

# **Plant Health Care, Integrated Pest Management and Monitoring in the Sustainable Landscape**

**Ladd Smith** – In Harmony Sustainable Landscapes

**Ray Willard** – Washington State Department of Transportation

# Ladd Smith



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Building a healthier planet one landscape at a time.

# Ray Willard

**ROADSIDE REVEGETATION**  
An Integrated Approach to Establishing Native Plants



the  
**art&science**  
of revegetation



This web site contains four integrated and interlinked modules dedicated to explaining the art and science of roadside revegetation. Each module contains similar topics, but communicates them differently depending on informational needs. You may begin with any module and continue through it step-by-step or you may use the *in depth* links to visit related information in other modules to reinforce what you are learning.

## LEARN »

The Roadside Revegetation Technical Guide is a comprehensive 400+ page document detailing the complete roadside revegetation process from project initiation through monitoring and management. The condensed Manager's Guide complements the Technical Guide.

Start here for specific and detailed knowledge of the roadside revegetation process. A full case study is included.

## TRAIN »

The training modules offer an interactive, guided learning experience that teaches basic roadside revegetation principals using examples, illustrations, and quizzes.

Start here if you are new to roadside revegetation or would like to refresh your knowledge of revegetation fundamentals.

## VISUALIZE »

The visualize tool is an innovative approach to illustrating roadside revegetation procedures in practice. The interactive tool prompts you for specific criteria about a revegetation site and your approach, and then displays the impacts of those selections over time.


Start here to see illustrated examples of roadside revegetation in practice.

## SHARE »

The online data form and Learning Summaries provide an opportunity for Revegetation specialists to share their experiences in implementing restoration projects using native plants.

Start here to view Learning Summaries.  
Start here to submit a Learning Summary

**VEGETATION MANAGEMENT:  
An Ecoregional Approach**



U.S. Department of Transportation  
Federal Highway Administration



# Integrated Vegetation Management for Roadsides

July 1997

 Washington State Department of Transportation

# Ray Willard

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Traffic & Cameras | Projects | Business | Environment | Maps & Data |

You are here: [Home](#) > [Maintenance](#) > [Roadside Maintenance](#)

## Maintenance

- [Maintenance Home](#)
- [Roadsides](#)
- [Safety Rest Areas](#)
- [Performance Measures](#)
- [Fleet & Equipment](#)

## Links

- [Aquatic Nuisance Permit](#)
- [Aquatic Noxious Permit](#)
- [Calibration Chart](#) (xls)
- [MSDS and Labels](#)
- [Pesticide Licensing & Recertification](#)
- [RCW – Noxious Weeds](#)
- [State and County Noxious Weed Board](#)
- [WA Invasive Species Council](#)
- [Waste Pesticide Disposal](#)
- [Westside IVM Prescription](#)
- [IVM Map Viewer](#)

## Contact Us

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## WSDOT Vegetation Management

Roadside vegetation management involves caring for and/or controlling plants along the highway. If managed properly, roadside vegetation can become self-sustaining over time and require less maintenance. This helps reduce costs and minimizes herbicide use.

### Why is Roadside Vegetation Management Important?

Safety is a high priority at WSDOT. Vegetation, if left alone will grow out of control, blocking visibility (signs, traffic, wildlife) which could endanger motorists. Weeds must be controlled to avoid impacts on the farming community and native ecosystems. Pride of ownership and the beauty of Washington are also important factors.

### What is a Roadside Vegetation Management Plan?

[Roadside vegetation management plan](#) is a "how to" guide for the best way to manage roadsides in any given area. Washington has diverse climates and the highways have many neighbors, so the plans vary depending on location. The plans determine the right tool or combination of tools, for the right plant at the right place and time. WSDOT often uses the term Integrated Vegetation Management (IVM) in reference to this process. Vegetation management tools include:

- Mowing and trimming
- [Selectively using herbicides](#)
- Release of weed-eating insects
- Improving Soils
- Planting native plants

### Detailed Information

- [Roadside Vegetation Management Plans](#)
- [Herbicide Use](#)
- [Roadside Maintenance Costs](#)
- [Studies and Research](#)

## Roadside Design and Construction

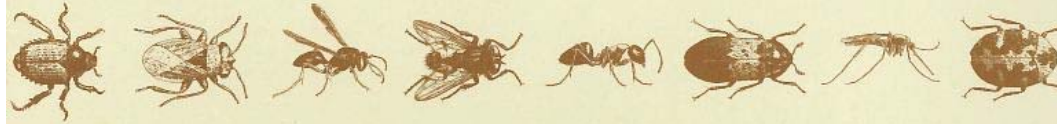
One of the keys to successful roadside vegetation management is treating the roadside

# Ray Willard



# What is Integrated Pest Management?

- IPM is the key to establishing and maintaining a sustainable and environmentally friendly landscape
- IPM is based on an understanding of the complete ecosystem surrounding a given landscape
- IPM is a coordinated decision-making and action process that uses the most appropriate vegetation management methods and strategies, along with a monitoring and evaluation system, to achieve the function and intent of the landscape
- The use of IPM naturally leads to improved plant health and more naturally self-sustaining plant communities



# COMMON-SENSE PEST CONTROL

Least-toxic  
solutions for your  
home, garden, pets  
and community



William Olkowski • Sheila Daar • Helga Olkowski



A FINE GARDENING Book

# IPM in State Law

## ■ RCW 17.15.010

(1) "Integrated pest management" means a coordinated decision-making and action process that uses the most appropriate pest control methods and strategy in an environmentally and economically sound manner to meet agency programmatic pest management objectives. The elements of integrated pest management include:

(a) **Preventing** pest problems;

(b) **Monitoring** for the presence of pests and pest damage;

(c) Establishing the density of the pest population, **that may be set at zero**, that can be tolerated or correlated with a damage level sufficient to warrant treatment of the problem based on health, public safety, economic, or aesthetic **thresholds**;

(d) **Treating** pest problems to reduce populations below those levels established by damage thresholds using strategies that may include biological, cultural, mechanical, and chemical control methods and that must consider human health, ecological impact, feasibility, and cost-effectiveness; and

(e) **Evaluating** the effects and efficacy of pest treatments.

(2) "**Pest**" means, but is not limited to, any insect, rodent, nematode, snail, slug, weed, and any form of plant or animal life or virus, **except** virus, bacteria, or other microorganisms on or in a living person or other animal or in or on processed food or beverages or pharmaceuticals, which is normally considered to be a pest, or which the director of the department of agriculture may declare to be a pest.



# From a Sustainable Landscape Standpoint –

- Stronger, healthier communities of plants
- Better soil stability
- Restored and enhanced soil life
- Better water retention and percolation in soils –  
S T O R M W A T E R
- Lower impact on all natural resources: air, water, wildlife
- Lower maintenance requirements (\$\$\$!) over time
- Think L I F E C Y C L E

- Landscapes
- Integrated Pest Management**
- Workshops
- Green Gardening Program
- Questions & Answers
- Pesticide Product Disposal
- Maintenance Plans
- Soils for Salmon
- Irrigation Tips & Rebates

[For Businesses](#) > [Landscapes](#) > [Integrated Pest Management](#)

Select Language ▼

## Integrated Pest Management

### IPM Workshops: Training for Professionals

[IPM Program Workshops](#) Register here for upcoming professional trainings, or view presentations from previous workshops. También vea [entrenamiento profesional en español](#).

