degradation was likely. However, the irrigation return study, which made up half the total samples, targeted water bodies dominated by irrigation return flow with only minimal consideration of pesticide use or crops grown. There was a greater frequency of toxicity in the PUR-guided study (34% vs 27% in irrigation return study) and in the frequency of pyrethroid detection (85% vs 65%), but the results are still quite striking even for the return flow study with minimal site selection bias.

While our work focused on smaller tributaries, there is some indication of sediment quality impacts in the larger rivers. One sample (of three) in the Feather River proved toxic to *C. tentans* with the responsible agent unknown. Three locations were sampled on the San Joaquin River: one in July 2002 and all three in March 2003, with the July sample showing *H. azteca* mortality due to unknown causes. Further

sampling in the major rivers would be desirable to better characterize regional impacts.

An important conclusion from these data is that legacy organochlorines, while widely distributed in Central Valley sediments, were far below acutely toxic concentrations to sensitive aquatic invertebrates. The only exception to this generalization was endrin, which was found at concentrations of approximately half its LC_{50} in a few irrigation canals. Current-use organochlorine compounds (endosulfan, methoxychlor) were below acutely toxic thresholds in the majority of samples, though they may have contributed to toxicity in the tailwater ponds or a few irrigation canals where concentrations exceeded several hundred ng/g.

The extreme toxicity of sediment-associated pyrethroids indicates the need to improve the detection limits achieved in this study. The sediments tested had organic carbon contents typically about 1%, and in such sediments the *H. azteca* 10-d LC_{50} of cypermethrin is 3.6 ng/g (*8*). Based on relative toxicity among the pyrethroids, in the same sediment the LC_{50}s for bifenthrin, cyfluthrin, and deltamethrin would be on the order of 3−6 ng/g, the LC_{50}s for esfenvalerate or fenvalerate would be about 10−15 ng/g, and the LC_{50}s for permethrin and fenpropathrin would be about 60−90 ng/g. Excluding permethrin and fenpropathrin, these estimates of LC_{50} are only slightly above the one ng/g detection limit. Thus, mere detection of any of the more toxic pyrethroids at least raises the possibility of acute toxicity, even without considering that other species may be more sensitive than *H. azteca* or that chronic toxicity may occur at concentrations less than the 10-d LC_{50} used in these estimates.

The data suggest that pyrethroid concentrations in aquatic habitats of the Central Valley tend to be greater shortly after their use rather than after heavy winter rains. Though there is some dormant spraying of pyrethroids on orchard crops during winter months, most Central Valley crops treated with pyrethroids receive the greatest amounts in the summer. During this period, the mechanisms for transport of residues to aquatic systems would be irrigation return and spray drift from aerial application. Potentially pesticide-bearing soils are washed into aquatic systems by heavy rains, largely confined to December through March. However, pyrethroids typically have half-lives on the order of 1−2 months in aerobic soils (*10*), providing opportunity for substantial degradation between summer application and winter rains. In this study, 65% of the sites with measurable pyrethroids had the highest concentrations in the late summer and fall near the end of the irrigation season. At only 35% of the sites were concentrations greatest in March and April at the conclusion of the rainy season.

The prevalence of sediment toxicity in this study, and evidence that pyrethroids were likely to be responsible for much of it, clearly shows the need for greater awareness of the risks of particle-associated pyrethroids. There are considerable data on the toxicity of dissolved-phase pyrethroids to aquatic life that have been used in developing risk assessments for the compounds (*9, 12, 23, 24*), but these risk assessments have generally focused more on the water column than on sediments. The bioavailability and toxicity of sediment-bound residues have received little attention, as indicated by the difficulty in locating direct sediment LC_{50} measurements for the compounds of interest in this study. The log K_{oc} for most pyrethroids ranges from 5 to 6 (*10*), and they rapidly partition on to soils or sediments (*8*). Except in close proximity to and shortly after application, pyrethroids will largely be sediment associated (*26*). It has been argued that the hydrophobicity of these compounds lessens their bioavailability (*12, 25*), which may be the case for organisms living within the water column (e.g., daphnids widely used for toxicity testing). However, results from our study indicate a substantial risk remains to benthic organisms under realistic conditions of agricultural use. Our study did not differentiate whether the primary route of toxicity was exposure to dissolved phase pyrethroids within the pore water or ingestion and digestive desorption of particle-associated residues. Digestive routes of contaminant uptake often take on increasing importance for strongly hydrophobic compounds (*26*), and deposit-feeder digestive fluids are usually far more effective extractants of hydrophobic organics than is water (*27*). Regardless of the route of uptake, our findings of widespread sediment toxicity indicate pyrethroid uptake by and toxicity to benthic organisms, and particularly deposit-feeding species, deserves closer study.

