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

In Harmony
sustainable landscapes

Building a healthier planet one landscape at a time.
Ray Willard

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

Using IVM and roadside vegetation management plans help reduce herbicide use and maintenance costs.

Roadside Design and Construction

One of the keys to successful roadside vegetation management is treating the roadside
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:
    
    - **Preventing** pest problems;
    - **Monitoring** for the presence of pests and pest damage;
    - 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**;
    - **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
    - **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 – STORMWATER
- Lower impact on all natural resources: air, water, wildlife
- Lower maintenance requirements ($$$!) over time
- Think LIFECYCLE
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 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
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
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

Step 1. Prevent problems by creating a healthy garden!
- Build the soil with compost and mulch
- Choose pest- and disease-resistant plants
- Right plant, right place: consider plant needs, diversity
- Maintain plants correctly: water, nutrients
- Minimize pest habitat

Step 2. Yikes! There is a pest problem!
Look carefully:
- What damage do you see? Is it getting worse?
- Are insects visible? Are they pests?

Step 3. What is the cause?
Look it up or ask for help!
- Drought stress?
- Unhealthy plant?
- Insect?
- Disease?
- Other?

Step 4. What can you do about it?
- Stressed plant? See step 1
- Pest management? Use the least-toxic controls available

Physical/cultural controls
- Hand removal
- Traps
- Barriers

Biological controls
- Encourage beneficial insects
- Import predators (such as Bt, beneficial nematodes, green lacewings)

Least toxic chemical controls
- Soaps
- Horticultural oils
- Careful spot sprays

Step 5. Evaluate: How well did your control method work?

Step 6. How can you prevent future problems?
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

Step 1. Prevent problems by creating a healthy garden!
- Build the soil with compost and mulch
- Choose pest- and disease-resistant plants
- Right plant, right place: consider plant needs, diversity
- Maintain plants correctly: water, nutrients
- Minimize pest habitat

Step 2. Yikes! There is a pest problem!
Look carefully:
- What damage do you see? Is it getting worse?
- Are insects visible? Are they pests?

Step 3. What is the cause?
Look it up or ask for help!
- Drought stress?
- Unhealthy plant?
- Insect?
- Disease?
- Other?

Step 4. What can you do about it?
- Stressed plant? See step 1
- Pest management? Use the least-toxic controls available

Physical/cultural controls
- Hand removal
- Traps
- Barriers

Biological controls
- Encourage beneficial insects
- Import predators (such as Bt, beneficial nematodes, green lacewings)

Least toxic chemical controls
- Soaps
- Horticultural oils
- Careful spot sprays

Step 5. Evaluate: How well did your control method work?

Step 6. How can you prevent future problems?
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

Step 1. Prevent problems by creating a healthy garden!
- Build the soil with compost and mulch
- Choose pest- and disease-resistant plants
- Right plant, right place: consider plant needs, diversity
- Maintain plants correctly: water, nutrients
- Minimize pest habitat

Step 2. Yikes! There is a pest problem!
Look carefully:
- What damage do you see? Is it getting worse?
- Are insects visible? Are they pests?

Step 3. What is the cause?
Look it up or ask for help!
- Drought stress?
- Unhealthy plant?
- Insect?
- Disease?
- Other?

Step 4. What can you do about it?
- Stressed plant? See step 1
- Pest management? Use the least-toxic controls available

Physical/cultural controls
- Hand removal
- Traps
- Barriers

Biological controls
- Encourage beneficial insects
- Import predators (such as Bt, beneficial nematodes, green lacewings)

Least toxic chemical controls
- Soaps
- Horticultural oils
- Careful spot sprays

Step 5. Evaluate: How well did your control method work?

Step 6. How can you prevent future problems?
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

Step 1. Prevent problems by creating a healthy garden!
- Build the soil with compost and mulch
- Choose pest- and disease-resistant plants
- Right plant, right place: consider plant needs, diversity
- Maintain plants correctly: water, nutrients
- Minimize pest habitat

Step 2. Yikes! There is a pest problem!
Look carefully:
- What damage do you see? Is it getting worse?
- Are insects visible? Are they pests?

Step 3. What is the cause?
Look it up or ask for help!
- Drought stress?
- Unhealthy plant?
- Insect?
- Disease?
- Other?

Step 4. What can you do about it?
- Stressed plant? See step 1
- Pest management? Use the least-toxic controls available

Physical/cultural controls
- Hand removal
- Traps
- Barriers

Biological controls
- Encourage beneficial insects
- Import predators (such as Bt, beneficial nematodes, green lacewings)

Least toxic chemical controls
- Soaps
- Horticultural oils
- Careful spot sprays

Step 5. Evaluate: How well did your control method work?

Step 6. How can you prevent future problems?
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
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 Gardener's Guide