### IPM Fact Sheets

Use these IPM fact sheets from the Green Gardening program in the field and to help explain to your clients the Integrated Pest Management (IPM) approach you use on their landscapes, plus learn about how IPM can benefit your health, business, and clients.

Each sheet provides the essential facts on an important Northwest pest or disease: identification, life cycle, monitoring, damage threshold, and treatments.

Use, print or download these fact sheets, and feel free to hand them out to clients.

For an introduction to IPM for your clients, see the [Natural Pest, Weed and Disease Control guide](#) (pdf), or contact the Garden Hotline at (206) 633-0224 or [help@gardenhotline.org](mailto:help@gardenhotline.org) for free copies to distribute to your clients.

All documents are in PDF format.

[Introduction to ProIPM Fact Sheets](#)

[PHC/IPM steps flowchart](#)

[Weed Control Calendar \(English/Spanish\) - Calendario para Control de Malezas \(inglés/español\)](#)

[Annual Weeds](#)

[Woody Weed Management](#)

[Moss](#)

# Grow Smart, Grow Safe®



**Garden notes**

- Garden without pesticides
- Natural lawn care
- How to's
- Resources
- Download options



A gardener's guide  
to choosing safer  
pesticides and  
garden products

# Things to Think About with Pesticides...

- How toxic are they?
  - To humans
  - To non-target organisms
  - To other environmental endpoints
- **Are they a means to an end, or part of a routine treatment???**
- What about “organic” pesticides?
- If you have to use pesticides –
  - Read the label!
  - Applicator safety
  - Proper rates and application timing
  - Monitoring and evaluation

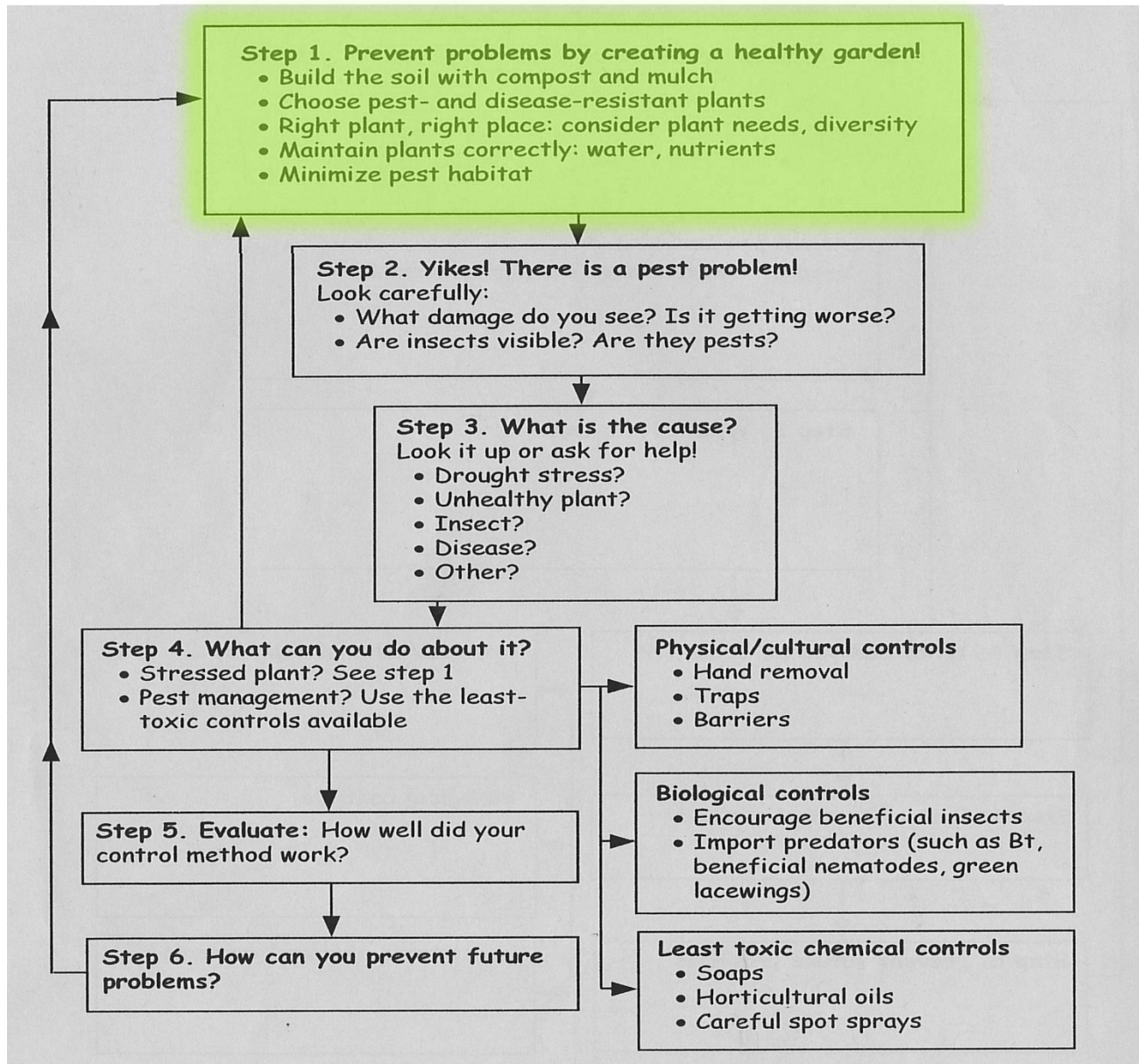


“Uh-oh, Vern! The Schumachers are in the tree again. We’ll have to spray.”

# IPM and Plant Health Care Overview

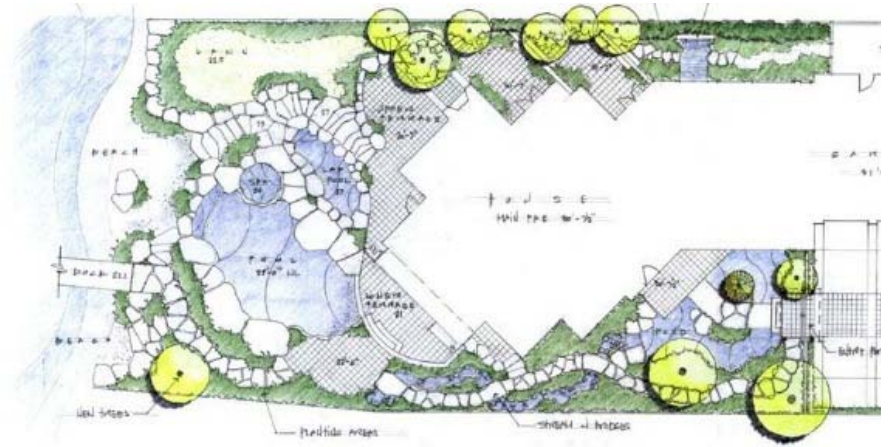
- Create a Healthy Garden Ecosystem – **Prevention is the key**, healthy plants are more resistant of pests and disease, and out-compete weeds
- Know Your Pests – Observe and understand the inter-relations **before** you spray, stomp or squash
- Give Nature a Chance to Work – Tolerate a little damage; get to know the beneficial bugs; sometimes problems work themselves out
- Use the Least Toxic/Least Disruptive Pest Control Available
- **Develop a system for recording observations and evaluating the effectiveness of controls from one season to the next**

# IPM and Plant Health Care Flowchart



# Prevent Problems

- Start with a good planting design
- Practice plant health care and encourage natural adaptation wherever possible



