

# Pesticides and You

News from Beyond Pesticides: Protecting Health and the Environment with Science, Policy & Action

Volume 33, Number 2

Summer 2013

## Why You Need to Listen to This Man

Even though the chemical industry and EPA want him silenced

Also in this issue:

**Health Effects of 30 Commonly Used Lawn Pesticides**

**Pesticides in My Drinking Water?**

### Special Report:

**Landmark Ordinance Passes in Maryland City**



## Independent Science Informs Landmark Citywide Pesticide Phaseout

This issue is about frogs and two mothers, including a piece about unfathomably destructive pesticide contamination juxtaposed with a success story—a story about a landmark local ordinance and about independent science informing local action.

### Landmark Ordinance Protects City

Successful adoption of sustainable practices are born of an understanding that pesticides used in our homes and communities are harmful. The work of two women in the small city of Takoma Park, Maryland, just outside Washington, DC, to stop most turf and landscape pesticide use on *public and private* land was informed by their knowledge of independent research—scientists like Tyrone Hayes, Ph.D., a biologist and professor at the University of California Berkeley who identified endocrine disruption, and developmental and reproductive failures associated with legal use of pesticides.

Armed with science and a critique of federal and state regulatory deficiencies, Julie Taddeo and Catherine Cummings did what no others have done in the U.S. They worked with their City Council to exercise the city's democratic right to adopt a community ordinance, which they call a "Safe Grow Zone," to curtail *all* landscape pesticide use. Communities are increasingly adopting policies like this for public lands. However, Maryland is one of seven states that does not restrict (preempt) local authority to regulate pesticide use within their political subdivisions. As Julie and Catherine explained the threat that pesticides pose to their children, and the health of their environment, Council members understood that their proposal was no different from other environmental and neighborhood stewardship laws, including restrictions on littering, recycling, noise, picking up after pets, and smoking. These ordinances all act on values associated with living in the community where clean air and water are shared resources. A year earlier the District of Columbia adopted more limited restrictions on public and private land that includes schools and day care centers and land contiguous to waterways.

### Getting to the Scientific Truth

The Safe Grow Zone ordinance prohibits the use of endocrine disrupting landscape pesticides identified by the European Commission. Note that the U.S. Environmental Protection Agency has never complied with a 1996 law that requires it to restrict endocrine disrupting pesticides. But, the debate on endocrine disruptors rages in large part because of the work of Dr. Hayes. He has shown us through his primary research that low level toxic chemical exposure is a meaningful dose, even if below legal limits. Mixtures of pesticides, a daily occurrence, can cause extraordinary hazards. While Dr. Hayes' findings are associated with his research with frogs, in his talk to Beyond Pesticides' 31st National Pesticide Forum this spring (check it out on our website), he cites the data in fish, birds, reptiles, and mammals, including humans, that show developmental, reproductive, and cancer effects associated with pesticide exposure.

Dr. Hayes points out that pesticide-induced damage to the thymus,

or to the immune system, causes a susceptibility to parasites that leads to reduced kidney and liver function, resulting in an organism's demise. Dr. Hayes says, "By damaging the kidney and the liver, you're effectively increasing the pesticide load because now you've damaged the organs that are supposed to metabolize and get rid of the pesticide." Given the subtleties of effects, without both Dr. Hayes' lab and field data, as he says, you would never guess why frog populations are disappearing in dramatic numbers. Dr. Hayes links the endocrine disruptor and herbicide atrazine to aromatase production in the body, which increases the production of estrogen, which causes cancer cells to divide. As he points out, while Novartis joined with AstraZeneca in 2000 to form Syngenta (the manufacturer of atrazine), it left Novartis Oncology to produce letrozole, the chemical that knocks out aromatase and decreases estrogen as a breast cancer treatment. "The same company that gives us 80 million pounds of an aromatase inducer that promotes breast cancer in rats and that's associated with breast cancer in humans now gives us letrozole to knock out aromatase, to basically, I would argue, undo what it did," says Dr. Hayes.

### Raising Funds for Independent Science

We need independent science to understand the toxicology, to influence state and local decision makers to act because of industry-dominated regulatory decisions that assume the necessity of toxic materials, driven by companies with an economic interest. Building systems that are not reliant on toxic inputs requires continual understanding of the destructive capacity of toxic materials in commerce and the sustainable practices that can replace them in the marketplace.

Dr. Hayes has been subjected to an orchestrated chemical industry attack, according to an investigative report on court documents in a case filed by Holiday Shores Sanitary District (Edwardsville, IL) and joined by more than 1,000 water utilities covering six states. The utilities, seeking to recover costs associated with testing, monitoring and filtering atrazine-contaminated water, settled for \$105 million last year. But, the attack on Dr. Hayes continues and his independent research funds are threatened.

To help raise the \$150,000 that Dr. Hayes needs, at a minimum, to keep his lab operating, we are starting the *Fund for Independent Science*. We ask you to consider making a pledge to the Fund. If the Fund is able to generate \$150,000 in pledges, we will then circle back

to collect your contribution. As the Fund grows, we will support other independent scientific research to inform greater growth of the sustainable sector. Please go to [www.beyondpesticides.org/fundscience](http://www.beyondpesticides.org/fundscience) to make your pledge. Thank you!



*Jay Feldman is executive director of Beyond Pesticides.*

# Contents



page 9

## 2 Mail

Diagnosing "FIFRA Shock;" Community Tick Control; Pressing On

## 4 Washington, DC

EPA's Phase-Out of Sulfuryl Fluoride Under Attack on Capitol Hill; Proposed Chemical Law Draws Criticism with Preemption Provision; Pollinator Protection Provision Passes House, Bill Introduced; Litigation Elicits Monsanto Promise Not to Sue for GE Contamination

## 6 Around the Country

Bill Seeks to Curb Fertilizer Runoff in Ohio; CT Curbs Pesticides to Save Lobsters; Goats Replace Herbicides at Historic Washington, DC Landmark; Frogs in Remote California Regions Contaminated with Pesticides; Hawaiians Fight Back Against Pesticide Manufacturing Giants; 50,000 Bees Dead After Neonicotinoid Pesticide Use in Oregon

## 9 Landmark Ordinance Passes in MD City

New law restricts cosmetic lawn pesticides on private property

## 12 Health Effects of 30 Commonly Used Lawn Pesticides

## 13 Why You Need to Listen to This Man Protecting Life: From Research to Regulation

Disappearance of frogs, human health effects linked to pesticide use

## 19 Pesticides in My Drinking Water?

Individual precautionary measures and community action

**Pesticides and You** © 2013 (ISSN 0896-7253) is published 4 times a year by Beyond Pesticides. Beyond Pesticides, founded in 1981 as the National Coalition Against the Misuse of Pesticides (NCAMP), is a voice for health and the environment, promoting protection from pesticides and safe alternatives; donations are tax-deductible.

### National Headquarters:

701 E Street, SE  
Washington DC 20003  
ph: 202-543-5450 fx: 202-543-4791  
email: info@beyondpesticides.org  
website: www.beyondpesticides.org

Articles in this newsletter may be reproduced without Beyond Pesticides' permission unless otherwise noted. Please credit Beyond Pesticides for reproduced material.

### BEYOND PESTICIDES STAFF

**Jay Feldman**, Executive Director  
**Nichelle Harriott**, Staff Scientist  
**Stephanie Davio**, Project Director/Forum Coordinator  
**Drew Toher**, Public Education Associate  
**Xoco Shinbrot**, Program Associate  
**Matt Wallach**, IPM and Health Care Facility Project Director  
**Terry Shistar**, PhD, Science Consultant  
**Matt Porter**, Fellow

### PESTICIDES AND YOU

**Jay Feldman**, Publisher, Editor  
**Stephanie Davio**, **Jay Feldman**, **Nichelle Harriott**, **Tyrone Hayes, PhD.**, **Matt Porter**, **Xoco Shinbrot**, **Drew Toher**, Contributors  
**Stephanie Davio**, Layout

### BOARD OF DIRECTORS

**Routt Reigart, M.D.**, president, Medical University of South Carolina, Charleston, SC  
**Lani Malmberg**, vice-president, Ewe4ic Ecological Services, Cheyenne, WY  
**Terry Shistar, PhD**, secretary, Lawrence, KS  
**Caroline Cox**, treasurer, Center for Environmental Health, Oakland, CA  
**Chip Osborne**, at-large, Osborne Organics, Marblehead, MA  
**Nelson Carrasquillo**, The Farmworkers Support Committee (CATA), Glassboro, NJ  
**Paula Dinerstein**, Public Employees for Environmental Responsibility, Washington, DC  
**Lorna Donaldson**, Donaldson Family Farm, Tiptonville, TN  
**Jay Feldman**, Beyond Pesticides, Washington, DC  
**Warren Porter, PhD**, University of Wisconsin, Madison, WI  
**Brett Ramey**, University of Kansas Medical Center Department of Family Medicine, Ioway Reservation, White Cloud, KS  
**Robina Suwol**, California Safe Schools, Van Nuys, CA  
**Andrea Kidd Taylor, DrPH**, Morgan State University, Baltimore, MD

*Affiliations shown for informational purposes only.*

## Diagnosing “FIFRA Shock”

*Beyond Pesticides,*

*I made –what I now realize after reading your website– a huge mistake in purchasing a lawn care pesticide from the hardware store last week. After learning about the negative effects of the active ingredient, what struck me most was that 90% of the product was made from “inert” ingredients. I called the manufacturer to find out what this meant, but was given the run-around and ultimately told that they couldn’t tell me because it was a “trade secret.” Can you tell me what’s going on?*

*–Chuck T.*

Hi Chuck,

It seems like what you’re going through is a term the staff here calls “FIFRA Shock.” This occurs when folks learn about one or more of the unprotective standards in our national pesticide law, the *Federal Insecticide Fungicide and Rodenticide Act*. The fact is that pesticide manufacturers are not required to disclose any information about the “inert” ingredients in their products. The industry argues that if this information was released, their products could be duplicated. However, despite their name, these ingredients are neither chemically, biologically or toxicologically inert; in fact, they can be just as toxic as the active ingredient. In general, inert ingredients are minimally evaluated, even though many are known to state, federal and international agencies to be hazardous to human health.

For example, the U.S. government lists creosols as a “Hazardous Waste” under Superfund regulations, yet allows these chemicals to be listed as inert ingredients in pesticide products. Creosols are known to produce skin and eye irritations, burns, inflammation, blindness, pneumonia, pancreatitis, central nervous system depression and kidney failure.

The good news is Beyond Pesticides has been working toward complete disclosure of inert ingredients, and EPA

has responded favorably to our petitions. Additionally, certain manufacturers, such as S.C. Johnson, have announced plans to disclose all ingredients in its products. We encourage you to contact EPA and manufacturers and tell them you deserve the right to full disclosure of all the chemicals in the products you purchase.

This will help eliminate many instances of “FIFRA Shock,” but there are numerous other issues that need to be tackled –including tests on pesticide mixtures, issues with low-dose exposures to endocrine disrupting chemicals, better accounting for sensitive populations, and EPA’s tendency to allow for the continued use of a banned pesticide during a “phase out” period despite agency conclusions that the chemical poses an imminent threat to human or environmental health. I hope this empowers you to take action and get more involved.

*–Beyond Pesticides*

## Community Tick Control

*Beyond Pesticides,*

*I am on my church’s Green Team and just learned that our Building and Grounds Committee hired an extermination company to spray insecticides for ticks. I would be grateful if anyone else out there has found “alternative approaches” to control for ticks, which I think is the main concern. Our chapel is surrounded by meadows and woods, and there is rampant Lyme disease out here, represented well in our congregation.*

*–Gina F.*



*Most pesticide products contain “inert” ingredients that manufacturers are not required by EPA to disclose.*

Hi Gina,

We’d be happy to help you and your church’s efforts to fight ticks through least-toxic means. While Lyme disease, carried by ticks, is a serious public health threat, harmful chemicals are neither required nor effective management tools. For example, a two year study conducted by the Centers for Disease Control in certain Maryland localities tested the efficacy of using the synthetic pyrethroid insecticide bifenthrin to kill ticks and control Lyme disease. (As a human testing study, Beyond Pesticides objected to this because participants were not given adequate warning.) In the study, some people’s lawn’s received the pesticide treatment while others were merely sprayed with water. Results showed that while there was a recorded drop in the number of ticks found on pesticide-treated lawns, there was a negligible difference between the two in both the numbers of ticks that volunteers reported on their

bodies and the number of Lyme disease cases reported. This example helps show that the focus of stopping tick-borne diseases should be prevention.

Prevention includes wearing long-sleeved, light-colored clothing that can be worn tight at your wrists, neck, and ankles. This makes ticks easier to spot, and more difficult for them to find a place to bite. It is critically important to do a full-body “tick check” whenever you leave a tick-infested area.

