

Managing Landscapes Without Toxic Pesticides

**Implementing an Action Plan
on Pilot Sites**

**County Council
Maui County, Hawaii**

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Beyond Pesticides
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The Federal Pesticide Policy Context

Rachel Carson

52th Anniversary of *Silent Spring*

Rachel Carson's landmark book, *Silent Spring*, published in 1962 –53 years ago, has provided us with guiding principles, an affirmation of core values, rooted in scientific understanding of biological systems that are central to the sustainability of our environment and our very existence.

Complex Biological Systems

■ “By their very nature, chemical controls are self-defeating, for they have been devised and applied without taking into account the complex biological systems against which they have been blindly hurled. The chemicals may have been pretested against a few individual species, but not against living communities.”

■ “To assume that we must resign ourselves to turning our waterways into rivers of death is to follow the counsel of despair and defeatism. We must make wider use of alternative methods that are now known, and we must devote our ingenuity and resources to developing others.”

-Rachel Carson, *Silent Spring*

Framework for Moving Forward

Ms. Carson has given us a life-long guide to understanding the effects of chemical-intensive practices, the importance of our relationship to nature, understanding chemical effects at the cellular level and resulting cancer, neurotoxic, genetic, and reproductive effects, and insect and weed resistance to chemical controls.

But, most importantly, she gives us a framework for moving off the chemical treadmill of increasing chemical dependency.

What's In A Pesticide?

Active Ingredients are by nature biologically and chemically active against the target pest, be it an insect or fungus. By definition, these materials kill living things.

Inert Ingredients are often as toxic as the active ingredient, although the law defines these materials as “secret business information.” Inerts, often petrochemicals, like benzene, toluene or xylene, generally make up the largest percentage of a pesticide formulation. Inerts are the solution, dust, or granule in which the active ingredient is mixed. Inerts generally make up the majority of the pesticide product formulation.

Contaminants and impurities are often a part of the pesticide product and are responsible for the product hazards. Dioxins are contaminants in pentachlorophenol, created as a function of the production process.

Metabolites, often more hazardous than the active ingredients, are breakdown products which form when the pesticide mixes with air, water, soil or living organisms.

Assessing FIFRA

The *Federal, Insecticide, Fungicide, and Rodenticide Act* (FIFRA), the nation's primary law facilitating pesticide registration, provides an inadequate framework:

- Risk Assessment Limitations
- Conditional Registration
- Unreasonable Adverse Effects
- Lack of Efficacy/Essentiality Consideration
- Inadequate Labels and Enforcement
- Emergency Exemptions and Special Local Needs

Complexities Not Addressed



- Mixtures
- Synergistic effects
- Inerts, metabolites and contaminants
- Endocrine disruption
- Assumes 100% compliance
- Arbitrary exposure assumptions
- No monitoring of adverse effects
- Additional margin of safety sometimes arbitrary
- Uncertainties/limitation of risk assessment not disclosed on products

30 Commonly Used Lawn Pesticides

Health Effects

- 16 are likely, probable or possible carcinogens
- 17 are known or suspected endocrine disruptors
- 12 are linked to birth defects
- 21 are reproductive toxicants
- 25 cause kidney or liver damage
- 26 are sensitizers/irritants

Parks Department Pesticides

Product	Active Ingredient	Cancer	Endocrine Disruption	Reproductive Effects	Neurotoxicity	Kidney/Liver Damage	Birth/Developmental Impacts	Groundwater Contamination (or runoff)	Toxic to Wildlife
Celsius	Dicamba			X	X	X	X	X	X
	Thiencarbazone-methyl					X			
	Napthalene	X				X		X	
Certainty	Metribuzin		X	X			X		X
Dismiss	Sulfentrazone			X			X		X
Revolver	Formasulfuron (new chemical, little data)					X		X	X (non-target)
	Napthlene	X				X		X	
Sencor	Metribuzin		X	X			X		X
Speedzone Southern	Dicamba			X	X	X	X	X	X
	2,4-D	X		X	X	X	X	X	X
	Carfentrazone-ethyl								X
	Mecoprop	X		X	X	X	X	X	X
Surflan Preemergent	Oryzalin					X	X	X	X

