WSU WHATCOM EXTENSION

TECHNICAL MEMORANDUM

Project Title: Gardening Green: Sustainable Landscaping
Storm water Management and Outdoor Water Conservation Practices

December 2017

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Acknowledgments

Special thanks are given to City of Bellingham Public Works for providing funding to supplement the in-kind contributions from WSU Extension and making this project a reality. Special thanks are also given to WSU staff leads Sue Taylor and Jill Cotton who coordinated and implemented most of the project including Sue Taylor's authoring of much of this final report with assistance from the Project Director, Sue Blake.

BACKGROUND

In April of 2017, WSU Whatcom County Extension entered into a contract with City of Bellingham Public Works Division to provide community outreach education about residential landscaping practices with a focus on storm water management and water conservation. WSU Extension's *Gardening Green: Sustainable Landscaping* program has been working with community members since 2009. The City of Bellingham and Whatcom County have been partnering with WSU Extension on this endeavor since 2010.

Education and outreach are crucial to the success of public works programs to protect water quality and promote water conservation. An informed and knowledgeable community with greater understanding of the reasons why it is necessary to manage storm water and conserve potable water builds public support for programs and leads to greater compliance. This community outreach effort (*Gardening Green)* moves residents through a continuum from basic awareness to implementation of on-the-ground changes that address these management goals to becoming partners in the education and outreach of other community members.

Traditional residential landscaping with large lawns and few trees and shrubs are not very effective at preventing storm water runoff. Lawns are often managed with frequent irrigation and applications of fertilizer and pesticides. These common practices combined with large areas of lawns have been identified as contributing to excess runoff and a decline in water quality. Storm water runoff from residential landscapes carries pesticide residue to surface waters and phosphorus/nitrogen loading to Lake Whatcom and the Puget Sound. Water quantity is also an issue. During the dry summer months, outdoor watering increases our community's daily average drinking water demand. This places a strain on the City's drinking water supply. The EPA calculates that nearly half of the water used for irrigation is wasted due to evaporation loss, over watering, and runoff.

There are many actions that individuals can take to reduce these negative impacts while saving time, money, and protecting human and environmental health. *Gardening Green* educates participants on soil management, storm water management, appropriate plant selection and planting technique, native plants, creating wildlife habitat, maintenance techniques for low environmental impact, water conservation/rainwater harvesting, and integrated pest management. This project seeks to alter attitudes as well as practices to foster sustained behavior change.

NPDES Phase II Requirements (S.5.C.1.a and b.)

This project meets the public education and outreach elements of the NPDES Phase II requirements to implement a public education program to distribute educational materials to the community and conduct outreach activities about the impacts of storm water discharges on local water bodies and the steps that can be taken to reduce storm water pollution by residential homeowners through the adoption of best management practices for the design and maintenance of their landscape.

This project satisfies elements of the NPDES Phase II Requirements for public education and outreach requirements. These requirements call for improvements in target audience understanding that residential property and traditional landscaping design and practices is a major contributor to fresh and marine water pollution. This project fulfills the NPDES II permit requirements for subject areas targeted by this scope of work. *Gardening Green* classes and associated outreach activities are open to all Whatcom County residents. Program evaluation activities measure the understanding and adoption of targeted behaviors. Specifically this program covers the following NPDES II requirements:

Particular audiences and subject areas targeted by this scope of work include:

1. Educating the general public about impacts of storm water flows into surface waters, impacts from impervious surfaces, source control best management practices (BMP's) and environmental stewardship actions and opportunities in the area of landscaping and buffers (S.5.C.1.a.i.);

2. Education and outreach for homeowners on yard care techniques protective of water quality, BMP's for use and storage of pesticides and fertilizers, and low impact development techniques including site design, pervious paving, retention of forests and mature trees (S.5.C.1.a.iii.); and
3. Measuring the understanding and adoption of the targeted behaviors for at least one targeted audience in at least one subject area (S.5.C.1.b.);

Comprehensive Water Conservation Goals:

As a municipal water supplier, the City of Bellingham complies with state water use efficiency requirements that ensure safe, reliable drinking water supplies far into the future. This class supports the City's efforts to achieve its comprehensive water conservation goals to encourage outdoor water conservation actions.

