



**SEATTLE
UNIVERSITY**

Guidelines for Sustainable Landscape Management

May 2009

Contents

Introduction	1
Fertilizer Use Policy	1
Landscape Waste Diversion Policy	1
Landscape IPM Plan	1
Roles and Responsibilities	2
Pesticide Use Policy	2
Inspection/ID/Monitoring & Record Keeping	3
Landscape IPM Short-Term Strategies and Treatment Options	3
Landscape IPM Long-Term Strategies	4
Landscape Water Conservation Practices	5
Erosion and Sedimentation Control Plan	6
Appendix	7
King County Native Plant List – Link	7
WA State Pesticide Laws – Links	7
References - Links	7
King County 2009 Noxious Weed Lists	8

Introduction

Seattle University has adopted these Guidelines for Sustainable Landscape Management in order to preserve ecological integrity, enhance natural diversity, and protect wildlife while supporting Seattle University campus operations. This Plan includes the following:

- guidelines for the use of chemical pesticides and fertilizers
- an exterior landscape integrated pest management plan
- guidelines for erosion and sedimentation control

It also outlines roles, responsibilities, and procedures to be followed to protect the health and safety of the campus community from pest and pesticide hazards while promoting the health, value, and beauty of the Seattle University campus landscape.

Fertilizer Use Policy

Fertilizers are seldom needed on healthy woody landscapes with proper soil management, proper plant selection, and the use of organic mulches and compost. Seattle University will use organic fertilizers as part of a turf management program for its athletic sports fields to correct deficiencies that, if not used, would cause plant disease or death. Organic fertilizers will be applied only after a soil test has been taken to determine the proper amounts needed. Organic fertilizers will be used on turf because they are slow release and long-acting. Synthetic fertilizers will be used as a last resort on the athletic sports fields when cold temperatures inhibit the function of organic fertilizers. Synthetic fertilizers will never be used on the main campus lawns and landscape beds.

Landscape Waste Diversion Policy

Landscape waste shall be diverted from the waste stream in several ways. Turf will be mowed with mulching mowers. Grass clippings will be left to decompose on the turf. Woody debris will be chipped and composted on site. During months when excessively large quantities of landscape debris are created, debris shall be picked up by Cedar Grove Compost's organic waste composting operation.

Landscape IPM Plan

Objectives of this IPM plan include:

- Elimination of threats to the health and safety of the SU community caused by pests
- Prevention of loss or damage to the landscape by pests
- Protection of environmental quality both inside and outside campus buildings

Integrated Pest Management is a decision-making process used to address pest problems in the landscape. IPM focuses on prevention by considering the ecosystem as a whole. Pest problems are prevented first using native and adapted plant varieties. Next, good maintenance practices are followed. If pests are encountered, the goal is to use a non-toxic treatment that will drop the pest level below an acceptable threshold.

A pest is defined as any organism that competes with the aesthetic value of plants in the landscape. At Seattle University, the goal of the exterior IPM program is to maintain and improve overall plant health and vigor. This is accomplished through a two tiered approach, with short term and long term strategies. The IPM Coordinator is responsible for overseeing the implementation of this program.

This policy applies to the following landscape pests, at a minimum:

- Plant diseases
- Arthropods
- Noxious weeds
- Indoor plant pests

Roles and Responsibilities

The Seattle University Integrated Pest Management Coordinator (IPM Coordinator) will oversee the Sustainable Landscape Management and IPM Program.

The IPM Coordinator will be responsible for the following:

- manage the exterior Landscape IPM Program and staff actions to ensure the Plan is followed.
- oversee staff training on basic IPM concepts and non-toxic methods of pest control.
- coordinate with the Environmental Health and Safety Specialist and/or contractors regarding rodent control in the landscape and at building perimeters.
- store the exterior Landscape IPM Plan and all related records and documents.

The Seattle University community will support the Plan by following established guidelines and by reporting pest sightings to the IPM Coordinator in a timely manner.

Pesticide Use Policy

The following strategies for pest control will be followed and/or used. The goal is to create and maintain healthy, vigorous landscapes without the use of harmful chemicals.