Golf Course Pesticides

Product	Active Ingredient	Cancer	Endocrine Disruption	Reproductive Effects	Neurotoxicity	Kidney/Liver Damage	Birth/Developmental Impacts	Groundwater Contamination	Toxic to Wildlife
Evade Preemergent	Prodiamide	X			X				
Dismiss	Sulfentrazone			X			X		X
MSMA	Monosodium methanearsonate	X		X		X		X	X
Revolver	Formasulfuron (new chemical, little data)					X		X (or runoff)	X (non-target)
	Napthlene	X			X	X		X	
Sencor	Metribuzin		X	X		X	X		X
Specticle Preemergent	Indaziflam				X	X	X	X	X

Public Works Pesticides

Product	Active Ingredient	Cancer	Endocrine Disruption	Reproductive Effects	Neurotoxicity	Kidney/Liver Damage	Birth/Developmental Impacts	Groundwater Contamination	Toxic to Wildlife
Roundup/Aqua-master/Kleen Up Pro	<i>Glyphosate</i>	X	X	X		X			X



30 Commonly Used Lawn Pesticides

- 19 are groundwater contaminants
- 22 are toxic to birds
- 30 are toxic to fish and other aquatic life
- 29 are toxic to bees





Environmental Impacts

Aquatic microorganisms & plants

– disrupts foundation for aquatic ecosystems

Amphibians – global decline, gender-bending

Fish – kills, intersex & other symptoms of endocrine disruption

Chronic poisoning

- Frog deformities have been linked to a number of pesticides, including atrazine, glyphosate, and other herbicides.



Indirect effects of pesticides

- Herbicides can cause a reduction in habitat or food, such as milkweeds used by monarch butterflies.
- Systemic insecticides can harm pollinators, including honey bees and wild bees.





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- Parkinson's Disease
- Sexual and Reproductive Dysfunction
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- Alternatives Factsheets
- How-To Factsheets
- Eating with a Conscience
- Quarterly Magazine: Pesticides and You
- Daily News
- State Pages
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Pesticide-Induced Diseases Database

The common diseases affecting the public's health are all too well-known in the 21st century: **asthma, autism and learning disabilities, birth defects and reproductive dysfunction, diabetes, Parkinson's and Alzheimer's** diseases, and several types of **cancer**. Their connection to pesticide exposure continues to strengthen despite efforts to restrict individual chemical exposure, or mitigate chemical risks, using risk assessment-based policy.

The *Pesticide-Induced Diseases Database*, launched by Beyond Pesticides, facilitates access to epidemiologic and laboratory studies based on real world exposure scenarios that link public health effects to pesticides. The scientific literature documents elevated rates of chronic diseases among people exposed to pesticides, with increasing numbers of studies associated with both specific illnesses and a range of illnesses. With some of these diseases at very high and, perhaps, epidemic proportions, there is an urgent need for public policy at all levels—local, state, and national—to end dependency on toxic pesticides, replacing them with carefully defined green strategies.

The current database, which contains hundreds of studies, itself is preliminary and will be added to over the coming months. **We urge readers to send studies to info@beyondpesticides.org that you think should be added to the database.**

Data Supports Policy Change

The database is a tool to support efforts to eliminate the continued use of hazardous pesticides in favor of green strategies that emphasize non-toxic and least-toxic alternative practices and products. The studies in the database show that our current approach to restricting pesticide use through risk assessment-based mitigation measures is not working. This failed human experiment must be ended. The warnings of those who have expressed concerns about risk assessment, such as EPA Administrator under Presidents Nixon and Reagan, William Ruckelshaus, have been borne out by three decades of use and study. Mr. Ruckelshaus in 1984 said, "We should remember that risk assessment data can be like the captured spy: If you torture it long enough, it will tell you anything you want to know." EPA's risk assessment fails to look at chemical mixtures, synergistic effects, certain health endpoints (such as endocrine disruption), disproportionate effects to vulnerable population groups, and regular noncompliance with product label directions. These deficiencies contribute to its severe limitations in defining real world poisoning, as captured by epidemiologic studies in the database.