Sustainable Landscaping Definition

There are many definitions of sustainable landscaping. This program conforms with the definition developed by an interdisciplinary effort that grew out of the 1987 United Nations' World Commission on Environment and Development. The commission called for changes in development practices to insure that *development met the needs of the present without compromising the ability of future generations to meet their own needs.* An interdisciplinary effort led by the partnership of the American Society of Landscape Architects, the Lady Bird Johnson Wildflower Center at The University of Texas at Austin, and the United States Botanic Garden have developed a Sustainable Sites certification system and educational resources (similar to LEED for buildings) for sustainable landscapes. The working definition of sustainable landscapes they developed and *Gardening Green* adheres to is:

"Landscapes are considered sustainable if they reduce water demand, filter and reduce storm water runoff, provide wildlife habitat, reduce energy consumption, improve air quality, improve human health, and increase outdoor recreation opportunities."

PROJECT DEVELOPMENT

Pilot Project Summary

Sue Blake WSU Extension water resources faculty, hosted a focus group for Lake Whatcom residents in 2008. Participants shared their opinions and ideas about what would be needed to help homeowners make changes to their landscape and maintenance practices to protect water quality. She also surveyed Master Gardeners and other community members about their interest in learning more about environmentally friendly landscaping. The information gathered in those two activities in addition to social marketing and watershed education literature formed the bases for *Gardening Green: Sustainable Landscaping* project.

WSU Extension conducted an extensive *Gardening Green* pilot project consisting of four comprehensive six-session classes and several workshops formats to refine the curriculum and determine the most effective delivery method for the *Gardening Green: Sustainable Landscaping* project.

Participants from all pilot projects completed a program evaluation survey. This information allowed the project developers to gather audience data on the interest of residents to make landscape changes, what type of changes were they willing to implement, and how emotionally involved they were about water quality stewardship. Information gather during these pilot classes informed future class curriculums, workshops, and schedules. Pinpointing the issues facing the target audience allowed us to modify project messaging to inspire the students to make behavior changes.

2009 - 2011: Six-Session Classes and Workshops

Class Format

The first *Gardening Green* class was offered as a pilot project in 2009. Interested Lake Whatcom homeowners registered for the class on a first come/first serve basis. The class met twice a week for three weeks from 9am to 1pm. The mornings were classroom presentations and the afternoons included sustainable landscape tours and a class visit to each participant's property. Participants completed a long, open-ended survey and did face to face interviews about all aspects of the program – content, activities, and format. All the participants of the initial pilot class enthusiastically recommended continuing the class. They appreciated a landscape class that was based on good science and practical information about how to address Lake Whatcom water quality issues with residential landscape choices. The input from the first pilot class was used to refine *Gardening Green.*

Three comprehensive 6-session classes were held during 2010 – 2011: April 2010, September 2010, and July 2011. The comprehensive classes followed the same format as the first pilot class.

- The classes were open to only Lake Whatcom residents.
- There was limit of 8 participants to foster interaction and a free exchange of ideas for improving the content, identifying the skills necessary to make on-the-ground changes and program scheduling.
- The entire class and instructors visited each of the participant's property. The goals of the on-site visits were to identify opportunities for managing storm water and barriers that made implementation of on-the-ground changes difficult. Taking part in evaluating each other's landscapes for opportunities for storm water manage and other sustainable landscape elements, not only gave participants more experience in applying strategies discussed in class, but also informed the instructors about audience concerns and needs.
- Home visits also provided an opportunity for hands-on activities to develop the skills necessary for drawing a site map to scale, conducting a site analysis of existing conditions, and group discussions of ways to organize each landscaping to meet homeowner goals for environmental stewardship and outdoor living.

The advantages and disadvantages of scheduling options for the comprehensive classes were studied. Questions about scheduling preferences were a part of Program Evaluation surveys from 2009 – 2016. The value of an evening/Saturday schedule to allow people with a fixed schedule to attend was recognized but very few said that they themselves would attend a evening/Saturday class.

- The two-weekday schedule were most popular.
- The evening/Saturday pilot class attracted the least number of participants.

Workshop Format

Shorter workshop formats were also tested. The workshops offered classroom presentations, demonstrations, and activities. Property visits were not part of the workshop experience. Participants completed a Program Evaluation survey and Best Management Practices pledge.

1. One four-hour 'Mini-Class' Workshop was held in Sudden Valley on a Saturday. It was well attended. There were few responses to a follow up survey six months later making it impossible track whether the workshop participants made on-the-ground changes to their landscape.

2. "Three Workshop Series" was held beginning in March of 2011. Each workshop covered a third of the content offered in the comprehensive class so that participants could attend all three workshops and have assess to all the content covered in the six-session class. These workshops met on Saturday mornings from 9:00 – 12:00. Only one person attended the entire series. The series of Saturday workshops had the least number of participants.