Acknowledgments

We thank Shakoora Azimi-Gaylon of the Central Valley Regional Water Quality Control Board for making possible our work in the irrigation return study and the Aquatic Toxicity Laboratory of the University of California, Davis for collecting those samples. Minghua Zhang of the University of California, Davis kindly provided maps of pyrethroid usage in the Central Valley. The laboratory work was done with the assistance of Kristina Estudillo, Kathleen London, Jessica Newman, and Nicole Ureda. This work was supported by grants from the CALFED Bay-Delta Authority and California State Water Resources Control Board.

Supporting Information Available

Sampling location details (Table S1), analytical chemistry results for all samples (Table S2), and toxicity testing results for all samples (Table S3). This material is available free of charge via the Internet at http://pubs.acs.org.

Literature Cited

(1) Kuivila, K. M.; Foe, C. G. *Environ. Toxicol. Chem.* **1995**, *14*, 1141−1150.
(2) Werner, I.; Deanovic, L. A.; Connor, V.; deVlaming, V.; Bailey, H. C.; Hinton, D. E. *Environ. Toxicol. Chem.* **2000**, *19*, 215−227.
(3) Webber, E. C.; Deutsch, W. G.; Bayne, D. R.; Seesock, W. C. *Environ. Toxicol. Chem.* **1992**, *11*, 87−105.
(4) Conrad, A. U.; Fleming, R. J.; Crane, M. *Water Res.* **1999**, *33*, 1603−1610.
(5) You, J.; Weston, D. P.; Lydy, M. J. *Arch. Environ. Contam. Toxicol.*, in press.
(6) U.S.E.P.A. *Methods for measuring the toxicity and bioaccumulation of sediment-associated contaminants with freshwater invertebrates*; EPA/600/R-99/064; U.S. Environmental Protection Agency: Washington, DC, 2000; 192 pp.
(7) U.S.E.P.A. *Methods for measuring the acute toxicity of effluents and receiving waters to freshwater and marine organisms*; EPA-600-4-90-027; U.S. Environmental Protection Agency: Washington, DC, 1991; 293 pp.
(8) Maund, S. J.; Hamer, M. J.; Lane, M. C. G.; Farrelly, E.; Rapley, J. H.; Goggin, U. M.; Gentle, W. E. *Environ. Toxicol. Chem.* **2002**, *21*, 9−15.
(9) Solomon, K. R.; Giddings, J. M.; Maund, S. J. *Environ. Toxicol. Chem.* **2001**, *20*, 652−659.
(10) Laskowski, D. A. *Rev. Environ. Contam. Toxicol.* **2002**, *174*, 49−170.
(11) Conrad, A. U.; Fleming, R. J.; Crane, M. *Water Res.* **1999**, *33*, 1603−1610.
(12) Maund, S. J.; Hamer, M. J.; Warinton, J. S.; Edwards, T. J. *Pest. Sci.* **1998**, *54*, 408−417.
(13) Nebeker, A. V.; Schuytema, G. S.; Griffis, W. L.; Barbita, J. A.; Carey, L. A. *Environ. Toxicol. Chem.* **1989**, *8*, 705−718.
(14) Schuytema, G. S.; Nebeker, A. V.; Griffis, W. L.; Miller, C. E. *Environ. Toxicol. Chem.* **1989**, *8*, 883−891.
(15) Hoke, R. A.; Ankley, G. T.; Cotter, A. M.; Goldenstein, T.; Kosian, P. A.; Phipps, G. L.; VanderMeiden, F. M. *Environ. Toxicol. Chem.* **1994**, *13*, 157−166.
(16) Phipps, G. L.; Mattson, V. R.; Ankley, G. T. *Arch. Environ. Contam. Toxicol.* **1995**, *28*, 281−286.
(17) U.S.E.P.A. *Sediment quality criteria for the protection of benthic organisms: dieldrin*; EPA-822-R-93-015; U.S. Environmental Protection Agency: Washington, DC, 1993; 70 pp.
(18) Lydy, M. J.; Bruner, K. A.; Fry, D. M.; Fisher, S. W. *Aquatic Toxicology and Risk Assessment*; Landis, W. G., van der Schalie,