Nymph ticks prefer to feed first on white-footed mice, a notorious transmitter and reservoir of the bacterium, so discouraging mice can help prevent the spread of Lyme disease. Remove any area that might provide shelter for mice, such as piles of wood, leaves or other debris.

A good way to reduce tick population numbers without pesticides is to employ carbon dioxide traps. You can find information on how to create one of these traps on Beyond Pesticides tick prevention factsheet ([bit.ly/controlticks](http://bit.ly/controlticks)) However, as

noted above, the overall number of ticks in a yard doesn’t seem to make an impact on the prevalence of Lyme disease.

-Beyond Pesticides

### Pressing On

*Dear Beyond Pesticides,  
Thank you for your note and all of the pertinent info included in the links you send me. So far I have had one victory - My Home Owners Association (HOA) agreed to switch from synthetic fertilizer to organic fertilizer in the common areas. My HOA has also given me newsletter space to write my “A Healthier Neighborhood” articles every other month. So, because of the information (and encouragement) that you sent, I will systematically work through the politics and hopefully see some change. Our city is going to have a tough time ignoring me.*

-Christie M.

Christie,  
That is wonderful! Glad to hear that you’re pressing on! Feel free to come to us

### Share With Us!

Beyond Pesticides welcomes your questions, comments or concerns. Have something you’d like to share or ask us? We’d like to know! If we think something might be particularly useful for others, we will print your comments in this section. Mail will be edited for length and clarity, and we will not publish your contact information. There are many ways you can contact us: Send us an email at [info@beyondpesticides.org](mailto:info@beyondpesticides.org); give us a call at 202-543-5450, or simply send questions and comments to: 701 E Street SE, Washington, DC 20003.

with any questions you have as you work through your local politics. We have a number of resources including additional factsheets, model policies, and strategies to help you continue on with your efforts. Thank you for your work to protect the environment and human health.

### From the Web

*Beyond Pesticides’ Daily News Blog features a post each weekday on the health and environmental hazards of pesticides, pesticide regulation and policy, pesticide alternatives and cutting-edge science, [www.beyondpesticides.org/daily news blog](http://www.beyondpesticides.org/daily-news-blog). Want to get in on the conversation? Become a “fan” by “liking” us on Facebook! [www.facebook.com/beyondpesticides](http://www.facebook.com/beyondpesticides).*

#### Cosmetic Lawn Pesticide Use Outlawed in Takoma Park, MD, First Local Ban of Its Type in U.S.

*Excerpt from Beyond Pesticides original blog post (7/25/13) The Safe Grow Act of 2013 unanimously passed, which generally restricts the use of cosmetic lawn pesticides on both private and public property throughout the Maryland city.*

#### Melanie H. Comments:

“Fantastic! I’ve just moved back to the family farm, in the middle of a small farming community and am trying to reverse the 99 years of agricultural chemical use on our 40 acres. I have found that hand soap, when applied undiluted directly to the dandelions works. Otherwise, I dig out the roots. Presently we rent the cropland out, but are moving toward farming it ourselves and eventually being certified as organic. Thanks for the good news!”

#### Twenty-Three Groups Tell EPA to Reject More Glyphosate in Our Food

*Excerpt from Beyond Pesticides original blog post (7/1/2013): EPA is poised to raise the allowable limits of the herbicide glyphosate (Roundup) in certain food commodities like carrots, sweet potato, and mustard seeds.*

#### Christie M. Comments:

“Please limit the use of Roundup. It’s contaminating the planet! It is found in our urine, and damaging our bodies, the animals we eat, and our pet’s health. We need to get back to organic practices so we can clean up the planet for our children. Less, not more!”

## EPA's Phase-Out of Sulfuryl Fluoride Under Attack on Capitol Hill

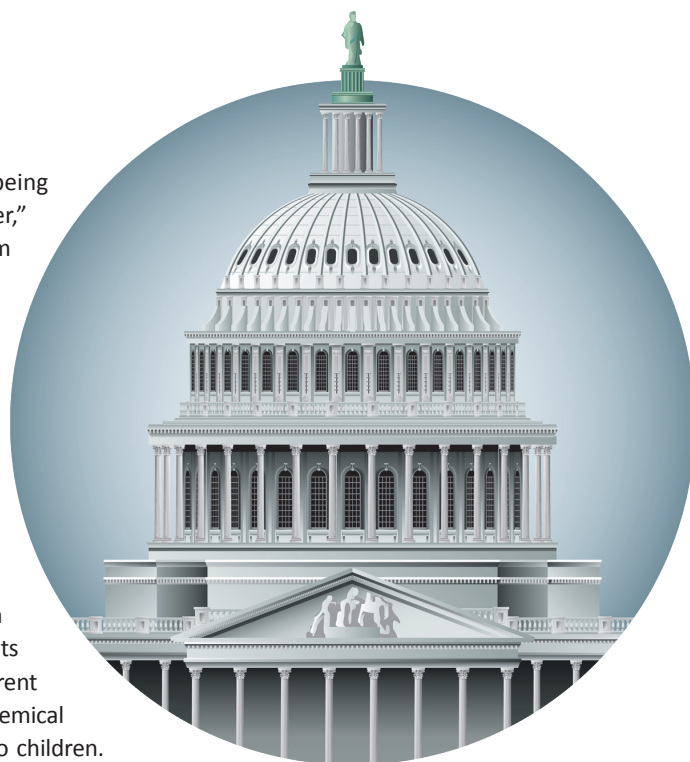
The House of Representatives Appropriations Interior and Environmental Subcommittee voted 7-4 on July 23 to approve an appropriations bill that would cut the budget of the U.S. Environmental Protection Agency (EPA) by nearly a third, and prevent the agency from enforcing its decision to phase out the use of the neurotoxic fumigant sulfuryl fluoride in our food.

While at press time the Senate had not acted, and observers thought a continuing resolution to keep programs funded was the most likely path forwards, the House language is instructive. The proposed cut arrived less than one week after the Senate confirmed Gina McCarthy as the new EPA Administrator. According to *Politico*, top subcommittee Democrat Jim Moran of Virginia stormed out of the markup, calling the bill a "disgrace." He estimates that the bill contains 31 "special interest earmarks," including 13 "brand-new" riders. Nine riders protect the grazing indus-

try, six "limit the EPA from being able to provide clean water," and four "prevent EPA from implementing clean air regulations." Rep. Moran said he was blindsided by the language prohibiting EPA from changing its regulations on the pesticide sulfuryl fluoride.

This is an attempt by the industry to circumvent a basic risk assessment calculation that EPA acknowledges puts the public at risk, given current exposure patterns, to a chemical that is especially hazardous to children.

This section will prohibit EPA from fulfilling its decision to phase-out sulfuryl fluoride food-related uses. In response to this, Beyond Pesticides, Environmental Working Group, Fluoride Action Network, and 22 groups submitted a letter to the House Ap-



propriation Committee Chairman and Ranking members urging them to strike section 449 from the *House Fiscal Year 2014 Interior and Environment Appropriations Act*.

## Proposed Chemical Law Draws Criticism with Preemption Provision

Nine state Attorneys General sent a letter to the Senate Environment and Public Works Committee in late July expressing their "deep concerns about unduly broad preemption language proposed in S.1009, the *Chemical Safety Improvement Act* [CSIA]." CSIA would amend the decades old (1976) U.S. chemical law, the *Toxic Substances Control Act* (TSCA), which in its current form requires no testing on chemicals (it does not cover pesticides) before they make their way onto the market. Manufacturers are only required to provide the U.S. Environmental Protection Agency (EPA) with 90 days premarket notification before a new chemical is introduced for public consumption. Even after entering the market, the testing and regulation thresholds for these chemicals are grossly inadequate. In the 37 years that TSCA has been in effect, only 200 of the 85,000 industrial chemicals have been tested or regulated.

The proposed law would prohibit judicial review of EPA's designation of a chemical as "high" or "low priority." In addition, states would be unable to both challenge EPA's designation of a chemical in court, and adopt and enforce new more stringent laws regulating these chemicals. And, CSIA would prevent states from regulating chemicals months or even years before a single protective federal regulation becomes effective, leaving a continuing safety gap, and exposing human health and the environment to harmful and untested effects.

Under current TSCA provisions, after EPA has regulated a chemical, states may adopt more protective laws or enforce existing laws regulating the same chemical without a waiver in many cases. The proposed legislation would eliminate many waiver-free regulatory paths for states – for example, by preventing states from banning any chemical that EPA has already regulated. And, if states were to seek a waiver to allow them to enact regulations stricter than those imposed by EPA, under the new law they would be required to certify a "compelling local interest," a phrase that state Attorneys General criticize as unclear and creating a possible barrier to state action. CSIA endangers the ability of states to enforce these laws, the Attorneys General letter says, explaining that, "Reforms that come at the cost of sweeping preemption of state authority –as in S.1009– do not advance the protection of our citizens' health and the environment.

## Pollinator Protection Provision Passes House; Bill Introduced

A provision by U.S. Representative Alcee Hasting, entitled the “Pollinator Protection Provision,” passed in the most recent House Farm Bill H.R. 2642. The provision will greatly improve federal coordination in addressing the dramatic decline of managed and native pollinators as well as direct the government to regularly monitor and report on their health. In addition to the provision, Representatives John Conyers (D-MI) and Earl Blumenauer (D-OR) introduced H.R. 2692, the *Save America’s Pollinators Act*, July 16, which would suspend the use of neonicotinoid pesticides until a full review of scientific evidence and a field study demonstrates no harmful impacts to pollinators. The systemic residues of these pesticides not only contaminate pollen, nectar, and the wider environment, but have repeatedly been identified as highly toxic to honey bees.

According to Rep. John Conyers, Jr. (D-Mich): “Scientists have reported that common symptoms of this decline are attributed to the use of a class of insecticides known as neonicotinoids. The ‘Saving America’s Pollinators Act’ will address this threat to honey bee populations by suspending the use of certain neonicotinoids and by requiring the EPA to conduct a full review of the scientific evidence before allowing the entry of other neonicotinoids into the market.”

The Act, which Beyond Pesticides helped to draft, will direct the Administrator of the Environmental Protection Agency (EPA) to suspend the registration of certain neonicotinoids –including imidacloprid, clothianidin, thiamethoxam, dinotafuran– and any other members of the nitro group of neonicotinoid insecticides until the EPA determines that they will not cause unreasonable adverse effects on pollinators based on an evaluation of peer-review scientific evidence and a completed field study. The bill will also require the Secretary of the Interior, in coordination with the EPA Administrator, to regularly monitor the health and population status of native bees and identify the scope and likely causes of unusual native bee mortality.



## Litigation Elicits Monsanto Promise Not to Sue for GE Contamination

A three-judge panel of the Court of Appeals for the Federal Circuit ruled June 10 that a group of organic and otherwise non-GE farmer and seed company plaintiffs are not entitled to bring a lawsuit to protect themselves from Monsanto’s transgenic seed patents after Monsanto made binding assurances that it will not take legal action against growers whose crops might inadvertently be contaminated with traces of Monsanto biotech genes.

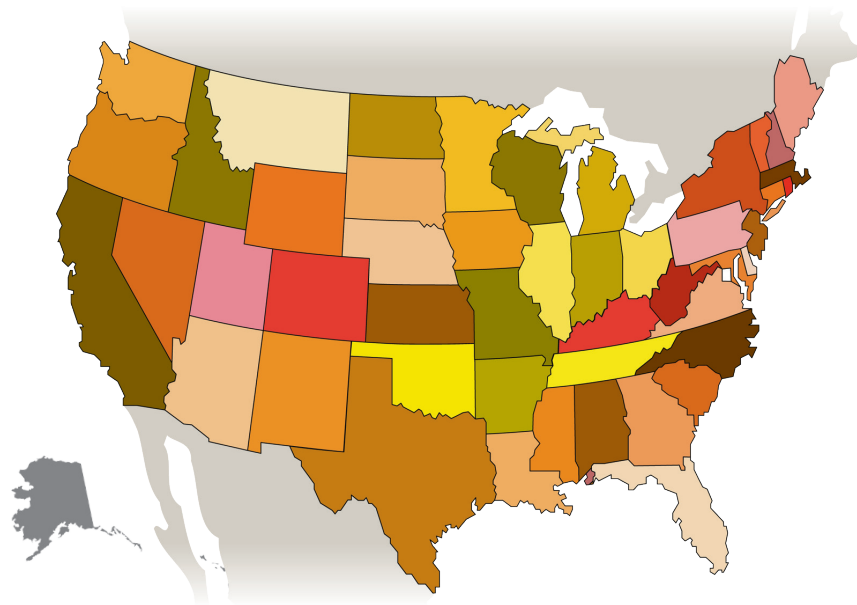
Organic and non-GE farms are contaminated when pollen or seed migrate from neighboring GE farms. Even though wind or insect transfer of pollen is a natural process, Monsanto has been suing farmers for infringing on its patents if contamination is found on their farms. In March 2011, a group of family farmers, seed

businesses and organic agricultural organizations sued Monsanto to challenge the chemical company’s patents on GE seed. The plaintiffs were forced to sue preemptively to protect themselves from being accused of patent infringement should their crop ever become contaminated by Monsanto’s GE seed. The case, *Organic Seed Growers and Trade Association et al v. Monsanto*, was dismissed in 2012 and an appeal was filed soon thereafter. However, the recent June 2013 ruling affirmed the previous court’s 2012 decision, which was informed by Monsanto’s commitment that it would not sue farmers with “trace amounts” of contamination of crops containing its patented genes.