An enlightened policy approach to proposed or continued toxic chemical use, in an age where the adverse effects have been widely and increasingly documented, is to first ask whether there is a less toxic way of achieving the toxic chemical's intended purpose. Simply, "Is there another practice that would make the substance unnecessary?" This approach does not preclude and should demand the prohibition of high hazard chemical use, those chemicals that are simply too dangerous.

The alternatives assessment approach differs most dramatically from a risk assessment-based policy in rejecting uses and exposures deemed acceptable under risk assessment calculations, but unnecessary because of the availability of safer alternatives. In agriculture, where the database shows clear links to pesticide use and cancer, it would no longer be possible to use hazardous pesticides, as it is with risk assessment-based policy, when there are clearly effective organic systems with competitive yields that, in fact, outperform chemical-intensive agriculture in drought years. Cost comparisons must take into account externalities such



Pesticide-Induced Disease Database

<http://www.beyondpesticides.org/health>

Pesticide-Induced Diseases

Beyond Pesticides' **Pesticide-induced Diseases Database** includes:

- Over 760 entries of studies that link labeled uses of pesticides (as instructed) to public health diseases:
- cancer, reproductive problems, neurological and immune system damage, Alzheimer's, Parkinson's, diabetes, asthma, and learning disabilities.
- When a Stanford University study finds, as it did in September, 2013 that the body burden of dozens of pesticides that we now all carry are not clinically linked to adverse effects, researchers need to be asked to study the wealth of epidemiologic studies that link use to disease.

Incentivizing Safer

- **Incentivize** use of non-toxic systems, with acceptable materials.

OR

- **Institutionalize** products and practices with acceptable risks -based on risk assessments with inherent limitations.

A Systems Approach: Organic Foods Protection Act (OFPA)

- Requires Organic Systems Plans for agricultural producers, evaluated through certification system; default against synthetic inputs; establishes *National List of Allowed and Prohibited Substances* –compatible synthetic inputs based on life cycle analyses, protecting against adverse health and environmental effects.
- Operates with definition: “Organic agriculture is an ecological production management system that promotes and enhances biodiversity, biological cycles and soil biological activity. It is based on minimal use of off-farm inputs and on management practices that restore, maintain and enhance ecological harmony.”