W. H., Eds.; ASTM STP 1096; American Society for Testing and Materials: Philadelphia, PA, 1990; Vol. 13, pp 140–164.
(19) Watts, M. M.; Pascoe, D. *Environ. Toxicol. Chem.* **2000**, *19*, 1885–1892.
(20) Blockwell, S. J.; Maund, S. J.; Pascoe, D. *Arch. Environ. Contam. Toxicol.* **1998**, *35*, 432–440.
(21) Klaassen, C. D. *Cassarett and Doull's Toxicology: the Basic Science of Poisons*, 6th ed.; McGraw-Hill Publishing: New York, 2001; 772 pp.
(22) Bodeker, W. E.; Altenburger, E.; Faust, M.; Grimme, L. H. *Nachrichtenbl. Deut. Pflanzenschutzd.* **1990**, *42*, 70–78.
(23) Siepmann, S.; Holm, S. *Hazard assessment of the synthetic pyrethroid insecticides bifenthrin, cypermethrin, esfenvalerate and permethrin to aquatic organisms in the Sacramento-San Joaquin River system*; California Department of Fish and Game: Rancho Cordova, CA, 2000; 45 pp.
(24) Giddings, J. M.; Solomon, K. R.; Maund, S. J. *Environ. Toxicol. Chem.* **2001**, *20*, 660–668.
(25) Liu, W.; Gan, J. J.; Lee, S.; Kabashima, J. N. *Environ. Toxicol. Chem.* **2004**, *23*, 7–11.
(26) Landrum, P. F.; Robbins, J. A. *Sediments: Chemistry, and Toxicity of In-Place Pollutants*; Baudo, R., Giesy, J. P., Muntau, H., Eds.; Lewis Publishers: Boca Raton, FL, 1990; pp 237–263.
(27) Mayer, L. M.; Weston, D. P.; Bock, M. J. *Environ. Toxicol. Chem.* **2001**, *20*, 1890–1900.

Received for review October 31, 2003. Revised manuscript received February 26, 2004. Accepted March 1, 2004.

ES0352193

Testimony of Steven W. Koehn
State Forester of Maryland
On behalf of the National Association of State Foresters

Before the House of Representatives
Committee on Transportation and Infrastructure

September 29, 2005

Pest Management and Fire Suppression Flexibility Act

Good morning Mr. Chairman and members of the Committee. My name is Steve Koehn, and on behalf of the National Association of State Foresters, I am pleased to have the opportunity to testify before you today on the Pest Management and Fire Suppression Flexibility Act, introduced by Congressmen Otter and Cardoza. Aside from my duties as the Director of the Maryland Forest Service, I also serve as chairman of the National Association of State Foresters Water Resources Committee.

The National Association of State Foresters is a non-profit organization that represents the directors of the state forestry agencies from the states, U.S. territories, and the District of Columbia. State Foresters restore, manage, and protect private and state forests across the U.S., which together encompass two-thirds of our nation's forests.

As you know, H. R. 1749 would codify the Environmental Protection Agency's long-standing position that forestry activities, aerial use of fire retardant, and application of pesticide in accordance with the EPA-approved labeling do not require a National Pollutant Discharge Elimination System (NPDES) permit. It does not exempt these practices from regulation, but rather ensures that the intended regulatory authorities serve as the primary method of oversight. The National Association of State Foresters strongly endorses the Otter-Cardoza bill, as it would ensure our continued ability to manage and protect private and state forests across the nation.

State Foresters believe that clean water is the most valuable commodity that comes from a well-managed forest. Our state forestry agencies ensure forests continue to produce clean and abundant water to meet a variety of societal needs. The importance of water to our lifestyles and to our economic vitality is reflected in many sectors: from conservation of cold water fisheries to agriculture, from recreation and tourism to community development. One of a state forestry agency's primary missions is to protect this clean water by implementing forestry Best Management Practices (BMPs).

Forest Management
In 1976, EPA issued a regulation that explicitly excluded nonpoint source silviculture activities from the NPDES permitting requirements. Harvesting, site preparation, prescribed burning, pest control, road construction and maintenance, and thinning are all examples of silvicultural practices that were given a categorical exclusion from the NPDES process. This is not to say, however, that silvicultural activities are exempt from

any sort of regulatory control. EPA delegated the authority for enforcement of forestry nonpoint source water pollution control to the individual states. Over the past 30 years, the state forestry agencies have developed and implemented a strong, efficient, and workable process for ensuring forestry activities, primarily timber harvesting, do not significantly degrade water quality. Each state has developed its forestry BMP program with input from a variety of stakeholders, including landowners and loggers. These programs are updated regularly to ensure the best available science and techniques are being applied on the ground. States are constantly monitoring the implementation and effectiveness of their forestry BMP programs, with steadily improving success.