Plaintiffs’ attorney, Dan Ravicher of the Public Patent Foundation (PUBPAT), views

the decision as a partial victory. “Before this suit, the organic seed plaintiffs were forced to take expensive precautions and avoid full use of their land in order to not be falsely accused of patent infringement by Monsanto,” said Mr. Ravicher.

“Even though we’re disappointed with the Court’s ruling not to hear our case, we’re encouraged by the court’s determination that Monsanto does not have the right to sue farmers for trace contamination,” said Maine organic seed farmer Jim Gerritsen, president of lead plaintiff Organic Seed Growers and Trade Association. “However, the farmers went to court seeking justice not only about contamination, but also the larger question of the validity of Monsanto’s patents. Justice has not been served.”



## CT Curbs Pesticides to Save Lobsters

After years of lobster decline, a new law in Connecticut seeks to protect and revive the crustacean population by banning the use of toxic mosquito pesticides in coastal areas. With the support of Connecticut's remaining lobstermen, Governor Dannel Malloy June 21 signed into law House Bill 6441, which bans two chemicals, methoprene and resmethrin. Declines in the sound's lobster population have been alarmingly common for the past 15 years, devastating fishermen and the local economy that depends on them. The pesticides have long been suspected in killing off the lobsters, however, last summer it was officially linked when those chemicals were detected in lobster tissue. Connecticut legislators say that they were convinced to ban the two mosquito pesticides after learning that Rhode Island and Massachusetts had enacted similar bans with successful results.

"The fisheries of Long Island Sound have been devastated by this lobster die-off, which has been terrible for our local economy and all the families that relied on this industry," State Senator Bob Duff (D-Norwalk, Darien) said in a statement. "We should be doing everything we can to reverse the trend and bring the lobster population back to a healthy level. I am confident that spraying fewer pesticides in coastal areas will help accomplish that."

A pilot program will be set up in September that will prohibit the use of methoprene or resmethrin in any storm drain or water system within the coastal boundary. Though the law was met with resistance by some who worry about the increased risk of West Nile Virus (WNV) and Eastern Equine Encephalitis (EEE), it explicitly allows the use of the chemicals if there is a documented case of WNV in a community with a population of over one hundred thousand residents, or per the recommendations of state environment and health officials.

## Bill Seeks to Curb Fertilizer Runoff in Ohio

A bill recently introduced in the Ohio State Senate would grant state agencies new regulatory powers intended to stunt the spread of toxic blue green algae in Lake Erie. Senate Bill 150, introduced by Republican State Senator Cliff Hite, will empower the Ohio Department of Natural Resources (ODNR) and Ohio Department of Agriculture (ODA) to require reductions in the amount of fertilizer runoff that is produced by farms. Currently the state lacks authority to limit commercial fertilizer runoff. Swift action is needed as blue green algae blooms, which feed off phosphorus in fertilizer runoff, have increased dramatically in Lake Erie since the mid-1990's.

The proposed legislation would provide ODNR the authority to cite farmers who allow fertilizers to runoff their field. Under the proposed bill, the Chief of ODNR would issue orders to farmers to comply with technical standards, to be created by ODNR, that "achieve a level of management and conservation practices that will...abate the degradations of the waters of the state by soil amendments." Under this legislation, farmers will have to undergo training and receive a certificate from ODA to apply fertilizers and manure. "Farmers would apply for a fertilizer certificate in the same way they obtain pesticide certificates," Erica Hawkins, an ODA spokeswoman, told the Columbus Dispatch.

The bill, however has several limitations. Importantly, the bill would not require any new permits or certifications for animal feeding facilities. Confined Animal Feeding Operations (CAFOs) produce 133 million tons of manure per year (on a dry weight basis) representing 13-fold more solid waste than human sanitary waste production. In the absence of overarching federal regulations, states are acting unilaterally to address their phosphorus problems. Twelve states, including Illinois, Maine, Maryland, Michigan, Minnesota, New Jersey, New York, Vermont, Virginia, Washington, Wisconsin and Florida (which only requires select counties to participate), enacted laws within the last five years that restrict the residential and commercial use and sale of phosphorus-containing fertilizers.



## Goats Replace Herbicides at Historic Washington, DC Landmark

Over 100 goats have been tasked with controlling poison ivy, ground cover, vines and other invasive weeds at the Congressional Cemetery in Washington, DC in early August. The Association for the Preservation of the Historic Congressional Cemetery partnered with a local company, Eco-Goats, to control the invasive plants that threaten large mature trees, which can fall and damage headstones. In addition to their weed-managing services, the goats provide free fertilizer, aerate the soil with their hooves, and eliminate the need for chemicals. The goats, penned outside of the burial area of nearly 200 members of Congress, J. Edgar Hoover, and other notable Washingtonians, grazed 24 hours a day for about six days to control weeds along the perimeter of the cemetery.

Paul Williams, president of the Association, explained at a press event that the goats are being used as an eco-friendly and cost-efficient alternative to machines or pesticides, considering the cemetery rests on the banks of the Anacostia River. Brian Knox, president of Sustainable Resource Management, Inc. and the supervising forester for Eco-Goats, explained at the press event that goats act as broad-spectrum weed killers; they will eat everything. In fact, goats prefer the leafy weeds to grasses, and are more environmentally sustainable than using harmful pesticides. They are notorious for eating poisonous plants, such as poison ivy and poison oak, and can handle them without getting sick.

Though this is the first time goats will be used in Washington, DC to control weeds, they have been used along a creek bed in the DC suburbs, and are increasingly used nationwide. Across the country, communities have discovered that grazing goats is a great option for land that suffers from unwanted plants, low organic matter, and soil compaction.



*A child watches the goats at the Congressional Cemetery in Washington, D.C. The goats drew many visitors from around the community, a spectacle that could not happen if chemical controls had been employed.*

## Frogs in Remote California Regions Contaminated with Pesticides

A new study finds that pesticide contamination from agricultural drift is rampant in Pacific Tree frogs in remote mountain areas, including national parks. Researchers collected Pacific Chorus frogs, as well as water and sediment samples, from seven ponds ranging from Lassen Volcanic National Park at the northern most location of California's Central Valley to the Giant Sequoia National Monument. The samples were tested for 98 types of pesticides, traces of which were found in frog tissues from all sites.

Two fungicides, pyraclostrobin and tebuconazole, and one herbicide, simazine, were the most frequently detected compounds. This was the first time these compounds have ever been reported in wild

frog tissues. Another commonly detected pesticide found by researchers was DDE, a breakdown product of DDT, which is a highly persistent pesticide that was generally banned in 1972.

According to the study, chemical concentrations are often higher in the frog tissue than the environment. This happens as frogs store up small exposures over time, allowing pesticides to bioaccumulate in their bodies. Exposure to pesticides can decrease frog's immune system and increase their risk of disease. Continual pesticide exposure has led to dramatic declines in amphibian populations. Amphibians are considered the most threatened and rapidly declining vertebrate group,

with more than a third of all amphibians listed in the International Union for Conservation of Nature and Natural Resources (IUCN) "Red List" of threatened species.

The environmental prevalence and effects of pesticides, particularly of newer fungicides, on wildlife and ecosystems are poorly understood. According to Kelly Smalling, lead study author, "Very few studies have considered the environmental occurrence of pesticides, particularly fungicides which can be transported beyond farmland." The study, "Accumulation of pesticides in Pacific chorus frogs (*Pseudacris regilla*) from California's Sierra Nevada Mountains, USA" was published in *Environmental Toxicology and Chemistry*.

## Hawaiians Fight Back Against Pesticide Manufacturing Giants

In the absence of federal and state action, local communities are rising up to confront the agrichemical giants Monsanto, Dow, BASF, DuPont Pioneer, and Syngenta. These companies are using the Hawaiian Islands as their private testing grounds for experimental pesticides and genetically engineered (GE) crops, but they don't want residents to know where these fields are and what chemicals they are spraying on them. Residents don't think they have that right. Federal and state governments have, in effect, sanctioned these practices and provided cover for these corporations to spray tons of restricted use pesticides across the islands (18 tons annually— and that's just on the island of Kauai).

In an effort to affirm local authority to protect its residents, two Hawaiian counties, Kauai and the "Big Island" of Hawaii, have introduced legislation to restrict these practices.

Kauai County Councilmen Gary Hooser and Tim Bynum introduced County Bill 2491, which will provide long overdue protections from some of the most egregious chemical intrusions occurring on the island:

- (1) Commercial pesticide applications would require a 500 ft buffer zone near schools, hospitals, residential areas, public roadways and sensitive ecological sites, such as streams, rivers and shorelines;
- (2) The testing of experimental pesticides would be restricted only to greenhouses and other contained structures;
- (3) A moratorium would be placed on the planting of new GE crops on the island, so that an Environmental Impact Statement (EIS) could be performed to properly assess health and environmental effects;
- (4) All pesticide applications and GE crops would be subject to mandatory disclosure to the county; and,
- (5) The use of any pesticides by these

corporations would require prior notification through the public posting of signs.

Meanwhile, the "Big Island" of Hawaii County has also moved toward legislation. Bill 79, introduced by Councilwoman Margaret Wille, will prohibit the planting of any GE crops that are not already grown on the island. Currently, only GE papaya is grown on the Big Island. This bill will prevent the introduction of new, experimental GE crops from being planted.

While Bill 79 is a preventive measure for Hawaii County, the Kauai County government is being forced to work backwards, as these experimental GE crops are already being planted on that island. Despite federal government requirements that these new GE crops undergo an EIS, the residents of Kauai have not been afforded this simple protection.

## 50,000 Bees Dead After Neonicotinoid Pesticide Use in Oregon

Just a few days before National Pollinator Week commenced on June 18, an estimated 50,000 bumblebees, likely representing over 300 colonies, were found dead or dying in a shopping mall parking lot in Wilsonville, Oregon. Authorities confirmed that the massive bee die-off was caused by the use of a neonicotinoid pesticide, dinotefuran, on nearby trees. Just a week later, it was reported that thousands of additional bees were found dead after a similar pesticide use in the neighboring town of Hillsboro.

This is the largest known incident of bumblebee deaths ever recorded in the country. Bumblebees, which are crucial to pollination of multiple berry and seed crops grown in the Willamette Valley, have recently experienced dramatic population declines, a fate that is similar to other pollinators. Dan Hilburn, director of plant programs at the Oregon Department of Agriculture (ODA), told *Oregon Live* that he's "never encountered anything quite like it in 30 years in the business."

ODA investigators learned that Safari, a pesticide product with the active ingredient dinotefuran, had been applied on Saturday, June 15 to control aphids. Dinotefuran is a neonicotinoid pesticide that is highly toxic to bees. The product's label strictly forbids its use if bees are in the area. Scott Black, executive director of the Xerces Society, noted that the pesticide was applied to the tree while it was flowering, an action that violates the product's instructions. Mr. Black said, "Beyond the fact that a pesticide was applied to plants while they were attracting large numbers of bees, in this case the pesticide was applied for purely cosmetic reasons. There was no threat to human health or the protection of farm crops that even factored into this decision."



*Rich Hatfield of the Xerces Society took this photo at the site of the massive bee die-off in Wilsonville, OR.*

# Landmark Ordinance Passes in MD City

## New law restricts cosmetic lawn pesticides on private property



In a sweeping victory for the protection of human health and the environment, the Takoma Park, Maryland City Council on July 22, 2013 unanimously passed the *Safe Grow Act of 2013*, which generally restricts the use of cosmetic lawn pesticides on both private and public property throughout the Maryland city of 16,700 residents.

This is the first time that a local jurisdiction of this size has used its authority to restrict pesticide use broadly on private property, exercising its responsibility to protect the health and welfare of its residents through its local government action. This landmark legislation stops involuntary poisoning and non-target contamination

from pesticide drift and volatility that occurs as these toxic chemicals move off of treated private yards. The new law fits into the city's strategic plan to lead community efforts in environmental sustainability, protection and restoration, and secures Takoma Park's role as a leader in sustainability in the state of Maryland and the nation. The action in Takoma Park brings to the U.S. an approach to outlawing cosmetic pesticide use on lawns and landscapes that has been in place in Canadian provinces for many years.