- Follow the exterior Landscape IPM Plan to assess and manage all pest problems.
- Modify the landscape including: replace susceptible plants, correct soil problems, and prune to allow more air movement and sunlight
- Educate Grounds staff on the exterior Landscape IPM Plan
- Monitor and trap pests
- Use physical or mechanical controls including: prune diseased plant parts and/or remove plant species susceptible to disease
- Coordinate exterior Landscape IPM efforts with all Seattle University departments, and other vendors working on Seattle University grounds
- Consider using a product chosen from the Organic Materials Review (OMRI) List as a last resort

Allowed products, if required for pest control, shall be taken from the most current edition of the Organic Materials Review (OMRI) List (www.omri.org/complete_company.pdf). A copy of the product label and Material Safety Data Sheet shall be kept in the Integrated Pest Management (IPM) Coordinator's office and available upon request. Only licensed applicators shall apply allowed products.

All appropriate steps will be taken to ensure compliance with state laws prohibiting unlicensed persons from using allowed pest control products on Seattle University property except for emergency control of stinging insects and disinfectants used for routine cleaning.

Allowed pest control products shall not be applied when unprotected persons are in the target area and would be subject to unconsenting exposure to pesticides. Spot treatments, rather than broadcast treatments, will be used when appropriate.

Inspection, ID, Monitoring, and Record Keeping

Regular Inspections

Gardening staff will regularly perform thorough inspections of landscape plants to identify problems and corrective actions needed to prevent and/or manage pest infestations. Results of the inspection will be submitted to the IPM Coordinator who will work with the gardener to plan, budget, and schedule corrective actions.

Reporting

Landscape pest monitoring reports will be generated and kept on file by the IPM Coordinator.

Pest Sighting Log

Exterior pest sighting instructions will be provided to campus staff on which they may report exterior pest activity sightings, including the identification of the pest (if known), number seen, other evidence (such as animal droppings), date, time, and location. The pest sighting report sheets will be kept in the office of the IPM Coordinator.

Pest Identification

When landscape pests are detected, an accurate identification will be obtained using professional resources such as WSU Cooperative Extension and/or other resources as necessary.

Record Keeping

The IPM Coordinator shall keep all records pertaining to landscape pest management, including any IPM reports, pest sighting logs, pest identification information, pest monitoring records, and remedial action reports.

Landscape IPM Short-Term Strategies and Treatment Options

Short term IPM strategies will be used to address problems that presently exist or subsequently occur in the landscape. These steps will be taken in the process:

- **Identification:** Positively identify both the pest organism and the host plant.
- **Establish an aesthetic threshold:** The following questions will be asked: What is the relative value of this plant in the landscape? Is it a key specimen? What level of damage can be sustained before action needs to be taken? Will existing beneficial insects take care of the problem, given time and provided habitat?
- **Monitoring:** Existing problems shall be carefully monitored to determine pest populations, the pest's life cycle, under what conditions damage occurs, and to determine if and when aesthetic threshold levels are reached.
- **Mechanical Control:** Damaged plant parts shall be removed using hand removal and pruning. Insect pests shall be removed using hand removal, water spray, traps, barriers, or horticultural soaps such as Safer Soap (on the OMRI List). Compost tea will be used for disease suppression. Spraying of vinegar-based products and clove oil-based products will be used for weed control.
- **Cultural Control:** Practices will include changes in irrigation pattern, fertilization program, and mulch use; pruning to increase air circulation and better light availability; good sanitation practices such as removal of diseased or infected plant material, removal of potential alternate host species and clean up of sites that may harbor insect vectors.

- **Biological Control:** Conservation Biological Control, allowing native beneficial insect populations to build in response to pest infestation, or Classical Biological Control, purchase and release of biological controls such as parasitic wasps, lacewings, etc. to manage a targeted pest problem shall be used.
- **Removal:** When other methods fail, are not cost-effective, or not applicable, it is appropriate to remove plants from the landscape that exceed the aesthetic threshold.