In my state of Maryland, controlling nonpoint source water pollution from forestry activities is a top priority of the Maryland DNR Forest Service. As one of the primary Chesapeake Bay states, we know well the significant impact to the ecosystem that can occur as a result of unchecked nonpoint source water pollution. While runoff from agriculture and urban development are the most significant contributors of nonpoint source water pollution to the Chesapeake Bay, forestry activities have the potential to contribute pollution as well, albeit at a lower rate. The Maryland Forest Service, along with the Maryland Department of the Environment, oversees the implementation of a highly effective forestry BMP program that ensures forestry activities are not contributing sediment and other pollutants to the Bay. My staff of more than 50 field foresters and forest rangers works closely with landowners, loggers, and the forest industry to ensure timber harvesting meets our state's BMP standards. The process works efficiently and effectively, allowing the logger and landowner to accomplish their goals, while simultaneously protecting water quality.

The situation I just described is also occurring in the other states and territories all across the nation. We are concerned that without this important legislation, future legal action may require landowners to obtain a NPDES permit prior to initiating any forestry activities. This scenario would have several detrimental effects. First, the permitting process would be redundant with complying with current forestry Best Management Practices. And second, it would be a prohibitively expensive step for many small family forest landowners who may only harvest timber once or twice during their lifetime. The income gained from these timber harvests is often pivotal to ensuring landowners keep their land in forest, as opposed to selling it for development.

Wildfire Suppression

One crisis that really resonates with the American people is a raging wildfire. While fire has its natural and beneficial role in the ecology of a forest, a century of fire suppression and rapidly increasing development in and around the forest has pushed wildfire far past that natural role. I'm sure many of you have seen pictures and television reports of helicopters and fixed-wing aircraft dropping water and fire retardant on wildfires in order to slow their spread. Fire managers often use this tool to protect houses and other property in those areas where forests and communities intermingle. These areas, commonly known as the "wildland-urban interface," are increasingly becoming more common across the landscape, both in eastern and western areas of the country. Controlling wildland fires in the wildland-urban interface is an increasingly difficult and

dangerous task, as risks to life and property greatly increase when fire and development are interspersed. The aerial application of water and fire retardant is often an essential tool to protect life and property in these communities. These techniques are also valuable when fighting fires in more remote areas, where access for initial attack hand crews is often a problem. We can quickly and safely knock back small fires before they can grow large and costly to control.

The National Interagency Fire Center, a coordinated group of seven federal and numerous state agencies, has developed guidelines for the application of fire retardant to wildland fires. These guidelines, published in the Interagency Standards for Fire and Fire Aviation Operations guidebook, were developed using data from studies that examined the effect of retardants on the environment. In order to protect water quality, the guidelines specify that aircraft must not apply fire retardant within 300 feet of a waterway, which includes lakes, rivers, streams, and ponds, whether or not they contain aquatic life. Retardant drops are usually supervised by ground personnel who also ensure these guidelines are followed. Furthermore, fire retardant is more effective when applied to ridge tops, as opposed to stream bottoms. These guidelines provide sufficient protection to waterways, while allowing fire managers to work quickly.

H. R. 1749 would ensure state and federal fire managers may continue to use aircraft to safely and effectively drop water and fire retardants to protect life, property, and the forest. Applying the NPDES permitting process to fire suppression would be redundant with current protections and wildly unrealistic, given the emergency nature of fighting wildfire. Retardant is often dispatched within hours of detecting a wildfire, clearly leaving no time for redundant permits.

Forest Health

The use of pesticides and biological control organisms to combat the spread of invasive exotic species is a high priority for the states. As the protectors of more than 500 million acres of state and private forestland across the country, State Foresters take an active role in detecting, controlling, and eradicating invasive forest pests and pathogens on these lands that comprise the majority of the nation's forests. The safe, scientific, and timely use of pesticides and biological control agents is an important and necessary tool for State Foresters and other forest managers to combat these harmful organisms. When controlling insect and disease outbreaks in forests, it is very often difficult or impossible to treat trees from the ground, due their height and inaccessibility. The aerial application of pesticides is often the best or only method of treatment in many cases.