# Site Prep, Design and Proper Maintenance

1. Grading and Drainage!
2. Creating a Healthy Soil System
3. Planting the Right Plants in the Right Places
4. **Ongoing Sustainable Maintenance:**
  - Watering
  - Mulching and Weed Control
  - Fertilization
  - Pruning
  - Mowing Routines
  - Reducing Pest Habitat
  - Use of Pesticides
  - Monitoring and Evaluation



# Healthy Soils = Healthy Plants

Feed soils with organic amendments like compost to:

- Keep soil loose and fertile
- Help prevent plant disease
- Store water and nutrients in the plant root zone

Soils without compost



With compost amendment

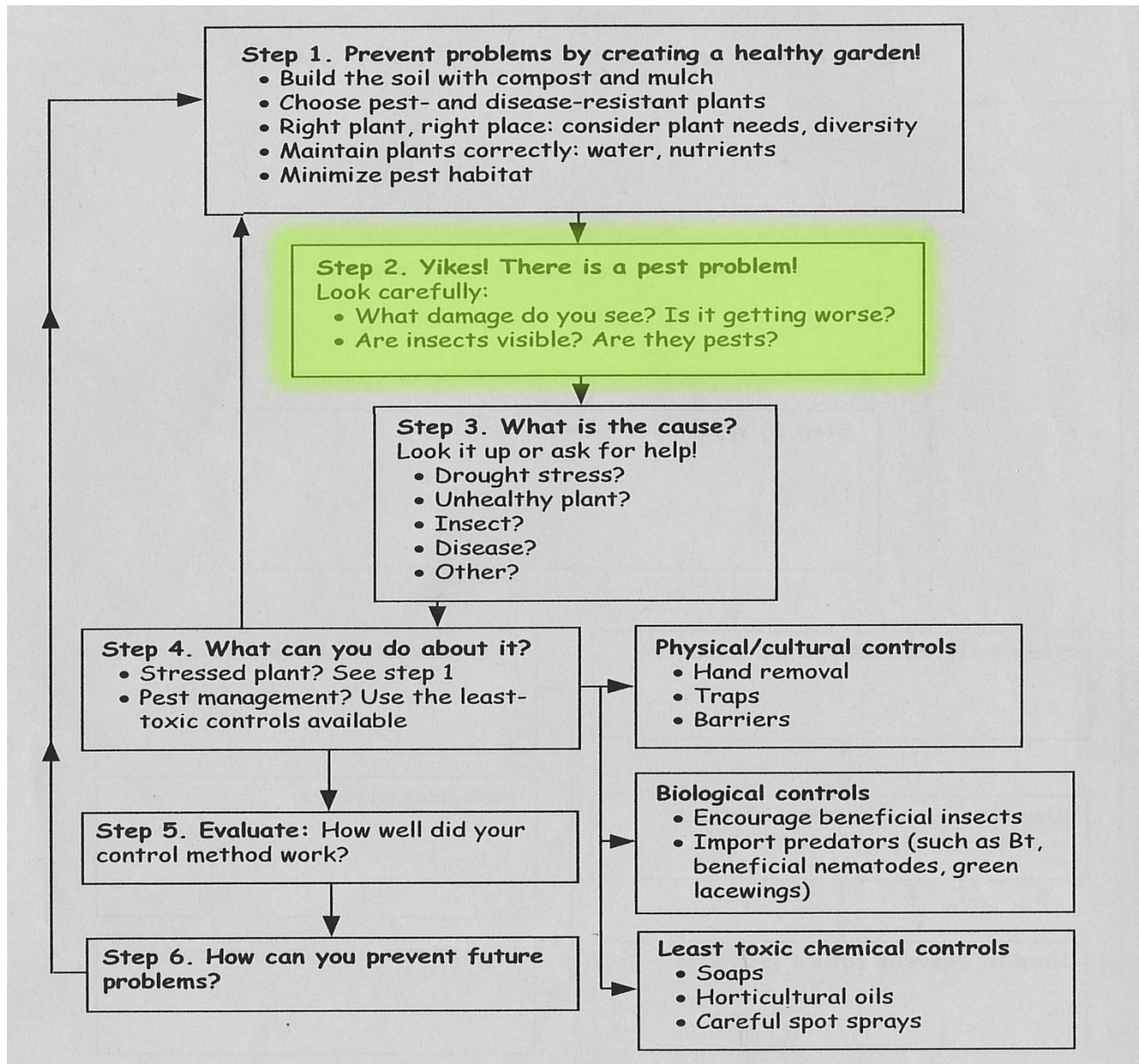


# Healthy Soils = Healthy Environment

- Allow rainwater to infiltrate, slowing runoff, preventing erosion, and filtering out urban pollutants
- Reduce the need for fertilizers and pesticides, which can have a negative impact on stream water quality and aquatic life
- Reduce the need for irrigation, so we can leave more water in the rivers for fish (and save money too!)