The ordinance in Takoma Park was drafted by residents and Beyond Pesticides' supporters Julie Taddeo and Catherine Cummings, who both recognized a need to reduce pesticide use in their community

### Can I Pass a Similar Law in My Neighborhood?

Maybe. If you are in one of the seven states, as Maryland is, that does not explicitly prohibit the adoption of local pesticide legislation, you can. In sixteen states, a community may petition or appeal to a state administrative authority to seek local restrictions. Jurisdictions in Illinois with a population over two million are granted local authority. The role of local government in imposing pesticide use requirements is important to the protection of public health and the environment. This right was affirmed by the U.S. Supreme Court in *Wisconsin Public Intervenor, Town of Casey v. Mortier*, June 21, 1991. In this case, the Court affirmed the rights of U.S. cities and towns to regulate pesticides that are not explicitly curtailed by state legislatures. The Court found that in conferring on states the authority to "regulate the sale and use of pesticides so long as the state regulation does not permit a sale or use prohibited by the Act [USC 136v(a)]," the *Federal Insecticide, Fungicide and Rodenticide Act (FIFRA)* "leaves the allocation of regulatory authority to the 'absolute discretion' of the states themselves, including the option of leaving local regulation of pesticides in the hands of local authorities."

After the Supreme Court ruling, the chemical industry, both manufacturer and service provider trade groups, went to state legislatures across the country and lobbied with the help of the Coalition for Sensible Pesticide Policy to adopt uniform language that preempts local pesticide legislation. There are currently forty three states that have adopted some form of this language, which restricts local jurisdictions from passing legislation similar to Takoma Park's. For more details, please see Beyond Pesticides' factsheet on preemption, available at [www.beyondpesticides.org](http://www.beyondpesticides.org) and find out more information about your state's requirements and what you can do.

to protect the long-term health and safety of their children. Ms. Taddeo and her family have lived in Takoma Park for seven years, but when she moved into a house with a yard after living in an apartment building, she was dismayed and baffled to see neighbors spray their yards for dandelions. It clicked for Ms. Cummings when she initially read about the cosmetic pesticide ban in Canadian provinces in *Beyond Pesticides' Daily News*. When she realized that a “gold standard” had been created by our northern neighbors, she thought there was no reason that Takoma Park couldn't do it as well. What began as an effort to educate neighbors in their community grew into a full-fledged campaign, and the creation of Safe Grow Zone.

The City Council, in passing the ordinance, hopes that it will serve as a model for other communities. “Keep going with this,” Councilwoman Kay Daniels-Cohen (Ward 3) urged Ms. Taddeo and Ms. Cummings. “You can take this to the next level. You can take it to the county, and keep going all the way through the state of Maryland . . . I think there are more people out there than you realize who are in your court.”

In addition to the Canadian laws, which helped inspire the Takoma Park ordinance, two of the city's neighbors have passed laws that restrict pesticide use on private and public land. Washington, DC enacted the *Pesticide Education and Control Amendment Act of 2012*, which offers protections from restricted use pesticides on property near waterways, schools, daycare centers and city-owned property. To the east, the *Sustainable Land Care Policy of 2011* in Greenbelt, MD strictly prohibits the use of synthetic chemical pesticides on all city-owned land. Using these policies as guidance, Takoma Park took these efforts a step further by including comprehensive restrictions on private property. Maryland is one of seven states that provides an unrestricted mechanism for local governments to enact stronger protections from pesticides on private property because of state preemption laws that prevent municipalities from passing pesticide policies that limit pesticide use restrictions to land owned by the local jurisdictions. In protecting the rights of local political subdivisions within Maryland to exercise their authority to impose pesticide use restrictions, the state is enabling the protection of the health and welfare of Maryland residents.

The Takoma Park law also provides for public educational



materials, including brochures, classes, and public forums to the community on environmentally-friendly practices and compliance with the new pesticide restrictions. Under the law, homeowners in Takoma Park can still use approved pesticides on gardens, invasive and noxious weeds and insecticides on disease-carrying insects. The Act specifically prohibits pesticides for use on lawns that are classified as: “Carcinogenic to Humans” or “Likely to be

Carcinogenic to Humans” by the U.S. Environmental Protection Agency (EPA); “Restricted Use Product” by EPA; “Class 9” pesticides (includes hazardous but generally available turf pesticides) by the Ontario, Canada, Ministry of the Environment; and “Category 1 Endocrine Disruptor” by the European Commission.

Of the 30 most commonly used lawn pesticides, 17 are possible and/or known carcinogens, 18 have the potential to disrupt the endocrine (hormonal) system, 19 are linked to reproductive effects and sexual dysfunction, 11 have been linked to birth defects, 14 are neurotoxic, 24 can cause kidney or liver damage, and 25 are sensitizers and/or irritants (see chart on page 12 for more detailed information). Children are

especially sensitive to pesticide exposure because they take in more pesticides relative to their body weight than adults and have developing organ systems that are more vulnerable and less able to detoxify toxic chemicals. Thinking of her children and future generations in Takoma Park, Ms. Cummings believes this ordinance is “close to the best thing we can offer for our kids.”

Though the ordinance passed unanimously, and with the support from many people in the community, including the local hospital, Safe Grow Zone was met with some opposition. Some residents expressed concern that while they were not supportive of widespread pesticide use, they believed the restrictions would be confusing for homeowners trying to decide what they could use, and could result in an abundance of “accidental” fines. They also raised the enforcement issue, maintaining that the ordinance would create a culture of “tattling” on neighbors. The Councilmembers responded by pointing to the number of laws that create environmental and neighborhood stewardship, including littering, recycling, noise ordinances, and even picking up after pets. These laws are rarely enforced with fines, but most people follow them because they have become internalized.

The laws also hold people accountable when there is a problem. The focus on the law is not to pit neighbors against each other or to impose an egregious amount of fines, according to the City Council. Instead, it is to educate the public on hazardous pesticides and alternatives in an effort to promote a healthy community and cleaner environment.

Neither Ms. Cummings nor Ms. Taddeo look at the ordinance as restrictive, but rather as a freedom from the harmful effects of pesticides. “It takes the burden off of families and anyone else

who cares about the environment, their health and the future. With every year that passes, there’s more information about how pesticides are hazardous,” said Ms. Cummings. “This law frees us from both the toxic effects of the use of pesticides, as well as the reliance on these chemicals.”

Though the ordinance puts Takoma Park on the leading edge of pesticide reform, Ms. Cummings says that it shouldn’t be such a huge deal. “We should have never become so reliant on these chemicals in the first place. How could we not do this?”

## Start Your Own Local Movement

Whether your state has preemption or not, you can still work to get toxics out of your community. It takes a lot of work and commitment, but it can be done with some perseverance. It’s important to find support—friends, neighbors, and other people who share your concerns about environmental health. (See Beyond Pesticides’ “state pages” for local environmental organizations.) It’s also essential to reach out to your local politicians and government. We have several factsheets available to help you organize in your community, which can be found at [www.beyondpesticides.org/lawn/activist](http://www.beyondpesticides.org/lawn/activist).

### Steps You Can Take:

1. **Find allies and create a coalition.** Start with your family, friends and neighbors. Contact local groups that may be interested, such as environmental organizations, community groups, garden clubs, churches, and the PTA.
2. **Contact your city council member** and let them know that you strongly support a pesticide law similar to Takoma Park’s Safe Grow Zone ordinance, or Beyond Pesticides’ model policy.
3. **Start a petition.** Starting your own petition is easy! You can start a petition online using one of many free petition-hosting sites, or contact Beyond Pesticides and we can help set one up for you through our action alert system. You can also simply print up a piece of paper and collect signatures manually when you attend local events, canvas door-to-door, etc. Be sure to get the first and last name, home address (it’s important to be able to verify that a supporter is within the target area) and email or phone number for follow up.
4. **Write a letter to the editor of your local newspaper.** Be concise and summarize your position in the first sentence (most editors read the first 2-3 sentences before deciding whether to include a letter). Be sure to keep your letter under 200 words, and pay attention to spelling and grammar.
5. **Contact Beyond Pesticides.** Finally, tell us what you’re doing to help stop or reduce pesticides in your community or ask us if you need assistance. We talk to people every day who, like you, want change in their communities. Call us at 202-543-5450, send us an email at [info@beyondpesticides.org](mailto:info@beyondpesticides.org), or post a note to our facebook page. Let us know if you’re ready to embark on your own local campaign!

### How to Talk to Your Neighbors

1. **Emphasize human health.**
2. **Stress cost-savings.**
3. **Use reasonable language.**
4. **Keep it simple.**
5. **Follow up.**

### Key Points of Focus

1. **Children, elderly, and those with existing health problems.** Pesticides applied according to label directions can adversely affect vulnerable populations.
2. **Human Health.** Research demonstrates that pesticide exposure elevates the risk of birth defects, Parkinson’s disease, and cancer, among others.
3. **Bees, pollinators, and beneficial organisms.** Pesticides have consistently been implicated as a key issue in pollinator declines.
4. **Pets.** Pets often walk through chemically-treated lawns, and can easily absorb pesticides through their paws.
5. **Water quality.** Pesticides can runoff or leach into soils, contaminating groundwater, damaging aquatic life, and putting stress on municipal water treatment plants.
6. **EPA registration of pesticides does not Equal Safety.** EPA establishes allowable hazards based on risk assessments that are filled with uncertainty and incomplete information on product ingredients, chemical mixtures, and additive and synergistic effects.
7. **Effective alternatives are available.** Toxic pesticides are not necessary for beautiful lawns and landscapes. Most garden stores stock organic/natural products and even some commercial lawn care companies offer organic practices.

*Arm yourself with the facts by using Beyond Pesticides’ website on science, policy and action.*

*See our resource, Pesticide-Induced Diseases Database and factsheets on pest management without toxic pesticides.*

*If you need additional help, we have staff that can work with you and provide assistance. We’d love to hear from you!*

# Health Effects of 30 Commonly Used Lawn Pesticides

	Health Effects						
	Cancer	Endocrine Disruption	Reproductive Effects	Neurotoxicity	Kidney/Liver Damage	Sensitizer/Irritant	Birth Defects
<b>Herbicides</b>							
2,4-D*	X	X	X	X	X	X	X
Benfluralin					X	X	
Bensulide				X	X	X	
Clopyralid			X			X	X
Dachthal	Possible	X			X	X	
Dicamba*			X	X	X	X	X
Diquat Dibromide			X		X	X	
Fluazipop-p-butyl			X		X		X
Glyphosate*	X	X	X		X	X	
Isoxaben	X				X		
MCPA		X	X	X	X	X	
MCPP*	Possible	X	X	X	X	X	X
Pelargonic Acid*						X	
Pendimethalin*	Possible	X	X			X	
Pronamide	Probable	X			X	X	
Triclopyr			X		X	X	X
Trifluralin*	Possible	X	X		X	X	
<b>Insecticides</b>							
Acephate	Possible	X	X	X		X	
Bifenthrin <sup>§</sup>	Possible	Suspected		X		X	X
Carbaryl	X	X	X	X	X	X	X
Dichlorvos	X	Suspected		X	X	X	
Fipronil	Possible	X	X	X	X	X	
Imidacloprid			X		X		X
Malathion*	Possible	X	X	X	X	X	X
Permethrin <sup>§</sup>	X	Suspected	X	X	X	X	
Trichlorfon	X	X	X	X	X		X
<b>Fungicides</b>							
Azoxystrobin					X	X	
Myclobutanil		Probable	X		X		
Sulfur						X	
Ziram	Suggestive	Suspected		X	X	X	
<b>Totals:</b>	<b>17</b>	<b>18</b>	<b>19</b>	<b>14</b>	<b>24</b>	<b>25</b>	<b>11</b>

\* These pesticides are among the top 10 most heavily used pesticides in the home and garden sector from 2006-2007, according to the latest sales and usage data available from EPA (2011).

§ EPA lists all synthetic pyrethroids under the same category. While all synthetic pyrethroids have similar toxicological profiles, some may be more or less toxic in certain categories than others. See Beyond Pesticides' synthetic pyrethroid factsheet at [bit.ly/TLBuP8](http://bit.ly/TLBuP8) for additional information.

List of citations available online at [www.beyondpesticides.org/lawn/factsheets/30health.pdf](http://www.beyondpesticides.org/lawn/factsheets/30health.pdf).