Landscape IPM Long-Term Strategies

Long term IPM strategies will be used to address the long range goal of building a healthy environment in which plants will obtain optimum health. These strategies are:

Responsible plant selection. Plants will be carefully chosen to be drought tolerant, well suited to the Northwest climate, resistant to insect and disease infestation, and not invasive species that out-compete native species. Selecting combinations of plants that meet this criteria and are also aesthetically pleasing, low maintenance, affordable, and contribute to the creation of wildlife habitat is the goal of this strategy.

Soil preparation and conservation. Before planting, soil that is compacted will be scarified to a depth of 8 inches and topsoil added if necessary. High quality compost will be used as topdressing. Compost tea will be applied to compacted, depleted soils as needed.

Weed suppression and control. Aggressive, thick ground covers will be densely planted to out-compete and hide weeds where appropriate. Until the time that these ground covers reach a size and density to outcompete weeds, mechanical removal of weeds (hand weeding, line-trimming, and sheet mulching) will be used to control weeds.

Wood chip mulch. Branches from pruning and tree removals will be chipped on site. A three to four inch layer of wood chips will be used to suppress most emerging weed seeds. The “soil to wood chip interface,” where many dormant weed seeds potentially reside, is depleted of available nitrogen during the breakdown of the high carbon content of the wood chips, further helping to suppress weeds.

Sheet mulching. The goal of sheet mulching is to provide additional, temporary weed suppression when renovating or planting a landscape. This method will be used where appropriate in the landscape. A layer of cardboard or several layers of wet newspaper will be put on top of bare soil or scalped turf prior to planting. Then a layer of three to four inches of wood chips will be placed on top of the cardboard/newspaper. Wood chip mulch will be added as needed on an annual basis, taking care to keep the mulch well away from the trunk flare of trees and the crown of shrubs and perennials.

Habitat development. Areas of campus will be developed to provide food, nectar, and nesting sites for beneficial insects and birds. Native plants will be chosen where possible in these sites. A source of water and refugia for cover will be provided. Beneficial insects and birds are an important part of the Conservation Biological Control plan.

Nutrient cycling. The nutrients in fallen leaves will be recycled by mowing leaves where they fall on lawns and then returning them to the landscape beds. A thin layer of wood chips will then be added to hold them in place. Where this is not possible, leaves will be collected for use as a carbon source in the compost operation.

Turf mix. A sustainable lawn care program will use a custom mix of grasses adapted to thrive in the local climate, typically New Zealand white clover and tall fescue grass, and then top seeded with perennial rye. The nitrogen fixing clover reduces the need for fertilizer, is wear resistant and drought tolerant. This model will be used when renovating a lawn on campus.

Grasscycling. The use of grasscycling mowers will insure that grass clippings are left on the lawn to decompose, which eliminates waste, reduces labor, recycles the nutrients in the grass clippings and reduces the need for fertilizer. The decomposing grass clippings provide organic matter and nutrients which feed soil dwelling organisms who process the nutrients into a food source for the lawn.

Landscape Water Conservation Practices

Drip irrigation. Drip irrigation systems routinely achieve much higher efficiencies than conventional overhead spray irrigation systems. Targeted placement of emission devices in direct contact with plant root zones shall be used where appropriate in the landscape to eliminate water transmission losses, such as wind, overspray, run-off, and evaporation.

Central computer-controlled irrigation. The irrigation system shall be monitored daily by computer. The irrigation clock schedules shall be adjusted bi-monthly and programmed to run in the evening when applying water is most efficient.

Hydrozoned irrigation. New irrigation systems shall be hydrozoned, meaning plant material with similar watering requirements shall be planted in the same zone and drought tolerant plants will be prioritized. Evapotranspiration data will be used as a guide to determine watering frequency and volumes.

Wood chip mulch. A four to six inch layer of wood chips shall be applied to provide insulation from high and low air temperatures. Coarse wood chips refract the sun's energy in several directions helping to regulate surface soil temperature thus reducing water loss to evaporation. Bark mulch will not be used as it absorbs more of the sun's energy and can form an impenetrable layer that inhibits water infiltration.

Grasscycling. Grass clippings will be left on the lawn to decompose, which adds organic matter to the soil and increases water holding capacity.

Mow high. Grass shall be mowed at 3 inches to shade the soil, reducing evaporation and decreasing water needs.

