In Harmony

sustainable landscapes

One Man's view of looking at weeds

A HOLISTIC VIEW OF PLANT GROWTH

Gardeners and homeowners have been programed and marketed to by chemical companies

EXTEND OPEN SEASON ON HARD-TO-KILL WEEDS.

For a cool-weather assault on hard-to-control weeds, arm yourself with the powerful arsenal of Super Trimec or Turf Ester. You can stretch your weed-control season with extra applications in the fall or get an early jump on weeds in the spring. So if you have pesky dandelions, black medic, ground ivy or clover in your sights, take'm out now with Super Trimec or Turf Ester. You can't get better cool-weather performance.

85,785,897
acres treated

1-800-[illegible] FOR ANY WEED PROBLEM, TRIMEC® HAS THE SOLUTION.

Six new ways to grow

The Scotts Advantage® keeps on spreading with the introduction of new combination fertilizers from Scotts® Landscaper PRO.™ Each offers three to four months of proven Poly-S® nutrition. Five save you time and labor by adding pest-control ingredients; one offers additional micronutrients for better results in deficient soils. Feed turf, trees and ornamentals the advanced nutrition of Scotts Landscaper PRO: four original granular turf and ornamental fertilizers, and now six new combination products.

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Scotts Landscaper PRO™

USGS

Pesticides Detected in Urban Streams During Rainstorms and Relations to Retail Sales of Pesticides in King County, Washington

According to studies conducted in the Puget Sound Basin from 1987 to 1995 and summarized by Bortleson and Davis (1997), more types of pesticides were detected in urban streams than in agricultural streams. As well, in the Puget Sound Basin, more pounds of pesticides were applied in urban than in agricultural areas (Tetra Tech Incorporated, 1988). To provide some insight about sources of pesticides found in urban streams, the U.S. Geological Survey (USGS), the Washington State Department of Ecology, and King County collaborated to study and compare types of pesticides found in urban stream water with pesticide sales information from large home and garden stores.

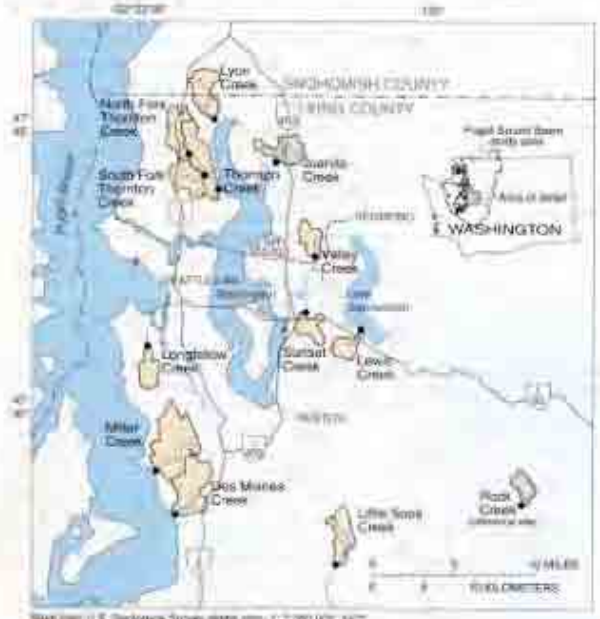


Figure 1. Location of sampling sites within watersheds.

Study Design

The study was designed to detect the largest number of pesticides likely to be transported in surface runoff to urban streams. Sampling occurred when pesticide applications to residential areas were high and when transport of pesticides to surface water would be likely. Sampling was conducted in April and May because data from home and garden stores indicate that pesticide application rates are higher in April and May than in any other months during the year.

Sampling was conducted during storms because previous sampling at Thornton Creek by the USGS showed that pesticide runoff is greatest during storms. Pesticides are not only more likely to be found during storms, but the concentrations of the pesticides found are also more likely to be of ecological concern.

From two to four surface-water samples were collected at each of 12 study sites in 10 urban or suburban watersheds in King County (fig. 1). Rock Creek, in an undeveloped basin, was sampled as a reference site.

Findings

Twenty-three pesticides were detected in water from urban streams during rainstorms, and the concentrations of five of these pesticides exceeded limits set to protect aquatic life.