# IPM and Plant Health Care Flowchart

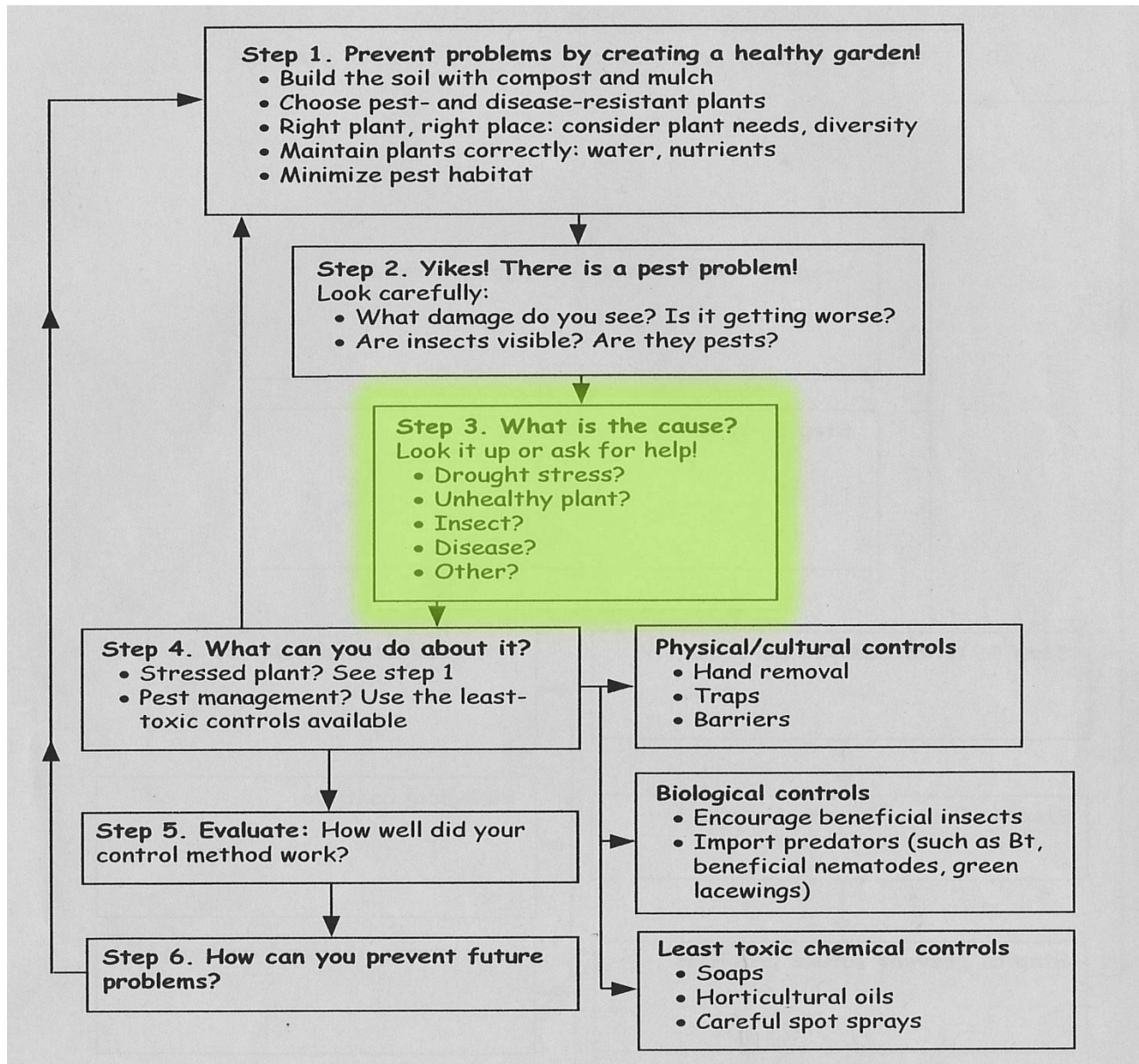


# Yikes! There is a Pest Problem!

Make careful observations:

- What is the damage?
- Is it getting worse?
- Are signs of insects or diseases visible?
- Is it effecting the health of the plant or plant community?
- Is what you are seeing really a problem?

# IPM and Plant Health Care Flowchart



# What's the Cause?

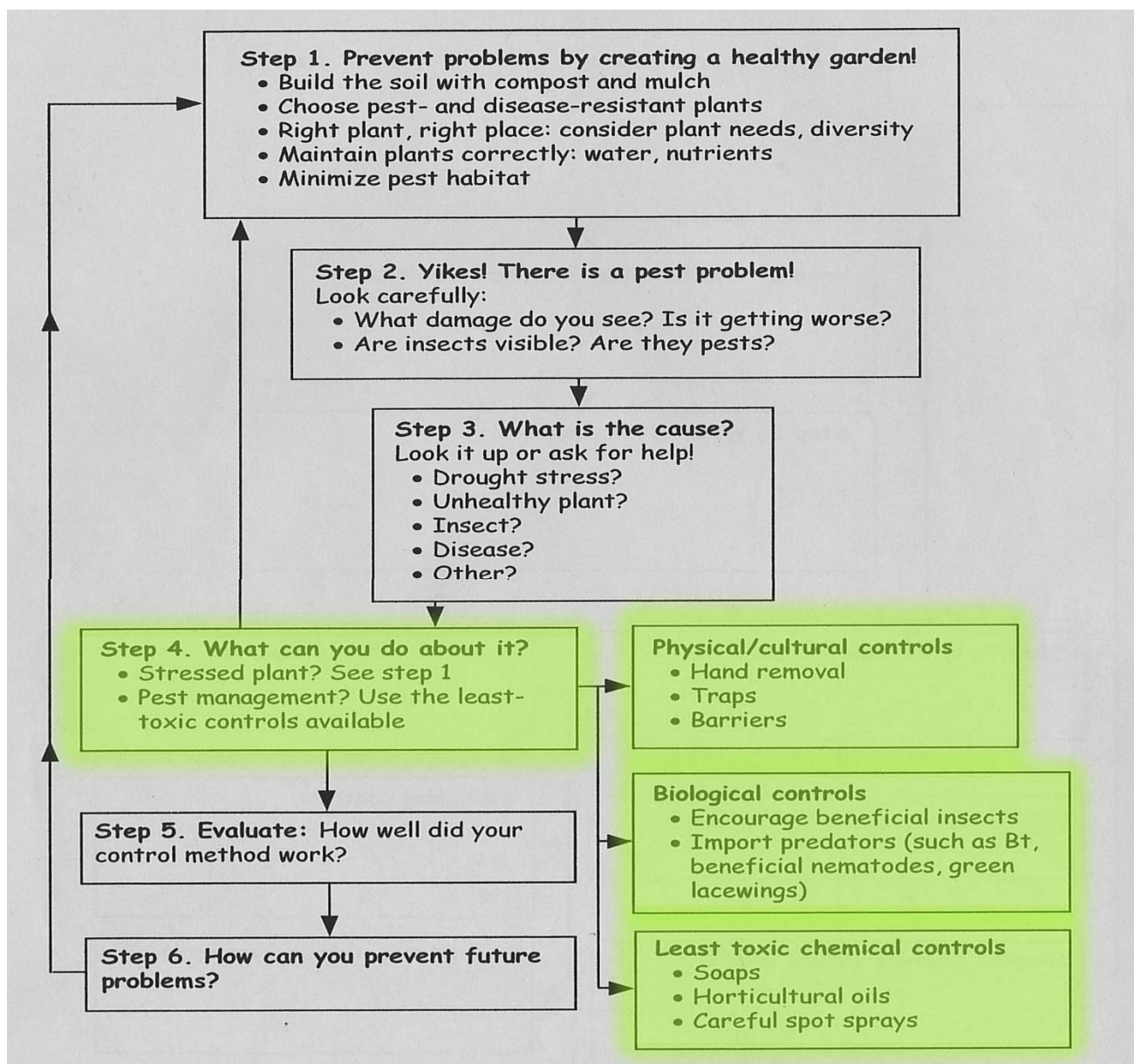
- Drought stress?
- Nutrient deficiency?
- Insects, fungus or disease?
- Poor soil condition?
- Too much water?
- Too much sun?
- Wrong plant in the wrong place?
- Poor pruning?
- Planted wrong or girdling roots?
- Weed seed source?



## Residential Thresholds: Based on Client's Personal Threshold level



# IPM and Plant Health Care Flowchart





# What Can You Do About It?

## Stressed Plant?

- Go back to Step 1: Prevention!
  - Good soils and mulch
  - The right plant in the right place
  - Proper plant care, including:
    - Proper watering
    - Proper mulching and weeding
    - Proper fertilizing
    - Proper pruning and mowing
    - Minimizing the pest habitat

# If Prevention Alone is Not Enough...

## Control is Necessary?

- Consider all options available
- Always use the least-toxic, least-disruptive controls available



Torches work on weeds in cracks or gravel



Copper slug barrier



Washing Aphids



Spreading mulch to prevent weeds



Protecting a crop with a floating row cover

# If Prevention Alone is Not Enough...

## Control is Necessary?

- Meet the Beneficials!



Mealy bug destroyer



Green lacewing



Rove beetle



Ladybug larva,  
eating aphids

# Grow Smart, Grow Safe®

A spiral-bound notebook with a yellow cover and a white page is positioned in the foreground. The page contains the title 'Garden notes' and a list of topics.