# Protecting Life From Research to Regulation

## Disappearance of frogs, human health effects linked to pesticide use

*Editors Note: There are few scientific research projects more important to protecting life and preventing its long-term demise than those conducted by Tyrone Hayes, Ph.D. And now this work is under threat. Dr. Hayes, a Harvard educated biologist and professor of Integrative Biology at the University of California, Berkeley, whose research finds that the herbicide atrazine feminizes male frogs, is one of the leading scientists critical of the pesticide industry and regulatory process. This critical research is threatened while, as Dr. Hayes' points out, amphibian species are in decline and they are disappearing. Dr. Hayes' work has shown that current regulatory reviews allow widespread use of pesticides that cause serious adverse effects well below allowable legal standards and when in mixtures not studied. He initially began his research with a study funded by Novartis Agribusiness, one of two corporations that would later form Syngenta, the maker of atrazine. When his results contradicted Novartis' expected or desired outcome, he was criticized by the company, which withdrew its funding. Dr. Hayes continued the research with independent funding and found more of the same results: exposure to doses of atrazine as small as 0.1 parts per billion (below allowed regulatory limits) turns tadpoles into hermaphrodites – creatures with both male and female sexual characteristics. When his work appeared in the prestigious Proceedings of the National Academy of Sciences, Syngenta attacked the study, starting an epic feud between the scientist and the corporation. In fact, a June 2013 investigative report by 100Reporters and Environmental Health News exposed the chemical giant's multi-million dollar campaign to discredit atrazine critics.*

*The African  
clawed frog  
(Xenopus laevis).  
Photo by Brian Gratwicke,  
December 30, 2012.*

*Dr. Hayes has since published more than 40 papers, over 150 abstracts and has given more than 300 talks on the role of environmental factors on growth and development in amphibians. With the cutbacks in government funds and the relentless industry attacks, Dr. Hayes has recently run into financial woes, including exceedingly high fees from the University's Office of Laboratory Animal Care. We hope that his important work will continue, however without funding there is no way for him to do research. The following are edited excerpts from Dr. Hayes' talk at the 31st National Pesticide Forum held in Albuquerque, NM. You can watch his full presentation online on Beyond Pesticides' YouTube Channel: [www.youtube.com/bpncamp](http://www.youtube.com/bpncamp).*

*We have established The Fund for Independent Science to support Dr. Hayes' work, to protect life from harmful chemicals. Dr. Hayes' lab operates on a budget of \$150,000. Funds raised will keep this critical research going forward. Contact Beyond Pesticides to donate, or go to [www.beyondpesticides.org/fundscience](http://www.beyondpesticides.org/fundscience). —Jay Feldman*

By Tyrone Hayes, Ph.D.

I study frogs. My work focuses on the role of hormones in frogs. I got thrown into this pesticide thing initially because I got asked by Novartis (merged with Zeneca Agrochemicals to create Syngenta AG) to study its herbicide atrazine, a weed killer that is mostly used on corn in the U.S. It's been used since 1958. We use 80 million pounds a year. It's used in more than 80 countries and is outlawed in all of Europe. The company asked me whether or not atrazine interferes with frog hormones, because I have extensively studied frog hormones. I was specifically asked to use the African clawed frog because it is the frog that everybody uses in the laboratory to study development. In 1920, a researcher discovered that the human pregnancy hormone, human chorionic gonadotropin hCG) would make this frog lay eggs. By 1940, the pregnancy test identified this hormone. I tell this story for a couple of reasons. First, it shows the value of basic research. Second, it shows you how similar our hormones are to frog hormones. Chemical exposures that affect frogs are very likely to affect us—albeit at different doses, and maybe through different routes of exposure.

### Laboratory Research

While working for Novartis, we discovered that atrazine decreased, or inhibited, the growth of the voice box, or larynx, in male frogs. This is bad news, since males have deeper voices because of testosterone. For this same reason, male frogs sing while females don't. Data suggested that atrazine is somehow decreasing testosterone and demasculinizing—or, I like to use the term “chemically castrating”—these frogs. We did some very early studies where we looked at the gonads and asked what might be the cause of this decrease in testosterone. We found that some of these individuals, when exposed as tadpoles, had ovaries, then it has another testis, and then it has more ovaries. No frogs are naturally hermaphroditic. So we proposed that atrazine turned on aromatase, which is the enzyme that converts testosterone into estrogen. The idea is that, when males are exposed developmentally, their testosterone is being used up. This demasculinizes them and their larynx doesn't grow. They are now feminized, because they are making the female hormone and will grow ovaries.

In that first early paper, we were able to show that if you expose frogs to atrazine, their testosterone levels drop to those of a female. The paper, *Hermaphroditic Demasculinized Frogs after Exposure to the Herbicide Atrazine at Low Ecologically Relevant*



Tyrone Hayes, PhD at the 31st National Pesticide Forum in Albuquerque, NM.

*Doses*, was published in the *Proceedings of the National Academy of Science (PNAS)* in 2002.

As important as it was for my career and for figuring out what atrazine was capable of, I still had a few questions that were left unanswered. For example, we didn't know if hermaphrodites were males with ovaries or females with testes. And, we didn't know what happened when these animals grew up. The problem is that frogs don't have sex chromosomes, so it's difficult to know who is who, and it takes these animals about four to five years to grow up. So, you have to convince a first year undergraduate and say, “You know, maybe by the time you graduate we might have something for you to publish.” We know the answer now. In fact it took us eight years to figure it out.

### Sex Change and Behavioral Changes

We discovered that when some of these hermaphrodites grow up they actually completely convert to females. After eight years and the publication of our work, we had identified a gene that is expressed in females that does not exist in males and we figured out that about 10% of the males that are exposed to atrazine completely turn into females. But I also wanted to know what happened to the other 90% of the exposed males. So we did these real simple experiments that I call the “pool party experiment.” These are experiments where we put together females with four unexposed males and four atrazine-treated males. The idea was to see if these guys could compete. We put them in the pool at 7:00 p.m., the lights go out, and then the next morning we just look at who got lucky and who didn't.

It turns out, when you do these trials over, and over again that the atrazine-treated males almost never win. Even though they didn't turn into females, they're not competitive. I'm an endocrinologist;



I study hormones. So, I have to do more than observe their behavior. We measured their testosterone levels and, as you might guess, the controls have a lot more testosterone on average than the atrazine-treated males. What's more important, if you look at who made the love connection in these trials, it turns out there is a kind of threshold and most of these atrazine-treated males just don't have the testosterone. We didn't know if that means the females don't like them or the other guys just beat them up. All we know is that by the time the morning comes these guys with the low testosterone lose.

Then we did another series of experiments that I often call the "Motel 6 experiments." In this case, we just put animals alone with females and ask, can you perform in the absence of competition. We know you're not competitive, but are you competent? The way we measured competency is by leaving them alone in the motel room overnight and then we collect the eggs and just look at how many eggs they fertilize. When you do that, control males fertilize about 85% of the eggs, while atrazine-treated males fertilize only about 15%. There is a clear difference in their fertility. They not only are not competitive, they're not competent.

It turns out they're not competent for two reasons. One is that they don't even try. If you observe them, they sit there and watch the female lay eggs. In addition, if you look at their testes under a microscope, you find that the control males are full of sperm, whereas the atrazine-treated males have testicular tubules that are basically empty with a little bit of cellular debris. They don't have enough testosterone to show behavior and, even when they do, they don't have enough testosterone to maintain their sperm.

### **EPA Ignores Original Research**

Then we asked some other questions. "Is this just specific to African clawed frogs or might all frogs be susceptible to atrazine?" We looked at North American leopard frogs and we actually found eggs bursting to the surface of the males' testes. Now at this point I started interacting with the Environmental Protection Agency (EPA). I sent this [research] to the EPA, and they wrote back, "Well, this is an interesting finding Dr. Hayes, however we do not think it is an adverse effect that would trigger review and regulation of the chemical."

### **Field Research and Multiple Factors**

The next thing we wanted to know was whether these effects occur in the wild. Figure 1 shows a testis of an animal collected from the wild, including the testicular tubules with eggs instead of sperm. In the real world,

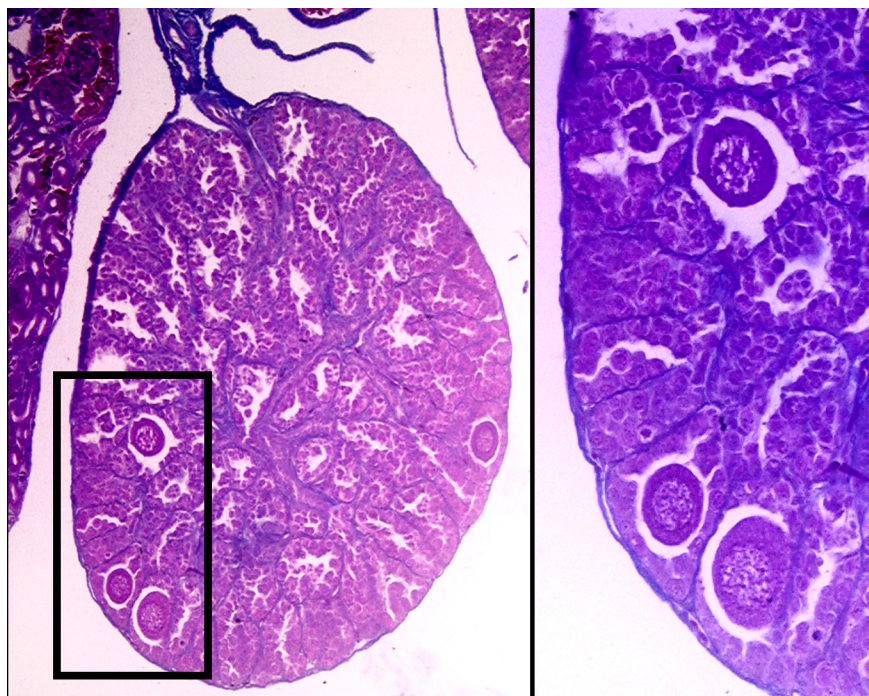
these animals are growing eggs in their testes instead of sperm, just like we see in the laboratory.

It turns out that every place we find hermaphrodites we find atrazine, and vice versa. The reason this study got published in *Nature* is we had the lab data to back it up. We knew we could take frogs from nature and raise them in the lab in clear water and they wouldn't become hermaphrodites. And, we could take frogs from nature and put them in atrazine and know that they would become hermaphrodites. So we knew it wasn't a natural variation, and we knew it was more than a correlation.

We want to ask, how important is atrazine? That is what we are focusing on, but how important is it really? I was concerned because they're not just using atrazine in typical field conditions, they're using all these herbicides, fungicides and insecticides.

In the study, we found that there are multiple factors that can affect development. If the temperature goes up, that's a stressor. If a pond dries up, that's a stressor. If the tadpoles become crowded, that's a stressor. Agriculture contributes to climate changes, contributes to desiccation, and loss of surface water, which leaves the animals crowded. That crowding causes an increase in stress hormones. We also show that mixtures of pesticides, which concentrate as the pond dries up, contribute to an increase in stress hormones and that causes a release of pesticides stored in fat, which effectively increases stress hormones even more.

**Figure 1**



*Transverse serial cross section of leopard frog's testes. Slide image courtesy Tyrone Hayes, Ph.D.*

There is this incredible nasty interaction of effects that results in damage to the thymus, or to the immune system, which causes animals in the lab to develop meningitis. The response to a flagella bacterium causes high parasite loads in the kidney and liver in the field. If I didn't have the lab data and the field data, you would never guess why these frog populations were disappearing. You would think it was disease. But in fact, pesticides and other stressors are playing an incredible role in terms of determining how susceptible the animals are to disease. By damaging the kidney and the liver, you're effectively increasing the pesticide load because now you've damaged the organs that are supposed to metabolize and get rid of the pesticide.

**Figure 2**



*Tadpoles from different sections of the Salinas River. Slide image courtesy Tyrone Hayes, Ph.D.*

We wanted to test this experimental paradigm more in the field. We were able to do so in the Salinas River. The river flows south to north with most of the agriculture up in the north, creating an incredible experimental regime. We could go to the Santa Margarita where the water is all nice and pristine, a foot and a half deep and 20 degrees Celsius. We can go down river where there is no water because it's all being drained off for agriculture use downstream. Here the tadpoles don't have pesticides, but they're crowded, they're hot, and they're stressed. Further downstream, the water is back at a foot and a half deep, 20 degrees Celsius, just like before, except that 100% of that water is agricultural runoff.

We did a really neat experiment where we started upstream and collected tadpoles at those three sites. Figure 2 shows three tadpoles at the same developmental stage, same age, same species, same river, collected on the same day, about two hours apart. The only difference between the two smaller tadpoles is that the first smaller tadpole is from one of those little crowded hot pools. The only difference between the second smaller tadpole and the larger tadpole is that the smaller tadpole is living downstream of water that is running off the food that we're eating.

**Amphibians in Dramatic Decline**

Over 70% of all amphibian species are in decline. This is a group of animals that have been around since the days of the dinosaurs and we are losing species now faster than the dinosaurs disappeared from earth. This sixth mass extinction will be the first time that a mass extinction on earth will be caused by a single species.

Now, what I have told you about is more than one species, or more than one population, that multiple species generate families of frogs. And, I have told you about more than just correlation. I've told you about experimental evidence supporting the impacts of atrazine and pesticides on amphibians and their declines. What's more, though, it's not just frogs. I'm going to show you that there is data in fish, birds, reptiles, and mammals, including humans, that show very similar things happening. The data that I'm going to show you comes from a group of scientists with whom I've worked. I emailed everybody in the world who has worked on atrazine and we've written a couple of papers.