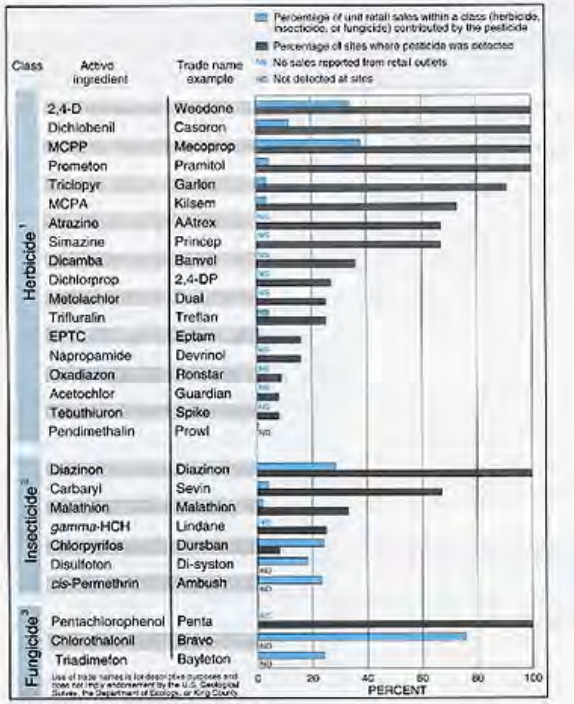
During rainstorms, 23 of 98 pesticides sampled for were detected in water samples from 12 study sites in 10 urban watersheds. Concentrations of five insecticides exceeded recommended maximum concentrations set by the National Academy of Sciences and National Academy of Engineering (NAS/NAE) (1973). In a few samples, concentrations of Diazinon, carbaryl, and Lindane exceeded U.S. Environmental Protection Agency (USEPA) and other chronic aquatic life criteria.

Pesticides used on lawns and gardens contribute to the occurrence of several pesticides in urban streams.

According to 1997 sales data from home and garden stores, of the pesticides sampled for, Diazinon, 2,4-D, and MCPP are the most frequently purchased pesticides by residents of King County. MCPP and 2,4-D are also among those pesticides used by professional applicators for pest control in residential, recreational, and industrial areas. The presence of these pesticides in water samples from all of the 12 study sites shows that their widespread application impacts water quality in urban streams. Also, residents purchased and applied four of the five pesticides that exceeded recommended maximum concentrations set by the NAS/NAE (Diazinon, carbaryl, Malathion, and chlorpyrifos).

Many pesticides found in urban streams might be the result of nonresidential applications.

Almost half of the 23 pesticides detected in stream water had no retail sales according to a 1997 survey of pesticides sales from home and garden stores in King County. Two of these pesticides, simazine and atrazine, were found at more than 60 percent of the study sites. This indicates that these pesticides are being applied to nonresidential areas in urban watersheds such as rights-of-way, parks, and recreational areas.



[1] Unit retail sales for these herbicides total to 140,000 units.
[2] Unit retail sales for these insecticides total to 66,000 units.
[3] Unit retail sales for these fungicides total to 1,700 units.

Figure 2. Percentage of unit retail sales in each pesticide class contributed by each pesticide and percentage of sites where pesticide was detected. Sales data for pesticides not analyzed for are not included.

Active ingredient and trade name[1] example in parentheses	Freshwater aquatic-life criteria, in parts per billion -- no aquatic-life criteria exist			Concentration, in parts per billion (ppb) RMC: recommended maximum concentration; Chronic aquatic-life criteria
Herbicide	Acute	Chronic	RMC	0.001 0.01 0.1 1 10 100
2,4-D (Weedone)	[4]10	[4]1	[5,2]4	
Acetochlor (Guardian)	--	--	--	
Atrazine (AAtrex)	[4]70	[4]7	[5]2	
Dicamba (Banvel)	[4]390	[4]39	[5]10	
Dichlobenil (Casoron)	--	--	[2]37	
Dichlorprop (2,4-DP)	--	--	--	
EPTC (Eptam)	--	--	--	
MCPA (Kilsem)	--	--	[5]2.6	
MCPP (Mecoprop)	--	--	--	
Metolachlor (Dual)	--	--	[5]8	
Napropamide (Devrinol)	--	--	--	
Oxadiazon (Ronstar)	--	--	--	
Prometon (Pramitol)	--	--	--	
Simazine (Princep)	[4]100	[4]10	[2,5]10	
Tebuthiuron (Spike)	--	--	--	
Triclopyr (Garlon)	[4]5,600	[4]560	--	
Trifluralin (Treflan)	--	--	[5]0.1	
Insecticide				
Carbaryl (Sevin)	[4]0.17	[4]0.017	[2]0.02	
Chlorpyrifos (Dursban)	[3,7]0.083	[3,7]0.041	[2]0.001	
Diazinon (Diazinon)	[6]0.16	[6]0.04	[2]0.009	
gamma-HCH (Lindane)	[3]0.95	[7]0.08	[2]0.02	
Malathion (Malathion)	--	[3]0.1	[2]0.008	
Fungicide				
Pentachlorophenol (Penta)	[3,8]19	[3,8]15	[5]0.5	