A good example of successful aerial application in Eastern forests is our effort to control the gypsy moth caterpillar through the aerial application of the organism *Bacillus thuringiensis*, commonly known as "Bt.". This naturally occurring bacterium is a parasite of the caterpillar and is effective only during a short time period during the gypsy moth's life cycle. This forest pest has been a problem in Maryland since the 1980s. The larvae consume vast quantities of foliage, especially from oaks, and weaken the trees, often to the point where they become susceptible to other insects or diseases. The insect can affect major damage both to shade trees in urban areas and other communities and in

forests across the state. The Maryland Forest Service, along with the Maryland DNR's Forest Pest Management Section, works closely with private landowners and other government agencies to initiate an aerial spray program to control gypsy moth in our hardwood forests. Since the advent of the spray program, defoliation by gypsy moth has decreased dramatically. The success of the program is due in large part to our ability to move quickly to guarantee our window of opportunity is not missed. This bill would ensure that we are able to continue to effectively control this and other forest pests.

In many states, herbicides are used to control vegetation and to help young trees grow free from competition from weeds. A common practice is to apply liquid or granular herbicide from a helicopter or small fixed-wing aircraft to vegetation on the ground. The use of technology has enabled forest managers to precisely deliver the herbicide to the ground, while avoiding streams and other bodies of water. Technology such as Global Positioning Systems, high-pressure nozzles, and digital mapping make this precision possible. Operators follow strict guidelines for handling and applying the herbicides, including pesticide application licensing from the state. Each herbicide must be applied according to EPA approved labeling, as defined by the Federal Insecticide, Fungicide, and Rodenticide Act. The current federal and state regulatory procedures are more than sufficient to protect water quality.

Many forest management activities, such as removing insect-infested trees, must be timed carefully so that they coincide with favorable seasonal conditions, or must be conducted on short notice. Requiring a NPDES permit will not leave landowners and forest managers nimble enough and may very well inhibit their ability to effectively time forest management activities or react to changing circumstances on the ground.

A good example of this scenario occurred in my state of Maryland just recently. In 2004, we discovered that a shipment of nursery stock to Maryland was infested with the emerald ash borer, and that the insect had escaped into the surrounding forest. As many of you know, the emerald ash borer, a small wood-boring insect native to Asia, was accidentally introduced into the Detroit metropolitan area, and has since spread into several surrounding states, including Ohio and Indiana. This invasive exotic insect destroys ash trees of several species, whether planted as shade trees in urban areas, or naturally occurring in the forest and elsewhere across the rural landscape.

Our ability to respond quickly to this unfolding crisis was of the utmost importance. The Maryland Forest Service, along with the Forest Pest Management Section of the Maryland Department of Agriculture, worked with a logger and several landowners to quickly remove every single ash tree within a one-half mile radius of the infested site. The cut ash were immediately piled and burned, successfully stopping the spread of this pest to Maryland and potentially other mid-Atlantic states. To date, this is the only known successful emerald ash borer eradication effort in the nation. The time involved in obtaining a NPDES permit, rather than simply following state forestry Best Management Practices, would certainly have resulted in an unsuccessful eradication process. I strongly support doing all we can do to ensure clean water, but the process

must be quick, efficient, and workable. Forestry Best Management Practices meet all three of these criteria.

Conclusion

In closing, I wish to stress a key point of this bill. It does not in any way remove protections for water quality under the Clean Water Act. Rather, it clarifies EPA's long-standing position that certain activities are to be regulated by other mechanisms. In this case, forestry Best Management Practices, the Federal Insecticide, Fungicide, and Rodenticide Act, and federal and state guidelines for fire retardant application are the appropriate mechanisms.

EPA's position has been clear all along. We strongly support EPA's development of a new rule to clarify the NPDES process, but we feel it does not do enough. The Otter-Cardoza bill would remove uncertainty, redundancy, and complexity from the process of protecting clean water. State Foresters believe the current suite of regulatory processes is efficient, effective and workable. More importantly, it has successfully protected our nation's water for nearly three decades.

Thank you for the opportunity to testify today. I would be happy to answer any questions you may have.

Statement of Congressman C.L. "Butch" Otter
Subcommittee on Water Resources and Environment
Committee on Transportation and Infrastructure
H.R. 1749, the "Pest Management and Fire Suppression Flexibility Act"
September 29, 2005

Thank you Mr. Chairman,

While I am no longer a member of the subcommittee, I appreciate you holding this hearing today and working with me on this important piece of legislation. I also want to welcome a fellow Idahoan: Scott Campbell, Chairman of the Water Quality Task Force of the National Water Resources Association, will be testifying today. I am proud to represent Scott here in Congress. I couldn't do my job half as well without the information and ideas I have received from Scott over the years. I hope you all will listen closely and take to heart what he has to say. I also am pleased to be sharing the table with Congressman Cardoza. I appreciate all his help in gaining support for the Pest Management and Fire Suppression Flexibility Act, which currently has 69 members signed on as cosponsors.