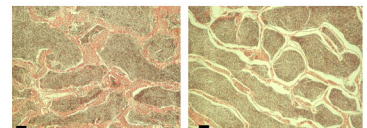
**Reproductive Failures**

We published with 22 authors from 12 different countries. My frog has sperm in the testes. Give them atrazine, no sperm. A scientist from Belgium with fish sperm in the testes; give them atrazine, no sperm. With reptiles, sperm in the testes; give them atrazine and they look just like my frog. Rat studies done in Croatia and

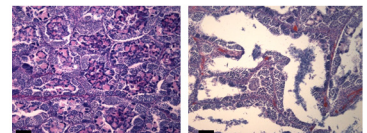
**Figure 3**

**Control Atrazine**

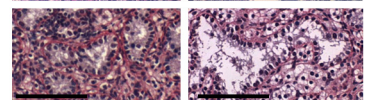
**Fish**  
(Kestemont *et al.*)



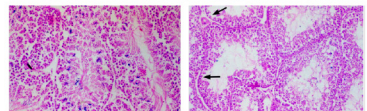
**Amphibians**  
(Hayes *et al.*)



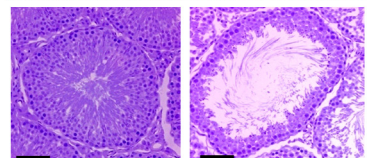
**Reptiles**  
(Muñoz-de-Toro *et al.*)



**Birds**  
(Hussain *et al.*)



**Mammals**  
(Victor-Costa *et al.*;  
Kniewald *et al.*)



*Testes of multiple species exhibited egg production after atrazine exposure. Slide image courtesy Tyrone Hayes, Ph.D.*

Nigeria show the same. This is all peer reviewed published data. Testicular tubules with sperm, give them atrazine, no sperm. A new colleague from Pakistan has shown that you take quail, with sperm in their testes, give them atrazine, no sperm. It doesn't matter what animal you're looking at, the same thing is happening in the tests. The route of exposure might be different, and important concentrations might be different, but the same effect occurs. It doesn't matter if you're looking at fish, amphibians, reptiles, birds, or mammals. (See Figure 3.)

Of critical importance is that my colleague Shanna Swan, Ph.D. at the Icahn School of Medicine at Mount Sinai found what she calls sub-fertile men in Columbia, Missouri. These men have about .1 parts per billion atrazine in their urine. These men, who have a low sperm count, have about as much atrazine in their urine as it takes us to chemically castrate a frog. Now that's just correlation. But, remember that atrazine knocks out testosterone in sperm in fish, amphibians, reptiles, birds, and rats, which are mammals like us. What's more is men who apply atrazine have 2,400 parts per billion of atrazine in their urine. That's 24,000 times higher than we know is associated with low fertility with men in Columbia, Missouri. Men who apply atrazine have 24,000 times the atrazine in their urine that we use in the laboratory to chemically castrate frogs and fish. If one of these guys were to pee in a bucket, I could dilute it 24,000 times and use the atrazine in their urine to chemically castrate and feminize 24,000 buckets of 30 tadpoles each.

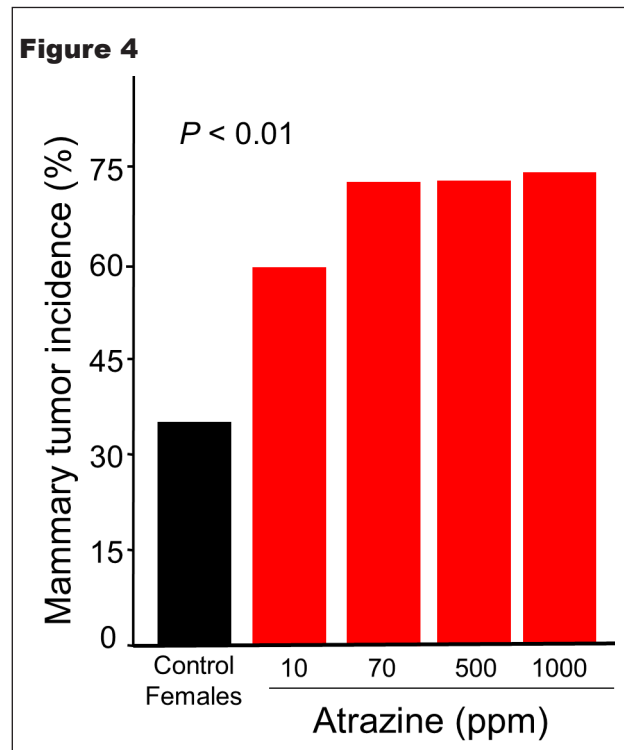
### Disproportionate Effects

Applicators are often part of a segment of our population for whom we know there is a health disparity. Black and Hispanics are at greater risk and usually have poorer outcomes and are more likely to live and work in areas where they are more likely to be exposed to chemicals that we know are associated with these same illnesses.

### Atrazine and Cancer

So does atrazine turn on aromatase and increase estrogens in humans? We're not going to worry about egg production in mammals, but what is concerning about aromatase expression and estrogen in mammals is breast cancer and prostate cancer. With

regard to prostate cancer, there is an 8.4-fold increase in prostate cancer in men who work in atrazine factories and bag atrazine. There is at least one correlational study, which I didn't publish, that



Syngenta study found cancer in female rats increased after exposure to atrazine. (Stevens et al. 1994) Slide image courtesy Tyrone Hayes, Ph.D.

shows women whose well water is contaminated with atrazine are more likely to develop breast cancer than women who live in the same community, but don't drink the well water. (Kettles, M., et al. *Environmental Health Perspectives*. 1997 Nov; 105(11): 1222-1227) Again, it's just a correlational study, but if you look at rats, testosterone goes down when you give them atrazine and estrogen goes up. Syngenta's own studies (1994) show that, if you give rats atrazine, there is an increase in breast cancer and mammary cancer (see Figure 4). The mechanism for prostate and breast cancer is the following. Adrenal cells normalize aromatase and estrogen production to one, but if you give these human cells atrazine they express aromatase and start making estrogen. Like we have shown in fish and amphibians —and just like they've shown in

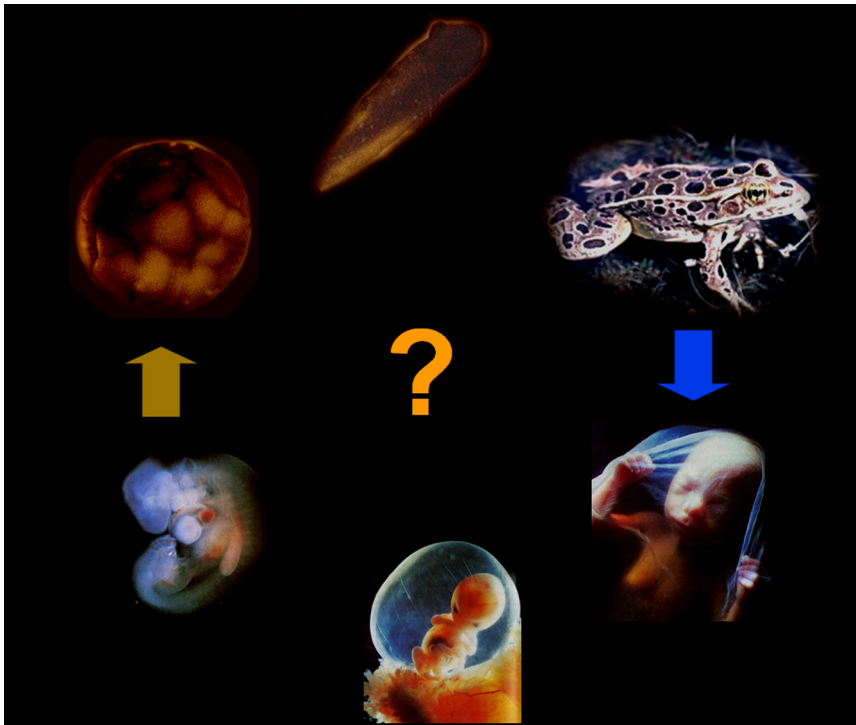
reptiles, just like they've shown in rats— lo and behold, human cells respond the same way. Now there is a mechanism to go along with our experimental evidence in rats, to go along with our correlational evidence for breast cancer.

One of my graduate students has shown that, if you take breast cancer cells and give them atrazine, they start expressing aromatase and start making estrogen. Now here's why that's important. It turns out that aromatase is typically expressed in those cells around breast cancer. Otherwise, think about it —most women get breast cancer after menopause, when estrogen levels are lower than they have ever been in their lives. How can that be? That's because one, breast cancer incidence depends on your lifetime exposure and, two, it depends on this local expression of aromatase. In fact, aromatase expression is critically important in causing that cancer to grow, elevating your own production of estrogen that binds to the receptor and causes the cell to divide.

### Produce the Poison, Profit on the Treatment

Who knows what the number one treatment for breast cancer is right now? The chemical called letrozole (Femara®) knocks out aromatase and decreases estrogen so that those cells don't turn into a tumor. How much sense does that make, when the number one contaminate of drinking water, bathing water, ground water, surface

**Figure 5**



Dr. Hayes' research has led him to believe that human fetal exposure could lead to similar effects observed in frogs. Slide image courtesy Tyrone Hayes, Ph.D.

water, and rain water does exactly the opposite in every animal that's been examined and is associated with breast cancer in humans and promotes and induces breast cancer experimentally in rats.

Here is where I get in trouble. The same company that's given us atrazine since 1958 now makes letrozole. Novartis Oncology offers treatment for cancers. The same company that gives us 80 million pounds of atrazine, an aromatase inducer that promotes breast cancer in rats and that's associated with breast cancer in humans, now gives us letrozole to knock out aromatase, to basically, I would argue, undo what it did.

### Effects Across Generations

I would argue that my love and study of this aquatic organism, the frog, has taught me quite a bit about another aquatic organism, the fetus. The things that we're studying in frogs are relevant to the things we are studying in humans. Some might question that, but I would argue that my tadpole trapped in a contaminated pond, is no different than the fetus, trapped in a contaminated amniotic fluid dependent on the same hormones as my frog. Studies now show that before we leave the womb, we are exposed to 300 chemicals, most of which have effects that are not understood.

Here now is the work that changed my life. An EPA lab showed that if you give pregnant rats atrazine, it will cause an abortion. (Cummings, AM., et al. *Toxicological Sciences*. 2000 Nov;58(1):135-43) It causes so much of a hormone imbalance that the rats can't

maintain the pregnancy. A second EPA lab showed that, of those rats that don't abort, the sons are born with prostate disease. (Stanko, J., et al. *Reproductive Toxicology*. 2010 Dec;30(4):540-549) A third EPA lab showed that those rats that don't abort the daughters of the exposed mothers are born with poor breast development and essentially their offspring have retarded growth and development because they can't make enough milk. (Rayner, JL., et al. *Toxicology and Applied Pharmacology*. 2004 Feb;195(1):23-34) Here is what changed me profoundly: we're seeing rats affected by atrazine that their grandmothers were exposed to. These are rats that never saw atrazine.

When I think about my little girl, it gives me a whole different vision. We publish in the ivory towers and journals, such as PNAS and *Nature*, that mean so much to our promotion and our academic colleges, but we publish in places that 99.9% of the world doesn't have access to.

I have told you there are birth defects in rats, but there is also a correlation between human birth defects and conception that occurs during peak atrazine. A study published by the Centers for Disease Control and Prevention concluded that maternal exposure to surface water atrazine is associated with fetal gastroschisis, particularly in spring conceptions. (Waller, SA., et al. *American Journal of Obstetrics and Gynecology*. 1010 Mar; 202(3):241)

I was told when I got involved in this, "Don't be an advocate, Tyrone. Let the science speak for itself." For many of us scientists in the ivory tower, we take that attitude because that is how we were taught. When I found that the idea of letting the science speak for itself really meant that my science was being spoken in PNAS, *Nature*, and places that don't reach the public, I knew I had a completely different responsibility. One, as an academic scientist, but two, to make sure that information is available wherever it is needed and whoever would tolerate me for 30 to 40 minutes to talk about it.

I figure I didn't grow up privileged, but I've had the benefit of some really fancy education and I know what's going on. Now I have a different philosophy, "Those who have the privilege to know, have the duty to act." I wish more of my colleagues would follow that philosophy.

Please consider supporting Dr. Hayes' continued research by keeping his lab open. Go to [www.beyondpesticides.org/fundscience](http://www.beyondpesticides.org/fundscience) to pledge your support.