**Conventional
chemical-
intensive**

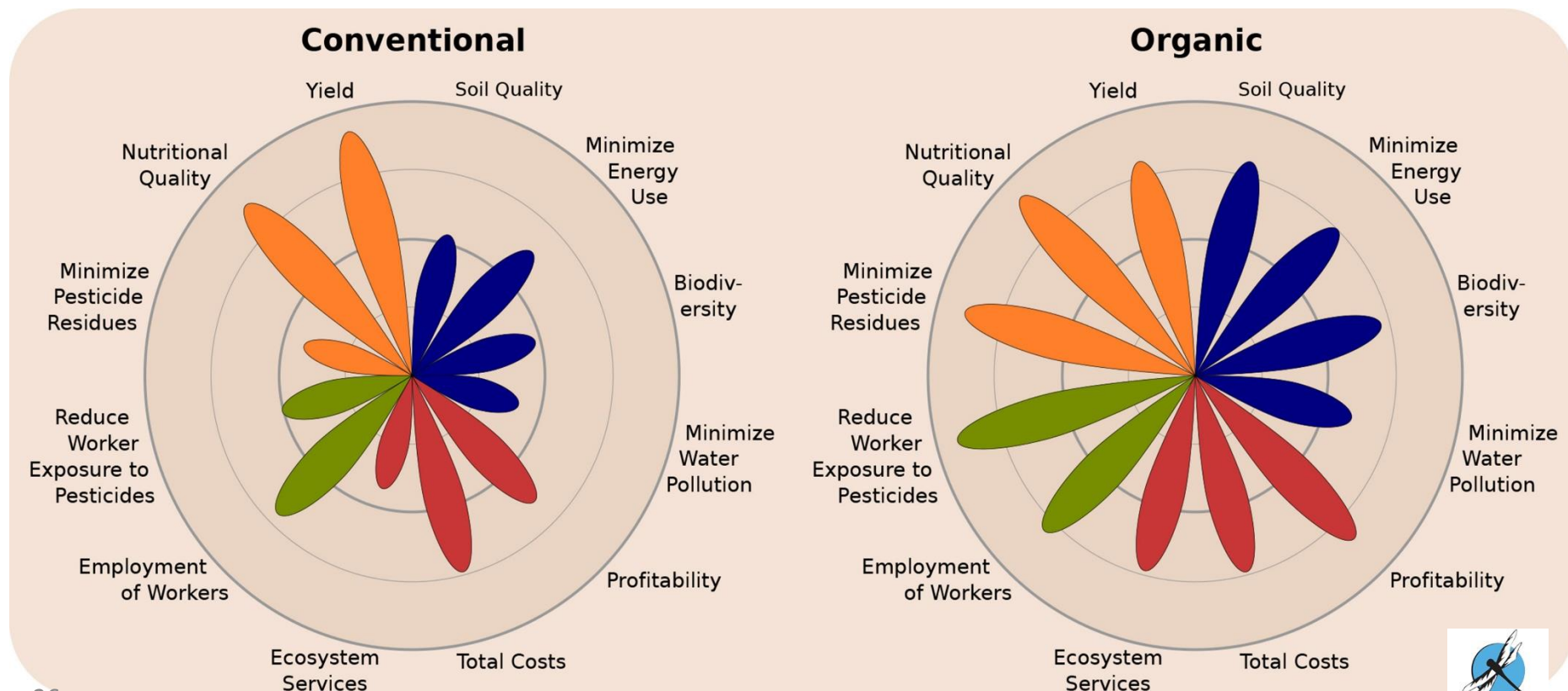
vs. Organic



Washington State University 2016 Study: Numerous benefits from organic production