Pilot Project Conclusions

Three program evaluation criteria were considered in evaluating the most effective program format.

1. Targeted (BMP) on-the-ground landscape changes were implemented.
2. Increase community knowledge about gardening/landscaping impacts on water quality and other environmental and human health issues.
3. Community benefit as measured by the number of outreach contacts made by program participants to share information about sustainable landscaping strategies.

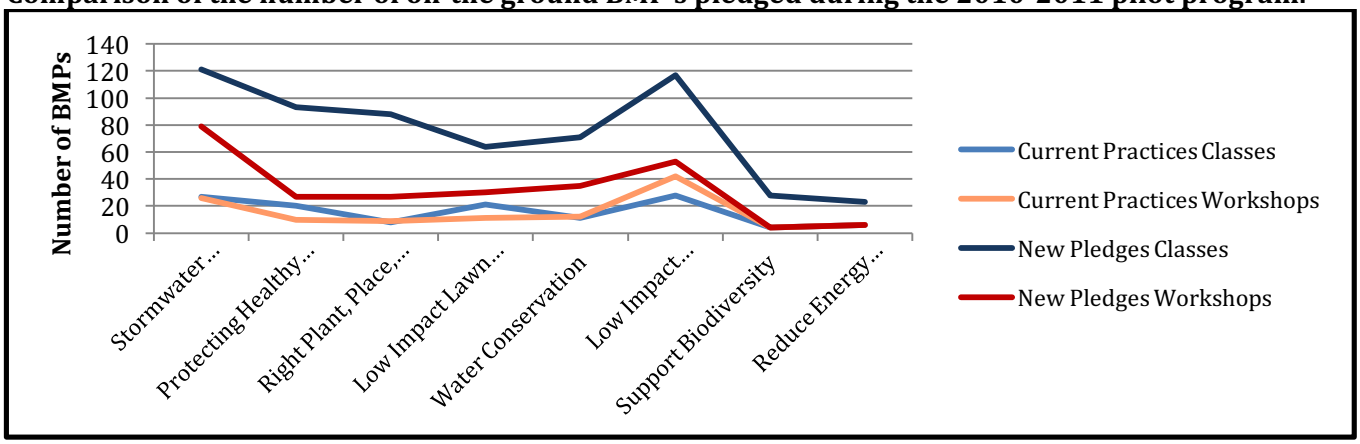
Participants in the 2010-11 comprehensive classes and workshops completed a Best Management Practices pledge. The BMP pledges were evaluated for differences between responses by class and workshop participants.

- Baseline BMP use was similar for both groups.
- The comprehensive class participants pledged to implement a much larger number of practices than the workshop attendees. The difference may be explained by the additional activities and experiences offered in the classes. Activities such as seeing other community members adopting BMP's, being a part of an on-going peer support group, and activities that fostered relationship building, and knowing that there was continuing support available, generated more emotionally involvement in the process.
- Confirmation of BMP's implemented were provided by participants in a follow-up survey sent six months after program participation. A much higher percentage of class participants responded to the survey that workshop participants. Class participants provided more complete responses to the questions and indicated that they had already implemented many of their BMP pledges. It is unknown whether this was the case for the workshop participants given the very limited number of survey responses.

Participants in both the comprehensive classes and workshops reported an increase in knowledge about sustainable landscaping, water quality issues, and actions they could undertake to make their landscapes more environmentally supportive.

Class participants reported that they had exceeded the expect number of community outreach contacts but the limited survey response by the workshop participants did not provide enough information to determine if this population did any outreach education.

Comparison of the number of on-the ground BMP's pledged during the 2010-2011 pilot program.



The chart corroborates that the outcomes for the comprehensive class out paced those for the workshops. Participants in the comprehensive classes demonstrated the most benefit. Classroom presentations followed by on-site visits were a highly valued part of the program. Participants were guided through the skills needed to successfully complete their landscape project. The experience applying the information

learned in the classroom to a real site enhanced confidence. Identifying themselves as a part of a group with similar stewardship goals was very motivating. The comprehensive class was determined to be the most effective delivery method. The home visits needed to be modified to allow for larger class sizes. The entire class does afternoon tours of sustainable landscapes of class alumni. They have the opportunity to see the strategies discussed in class being implemented on a variety of properties. Home visits are still a part of the project but are now conducted by Sue Taylor, project instructor/coordinator outside of the class schedule. Other participants sometimes join in to visit properties of fellow students.

Although the workshop format did not offer the range of benefits as the comprehensive class, it is a viable outreach approach for reaching targeted populations unlikely to participate in the longer classes. Community workshops continue to be offered by *Gardening Green* instructors in addition to the comprehensive classes.