**Garden notes**

- Garden without pesticides
- Natural lawn care
- How to's
- Resources
- Download options



A gardener's guide  
to choosing safer  
pesticides and  
garden products

# GROW SMART, GROW SAFE

Home >> [Grow Smart, Grow Safe](#)

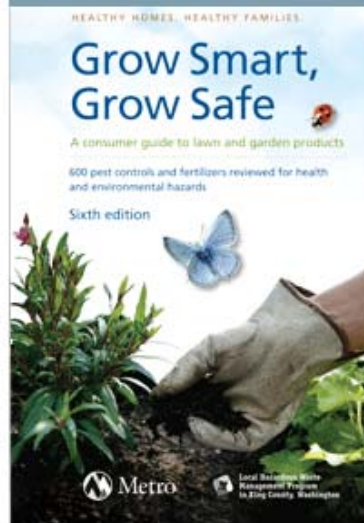
## Search

Search hundreds of pesticide products and fertilizers for health and environmental hazards

---All Products---

Search

## Download Guide



Download (PDF, 2.4 MB)

## Grow Smart, Grow Safe >> A Gardener's Guide

Sponsors:



### Gardening with nature

[Yard care without pesticides](#)  
[Good bugs are great for gardens](#)  
[Target action if pests appear](#)  
[Why care?](#)



### Insects

[Prevent by choosing right](#)  
[Observe](#)  
[Manage](#)  
[Learn](#)  
[Search for safer methods](#)



### Slugs and snails

[Prevent](#)  
[Observe](#)  
[Manage](#)  
[Learn](#)  
[Search for safer methods](#)



### Diseases

[Prevent](#)  
[Observe](#)  
[Manage](#)  
[Learn and evaluate](#)  
[Search for safer methods](#)



### Weeds

[Prevent](#)  
[Observe](#)  
[Manage](#)  
[Learn](#)  
[Best weeding tools](#)



### About

[Using this guide](#)  
[Reading a pesticide label](#)  
[Storing old pesticides](#)  
[About us](#)



### Moss

[Prevent](#)  
[Observe](#)  
[Manage](#)  
[Learn](#)  
[Search for safer methods](#)



### Animal pests

[Moles and voles](#)  
[Rats and mice](#)  
[Deer](#)  
[Birds](#)  
[Observe and learn](#)  
[Search for safer methods](#)



### Soil amendments & fertilizers

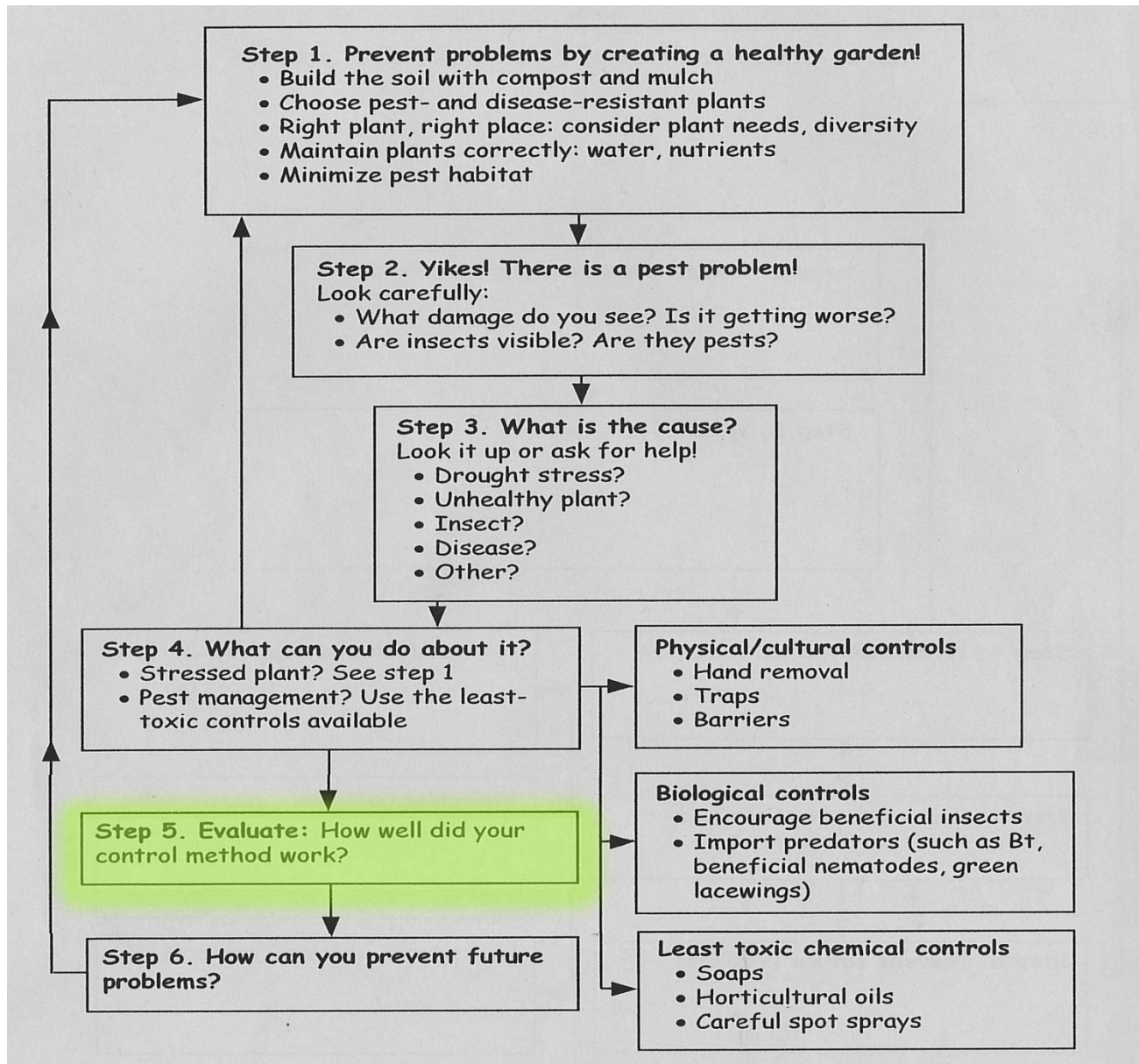
[Creating healthy soil](#)  
[How to choose a compost product](#)  
[Soil tests can help you choose](#)  
[Soil amendments](#)  
[Fertilizer and fertilizer labels](#)  
[Search for safer methods](#)



### Resources

[From our partners](#)  
[Local nurseries](#)  
[More on gardening](#)

# IPM and Plant Health Care Flowchart



# Evaluation and Monitoring

- How well are your controls working?
- Everyone needs a system to record treatments and corresponding results
- Using technology to practice IPM – “There’s an app for that...”

723 723 Total (Unsorted)

Records Show All New Record Delete Record Find

Layout: Planning Record View As: [Icons] Preview

Print New Record List View Main menu

**Washington State Department of Transportation** **Integrated Vegetation Management Record**

Orig Code County Date 1/28/2014 Vegetation Management Zone(s) [Zone 1] [Zone 2] [Zone 3]

Area Location

SR [ ] to SR [ ] to SR [ ]

Check Appropriate Boxes

NB  EB  Shoulder  Rest Area  Interchange  Mitigation Site  Third Party Damage  Sensitive Sites

SB  WB  Median  Park-a-Ride  Ramp  Stormwater  Yes  Aquatic

Target:  Noxious Weeds  Brush/Trees  Other  Nuisance Weeds  Hazard Tree List Target Species:

Reason for Action:

Noxious Weeds  Nuisance Weeds  Fire Prevention  Restore Native Veg  Zone 1 Pilot  Aesthetic

Site Distance  Hazard Vegetation  Customer Request  Enhance Vegetation  Slope Stabilization  Other

Long term IVM plan: (Describe goals/objectives and a step-by-step approach over time)

Approximate Acres to Accomplish

Activities Planned date of Treatment Actual date of Treatment

Manual:  Digging  Pulling  Planting  Logging  Staking  Other

Mechanical:  Aerial Saw Work  Tractor Brush Cutter  Mower/Chop  Manual Brush Cutting  Tractor Mower  Other