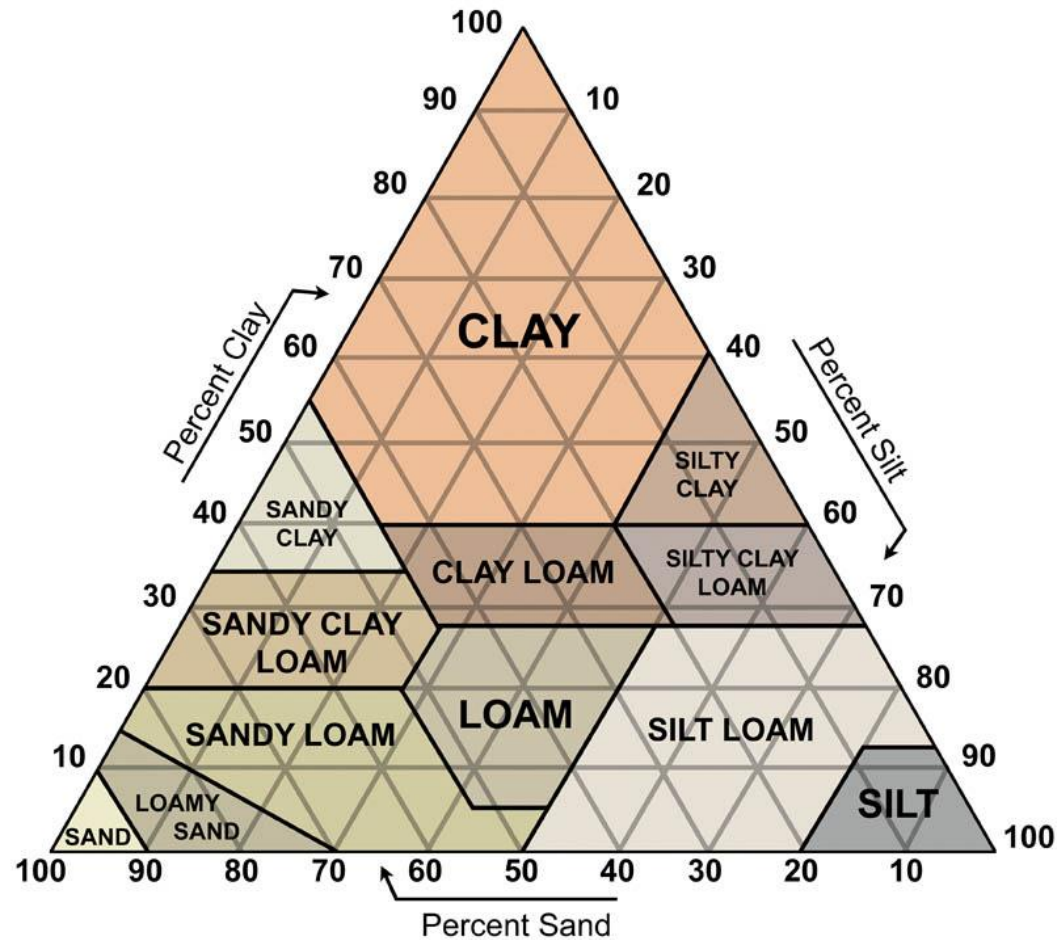
An organic turfgrass system also:

- Improves soil quality ■ Minimizes energy use ■ Increases biodiversity ■ Minimizes water pollution
- Minimizes pesticide residues ■ Reduces worker exposure to pesticide residues ■ Improves ecosystem services ■ Equal or less cost in the long term while maintaining quality landscapes





Soil Textural Triangle



Soil Chemistry Basics

- pH (Acidity or Alkalinity)
- Nutrient Management
- Organic Matter (OM) and Cation Exchange Capacity (CEC)



Soil Biomass and Microorganisms

- Soil biomass is the foundation upon which our nutrient program is based.
- In taking a “feed the soil” approach, soil microbes are at the heart of our management strategy.
- Natural, organic fertilizer is broken down by the microbial life to nutrients for the plant.
- Synthetic fertilizers by their nature, and with high salt content, compromise the activity of the life in the soil.



Managing the Biomass

- Compost Tea
 - Large number of microbes to soil
- Humates
 - Builds healthy soil; Increased organic matter which helps to reduce N loss through leaching; Contains carbon as an energy source for microbes; Improves soil structure, aggregation, water infiltration, aeration, and water-holding capacity; Increases nutrient availability to the grass plant; Facilitates mineral breakdown; Increases microbial activity; And, helps with root growth and penetration, and chlorophyll density
- Compost
 - Increases soil organic matter; When combined with over-seeding, enhances germination and establishment; By virtue of its neutral pH and healthy microbial population, helps buffer the soil and counteract naturally acidic soils without the use of lime; During decomposition, continues to release nutrients



Transition Period

- When moving from a conventional program to a natural one, the length of transition is directly related to the intensity of current and past management practices and the overall turf quality.
- After years of synthetic, water-soluble fertilizers with high salt levels, the soil microbiology has been bypassed and somewhat compromised.
- Don't expect a collapse or failure.



Fertility and Turfgrass Nutrition

- Nitrogen (N), Potassium (K) and Phosphorus (P).
- Nitrogen not just from liquid fertilizer, also from compost topdressing, compost tea and humic substances, microbial inoculants, and grass clippings.
- Synthetic fertilizers provide “quick green-up,” but pollute and require many applications.
- Organic fertilizers work with soil microbial life.