Aerate. The lawns shall be aerated to increase water and air penetration, encouraging a deeper, healthier root system that is better able to withstand longer periods between watering.

Erosion and Sedimentation Control Plan

Ongoing Landscape Operations

There were no existing erosion problem areas on campus at the time this Guide was written. In the future, most erosion issues will likely occur from construction projects (see section on Future Construction Activity). Ongoing erosion and sedimentation control via operations shall focus on maintaining slopes and drainage facilities.

Strategies for control include the following actions, to be taken by appropriate staff:

- Periodically check and clear roof drains, downspouts, drainage ditches, and other drainage infrastructure
- Periodically check for loose soil on slopes during rainy season. Establish and maintain organic mulches and ground covers with the goal of covering exposed soil quickly and completely.
- Check for standing water and other evidence of poor drainage after rain storms
- Clean up sources of sedimentation, such as plants growing over paved surfaces

Future Construction Activity

All future construction projects on the Seattle University campus shall meet the requirements for erosion and sedimentation control as written in the following:

- The most current edition of the City of Seattle's "Construction Best Management Practices Manual"
- The most current editions of the City of Seattle's
 - Department of Transportation Standard Specifications for Road, Bridge, and Municipal Construction
- NPDES Construction Storm Water General Permit requirements

Temporary Erosion and Sedimentation Control facilities must be maintained in conjunction with all clearing and grading activities and in such a manner as to insure that sediment laden water does not enter the drainage system or violate applicable City of Seattle requirements.

These requirements shall include the following practices:

- Creation of a "Surface Water Pollution Prevention Plan" which shall be reviewed and approved by the City of Seattle prior to acquiring the Clearing and Grading permit.
- The contractor shall have on staff a Certified Erosion and Sedimentation Control Lead who shall be on site or on call at all times and who shall perform regular site inspections and write an inspection report or checklist which shall be attached to the site log book.
- Site turbidity and pH monitoring shall be conducted as outlined in the NPDES permit
- Silt Control Measures which include filter fabric fencing, diversion swales and berms, straw bale check dams, mulch, and polyethylene sheeting cover for exposed soil
- Temporary Storm Water Runoff Control
- Measures to keep streets clean shall include wheel cleaning stations at site exits and measures to clean campus and public streets if they become fouled
- Slope erosion control measures
- Protection of drain inlets
- Control of pollutants to include vandalism protection, covering of chemicals and liquids, maintenance of equipment and vehicles to prevent spills, application of fertilizers and pesticides
- Control of de-watering water

Appendix

King County Native Plant List - www.wnps.org/plant_lists/counties/king/king_county.html

WA State Pesticide Laws

- RCW Title 17 - Weeds, Rodents, and Pests - contains most of the pest control laws.
- Specific laws about pesticides are in Chapter 21 Washington pesticide application act, RCW 15.58 Washington pesticide control act and WAC 16-228 General pesticide rules.

References

- Organic Materials Review Institute, www.omri.org/
- Northwest Coalition for Alternatives to Pesticides, NCAP, www.pesticide.org/
- IPM Institute, www.ipminstitute.org/
- Bio-Integral Resource Center, www.birc.org/index.html
- Tri-County Integrated Pest Management Guidelines:
www.govlink.org/hazwaste/publications/IPMTriCountyGuidelines.pdf
- Pesticide Action Network North America (PANNA), www.panna.org/
- Washington Department of Fish and Wildlife (WDFW), <http://wdfw.wa.gov/>

Class A Noxious Weeds, 2009 List
 (eradication required throughout Washington State including King County)