Bio-Control:  Insects  Pathogens  Parasites Type/Species:

Cultural:  Pruning  Grading  Seeding  Cultural  Fertilizing  Grating  Soil Amendment  Other

Chemical: Record Number

#1 Evaluation and Date

#2 Evaluation and Date

#3 Evaluation and Date

Bio control Species

Account # Customer Since:

Name: Billing Name: Lawn sq.ft.:

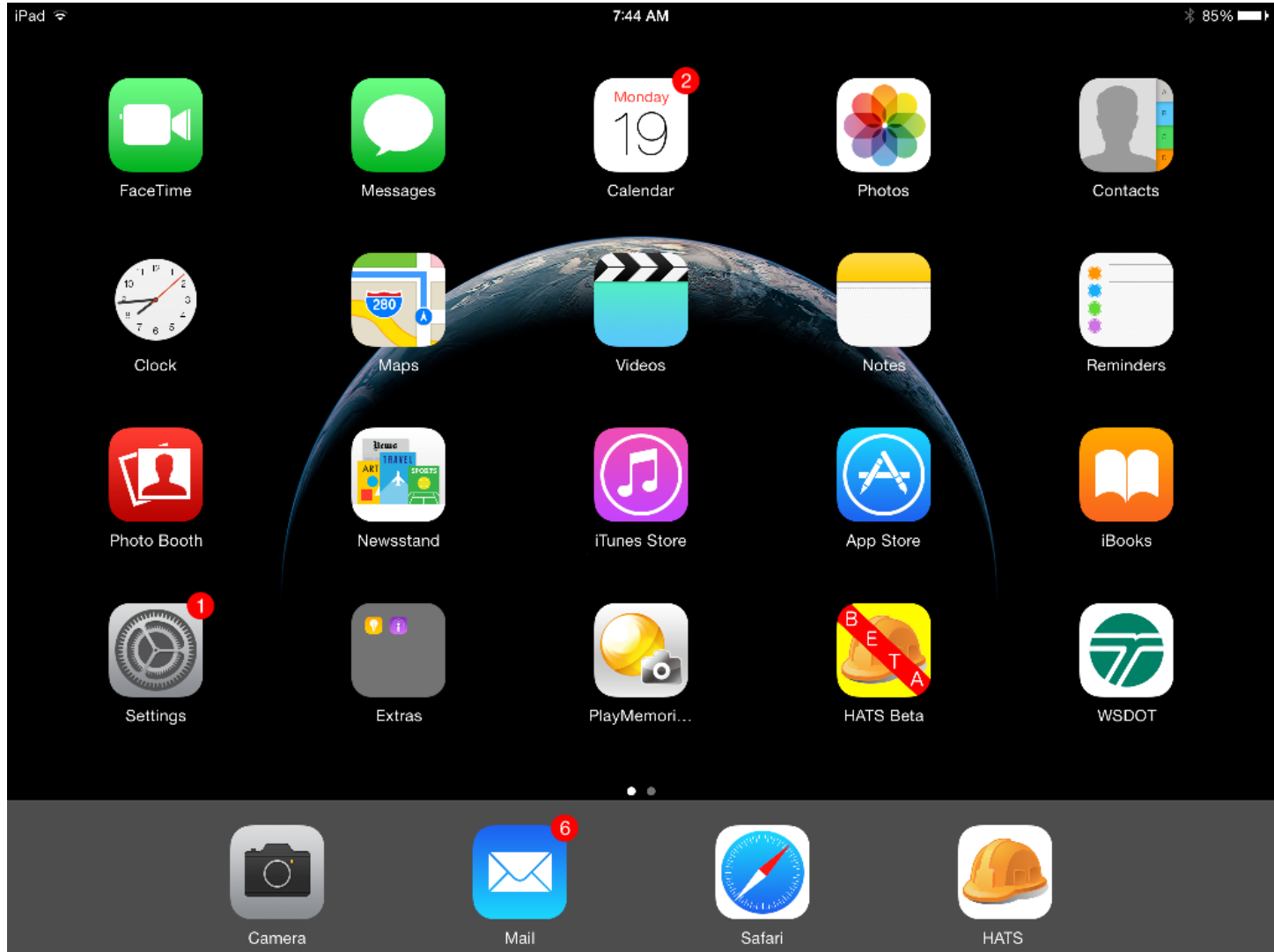
Address: Address: Ph Test Year:

City: Zip: City: Zip: Results:

Phone #: 2nd Ph# Call Ahead? 24 or 48 hour notice

MAP PAGE #

Round	Date	Tech	Amount	Product	RED ALERTS	Service Notes & Customer Concerns	SERVICE INFORMATION
1							Aerials Bark/Crown Caterpillars Conifer needle Drop Corn Gluten Compost tea Crane fly Spr
2							Crane flys Fall Diseases Fert Types Fruit Trees Fruits-Insects
3							Bales Injections Lawn Weeds Lawn Grasses
4							Leaves-Fall Lime Moss Spr Moss Fall
5							Mowing Moles Mushrooms Mycorrhizae
6							Pear Slug Pruning Red Thread Root Weevils
7							Poses Sanitation Sea Kelp Soil Dis-Arm
							Soil Dis-Phom Soil Dis-Vert Spider Mites Root Feeding
	Date:			Aeration Overseeding			Tree Staking Top 10 Watering