H.R. 1749 or the Pest Management and Fire Suppression Flexibility Act codifies the Environmental Protection Agency's rulemaking and longstanding policies regarding the Clean Water Act and pesticide applications, fire suppression and other pest management activities. In so doing, H.R. 1749 reaffirms Congressional intent and the long-held positions of Republican and Democrat administrations.

Congress passed the federal Clean Water Act in the early 1970s in an attempt to better account for and more closely regulate discharges of municipal wastes and pollutants into our nation's waterways from large industrial facilities. More than 30 years later, however, federal courts have expanded the scope of the Clean Water Act far beyond the original intent of Congress. Today, family farmers, mosquito-abatement and pest-control districts, irrigators, rural water districts, federal and state agencies, foresters, pest and lawn-care control operators and many others are subject to unnecessary, bureaucratic permitting requirements and nuisance lawsuits based on misguided interpretation of the Clean Water Act by the 9th U.S. Circuit Court of Appeals.

In the *Talent* decision, the court ruled that persons applying a pesticide according to the federally approved label directly to or above a body of water must first obtain a Clean Water Act permit. The court's viewpoint in *Talent* blatantly disregards the comprehensive pesticide registration process required by the primary federal pesticide statute, the Federal Insecticide, Fungicide and Rodenticide Act. Under FIFRA, the EPA reviews environmental affects and water quality data, and approves specific use directions for pesticides based on the information it has evaluated – a factor the district court in *Talent* relied upon heavily in rejecting the suit. Failing to use a pesticide in accordance with its EPA-approved labeling is a violation of federal and state laws.

It has been the operating approach of EPA that the application of agricultural and other pesticides in accordance with label directions is not subject to Clean Water Act permitting requirements. EPA has never stated in any general policy or guidance that a permit is required for such applications. EPA recently issued rulemaking specifically exempting pesticide applications performed according

to label instructions directly to, above or near bodies of water from Clean Water Act permitting requirements.

While rulemaking is helpful, I fear it will not stop the lawsuits. In my home district, the Gem County Mosquito Abatement District is being sued for not having a Clean Water Act permit before spraying. Yet the EPA refused to grant the county's application for just such a permit. The agency explained to the county that no permit is necessary, but the county now has to use its scarce resources to defend its position in court.

By transferring regulatory primacy over pesticide use from FIFRA to the Clean Water Act, the 9th Circuit has authorized attorneys for activist groups to bully and intimidate farmers, mosquito abatements districts and others into ceasing long and widely practiced activities that have been authorized by – and already are closely overseen by – federal and state governments.

An equally important but less frequently discussed part of the bill involves fire suppression. It aims to protect state and federal firefighters from nuisance litigation by reaffirming that the use of fire retardants by or in conjunction with federal and state firefighting agencies is not subject to NPDES permitting requirements. This provision was necessitated by the 9th Circuit's *Forsgren* decision. In that case, the court misinterpreted a long-standing EPA rule clearly stating that fire control activities do not require an NPDES permit.

My district is home to the National Interagency Fire Center, the country's support center for wildland firefighting. NIFC is comprised of seven federal and state agencies that work together to coordinate and support wildland firefighting and disaster operations. In developing H.R. 1749, I learned that activist groups had threatened to file a Clean Water Act lawsuit against the U.S. Forest Service for its use of fire retardants in Montana. Idaho, Montana and many other western states are very vulnerable to dangerous, destructive and potentially deadly wildfires, and I feel strongly that redundant red tape and mischievous litigation should not delay efforts to combats these outbreaks.

Moreover, the use of fire retardants already is heavily regulated. Before approving any fire retardant for use, the Forest Service conducts an intensive, two-year procedure that includes testing the product for aquatic toxicity. In addition, the Forest Service and Bureau of Land Management require a 300-foot buffer zone for use of fire retardants near aquatic environments.

The court's misinterpretations give license to activist groups to intimidate farmers, federal and state agencies and mosquito abatement districts into discontinuing well established, expressly approved and heavily regulated activities. H.R. 1749 provides needed protection against such costly and needless lawsuits.

Thank you again for conducting today's hearing, and I look forward to working with the committee to pass this bill into law.

○