PROJECT GOALS

The goals of this project are to reduce negative water quality impacts to receiving water bodies associated with traditional residential landscaping as well as promote outdoor water conservation. To achieve these goals, *Gardening Green* targets specific learning and behavioral outcomes:

Short-term Outcomes – Learning

- Participants will increase their knowledge about negative impacts to receiving water bodies associated with landscaping practices. They will feel confident enough about their understanding of these watershed issues and be able to talk to other community members.
- Participants will understand the components of sustainable landscaping and the benefits it offers homeowners such as reduced maintenance chores, cost savings of picking the right plant for site conditions, and the positive feelings that come with knowing they are protecting both human and environmental health.
- Participants will increase their knowledge about environmentally friendly strategies (best management practices) for intentionally locating vegetation and/or adding more layers of vertical plant canopy to manage storm water through evapotranspiration and soil infiltration and reduce runoff from leaving their property.
- Participants will increase their knowledge about low impact maintenance practices including integrated pest management to reduce the need for pesticides, fertilizers, and supplemental watering. They will understand the concepts of hydro-zoning, drought tolerant plants. rainwater collection, and actions that reduce soil moisture evaporation to reduce outdoor watering needs.
- Participants will recognize that individual actions can have a positive impact on local environmental issues and their attitude toward and commitment for gardening sustainably will be reinforced.

Mid-term Outcomes – Behavioral

- Participants will implement on-the-ground changes in their landscape to manage storm water and reduce nutrient and pesticide run-off, practice low impact maintenance, and add native plants to the landscape.
- Participants will use the changes to their landscapes to demonstrate that sustainable landscaping can be attractive and functional while supporting environmental goals to friends, family, and neighbors.
- Participant interactions with instructors, class members, class alumni and community partners during the class, tours, and activities will encourage and foster a long-term commitment to complete their landscape changes and sustain new maintenance behaviors.

Long-term Outcomes

- Participants, through their actions and leading by example, will promote stewardship activities and attitudes to the general community.
- Participant's outreach efforts will contribute to a change in social norms to move the ideal landscape from 'traditional landscapes' to 'sustainable landscapes' that include native plants and require minimal inputs of fertilizers, pesticides, and irrigation.
- Water quality in the City and County watersheds will improve.
- Policy makers will support continued outreach education to advance stewardship information and behaviors.

PROJECT DESIGN

The potential audience for *Gardening Green* covers a large range of landscaping knowledge and skills. Some have been long time gardeners who have taken part in other training opportunities such as Master Gardeners. Others are new to the region or have little working knowledge about selecting appropriate plants and other important components of creating a sustainable landscape. Built into the project design are steps to move participants from awareness to sustained independent action including becoming partners in outreach education.

Continuum Of Public Engagement Activities

AWARENESS

Gardening is not benign and our choices matter. The class begins with presentations about the links between common residential gardening practices and negative water quality and environmental impacts. Adopting sustainable landscape strategies supports the environment and offers many benefits to the gardener including reducing maintenance chores.

LEARNING

The concepts covered in classroom presentations build an understanding of the components of a sustainable landscape. Tours of home landscapes utilizing the strategies discussed provide implementation examples.

APPLIED LEARNING

Skills necessary to successfully complete a landscape project are developed through hands-on activities and demonstrations. Each week homework assignments encourage participants to apply the strategies learned in class and viewed during landscape tours to their landscape plan. Using new information immediately facilitates learning and increases individual confidence levels with talking to others.

FACILITATED ACTION

Participants sign a PLEDGE indicating specific BMP's they intend to implement and their volunteer community outreach plans. Individual on-site visits by program instructors help homeowners overcome barriers that prevent BMP implementation. Home visits also provide support and affirmation.

SUSTAINED INDEPENDENT ACTION

Participants "pay" for their education with volunteer projects about actions that protect water quality using the knowledge gained from the class & written class resources. As participants confidence in their knowledge and skills increase and they begin to view themselves as good stewards, they will be more likely to continue to improve the sustainability of their landscape design and maintenance practices.

Sustained Behavior Change

To achieve the benefits of sustainable landscaping, on-the-ground changes in both the design and maintenance practices must occur. Replacing all or part of the lawn with more beneficial tree, shrubs, ground covering plants and woody mulch; require months of planning, physical labor, money, and a huge commitment of time. It also requires strong personal motivation – a desire to adopt more sustainable behaviors that outweighs the inconvenience of making changes. Changing long-held maintenance practices is just as hard as changing other behavioral habits.