Cultural Practices

- Irrigation
 - Deep watering
- Cultivation
 - Need non-compacted, aerobic soils
- Over-seeding
 - Maximum density of grass suppresses weeds
- Mowing
 - 3 inches



Site Analysis and History

Maui County

- Little League Field #2
- Makana Park, Paia
- South Maui Community Park – Soccer Field
- Luana Gardens



To follow, report with:

- Soil Test Data by site
- Site Photos
- Recommendations by site
aggregation
- Management schedule by site

and

- Staff Training



Growing Trend Across the U.S. & Canada

Beyond Pesticides' "Tools for Change" (bit.ly/Tools4change) highlights 50+ community initiatives that reduce or eliminate pesticide use in land care (non-comprehensive list).

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Diseases
National Pesticide Forum
National Watchdog
Organic Agriculture
Rodenticides
Threatened Waters
Wildlife
Wood Preservatives

- Local Organic Land Management, IPM and Pesticide Reduction Policies and Programs**
An Organic Land Management program, or a strong integrated pest management (IPM) definition and policy is one of the best ways to minimize or eliminate exposure to pesticides. IPM is a term that is used loosely with many different definitions and methods of implementation. Beyond Pesticides defines IPM as a program of prevention, monitoring, and control which offers the opportunity to eliminate or drastically reduce pesticides, and to minimize the toxicity of and exposure to any products which are used. Education, in the form of workshops, training sessions and written materials, is an essential component of an IPM program. Concrete examples of IPM strategies and pesticide reduction policies have been implemented in the following localities
- Model Ordinance for Public Property.**
 - Applicable to all localities in the United States, but only restricts pesticide use on publicly owned property. If you live in one of the **21 states that are not explicitly pre-empted** by state pesticide policy we encourage you to use the *Model Ordinance for Public and Private Property*, below.
- Model Ordinance for Public and Private Property.**
 - Applicable only to **localities in seven states that are not preempted** from adopting local ordinances and **14 states** which have the potential authority to create stronger pesticide regulations.
- Takoma Park, MD, and Ogunquit, ME** banned cosmetic lawn pesticides on both public property and private, residential property throughout the city.
 - Beyond Pesticides **worked with community members** in Takoma Park to help pass the *Safe Grow Act*, and also created educational materials for the city in order to implement the ordinance. See Beyond Pesticides' model implementation plan [here](#).
- California has been a bastion for growing city-wide IPM and Pesticide Reduction policies and programs:

Arcata	San Francisco	San Diego	Santa Barbara	Santa Cruz
Santa Monica	Marin	Fairfax	Berkeley	Davis
Contra Costa	Corte Madero	Richmond		
- These trends have been support around the nation including:
 - Plainville, CT
 - Cuyahoga County, OH
 - Durango, CO
 - Madison-Dane County (weed and feed product ban)
 - Marblehead, MA (organic land care policy)
 - Newton, MA
 - Wellesley, MA
 - Wellfleet, MA (Selectmen's meeting minutes, see p. 3)
 - Bernards' Township, NJ
 - Carrboro, NC
 - Vorhees, NJ
 - Santa Fe, NM
 - Albany, NY
 - New York City, NY
 - Eugene, OR

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- King County, WA** (County-wide)
 - Pesticide-Free Places:** In order to provide citizens with the utmost level of transparency, communities across the country are beginning to put their pesticide free zones on a real-time map! Find outdoor areas in King County managed pesticide-free or pesticide-reduced to protect people, water and wildlife. This interactive map lists over 800 parks, garden, trails and natural areas in King County. Including, of course, parks in the City of Shoreline and the City of Seattle.
- Olympia, WA** (PBT and pesticide reduction city policy)
- Seattle, WA** (City Program)
- Washington, DC** ("Pesticide Education and Control Amendment Act of 2012")
- Greenbelt, MD**

Pesticide-Free Parks
A growing number of communities across the country, concerned about pesticide impacts to public health, the environment, and wildlife, are taking actions that you can replicate in your own city or town. From the north shore of Massachusetts to San Diego, CA, municipalities are establishing pesticide-free parks, piloting organic playing fields, passing policies that restrict pesticides on municipal lands, or voluntarily for private land.