<table>
<thead>
<tr>
<th><strong>Gardening with nature</strong></th>
<th><strong>About</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Yard care without pesticides</td>
<td>Using this guide</td>
</tr>
<tr>
<td>Good bugs are great for gardens</td>
<td>Reading a pesticide label</td>
</tr>
<tr>
<td>Target action if pests appear</td>
<td>Storing old pesticides</td>
</tr>
<tr>
<td>Why care?</td>
<td>About us</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Insects</strong></th>
<th><strong>Moss</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Prevent by choosing right</td>
<td>Prevent</td>
</tr>
<tr>
<td>Observed</td>
<td>Observe</td>
</tr>
<tr>
<td>Managed</td>
<td>Manage</td>
</tr>
<tr>
<td>Learned</td>
<td>Learn</td>
</tr>
<tr>
<td>Search for safer methods</td>
<td>Search for safer methods</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Slugs and snails</strong></th>
<th><strong>Animal pests</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Prevent</td>
<td>Moles and voles</td>
</tr>
<tr>
<td>Observed</td>
<td>Rats and mice</td>
</tr>
<tr>
<td>Managed</td>
<td>Deer</td>
</tr>
<tr>
<td>Learned</td>
<td>Birds</td>
</tr>
<tr>
<td>Search for safer methods</td>
<td>Observe and learn</td>
</tr>
<tr>
<td></td>
<td>Search for safer methods</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Diseases</strong></th>
<th><strong>Soil amendments &amp; fertilizers</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Prevent</td>
<td>Creating healthy soil</td>
</tr>
<tr>
<td>Observed</td>
<td>How to choose a compost product</td>
</tr>
<tr>
<td>Managed</td>
<td>Soil tests can help you choose</td>
</tr>
<tr>
<td>Learned and evaluated</td>
<td>Soil amendments</td>
</tr>
<tr>
<td>Search for safer methods</td>
<td>Fertilizer and fertilizer labels</td>
</tr>
<tr>
<td></td>
<td>Search for safer methods</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Weeds</strong></th>
<th><strong>Resources</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Prevent</td>
<td>From our partners</td>
</tr>
<tr>
<td>Observed</td>
<td>Local nurseries</td>
</tr>
<tr>
<td>Managed</td>
<td>More on gardening</td>
</tr>
<tr>
<td>Learned</td>
<td></td>
</tr>
</tbody>
</table>
IPM and Plant Health Care Flowchart

**Step 1. Prevent problems by creating a healthy garden!**
- Build the soil with compost and mulch
- Choose pest- and disease-resistant plants
- Right plant, right place: consider plant needs, diversity
- Maintain plants correctly: water, nutrients
- Minimize pest habitat

**Step 2. Yikes! There is a pest problem!**
Look carefully:
- What damage do you see? Is it getting worse?
- Are insects visible? Are they pests?

**Step 3. What is the cause?**
Look it up or ask for help!
- Drought stress?
- Unhealthy plant?
- Insect?
- Disease?
- Other?

**Step 4. What can you do about it?**
- Stressed plant? See step 1
- Pest management? Use the least-toxic controls available

**Step 5. Evaluate: How well did your control method work?**

**Step 6. How can you prevent future problems?**

---

**Physical/cultural controls**
- Hand removal
- Traps
- Barriers

**Biological controls**
- Encourage beneficial insects
- Import predators (such as Bt, beneficial nematodes, green lacewings)

**Least toxic chemical controls**
- Soaps
- Horticultural oils
- Careful spot sprays
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...”
Homeless Camp
1676 - Site Cleanup

Organizational Information

Select User

Orgcode: *  First Name:  *  Last Name:  *

343022  Ray  Willard

WSDOT Username:
Willard

Date & Time: *

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Sat</td>
<td>Oct 17</td>
<td>6</td>
</tr>
<tr>
<td>Sun</td>
<td>Oct 18</td>
<td>7</td>
</tr>
<tr>
<td>Today</td>
<td></td>
<td>8</td>
</tr>
<tr>
<td>Tue</td>
<td>Oct 20</td>
<td>9</td>
</tr>
<tr>
<td>Wed</td>
<td>Oct 21</td>
<td>10</td>
</tr>
</tbody>
</table>

10-19-2015 08:16 AM
IPM and Plant Health Care Flowchart

Step 1. Prevent problems by creating a healthy garden!
• Build the soil with compost and mulch
• Choose pest- and disease-resistant plants
• Right plant, right place: consider plant needs, diversity
• Maintain plants correctly: water, nutrients
• Minimize pest habitat

Step 2. Yikes! There is a pest problem!
Look carefully:
• What damage do you see? Is it getting worse?
• Are insects visible? Are they pests?

Step 3. What is the cause?
Look it up or ask for help!
• Drought stress?
• Unhealthy plant?
• Insect?
• Disease?
• Other?

Step 4. What can you do about it?
• Stressed plant? See step 1
• Pest management? Use the least-toxic controls available

Physical-cultural controls
• Hand removal
• Traps
• Barriers

Biological controls
• Encourage beneficial insects
• Import predators (such as Bt, beneficial nematodes, green lacewings)

Least toxic chemical controls
• Soaps
• Horticultural oils
• Careful spot sprays

Step 5. Evaluate: How well did your control method work?

Step 6. How can you prevent future problems?
Practice Plant Health Care!
Weed control is a year-round job
El control de malezas es un trabajo de todo el año

WINTER
INVIERNO
Flame weed on pavement or gravel (safer in wet weather)
Antorcha sobre pavimento o gravilla (menos riesgo en tiempo lluvioso)

SPRING
PRIMAVERA
Pull, line trim, or hoe to prevent weed flowers and seeds
Extraiga, weed-eater, a azada, para evitar que hagan flores y semillas

SUMMER
VERANO
Use vinegar and clove-based herbicides (e.g. "Burnout") - more effective in hot, dry weather
Productos de vinagre fuerte o clavo (como "Burnout") - sirve mejor en seco, caliente

LATE SUMMER
VERANO TARDE
One-time herbicide (e.g. Roundup) spot-application on persistent weeds, if needed
Una vez, espere el herbicida encima de malezas persistentes, si es necesario

FALL
OTOÑO
Add plants to fill in beds, spread 2-4 inches of mulch to prevent new weeds.
Agregue más plantas a las camas, espereza 2-4 pulgadas de asoleado para evitar las malezas nuevas

Questions? Call the Garden Hotline (206) 633-0224 ¿Preguntas? Llame a la Línea de Respuestas para un Jardín y Césped Natural

Created by: Elaborado por L.J. Tool, Woodland Park Zoo, & David McDonald, Seattle Public Utilities, for the Local Hazardous Waste Management Program in King County, WA.