[1] Use of trade names is for descriptive purposes and does not imply endorsement by the U.S. Geological Survey, the Department of Ecology, or King County.
[2] National Academy of Sciences and National Academy of Engineering, 1973
[3] U.S. Environmental Protection Agency, 1998
[4] Norris and Dost, 1991, Table 3.
[5] Ministers of Health Canada and Environment Canada, 1995
[6] Mancini and Cox, 1994
[7] State of Washington, 1992
[8] Criteria are pH dependent; values shown calculated at pH of 7.8

Figure 3. Concentrations of pesticides detected in water and aquatic-life criteria.

In Harmony Philosophy

- We chose to focus on residential clients for a reason
- We felt it was easier to develop a relationship with a client one-on-one
- We were hoping that we could open the dialog about organic landscape care
- We understood that weeds were the most difficult ‘pest’ to control in any landscape, not just organic gardens
- We wanted to help the client understand weed control options and solutions

WEEDS!!!!

- They drive us nuts!!
- They survive in poor situations and thrive in good conditions
- They are very successful plants!!!

If we understand Mother Nature's methods we will appreciate her approach

A weed possesses certain definable characteristics that set it apart from other plants

- Abundant seed production
- Rapid population establishment
- Seed dormancy
- Long term survival of buried seeds
- Adaptations for spreading
- Presence of vegetative reproduction structures
- **The ability to occupy areas disturbed by human activities**

Plant Succession

- Ecosystems mature and change with time
- Always determined by the physical parameters of the environment
- Initial stages—high rate of replacement, unstable (prone to erosion and wind damage)
- Later stages—low rate of community change, more stable

Principals of Plant Succession

Living plants alter their environment, making room and creating proper soil conditions for other plants, which in turn make changes allowing for still other plants to take hold

A simple path of succession

- Primary succession occurs when plants become established on land completely devoid of soil and vegetation
- Lichens (pioneer species)>>>>
- Mosses & ferns>>>>
- Grasses>>>>
- Shrubs>>>>
- Trees
- As succession proceeds, soil is formed and thickens-the result of decomposition
- As the succession progresses, the soil biology, flora and fauna become more diversified and complex

Is this how Mother Nature works?

Areas disturbed by human activity

Plant succession at its finest

Climax Communities

- The relative stable community at the end of succession is called a **climax community**
- A climax community is thought to be in equilibrium with the environment
- Permanent until there is some type of environmental change (flood, fire, wind or climate change)

8 major types of climax communities

- Tundra
- Taiga
- Scrub forest (called chaparral in California)
- Desert
- Grassland
- Temperate Deciduous Forest
- Tropical Rain Forest
- Temperate Rain Forest

Which one do we live in?

Temperate Rain Forest

Our Environment

- Our environment eventually wants to get to a temperate rain forest biome
- Upper canopy trees include: Fir, Hemlock, Cedar and Spruce
- Understory trees include: Vine maples and dogwoods
- Forest floor—Ferns, Mosses and shrubs

Why is this important to know?

- Because our environment is perfect for lots of plant growth-we literally live in a 12 months a year plant living period
- Our environment allows for quick succession of plant material
- Plants will always be trying to establish themselves
- Any bare ground is ripe of plant growth

How can we work with Mother Nature?

- We must understand that natural systems can maintain themselves, disturbed systems can not
- Generally, humans knock out the climax community
- A turf grass lawn is not a climax community-other plants will always try to establish themselves

Integrated Pest Management

Principals and Methods

IPM or better yet: Plant Health Care (PHC)

Insect and disease problems usually are associated with a poor cultural situation; i.e.

