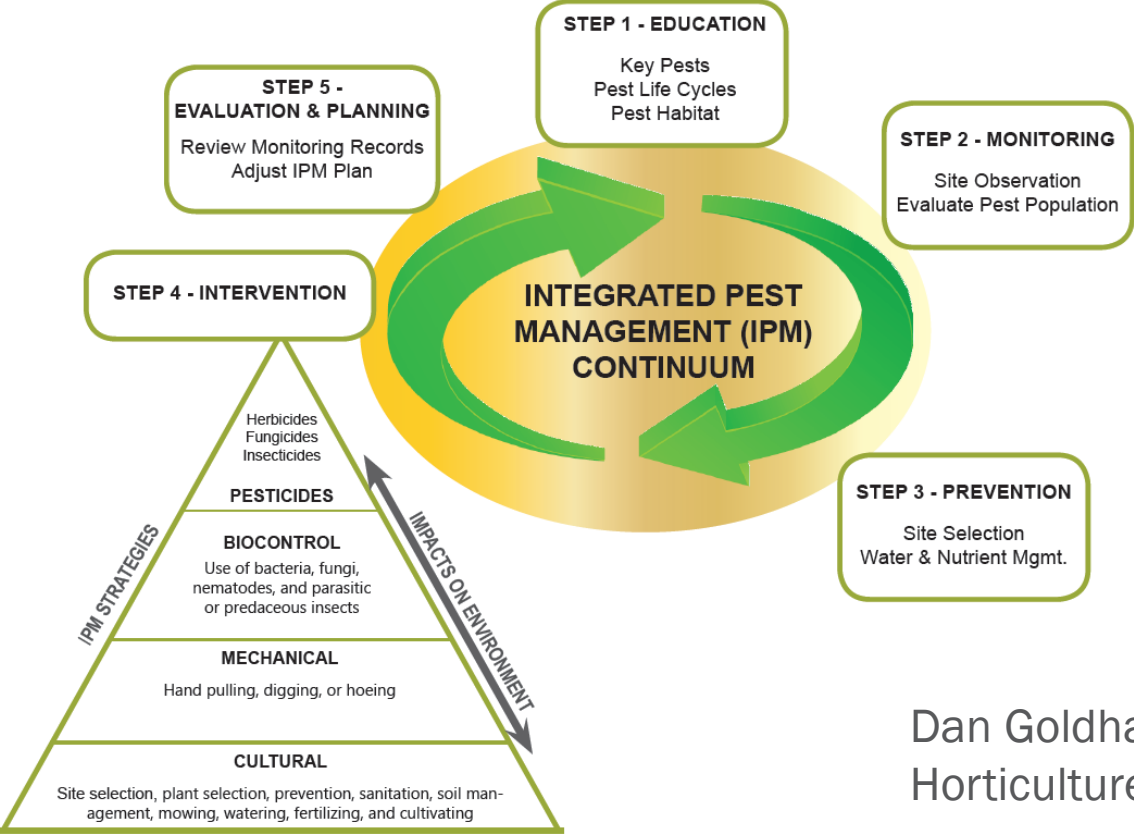

Integrated Pest Management

Denver Parks and Recreation

Integrated Pest Management

Denver Parks and Recreation (DPR) utilizes an Integrated Pest Management (IPM) program that incorporates a multi-strategy approach to reduce pest damage while balancing environmental resiliency, expense, staff, and public safety to support healthy parks in Denver. The DPR IPM program uses best management practices which include preventative, cultural, chemical, biological, and mechanical controls.

Using Integrated Pest Management



Dan Goldhamer, CSU Extension Horticulture Agent

Establishing Weed and Pest Thresholds

DPR's integrated pest management program strives to control weeds and pests to acceptable levels that maintain desired plant and tree health allowing our park system to thrive.

Eradication is not the goal except for targeting extremely invasive species designated by the Colorado Noxious Weed act as List A (and select List B) noxious weeds.

Our IPM program starts with field scouting to evaluate plant health, and identify pest populations to develop site specific management plans

Parks' Management for Pest Control

DPR uses management techniques that create less favorable environments for weeds and pests, and mechanical controls that physically remove pests from parks

This includes:

- Proper tree and plant selection
- Irrigation practices that optimize tree, turf, shrub, and flower health
- Turf fertility and aeration that promote dense, healthy stands of turf
- Properly maintained equipment that provides clean cuts during tree pruning and mowing operations
- Lake aeration

What are Pesticides?

Pesticide law defines a “pesticide” (with certain minor exceptions) as:
Any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any pest.

Any substance or mixture of substances intended for use as a plant regulator, defoliant, desiccant, and any nitrogen stabilizer.

Pesticides include:

Herbicides	Algaecides
Insecticides	Miticides
Fungicides	Rodenticides
Bactericides	

Everything is poison.
There is poison in
everything. Only the
dose makes a thing
not a poison.