Common Name	Scientific Name
buffalobur	<i>Solanum rostratum</i>
common crupina	<i>Crupina vulgaris</i>
cordgrass, common	<i>Spartina anglica</i>
cordgrass, dense flower	<i>Spartina densiflora</i>
cordgrass, salt meadow	<i>Spartina patens</i>
cordgrass, smooth	<i>Spartina alterniflora</i>
dyers woad	<i>Isatis tinctoria</i>
eggleaf spurge	<i>Euphorbia oblongata</i>
false brome	<i>Brachypodium sylvaticum</i>
floating primrose-willow	<i>Ludwigia peploides</i>
flowering-rush	<i>Butomus umbellatus</i>
garlic mustard	<i>Alliaria petiolata</i>
giant hogweed	<i>Heracleum mantegazzianum</i>
goatsrue	<i>Galega officinalis</i>
hawkweed, European	<i>Hieracium sabaudum</i>
hawkweed, yellow devil	<i>Hieracium floribundum</i>
hydrilla	<i>Hydrilla verticillata</i>
johnsongrass	<i>Sorghum halepense</i>
knapeed, bighead	<i>Centaurea macrocephala</i>
knapeed, Vochin	<i>Centaurea nigrescens</i>
kudzu	<i>Pueraria montana var. lobata</i>
meadow clary	<i>Salvia pratensis</i>
purple starthistle	<i>Centaurea calcitrapa</i>
reed sweetgrass	<i>Glyceria maxima</i>
ricefield bulrush	<i>Schoenoplectus mucronatus</i>
sage, clary	<i>Salvia sclarea</i>
sage, Mediterranean	<i>Salvia aethiopsis</i>
shiny geranium	<i>Geranium lucidum</i>
silverleaf nightshade	<i>Solanum elaeagnifolium</i>
Spanish broom	<i>Spartium junceum</i>
spurge flax	<i>Thymelaea passerina</i>

Syrian bean-caper	Zygophyllum fabago
Texas blueweed	Helianthus ciliaris
thistle, Italian	Carduus pycnocephalus
thistle, milk	Silybum marianum
thistle, slenderflower	Carduus tenuiflorus
variable-leaf milfoil	Myriophyllum heterophyllum
velvetleaf	Abutilon theophrasti
wild four o'clock	Mirabilis nyctaginea

Class B Noxious Weeds, 2009 List
 (control required in King County)

Common Name	Scientific Name
Austrian fieldcress	Rorippa austriaca
blackgrass	Alopecurus myosuroides
blueweed, viper's bugloss	Echium vulgare
Brazilian elodea*	Egeria densa
bugloss, annual	Anchusa arvensis
bugloss, common	Anchusa officinalis
camelthorn	Alhagi maurorum
common reed (non-native genotypes)	Phragmites australis
Dalmatian toadflax	Linaria dalmatica ssp. dalmatica
fanwort	Cabomba caroliniana
gorse	Ulex europaeus
grass-leaved arrowhead	Sagittaria graminea
hawkweed, oxtongue	Picris hieracioides
hawkweed, mouseear	Hieracium pilosella
hawkweed, orange	Hieracium aurantiacum
hawkweed, polar	Hieracium atratum
hawkweed, queen-devil	Hieracium glomeratum
hawkweed, smooth	Hieracium laevigatum
hawkweed, yellow	Hieracium caespitosum
hoary alyssum	Berteroa incana
knapweed, black	Centaurea nigra
knapweed, brown	Centaurea jacea

knapeed, diffuse	<i>Centaurea diffusa</i>
knapeed, meadow	<i>Centaurea jacea x nigra</i>
knapeed, Russian	<i>Acroptilon repens</i>
knapeed, spotted	<i>Centaurea stoebe</i>
kochia	<i>Kochia scoparia</i>
lepyrodiclis	<i>Lepyroclis holosteoides</i>
longspine sandbur	<i>Cenchrus longispinus</i>
loosestrife, garden	<i>Lysimachia vulgaris</i>
loosestrife, purple	<i>Lythrum salicaria</i>
parrotfeather	<i>Myriophyllum aquaticum</i>
perennial pepperweed	<i>Lepidium latifolium</i>
perennial sowthistle	<i>Sonchus arvensis</i>
policeman's helmet	<i>Impatiens glandulifera</i>
rush skeletonweed	<i>Chondrilla juncea</i>
saltcedar	<i>Tamarix ramosissima</i>
spurge, leafy	<i>Euphorbia esula</i>
sulfur cinquefoil	<i>Potentilla recta</i>
swainsonpea	<i>Sphaerophysa salsula</i>
tansy ragwort	<i>Senecio jacobaea</i>
thistle, musk	<i>Carduus nutans</i>
thistle, plumeless	<i>Carduus acanthoides</i>
thistle, Scotch	<i>Onopordum acanthium</i>
water primrose	<i>Ludwigia hexapetala</i>
white bryony	<i>Bryonia alba</i>
wild chervil	<i>Anthriscus sylvestris</i>
yellow floating heart	<i>Nymphoides peltata</i>
yellow nutsedge	<i>Cyperus esculentus</i>
yellow starthistle	<i>Centaurea solstitialis</i>