Key findings gathered in local focus groups and surveys helped to determine not only what knowledge and skills homeowners felt were necessary but equally important how to engage with the community to maximize the likelihood of follow through on the implementation of best management practices. The input from our community was very consistent with the actions recommended in literature critiquing watershed education programs. These findings were built into the design of Gardening Green in the following ways:

1. **Attitude change is very difficult to achieve unless residents are engaged on an emotional basis.**
Seeing other community members adopting sustainable landscaping nurtures emotional engagement as students interact with other homeowners. These homeowners tell their stories of why they felt making changes was important enough to undertake changing their landscape, behaviors, and attitude. The commitment to stewardship and positive feelings about being part of the solution conveyed by fellow citizens is inspirational.
Motivation is galvanized by the positive energy of being part of a group endeavor to become more effective environmental stewards. Students share their own stories and their plans for on-the-ground changes.

People are more likely to sustain behavior change when they believe that their individual actions will make a difference. Stories documenting common people's successful efforts to solve local, regional, and global environmental issues are shared with students through out the class.
Importance of being part of preserving of our natural habitat for descendants has a strong appeal and galvanizes students to take actions on their own property as well as get involved in community efforts.

2. Make change easy by providing resources and support. Recognize the value of small steps by many people.

- Students are encouraged to develop an implementation timeline for their landscape changes that divide the project into phases based on time, energy, and budget.
- Many small steps add up to make positive changes in how the landscape functions.
- Presenters share ideas for smaller project phases:
  - Cover all bare soil with 3-4" of woody mulch.
  - Expand existing border beds a little each year to slowly reduce the size of lawns, increase soil infiltration and reduce runoff of storm water.
  - Increase the layers of plant canopy cover in existing landscape beds.
  - Remove plants that require frequent fertilization, treatment with pesticides, or more irrigation than surrounding landscape plants. Grow favorite but needy plants in containers on the patio.
  - Begin with a project near frequently used outdoor living areas to get immediate satisfaction from their efforts.
- Establish maintenance zones and save time on routine maintenance by leaving some areas more natural with fallen leaves and plant debris that will manage storm water more efficiently while you save time and labor.
- A list of 63 best management practices provides guidance about sustainable practices and permit students the flexibility adopt ones that fit their property and goals. One size seldom fits all.
- Provide easy access to affordable native plants. Our community partner, Fourth Corner Native Plant Nursery, allows students to purchase plants at wholesale prices. At least four group visits, open to all class alumni, are scheduled each Spring and Fall with the class instructors present to assist students. Students can also make appointments for nursery visits independently.

3. Break down the barriers to adopting new behaviors by strengthening confidence and building needed skills.

- Participants receive training in skills necessary for planning sustainable changes to their landscape.
- Homework assignments, during this course, encourages participants to apply the information they learned during each session to their sustainable landscape master plan.
- Students share their landscape plans with the class and receives encouragement and affirmation from fellow class members and instructors.

- Students complete a signed Best Management Practices pledge. Watershed outreach critiques found that making a written pledge increased the likelihood of follow through actions.
- Gardening Green instructors continue student contact and assistance beyond the three-week class period by providing on-site consultations and follow up email and phone contacts to overcome barriers that could prevent on-the-ground changes and to review final project plans and the plant list.

4. Focus on the personal benefits people receive from sustainable landscaping.

- Gardener's benefit by spending less time on routine maintenance by appropriate plant selection, use of mulch, installation of drip irrigation for new plantings, and less lawn mowing and leaf raking.
- Reduced costs associated with conservation of energy and water; replacement of dead and damaged plants; and decrease in manufactured fertilizer and pesticide use.
- Human health benefits from air quality improvement by planting trees and using hand powered or electric tools and equipment; managing landscaping organically; and improving water quality for drinking and outdoor recreation.
- Creation of outdoor living spaces for relaxation, stress reduction, and other mental health benefits derived from contact with natural settings.

Cultivating student interest and recreational enjoyment in our natural environment supports sustained behavior change. Guided tours introduced students to native plant identification and bird watching. Class alumni reported that an increase in the number and variety of birds visiting their landscape brought them joy and the desire to continue to add native plants. These guided activities allow students to meet and interact with members of our local Komo Kulshan Native Plant Society (WNPS) and North Cascades Audubon Society (NCAS). Both groups offer monthly educational presentations and frequent field trips for the community so students can continue with their education.