Paracelsus
1493-1541
Father of Toxicology

Chemical toxicity is a sliding scale, not black and white – and whether a chemical is naturally occurring, organic, or man-made tells us NOTHING about its toxicity.

Using 'RITE' to Protect Staff and Community

Risk
Is equal to
Toxicity times
Exposure

How do you measure RISK when using pesticides? Using RITE...

Even Pesticides used in Organic Production can be toxic.

<http://www.xerces.org/wp-content/uploads/2009/12/xerces-organic-approved-pesticides-factsheet.pdf>








PESTICIDE	NON-TOXIC	LOW TOXICITY	HIGHLY TOXIC
Insecticides/Repellants/Pest Barriers			
<i>Bacillus thuringiensis</i> (Bt)	Green		
<i>Beauveria bassiana</i>			Red
Boric Acid		Orange	
<i>Cydia pomonella granulosis</i>	Green		
Diatomaceous Earth			Red
Garlic	Green		
Insecticidal Soap ^a			Red
Kaolin Clay	Green		
Limonene ^a		Orange	
Neem ^a		Orange	
Horticultural Oil ^{a,b}			Red
Pyrethrins ^c			Red
Rotenone ^c			Red
Ryania/Ryanodine		Orange	
Sabadilla ^c			Red
Spinosad			Red
Herbicides/Plant Growth Regulators/Adjuvants			
Adjuvants		Orange	
Corn Gluten	Green		
Gibberellic Acid	Green		
Horticultural Vinegar		Orange	
Fungicides/Bactericides			
Copper		Orange	
Copper Sulfate			Red
Lime Sulfur ^a , Sulfur ^{c,d}		Orange	



^aLow risk to bees if applied at night when bees are inactive.

^bSome horticultural oils (such as formulations with thyme or rosemary oil) primarily sold as fungicides.

^cRepellent >1 day. In greenhouse setting, bees should be removed prior to spray and not replaced before 1½ days after spray.

^dLong residual toxicity (1 - 7 days).

Material	What the heck is it?	LD50 (mg/kg)*	toxic category**
water 	You know this one.	90000	practically non-toxic
sucrose 	...and this one. Refined from sugar cane or sugar beets	30000	practically non-toxic
citric acid	A chemical in citrus fruits (lemons, oranges, etc)	12000	slightly toxic
ethanol (component in many bevies) 	Hic!	7000	slightly toxic
glyphosate	A broad-spectrum systemic herbicide used to kill weeds brought to market under tradename RoundUp	5600	slightly toxic
sodium bicarbonate (baking soda)	One word: Biscuits 	4220	moderately toxic
sodium chloride (table salt) 	Not too much now...	3000	moderately toxic
acetaminophen	Whoa...I'm getting a headache	1944	moderately toxic
hydrogen peroxide	Common household product often used industrially for drinking water and waste water treatment	1580	moderately toxic
theobromine	Is a bitter alkaloid of the cacao plant in CHOCOLATE (What the heck is this doing on this list?) 	1265	moderately toxic
Rotenone	A broad-spectrum insecticide and pesticide approved for use in organic production	132-1500	very toxic
copper sulfate	A compound approved for use in organic production as a fungicide	300	very toxic
caffeine 	Gasp. See <i>italicized</i> comment on chocolate^	192	very toxic
DDT	Tasteless and almost odorless chemical known for its insecticidal properties. Was used in WWII to control malaria and typhus.	113-800	very toxic

Nicotine	A potent alkaloid found in the nightshade family of plants (Solanaceae) and a stimulant drug and a major contributing factor to the dependence-forming properties of tobacco smoking.	50	 extremely toxic
cyanide	Cyanides are produced by certain bacteria, fungi, and algae and are found in a number of plants - used in mining, industrial organic chemistry and for pest control.	10	extremely toxic
vitamin D	Vitamin D toxicity can occur when you have excessive amounts of vitamin D in your body by megadoses of vitamin D supplements (not by diet or exposure to the sun). 	10	extremely toxic
Strychnine	Is a highly toxic, colorless, bitter crystalline alkaloid used as a pesticide, particularly for killing small vertebrates such as birds and rodents.	1-2	super toxic
aflatoxin	Naturally occurring mycotoxins produced by species of fungi. 14 different types of aflatoxin are produced in nature. They can colonize and contaminate grain before harvest or during storage.	0.003	super toxic
botulin	A protein and neurotoxin produced by a bacterium. In its pure form, it is the most acutely toxic substance known. Preparations of the toxin can be effectively used for therapeutic or cosmetic purposes.	0.00001	super toxic

Making Policies for Pesticide Use

- Establish goals and thresholds
- Use good science...and scientists as resources.
- Avoid anecdotal evidence
- Determine benefits/risks and costs
- Make the decision, set standards and adopt policies
- Implement the decision
- Review and look for improvements