*Brazilian elodea is designated for control throughout King County except in Lake Washington, Lake Sammamish, Lake Union and Lake Fenwick.

Class C Noxious Weeds, 2009 List (control required in King County)

Common Name	Scientific Name
hairy willow-herb	<i>Epilobium hirsutum</i>

hawkweed, common	Hieracium lachenalii
hawkweeds, non-native and invasive	Hieracium spp.

Non-Regulated Noxious Weeds, 2009 List

(non-designate B and C noxious weeds, control recommended but not required in King County)

Common Name	Scientific Name
absinth wormwood	Artemisia absinthium
blackberry, evergreen	Rubus laciniatus
blackberry, Himalayan	Rubus armeniacus
butterfly bush	Buddleia davidii
common fennel (except bulbing variety azoricum)	Foeniculum vulgare
common groundsel	Senecio vulgaris
common St. Johnswort	Hypericum perforatum
common tansy	Tanacetum vulgare
curly-leaf pondweed	Potamogeton crispus
Eurasian watermilfoil	Myriophyllum spicatum
field bindweed	Convolvulus arvensis
fragrant water lily	Nymphaea odorata
hairy whitetop	Cardaria pubescens
herb Robert	Geranium robertianum
hoary cress	Cardaria draba
houndstongue	Cynoglossum officinale
ivy, Atlantic	Hedera hibernica
ivy, English	Hedera helix 'Baltica', Hedera helix 'Pittsburgh', Hedera helix 'Star'
knotweed, Bohemian*	Polygonum bohemicum
knotweed, giant*	Polygonum sachalinense
knotweed, Himalayan*	Polygonum polystachyum
knotweed, Japanese*	Polygonum cuspidatum
lawnweed	Soliva sessilis
myrtle spurge	Euphorbia myrsinites
old man's beard	Clematis vitalba
oxeye daisy	Leucanthemum vulgare

poison-hemlock	Conium maculatum
reed canarygrass	Phalaris arundinacea
Scotch broom (required SR-2, I-90 E. of MP 34)	Cytisus scoparius
spurge laurel	Daphne laureola
thistle, bull	Cirsium vulgare
thistle, Canada	Cirsium arvense
wild carrot	Daucus carota
yellow archangel	Lamium galeobdolon
yellow flag iris	Iris pseudacorus
yellow toadflax	Linaria vulgaris

*Control of Bohemian, Japanese, giant and Himalayan knotweed is required on the Green River and its tributaries (defined as Type S, F or N aquatic areas in KCC 21A.24.355) upstream of the Auburn City Limits, including but not limited to Newaukum Creek, Soos Creek, Big Soos Creek, Jenkins Creek, Covington Creek, and Crisp Creek. Control of these invasive knotweed species is required up to the ordinary high water mark (or up to the top of the bank if the ordinary high water mark cannot be identified) and in the adjacent buffer area as specified in KCC 21A.24.358.

King County Weeds of Concern, 2009 List

(This list is for educational purposes only; these species are not classified as noxious weeds in Washington State. These species often impact and degrade native plant and animal habitat. Control is recommended where possible and new plantings are discouraged.)

Common Name	Scientific Name
bittersweet nightshade	Solanum dulcamara
buttercup, creeping	Ranunculus repens
buttercup, tall	Ranunculus acris
common hawthorn	Crataegus monogyna
English holly	Ilex aquifolium
English laurel	Prunus laurocerasus
European mountain-ash	Sorbus aucuparia
hedge bindweed, morning glory	Calystegia sepium
spotted jewelweed	Impatiens capensis