Some of the most promising examples of pesticide free parks include:

- Eastwood Park in Mill Valley, CA
- Fairfax, CA
- Santa Barbara, CA
- Corte Madera, CA
- Plainville, CT
- Sarasota, FL
- Lawrence, KS
- Marblehead, MA (Town-owned land)
- Brick, NJ
- Hazlet, NJ
- Chatham, NJ
- Ocean City, NJ
- Wichita, KS
- Portland, OR
- Seattle, WA
- Shoreline, WA
- Camden, ME
- Vorhees, NJ
- Rockport, ME
- Rockland County, NY
- New Paltz, NY
- Westchester County, NY
- Branford, CT (*The Sounds* article).

State Policies

- Connecticut - Proposed 2005 Act Concerning Municipal Restriction of Lawn Care Pesticides**
- New York - Child Safe Playing Fields Act Passed in 2010** (See Education Law 409-k for schools; Social

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Beyond Pesticides' Organic Land Care Program

Initiated by an action plan:

Organic Land Management Action Plan [XXX Community]

Grantee: [XXX]
Contact: [XXXXX]

Funding:

Cost of Project: \$ 3,500

Funds Requested from Beyond Pesticides: \$(XXX)

Community Contribution: \$(XXX)

Services to be funded: 1 day long 8 hour training by Osborne Organics [or an equivalent service provider with knowledge and experience in organic turf and landscape management].

Expected Outcomes

Trained staff and administrators – a 1 day training for administrators and staff of XXX focused on the concepts and techniques to convert traditional and IPM land management to organic.

This training is in is the first step in implementation of a strategy to adopt organic land management practices by:

1. Enabling decision makers to understand the concepts, challenges, strategies, benefits and outcomes of going organic to enable them to set a new community policy.
2. Preparing the staff and decision makers to participate in the development and implementation of a possible transition plan to be facilitated by Osborne Organics (or an equivalent service provider with knowledge and experience in organic turf and landscape management) to chemical free management of public lands.

Beyond Pesticides will contribute up to 100% of the cost of this training. The organization is encouraging the community to conduct this training and is willing to provide financial support for this action plan to make the transition. We ask that the community commit at least two public spaces to this approach.

The community will work with the service provider to conduct the following activities related to turf management:

- Document existing conditions.
- Determine site expectations.
- Test soil and analyze nutrient, textural, and soil microbial life.
- Assess current and past management practices, both cultural and product.
- Provide access to records on material and product use.
- Formulate action and management plan and report to transition in an area of the community choosing.
- Help develop contract specification for the related work that the community contracts out.
- Receive technical assistance through part of the first year of transition.

Signature: _____ Date: _____

To initiate the action plan, a signature from a government official responsible for landscape management in XXX is required.

■ Aims to support the successful implementation of an organic land care ordinance.

■ Provides for:

■ Training in systems-based approach to natural land care

■ Specifically tailored management plan at designated demonstration sites, based on:

■ Site walk-through and evaluation

■ Soil sampling for structural, chemical, and biological composition of the soil

■ Questionnaire on current management practices

■ Ongoing consultation/technical support on as-needed basis

■ Not a a service provider or bidding on county work

■ Not selling a specific product – focus is on creating a healthy, resilient soil system that resists weed and pest pressure, not replacing one pesticide for another.

Rachel Carson

Can anyone believe it is possible
to lay down such a barrage of poisons
on the surface of the earth
without making it unfit for all life?

Contact

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