The actions and strategies presented in *Gardening Green* meets the definition for sustainable landscaping: *"Landscapes are considered sustainable if they reduce water demand, filter and reduce storm water runoff, provide wildlife habitat, reduce energy consumption, improve air quality, improve human health, and increase outdoor recreation opportunities."*

The scope of the project includes content in topics related to landscaping and environmental issues as well as lessons and activities to build the skills necessary to complete a sustainable landscape plan and implement the changes in their home landscapes. Tours of sustainable home landscapes, mostly class alumni, provide practical examples of using landscaping to manage storm water, reducing outdoor watering, creating wildlife habitat, reducing energy consumption and air pollution, using sustainable materials, and the multiple benefits each BMP offers including protecting and enhancing human health.

Class participants plan the sustainable changes they intend to make to their property as a part of the curriculum. They begin by creating a scaled drawing of their property. After each class session, they are encouraged to put the information learned into their master plan for landscape changes. At the end of the class they have completed a written Best Management Practices (BMP's) Pledge for landscape design and low impact maintenance practices. On-site consultations provide participants individualized assistance to prioritized implementation of on-the-ground changes and overcome any barriers that might prevent the completion of their planned changes.

The scope of curriculum listed below is organized as covered in the Gardening Green schedule. Each presentation and associated activities build on the one before and encourage the participants to view gardening as a ecosystem.

PRESENTATIONS: Strategies & Skills	TOURS: Strategies in Action	HOMEWORK: Applying Strategies
DAY ONE **Sustainable Landscaping** Class organization, pay-back & resources • Human & environmental benefits • Definition • Decision making guidelines • Comparison sustainable / traditional **Water and Gardening Connection** • Links – water quality and gardening • Local water issues-quality & quantity • Demonstration of changes when forests become neighborhoods	**Stimpson Forest Reserve** • Guided native plant walk • Selected plant list of plants along trail • Benefits of time spent in nature • How forests manage storm water with topography variations, vegetation & canopy cover, and a deep layer of duff Native Plant Society members lead the walk & share opportunities for continuing education about native plants through workshops, walks, and books.	**1. Review** • Review class manual • Sustainable Landscape Workbook (SLW) • Gardening Green Resources List **2. Activities** • Reflect on your neighborhood/yard vs. a natural forest. Consider storm water management, quality of habitat, and natural green spaces for relaxing. • WkBk*: Design Development.* pp. 1-3 1-Create a scaled site map of property 2-Evaluate existing landscape 3-Create a photographic inventory
DAY TWO **Healthy Soil** • Soil characteristics • How soil protects water quality • Five ways to protect soil functions • Improving soil health **Site Analysis** • Evaluation of existing property conditions relevant to plant health and homeowner needs • Check for soil compaction & erosion **Water Conservation & Collection** • Conservation of indoor water use based on behavior change and /or appliance upgrade • Conservation of outdoor water use. • Rainwater collection for irrigation	**Landscape Tours** Michael's: • Storm water management – cisterns, an infiltration/dispersion trench under path, and a dry stream • Added native plants to landscape • Reduced lawn size so mowed with single charge of electric mower • HIP program participant Jenny & Bill's: • Demonstration/presentation on rainwater collection in 7 cisterns for 100% of outdoor watering needs • Eliminated all lawn and replaced with native plants • Rain garden • HIP program participant	**1. Readings** WSU'S Horticultural Myths at https://puyallup.wsu.edu/cs • *Soil Amendments*: entire section : *How Plants Work* – Mycorrhizae **2. Review** Healthy Soil Resource List **3. Activities** (SLW)*: Design Development pp. 3-11* • **Conduct a Site Analysis** Water Movement, Soil Characteristics, Tracking the Sun , Winds, Regional Climate, Area Microclimates, Views, Home Security, Off-site Influences, & Habitat
DAY THREE **Right Plant/Right Place** • Match plant needs & site conditions • Drought tolerant/Disease resistant ornamental plants • Planting on a slope • Buying healthy plants • Proper planting technique • Plant establishment **Sustainable Strategies** • Imitating natural ecosystems • Strategies to manage storm water and reduce energy use • Methods to reduce/eliminating lawn • Landscape alternatives to lawns	**Landscape Tours** Dorcie's: • No lawn • Raised Vegetable Beds • Creative repurpose of resources • Some natives mixed with ornamentals • Before/After Photos Mary & Michael's: • Small lawn / mows with reel mower • Cisterns & rain barrels & Delta Lock Wall • Runoff from pervious paver patio goes into manifold under lawn to water it • Sustainable outdoor lighting/solar panels & covered compost • Earthworks to slow runoff • Some native plants	**1. Readings** WSU'S Horticultural Myths • *Planting Technique*: entire section • *How Plants Work*: entire section 2**. Review** Right Plant & Sustainable Strategies Resource Lists **Activities** (SLW)*: Landscape Planning pp. 12-13* 1-Imagine Your Dream Garden 2-Needs Assessment 3-Determine Your Style