- Poor soils
- Wrong plant in the wrong place
- Improper watering
- Too much or too little sun

These situations create unhealthy situations for plants, leading to insect and disease infestations

Fix the cultural problem and usually the pest problem will be lowered to a tolerable level or the pest problem may even go away

Weeds are a different kind of Pest

It takes a different mindset for this type of management system

Integrated Weed Management (IWM)

A successful WMP is based on long term solutions while setting realistic goals, timetables and expectations

Regardless of the number and species of weeds, it is not realistic to attempt to eradicate all weeds. The goal should be to reduce weeds to acceptable levels –

A Threshold Level

Establishing Thresholds and Expectations

Usually based entirely on the client's point of view

The client's point of view is usually based on unrealistic expectations.

It is our jobs as professionals to educate and inform the client- leading the client to an *informed* and *realistic* decision.

Successful IWM Programs

Successful plans will embrace these major factors that are in all successful IWM programs:

1. Persistence
2. Diligence
3. Tolerance

All IPM or IWM Programs consist of the following steps:

- Pest identification
- Prevention
- Physical or Mechanical Management
- Cultural Management
- Biological Management
- Chemical Management
- Review and recommendations

Look for reasons why the weed species is successful

Why is the plant dominating?

Or turn it around, why are our desirable plants not dominating

A Successful IWM Program

- Pest identification
- Prevention
- **Physical or Mechanical Management**
- Cultural Management
- Biological Management
- Chemical Management
- Review and recommendations

Weed Prevention

- Easier said than done
- Weed management is much simpler if weeds do not become established
- Do not introduce weeds from contaminated soils—know your soil sources
- Don’t plant ornamental species that are potentially weedy unless labor is available to control them

Physical or Mechanical Management

- **Hand weeding**-Most annual and biennial weed plants can be easily managed by hand weeding
- **Hoeing-**Hoeing is intended to cut weeds off at or just below the soil line with minimal soil disturbance
- **Heat and Flame**-Torches, hot water, radiant heat
- **Cultivation**-rototilling and similar methods, while effective for annual and biennial weeds, can contribute to the spread of perennial weeds
- **Mowing**-Mowing may provide adequate management of tall weeds by reducing seed population

Labor is the #1 factor for weed management success

- Seattle Times article:
- Lake Washington School District
- 40 sites
- 600 acres
- **9 People**

The best physical control: Mulching

- Mulching prevents weed growth
- Mulches work by preventing sunlight from getting to plants
- Dormant weed seeds will never get a chance to germinate
- Mulches aid in soil building