# Pesticides in My Drinking Water?

## Individual precautionary measures and community action

By Drew Toher



**P**esticides contaminate surface water, groundwater, and drinking water throughout the United States. This problem requires individual precautionary measures and preventive community-based action to protect one's self and ultimately stop ongoing pesticide use that ends up in drinking water from numerous agricultural, public land, and home and garden uses. Beyond Pesticides urges a solution that keeps pesticides out of the water, rather than trying to clean them up after they enter our waterways and drinking water supply.

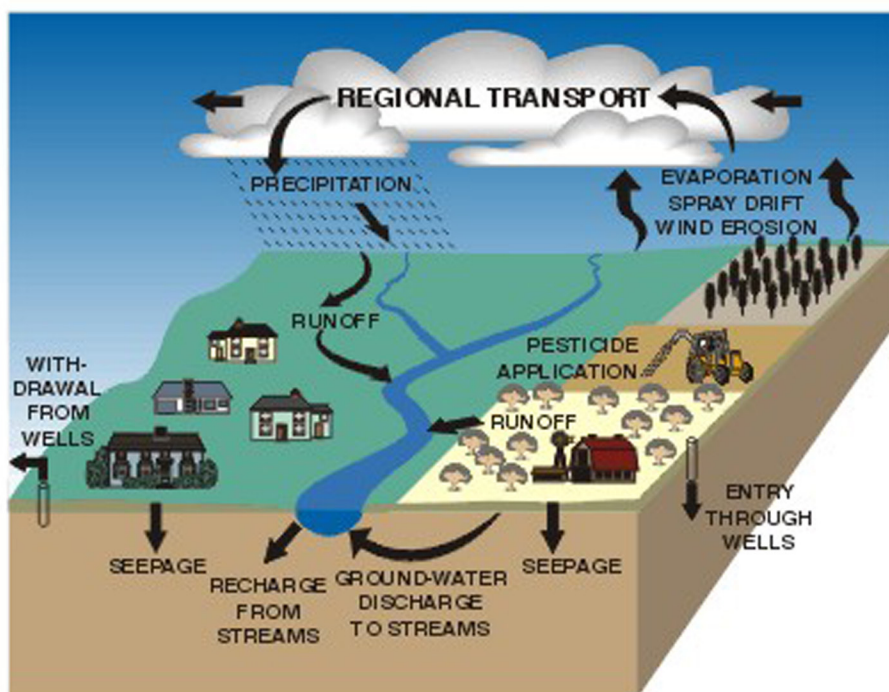
The cleanup approach –either through expensive enhanced technological fixes for public water utilities, individual private well filters, or consumption of bottled water– is fraught with controversy over (i) acceptable regulatory levels of hazards associated with ingestion or absorption of pesticides from water intake, (ii) issues related to whether the regulatory and enforcement systems are robust enough, (iii) numerous unanswered questions about chemical mixtures, synergistic effects of pesticides and other toxic chemicals found in water, and low level exposure, and (iv) inadequate and expensive removal technologies that are costly for taxpayers. As explained here, individual action is a necessary short-term remediation tactic for reducing exposure that must lead to community-based adoption of land management policies that do not allow hazardous pesticide use. With the growth of organic management practices – including agricultural, public lands, and home and garden, this approach represents a practical and feasible path toward safer drinking water nationwide.

### How Do Pesticides Get into My Drinking Water?

Rain or snow melt carries pesticides from agricultural fields, golf courses, parks, and residential properties through storm drains and into local water reservoirs, endangering wildlife and stressing our water treatment facilities. Pesticides also seep into our water table where they can contaminate groundwater and enter private wells. Many pesticides can volatilize and attach to particles and become airborne. These chemicals can drift within a neighborhood, region, or even hundreds or thousands of miles from their application site (some pesticides have even been found in snowpack in remote areas of U.S. National Parks!), carried in fog and rain clouds before being deposited into public drinking water sources. Improperly disposed pesticide products in unlined landfills can also contaminate groundwater and end up in our water supply.

### Is My Water Safe?

Widespread concern over drinking water safety in the U.S. compelled the 93rd Congress to craft the *Safe Drinking Water Act of 1974* (SDWA). The act empowered the U.S. Environmental Protection Agency (EPA) to set legally enforceable standards for maximum contaminant levels



Pathways of pesticide movement in the hydrologic cycle (modified from Barbash and Resek, 1996). <http://pubs.usgs.gov/fs/fs03400/#pesticides>.

(MCL) in drinking water. MCLs are intended to mark the maximum concentration at which a substance causes no adverse health effects in the general population.

EPA has set MCLs for over 90 contaminants, including some pesticides, but after nearly 30 years since the passage of the SDWA, upwards of 10% of public U.S. water treatment systems do not meet the requirements set by the agency. Moreover, in terms of pesticide contamination, current federal and state MCLs for public water supplies are raising intense scientific controversy within executive agencies due to claims of inadequate regulatory attention.

The U.S. Geological Survey's (USGS) National Water-Quality Assessment Program (NAWQA) has criticized EPA for not setting adequate water quality benchmarks for pesticides. According to NAWQA, "Current standards and guidelines do not completely eliminate

risks posed by pesticides in waterways because: (1) values are not established for many pesticides, (2) mixtures and breakdown products are not considered, (3) the effects of seasonal exposure to high concentrations have not been evaluated,

#### **Studies of U.S. Rivers and streams currently document:**

- 100% of U.S. streams have detectable levels of at least one pesticide,
  - 56% of streams contain one or more pesticides that exceed at least one aquatic-life benchmark;
- 50% of shallow wells have detectable levels of pesticides,
  - 20% of private wells contain at least one contaminant at levels of potential health concern, and;
- 90% of the 139 municipal water systems sampled by EPA in 2003/2004 contained detectable levels of atrazine,
  - 50% of drinking water sites sampled in the Midwest contain levels of atrazine above EPA MCLs.

and (4) some types of potential effects, such as endocrine disruption and unique responses of sensitive individuals, have not yet been assessed."

In 2010, then EPA Administrator Lisa

Jackson announced a new Drinking Water Strategy for the agency in an effort to strengthen public health protection from contaminants. To this end, EPA released its new "Human Health Benchmarks for Pesticides" in 2012, setting guidelines for over 350 chemicals' chronic and acute effects in sensitive populations, including women and children. Although the benchmarks are a step forward, because no federal MCLs have been set for these chemicals, enforcement and oversight still need to be strengthened in order for the new benchmarks to have an impact.

#### **Public Drinking Water Safety**

Under SDWA, public water systems must provide customers with an annual report of their drinking water quality. The report includes information on contaminants detected during the year and how they compare to state and federal MCLs. Water utilities are required to have this information by July 1 of each year. Some water utilities post their reports online or send them to their customers.

You can request a report from your local utility directly at any time. Contact information is available at [bit.ly/drinklocal](http://bit.ly/drinklocal). With information in hand, talk to your

local utility and public health department if pesticides are found in your public water system; discuss pesticide use patterns that contribute to contamination, and the adoption of local policies or an ordinance that facilitates the transition to organic practices not reliant on the contaminants found in water. For assistance in organizing a campaign to eliminate toxics in your community, see Beyond Pesticides' booklet *Pesticide-Free Zones in Your Community* at [bit.ly/pesticidefree](http://bit.ly/pesticidefree). You

can also contact Beyond Pesticides at 202-543-5450 or [info@beyondpesticides.org](mailto:info@beyondpesticides.org) for a copy of our model municipal policy.

Annual reports are a useful reference, but remember that current MCLs are

under scrutiny for not adequately reflecting hazard, especially to vulnerable populations such as children, elderly, and those with pre-existing illnesses. Additionally, these reports often fail to reflect spikes in contamination levels. Spikes occur most often in agricultural areas during the spring or fall planting season. In more urban areas, they may occur in relation to in-season lawn and garden pesticide use. EPA does not consider temporary spikes a human health hazard, but scientific studies continue to show that even low doses of pesticides below federal MCLs can cause harm. Pregnant women, children, elderly, and the chemically sensitive are particularly vulnerable to these events.

### Well Water Safety

According to EPA, approximately 15% of Americans rely on their own private drinking water supplies. However, EPA does not regulate the quality of private well water. Therefore, it is important for those obtaining their drinking water from wells to routinely check the supply for contaminants. People who use older, deteriorating wells or those that are shallow or poorly constructed, or near agricultural areas are most susceptible to pesticide contamination. Any cracks

present in the well could allow for the infiltration of pesticides.

Factors to consider when thinking about testing the water in your well for pesticides include:

- Age of the well
- Depth of the well
- Circumference of the well
- Soil type on your property
- Proximity to areas where pesticides are heavily applied, such as golf courses, agricultural fields or natural gas wells
- Proximity to pesticide distributors/businesses
- If other testing reveals high levels of nitrates (though low levels of nitrates do not ensure that the water is contaminant-free)
- If other wells in your area have detected pesticide residues
- If pesticides have been spilled or mixed near your well
- If you are unsure about the use of pesticides in your area

Generally, new wells drilled deeper than 200 feet below ground with a two inch pipe are safer than most in terms of pesticide contamination. Most local health departments can perform an

inspection of your well site to check for any vulnerability. If your well is at risk from any of the factors listed above, consider testing your well for one or more of the pesticides used frequently in your area.

### Where Can I Find a Testing Lab?

National Testing Laboratories, Ltd offers a WaterCheck Water Quality Test with Pesticide Option, which tests for bacteria, heavy metals, inorganic chemicals, volatile organic chemicals, plus 20 additional pesticides and PCB's. You collect water samples, ship them overnight to the lab, and they return the results. The kit can be ordered online at <http://www.ntllabs.com/residential.html>.

State or local agriculture or health departments can also test for pesticides, or help find a private lab that is certified to test drinking water in your area. Find your local agricultural cooperative extension contact information at [bit.ly/coopoffices](http://bit.ly/coopoffices). Healthguide USA is a resource for finding your local health department. Contact information: [bit.ly/USAhealth](http://bit.ly/USAhealth).

### Which Tests Should I Request?

Testing for pesticides is more expensive than testing for bacteria or nitrates. Often it is least expensive to "screen" your water sample for a range of chemicals that may be in your area. Speaking with your local health department or agricultural extension office about the pesticides that are applied most often in your region should help you determine which chemicals to "screen." If you live close to an agricultural field and use well water, you may want to contact the farmer and ask directly which chemicals are applied to the land. Likewise, those near golf courses may want to ask the head groundskeeper what pesticides are applied.

Although the "screening" method is less expensive and can identify select hazardous chemicals, a comprehensive pesticide test is more accurate and better able to determine if other pesticides are present. If you do decide to "screen"



Water well for the Herkimer House in Danube, Herkimer County, New York. September 2009  
Author: Wknight94.



your water sample and it detects any pesticides, you will want to follow up with comprehensive testing to determine concentrations of the chemical(s) in question. You also may want to contact your local health department and alert it to the detection, as officials may want to become involved in any further testing.

Home testing kits can be helpful in identifying the presence of certain chemicals above the MCL, but no home testing kit can completely determine the safety of your drinking water. In order to receive the most accurate results, a certified laboratory is the best place to send your samples. Again, as with the screening, if you detect the presence of any pesticides, you will want to follow up with comprehensive testing from a certified laboratory. Contact Beyond Pesticides at [info@beyondpesticides.org](mailto:info@beyondpesticides.org) if you have any additional questions about the pesticides to look for in your area.

### **How do I Interpret My Results?**

Current drinking water standards can be viewed on EPA's website at [bit.ly/waterstandard](http://bit.ly/waterstandard). Note that your state and county may have adopted stricter drinking water standards than those required by EPA.

Additional questions concerning the health implications of your water testing results can be handled by your testing company, local agricultural extension, or health department. However, the changing nature of federal and state MCL determinations concerning what are considered acceptable levels of pesticide contaminants in water make it difficult

to predict the health implications of detections, especially for pesticides found at low levels, as well as concerns about chemical mixtures. Scientific studies have shown that low dose exposure under federal MCLs to certain pesticides can result in serious health problems. Therefore, it is prudent for all homeowners to take proper precautions if they discover any pesticides in their drinking water, even when results show the chemical to be under federal MCLs. To view scientific studies about the potential dangers of low-dose pesticide exposure, see Beyond Pesticides *Pesticide Induced Diseases Database*: [bit.ly/pidd](http://bit.ly/pidd).

### **What if I Find Pesticides in My Drinking Water?**

#### **The Short Term Solution**

Even when below MCLs, pesticide detection in your drinking water can put your health at risk. If tests determine that your house's drinking water is contaminated with pesticides, there are many filtration options which can be installed to remove the chemicals. The most cost-effective and efficient way to purify your home's water is to treat only the water you plan to consume. This is known as a point-of-use water treatment system. However, note that contaminants can be absorbed

### **Is Bottled Water the Answer?**

The tremendous growth of the bottled water industry over the past 20 years is a good indication that Americans are skeptical about the safety of their drinking water supply. Bottled water is convenient and may taste better, but is it a solution to contaminated water?