DAY FOUR

Low Impact Maintenance

- Smart watering & fertilizing
- Weed management, noxious weeds
- Reduce green waste – pruning, etc
- Low impact lawn care

Native Plants In The Landscape

- Introduction to PNW native plants
- Landscape uses and benefits
- Growing/Caring for native plants
- Designing with native plants

Landscape Planning

- Goals for landscape function
- Best Management Practices
- Schematic Designs
- Maintenance Zones

Landscape Tours

Ron's:

- Presentation on setting up drip irrigation
- Reviews plans he made in class & shows the resulting landscape area
- Removed front lawn
- Small back lawn, large trees, terracing

Sue K's:

- Front lawn with trees and shrubs
- Garden rooms instead of lawn in backyard with trees, shrubs, & ground layer plants
- Native plant back area
- Before/After photos

Readings

WSU Horticultural Myths:

- Fertilizers
- Maintaining Trees & Shrubs
- Mulches

Review Low Impact Maintenance and Native Plants Resource Lists

Activities

(SLW)*: Landscape Planning pp. 13-15*

- Set the Goals for how your landscape will function
- Complete Best Management Practices Pledge
- Do several schematic designs of landscape changes & organization
- Establish maintenance zones

DAY FIVE

Wildlife Habitat

- Birds, Butterflies, Insects , and more
- Habitat components
- Structural & Plant diversity

Planting Plan

- Design Guidelines
- Review of key concepts for creating 'plant communities'
- Take control of maintenance strategies

Introduction to Bird Watching

- Audubon Society presentation
- Birding Apps
- Audubon Society's opportunities to learn more about birding

Landscape Tours

Barbie's:

- No lawn – very small lot
- *Celltek* pervious walks
- Backyard food gardens
- Recycle/repurpose resources

Sue T's:

- Storm water management
- Wildlife habitat
- Plant diversity
- Terracing slopes
- Forest & meadow
- Bird watching

Readings

REVIEW Resource List for

- Wildlife Habitat

Activities

(SLW): *Master Plan Record* pp. 14-18

- Complete master plan
- Determine implementation timeline
- Design first planting plan

DAY SIX

Integrated Pest Management

- Four step process to manage plant pests: observation/monitoring, identify/research, level of tolerance, methods of management
- Types of pests
- Managing problem wildlife
- Pesticide use & safety

Share Your Plans

- Each student shares plans for creating a sustainable landscape and pay-back outreach activity.

CELEBRATE

GARDENING WITH A PURPOSE

Potluck

1. WSU'S Horticultural Myths

- *Pesticides* – entire section

2. Review - Resource List for

- Integrated Pest Management

3. Activities

- Check signal words on products under the sink & garden products
- Complete your sustainable plans
- Install BMP's & your new plants
- Set up On-Site Consultation

PROJECT IMPLEMENTATION:

Deliverables:

1. One thirty-hour *Gardening Green: Sustainable Landscaping* class
   - April 24 – May 10 on Mondays and Wednesdays 9am – 2pm: 6 sessions

2. Follow up consultations with current and past participants
3. Community outreach education
4. Project coordination activities
5. Sustainable landscape manual for class participants
6. Sustainable landscape Website content organization and securing a Host
7. Final Technical Memorandum compiling learning objectives, outcomes, and attendance

Community Partners:

- Fourth Corner Native Plant Nursery: Sells native plants, at wholesale prices, to class participants
- Komo Kulshan Native Plant Society – Leads native plant identification walk
- North Cascades Audubon Society – Provides "Introduction to Bird Watching" class
- Class alumni and other community members host landscape tours

EVALUATION DESIGN

Evaluation is an essential component of the success of this educational outreach project. Community training activities were evaluated for changes in knowledge, skills, commitment, and implementation of best management practices in participants' landscapes. The results of the evaluation component are used to make program changes to improve outcomes and inform future outreach education efforts.

- Participants self-rated increase knowledge, skills, and commitment.
- Participants signed pledges indicating the Best Management Practices they intend to implement.
- A follow up survey of participants, six months after the class, collected information about the actions and changes they have implemented, any barriers they encountered that prevented actions, and suggestions for program improvement.