My Favorite Mulches

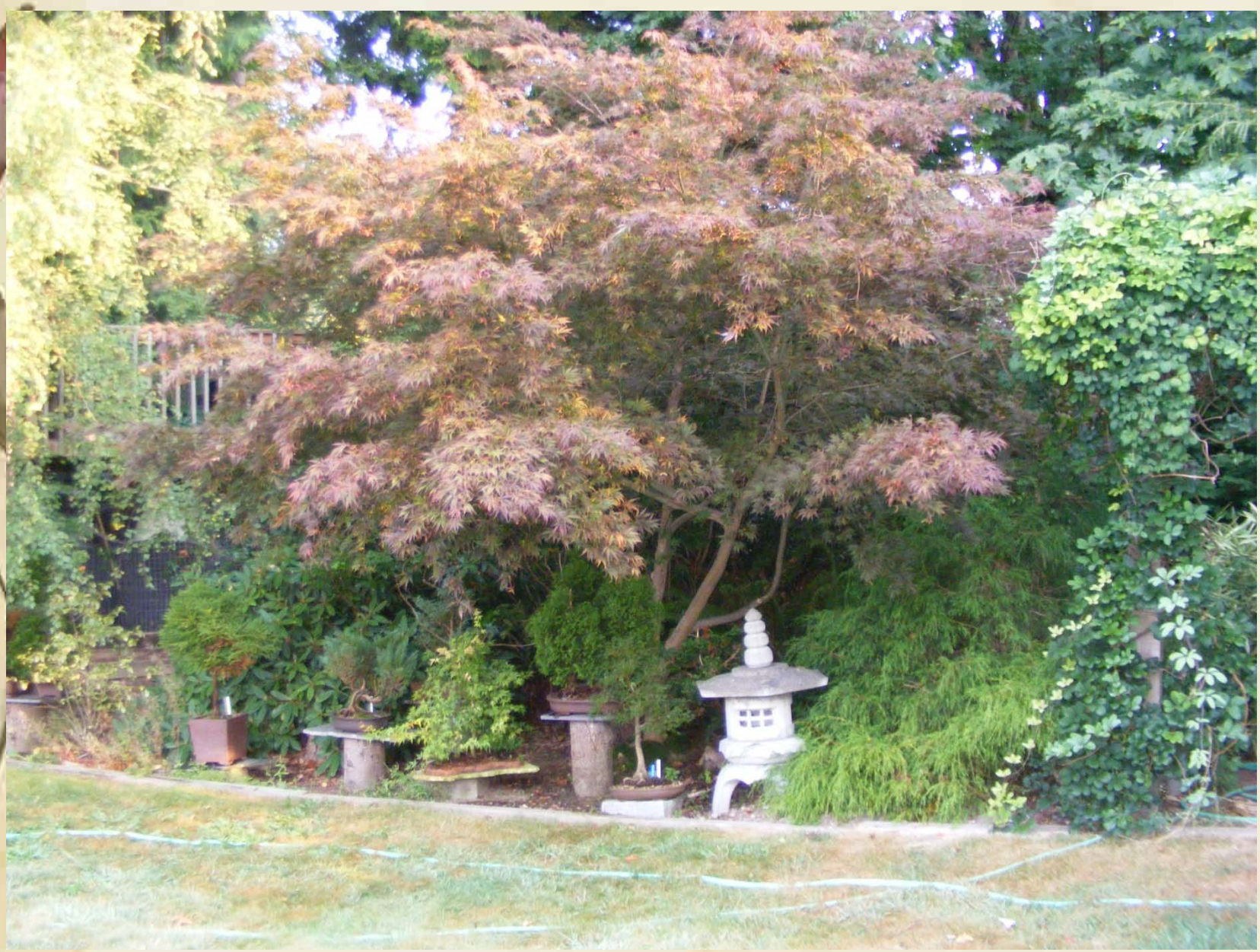
- Compost or composted bark-Needs to be replaced periodically due to natural decay-a good thing!

- Leaves-Nature's Gold. They are free! Leave them in flower and shrub beds to replenish nutrients and protect soil

Until your neighbors figure it out, they will usually rake them up and give them to you

- Use cardboard and leaves for quick and easy sheet mulching

- The thicker the better! Come back in spring or summer for planting



Sheet Mulching for bigger jobs

Using free arborist chips

- Work was completed in 8 labor hours-a 15 X 120 sq.ft. area
- No hauling off of any weed debris
- The cardboard was purchased through KOR recycled packaging-www.recycled-packaging.com
- The burlap sacks were free

Torches

- Heat is very effective in killing top growth
- Properly outfitted, this unit has water and a fire extinguisher for backups
- www.flameengineering.com

Radiant Heat

- Not as dangerous because there is no flame
- Heat destruction is quicker
- This unit has a backpack for the propane tank
- www.chemfree-weedcontol.com

Hot water is very effective

- Hot water can be a great weed control in the right situations
- Concrete, pavers, and even gravel areas are great areas to use hot water treatments

Even Cisco Morris likes using hot water! Watch out for your toes Cisco!

Cultural Management

Methods may include:

- Drip irrigation to minimize water availability to weeds
- Selective fertilizer applications (rather than broadcast)
- In Lawns, a healthy stand of grass will help weeds from getting established
- Best cultural management technique is:

Plant Competition

A healthy, thick lawn is the best weed defense

- By providing good soil, roots can grow deep and thick
- Direct result is a turf grass that is thick, lush and a tough competitor for weed plants

Great groundcover plants

Other Successful Plantings

Chemical Weed Management

- Use the least toxic products
- 25b pesticides are the first choices:
- Most are contact sprays, they will not kill the root
- Nature's glory weed and grass killer (25% acetic acid)
- Blackberry and Brush Blocker (20% citric acid)
- Burnout Herbicide –clove oil and vinegar
- Safer's soaps-fatty acids

If you decide to use traditional herbicides

- In an integrated weed management program, these products are only used as a last resort option
- Select the proper product for the job
- Read the label, Read the label, **READ THE LABEL**
- Make sure you will have proper timing
- Spray with care
- Always wear proper protective clothing

In Harmony's approach to Lawns

In Harmony's approach to bed weed care

Constant flow of information

Canada does not allow herbicide use for aesthetic purposes

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sustainable landscapes