Bottled water, being a packaged food product, is regulated by the U. S. Food and Drug Administration (FDA) and not EPA. FDA's allowable limits for contaminants generally follow EPA MCL guidelines, but oversight is lacking in many areas. For example, while public water systems are required to undergo quarterly testing from certified labs, bottled water is only required to be tested once a year, and the tests are not required to come from certified labs. Additionally, while public water systems are required to report any violations to state or federal officials, bottled water manufacturers have no such requirement. Therefore, in terms of pesticide contaminants, bottled water, including "spring water" and "artesian well water," is only required to meet minimum federal guidelines.

Given the aforementioned problems with federal MCLs, bottled water is not a 100% safe alternative to normal municipal water supplies. Unless your well water or public water supply has dangerous levels of pollutants, it is not advisable or economical to rely on bottled water for the majority of your drinking water. Bottled water also consumes large amounts of plastics and requires transportation, both of which use fossil fuels that contribute to climate change. Depending on the chemicals removed, a point-of-use water treatment system may be a safer and more economical way of ensuring you and your family has access to pesticide-free drinking water in the short term.



## A few examples of point-of-use water treatment systems that remove pesticides:

**Reverse osmosis filters (also called ultrafiltration).** Reverse osmosis filters are said to remove 99 percent of the toxic chemicals in water, including some pesticides. Reverse osmosis utilizes normal household water pressure to force water through a selective semi-permeable membrane that separates contaminants from the water. Treated water emerges from the other side of the membrane, and the accumulated impurities left behind are washed away. However, the downside of reverse osmosis filters is that they use a great deal of energy and water. Reverse osmosis filters generally can be purchased for \$300 to \$600.



Carbon water cartridge. Photo Courtesy Emilian Robert Vicol, July 31, 2010.

**Distillers.** Another device that will remove almost everything from water is a distiller. Distillers electrically heat water until it turns to steam; the steam then condenses and turns back into water in a separate chamber, leaving behind 99 percent of the contaminants. The disadvantage of distillers is that countertop models must be filled manually and they use a lot of electricity and may take several hours to produce one gallon of water. Distillers also do not remove metals such as lead and copper from the water. These products range from \$100 to \$300.

**Activated carbon (AC) Filters.** Many AC filters remove pesticides in addition to chlorine, radon, trihalomethanes, and some inorganic chemicals. Check before buying to find out exactly what is removed. It is very important to be vigilant about replacing the filter cartridge because it may accumulate the contaminants it cleans from water, and bacteria may breed in it. Effectiveness of a particular carbon unit is directly related to the amount of activated carbon it contains. Beneath-the-counter systems with dual filters typically cost from \$100 to \$200. If you rent your home and beneath-the-counter systems are impractical, at the same cost there are now larger, over-the-counter, faucet-attachment carbon filters. Many of the less expensive, 'big-name' faucet-attachment models are only somewhat effective at filtering organic chemicals, so the extra money is worth it. Whole house systems can be installed as well as showerhead models, both of which will also decontaminate water used for bathing.

through the skin, so shower or bath water should be considered a route of exposure. It is important to perform some research before purchasing a point-of-use water device because health and safety claims made by manufacturers can be misleading. Some systems only improve the taste and odor of water, while others go further and actually reduce pesticides and other contaminants' concentrations. When considering a treatment device, make sure to read the data sheets provided by the manufacturer. Also look for independent documentation on the performance of the device for the contaminants of concern.

Ideally, seek out devices that are certified with the independent non-profit organization National Sanitation Foundation (NSF), whose logo should appear on its data sheets. NSF requires annual re-certification, periodic retesting,

and also preforms unannounced plant inspections of filtration manufacturers. Use NSF's Certified Drinking Water Treatment Units online database as a guide to find a filter at [bit.ly/nsfcertified](http://bit.ly/nsfcertified). If there are certain chemicals of concern in your water, the guide can direct you to products that claim to specifically reduce the contaminant in question.

### The Long Term Solution

Precautionary measures at your household faucet are only the first steps toward an end goal of clean water from source to tap. We must consider how the trajectory on which we are headed will impact future generations, and make adjustments so that a reliance on short-term solutions does not become ingrained in how we respond to these problems.

Beyond Pesticides encourages you to get

active and speak with members of your community and local government about changing land management practices in order to safeguard local water supplies. Working with your city, county, or town to implement organic land management policies will drastically reduce the pesticides in local waters and also encourage private homeowners to forgo their use of these chemicals. At a time of widespread pesticide contamination in our drinking water sources, inadequate government regulation, and a rampant distrust of tap water, we need, more than ever, land management policies that restore public trust in our ability to manage environmental issues, and safeguard the health of all individuals and communities now and into the future.

*A fully cited version of this available at <http://bit.ly/pesticidesandyou>.*

## BEE Protective Habitat Guide Creating Pesticide-Free Native Pollinator Habitat

*Beyond Pesticides, 2013. 18pp. \$3.50 each or 10 plus at \$3 each.*

The *BEE Protective Habitat Guide* is an invaluable resource for gardeners and activists wanting to work in their yards and communities to support pollinators and pollinator habitat.

The guide is available in hard copy and online at [www.BEEProtective.org](http://www.BEEProtective.org), as one of the many resources available in Beyond Pesticides' BEE Protective Campaign.

The guide, which catalogues a variety of flower species that are known to nurture pollinator populations in the U.S., with a focus on insect pollinators, is arranged in alphabetical order by common name. The guide is organized by season and provides information on pollinator types attracted to the plants, and plant's regional dispersal – all this to encourage gardeners and land managers to plant flowers that will bloom all year round.

For those new to the issue, the guide also lays out the role of pesticides in pollinator decline. It explains how pollinators are exposed, which pesticides are associated with pollinator decline, and the inadequacy of current regulations. Pesticides have been identified as important contributors to the decline of pollinators because of their acute and chronic effects. Pollinators foraging and pollinating are exposed to pesticides as a result of direct application to crops and plants, drift from spraying and volatilization, and the uptake from treated seeds of toxic chemicals that move systemically through the plant. Contaminated pollen and nectar, a source of food for bees and other insect pollinators, proves to be a major source of chronic exposure. Additionally, residual pesticide contamination persists for extended periods in soil and water. Adverse effects in bees, including impaired reproduction, compromised immune function, and degraded ability to forage and navigate, have all been linked to low level pesticide exposure. For honey bees, the decline in populations has been exacerbated by pesticides that weaken the immune system, making them more

susceptible to bacteria, viruses, and mites that prey on them.

The guide highlights some of the major suspected pesticides in current pollinator decline including neonicotinoids, a relatively new class of insecticide for indoor and outdoor insect control, home gardening and pet products, and includes imidacloprid,

clothianidin, and thiamethoxam. Other pesticides under scrutiny include synthetic pyrethroids, fipronil, and some organophosphates.

Most importantly, the guide provides tools that activists and gardeners can use in their communities to support efforts to protect pollinators, including background on the urgent need for pollinator protection, a pollinator habitat pledge, and information about alternative, least-toxic pest control options.

Fortunately, the guide provides seven steps that anyone can take to help support and protect pollinators. They are:

1. Creating pollinator friendly habitat with the help of this guide,
2. Using least-toxic alternatives pest control in gardens and backyards,
3. Buying and supporting organic, and adopting organic practices,
4. Pledging gardens, yards and parks as pollinator friendly,
5. Supporting bees and pollination services by becoming a beekeeper,
6. Becoming an activist in local communities to support pollinator habitat and reduce pesticide use, and
7. Urging elected officials and federal agencies to act to protect pollinators.

The *Habitat Guide* is one of many tools that BEE Protective offers in order to help educate on the importance of pollinators and pollinator habitat, and spur action at the local level to pass policies that reduce toxic pesticide use and protect pollinator populations. For a hard copy, contact us at [info@beyondpesticides.org](mailto:info@beyondpesticides.org) or call 202-543-5450. Other pollinator resources are also available on the BEE Protective website.





# Support the Clear Unequivocal Voice of Beyond Pesticides to Protect Health and the Environment

## Get your community off the toxic treadmill

### ...We're Here to Help!

Did you know that we assist thousands of people each year through our website, by phone, email and in person?

Visit us at our online "doorways" listed below to get started:

### Have a pest problem?

Find a service provider, learn how to do it yourself, and more.

<http://bit.ly/doorwayPests>

### Tools for Change

Find resources for activists and information on Beyond Pesticides' campaigns.

<http://bit.ly/doorwayTools>

### Sign Up and Donate

Your support enables our work to eliminate pesticides in our homes, schools, workplaces and food supply.

### Action Alerts

Sign up for free at: <http://bit.ly/SignUpBP>

### Join Beyond Pesticides

#### Membership Rates:

- \$15 low-income
- \$25 Individual
- \$30 all-volunteer org
- \$50 public interest org
- \$100 business

Membership to Beyond Pesticides includes a subscription to our quarterly magazine, *Pesticides and You*.

### Two easy ways to become a member:

- Go to -

[www.beyondpesticides.org/join/membership.php](http://www.beyondpesticides.org/join/membership.php)

- Or -

Simply mail a check in the enclosed envelope to: Beyond Pesticides, 701 E St SE, Washington, DC 20003

### Questions?

Give us a call at 202-543-5450 or send an email to [info@beyondpesticides.org](mailto:info@beyondpesticides.org)



## BEYOND PESTICIDES

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

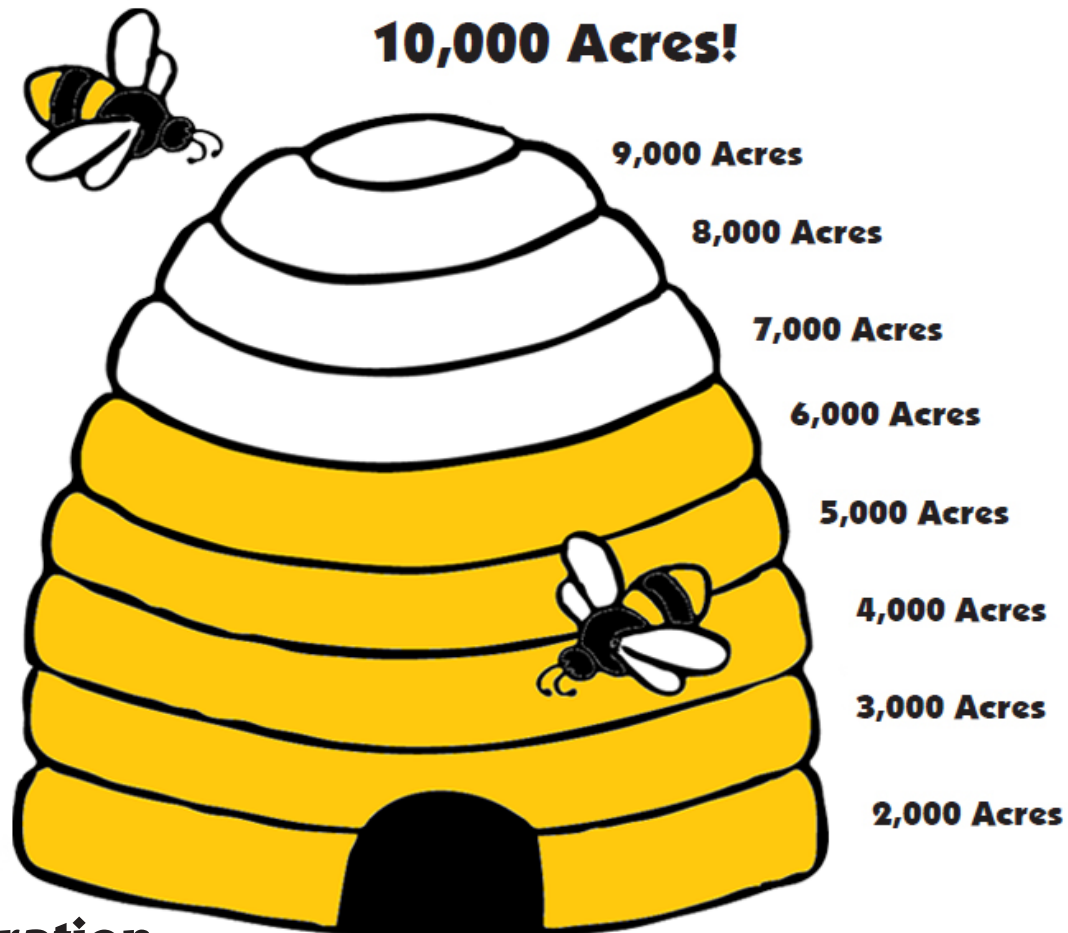
NON-PROFIT ORG.  
U.S. POSTAGE  
PAID  
Washington DC  
Permit No. 345

Summer 2013 ■ Vol. 33, No. 2



# Take the pledge today!

Help us reach  
our goal of  
**10,000 acres**  
of organic,  
pollinator-  
friendly land!



Sign up at:  
[bit.ly/LawnDeclaration](http://bit.ly/LawnDeclaration)