### Map

Homeless Camp



Noxious Weed Control



Hydrant



Cable Barrier



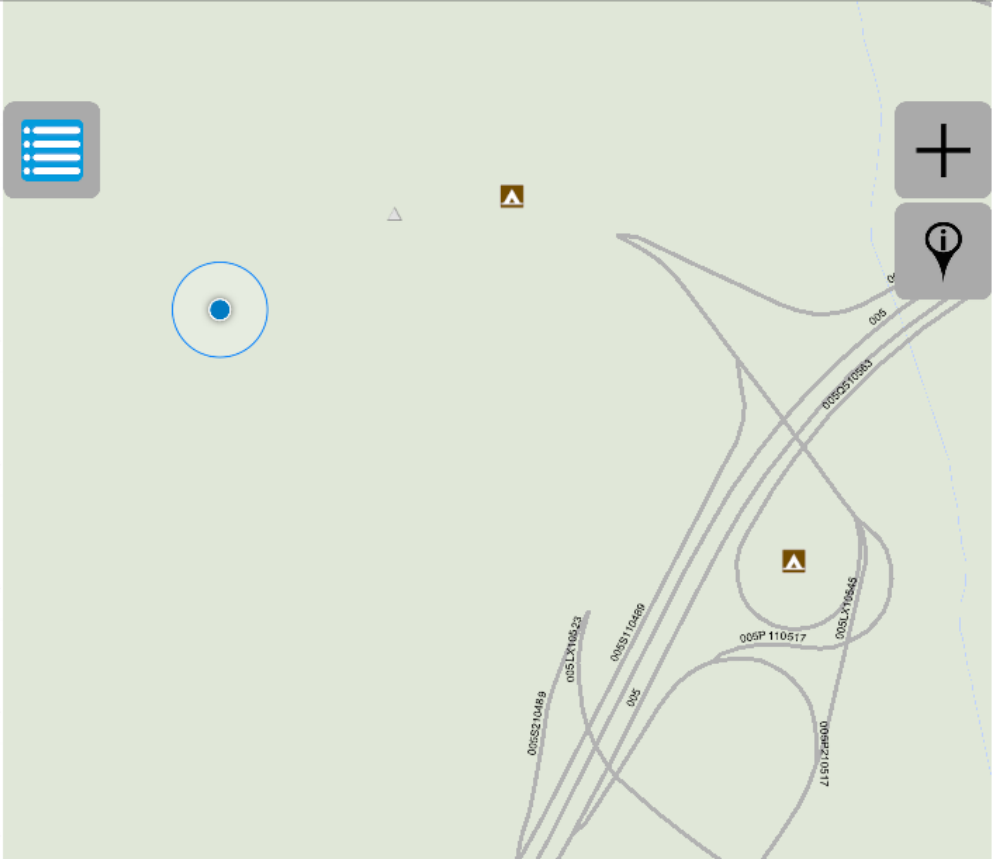
Culvert



Culvert End



Stormwater Drainage Inlet



Basemap



Map

Mode



Other



Multiple



Pending Activities



Saved Records



Sync



Settings

Lat:47.034480, Long:-122.897967

### Map

Homeless Camp



Noxious Weed Control



Hydrant



Cable Barrier



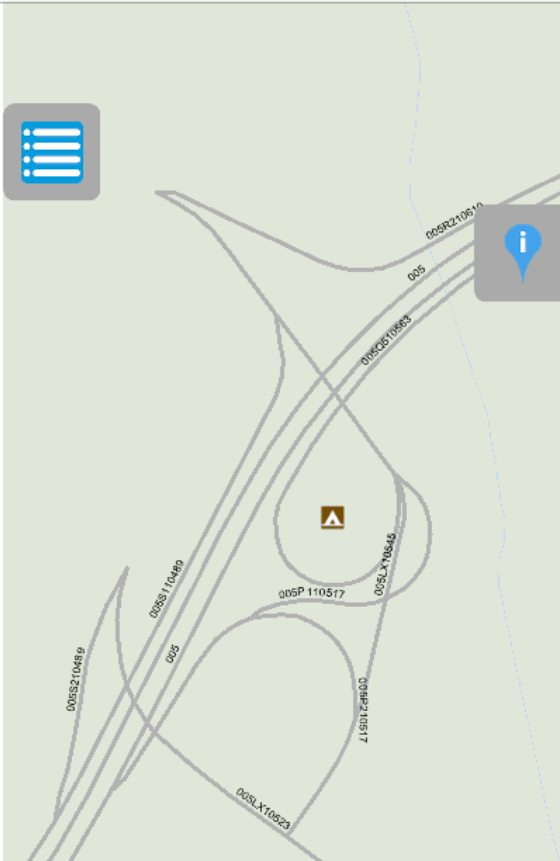
Culvert



Culvert End



Stormwater Drainage Inlet



Homeless Camp

WSDOT ID: WSDOT0001000343

005Q510563 MP: 0.17 Dir: Ramp



+ Activity

Basemap



Map

Mode



Other



Multiple



Pending Activities



Saved Records

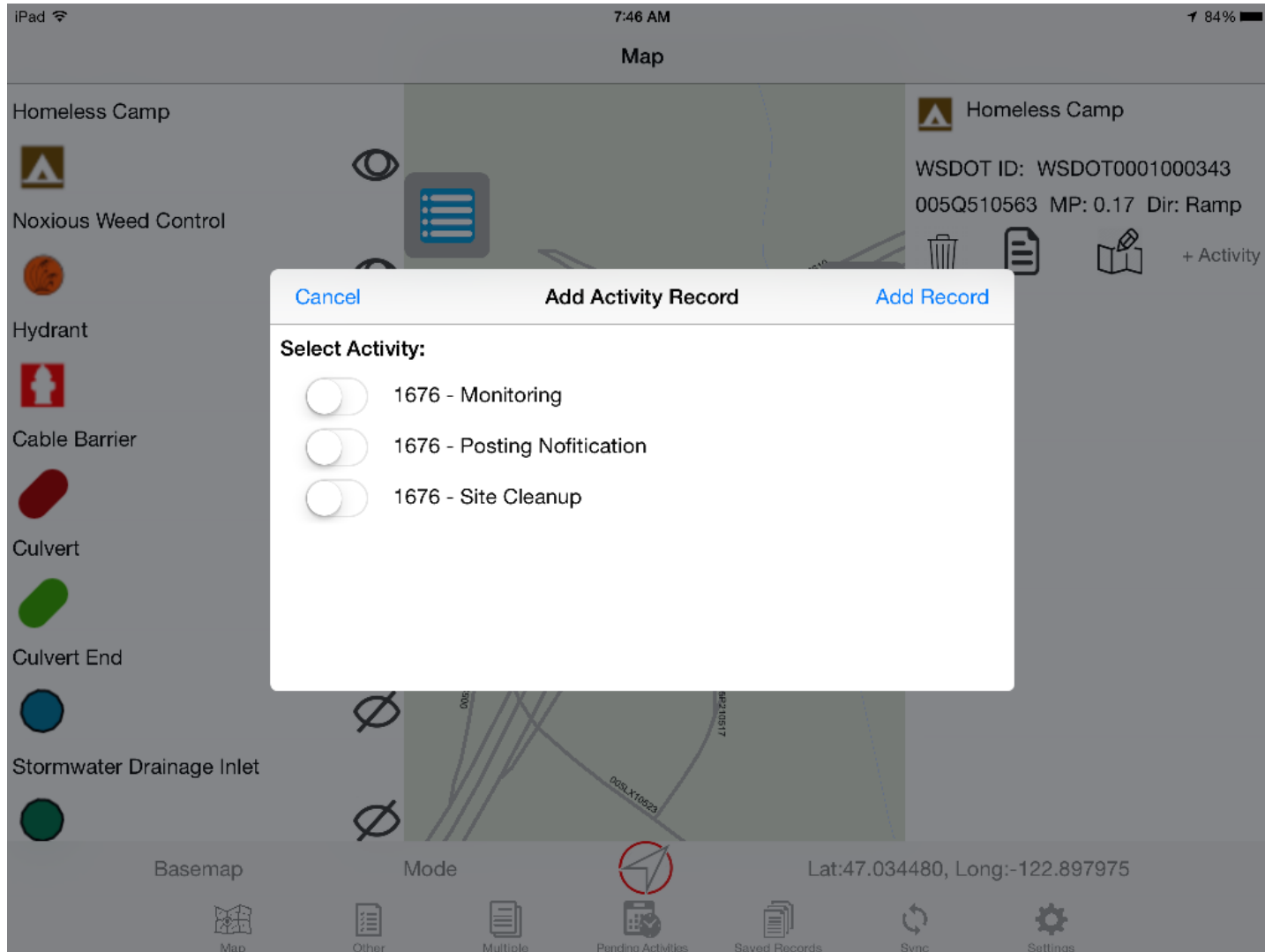


Sync



Settings

Lat:47.034479, Long:-122.897974



[Cancel Record](#)

Record

[Save Record](#)

### Homeless Camp

### 1676 - Site Cleanup

#### Organizational Information

Select User

Orgcode: \*

343022

First Name: \*

Ray

Last Name: \*

Willard

WSDOT Username:

Willarr

Date & Time: \*

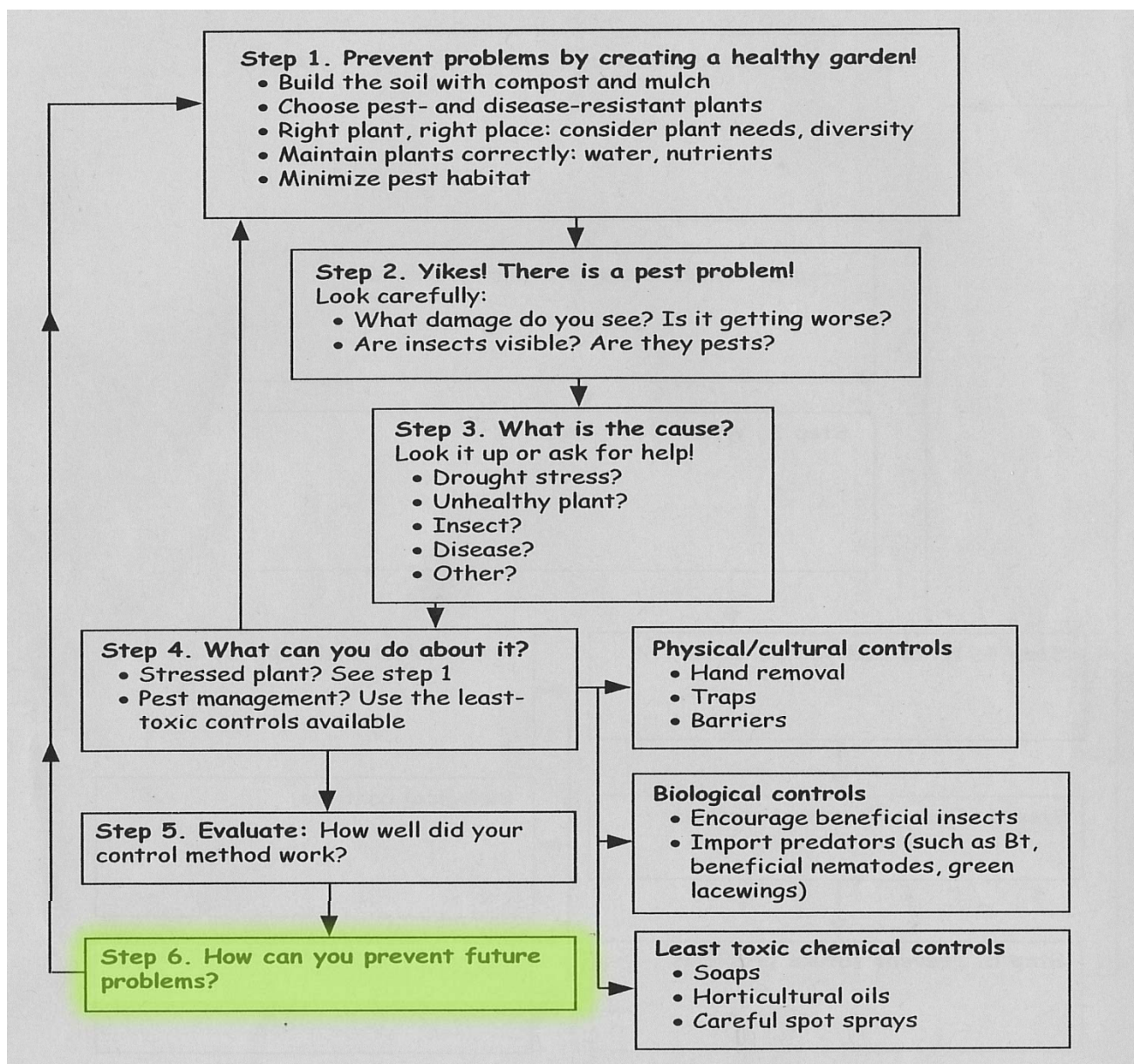
Sat Oct 17	6	14	
Sun Oct 18	7	15	
Today	8	16	AM
Tue Oct 20	9	17	PM
Wed Oct 21	10	18	

10-19-2015 08:16 AM

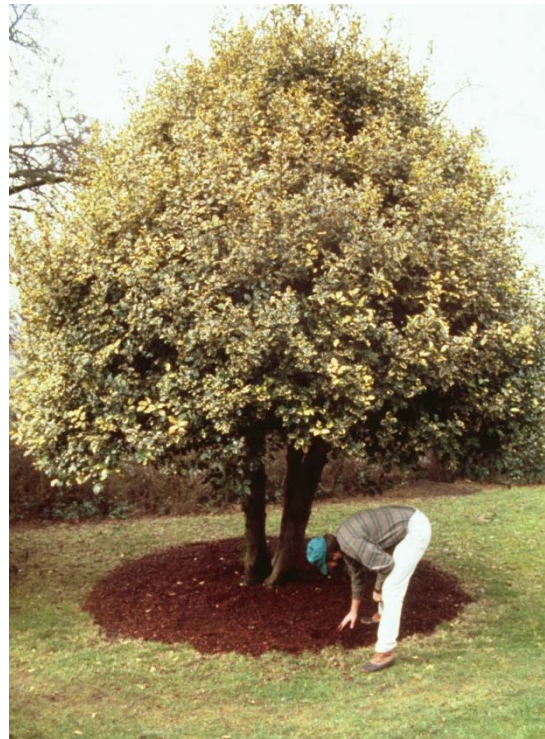
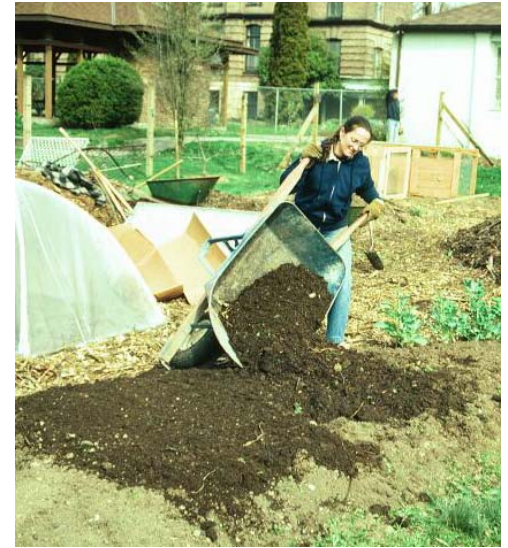
#### Questions



# IPM and Plant Health Care Flowchart



# Practice Plant Health Care!



# Weed control is a year-round job

## El control de malezas es un trabajo de todo el año



WINTER INVIERNO	SPRING PRIMAVERA	SUMMER VERANO	LATE SUMMER VERANO TARDE	FALL OTOÑO
Flame weed on pavement or gravel (safer in wet weather)	Pull, line trim, or hoe, to prevent weed flowers and <u>seeds</u>	Use vinegar and clove-based herbicides (e.g. "Burnout") - more effective in hot, dry weather	One-time herbicide (e.g. Roundup) spot-application on persistent weeds, if needed	Add plants to fill in beds, spread 2-4 inches of mulch to prevent new weeds.
Antorcha sobre gavilla o pavimento (menor riesgo en tiempo lluvioso)	Extraiga, weed-eater, o azadón, para evitar que hagan flores y <u>semillas</u>	Productos de vinagre fuerte a clavo (como "Burnout") - sirve mejor en sequía caliente	Una vez, esparza herbicida encima de malezas persistentes, si es necesario	Agriegue más plantas a las camas, esparza 2-4 pulgadas de acolchado para evitar las malezas nuevas

Created by / Elaborado por E.J. Hook, Woodland Park Zoo, & David McDonnell, Seattle Public Utilities, for the Local Hazardous Waste Management Program in King County, WA.  
 Questions? Call the Garden Hotline (206) 633-0224 ¿Preguntas? Llame a la Línea de Respuestas para un Jardín y Césped Natural