Marketing Plan:

Participant recruitment efforts encompassed both word-of-mouth from past participants and advertisements through the following locations. Those in bold indicate where students in this year's classes heard about the program. Over the years this program has been offered, participants have reported reading about the class in most of the outlets listed. WSU Extension website and Master Gardener's List serve have been the most consistently reported. Birch Bay class participants learned about the class through BBWARM and Northern Lights.

Email notification of interest list	Foothills Gazette	**Native Plant Society List serve**
Sudden Valley Community Association	**Cascadia Weekly**	**Audubon Society Website**
Northern Lights	**Take Five - Herald**	**Nextdoor Neighborhood website**
BBWARM	Lynden Tribune	WSU Whatcom Extension website
Recommended by a friend & family	County Departments	**Master Gardener's List serve/Faceboo**

Gardening Green Class

The class met at WSU Extension classroom at 1000 N. Forest Street. *Gardening Green* meets six times over a three-week period. All sessions began with two classroom presentations that include power point presentations, demonstrations, and hands-on activities. Afternoons were field trips to natural areas and sustainable landscapes.

Tours of sustainable landscapes utilizing the strategies discussed in class allowed students to view how other community members are implementing Best Management Practices to make their property more sustainable regardless of the "style" of landscaping.

- These hosts provide information and demonstrations on the installation of drip irrigation, setting up rainwater harvesting systems (cisterns and rain barrels), rain gardens, and the use of native plants in the landscape. Many show the landscape plans they developed in class and before/after photographs.
- Many of these Gardening Green class alumni offer additional assistance to current class members such designing and implementing rainwater harvesting systems, allowing them to visit another time with spouses/partners, and sharing plant starts and seeds.

Each topic covered in class presentations builds on the one before to create a landscape that becomes more self-sustaining with less need for inputs of fertilizers, pesticides, or regular irrigation. After each class session participants had a homework assignment to add the information learned during the class to their landscape master plan that included:

1. SITE PLAN: A scaled drawing of existing site conditions.
2. SITE ANALYSIS: Study of sun aspect, soil characteristics, soil moisture, water movement across the property, views to enhance/views to screen, impacts of winds, and off-site influences.
3. SCHEMATIC PLANS: Identifying opportunities to implements BMP's and still provide for family uses. Intentional planning to create a balance among the practical, aesthetic, and environmental landscape functions.
4. MASTER PLAN: Document intended on-the-ground changes and establish installation phases based on their time and budget.

Follow-up Consultations

On-site consultations were offered to participants to encourage on-the-ground actions. Opportunities for improved storm water management, water conservation strategies, plant recommendations, and finding solutions for barriers to the implementation of best management practices were the focus of the visits. Past class participants are eligible to receive continuing assistance. Most people choose to renovate their landscape in phases that match both their available time and budget constraints. These are multi-year efforts. There is a wide range of issues facing class participants as they plan their sustainable landscape. Assistance prioritizing the order of the renovation phases, reviewing of final plans and plant lists, recommending plants for specific conditions, and identifying existing plants are frequent requests. Here are some examples of the types of conditions and projects this group was dealing with:

- Too Dry: Evelyn wanted to discuss the sharp drainage in her front yard that was confirmed by her site analysis (porosity/drainage test) and supported by the poor performance of lawn unless it was frequently irrigated. Prior to the site visit, she had begun sheet mulched the front yard to eliminate all lawn and widen the border beds in the backyard to add more native plants. She had researched the Garry Oak Meadow native plant community as a guide for appropriate plants for her sharp drainage and had developed a list. We discusses plant characteristics and she refined the native plant list for her front yard meadow. We reviewed the list of native plants to attract birds and pollinators for her backyard.
- Too Wet: Beth's project was to figure out how to best manage a very wet 6 acres. There was still standing water over 60% of the property in late May. On the property walk about, we labeled all existing native plants in the forested areas to develop a list of plants that performed well in her site conditions. She will use that list to slowly extend the forested areas into part of the 3 acre field. We developed a second list of native plants for full sun, wet meadows conditions. She and her husband mowed wide paths for traveling around the field and this fall planted wildflowers, shrubs, and a grove of trees near one of the drainage ponds they had dug in the past to try to drain the field. Her goal is to transform a wet field with no native plants into a wet meadow with native plant habitat for birds.
- Shore of Lake Whatcom: Donna wanted to review the three pages of native plants she had been identifying during class on her 2 acre South Bay property. She planned to invite the other South Bay residents to a *Ladies Sunhat Tea* and do a guided walk around her property to show them native plants that would grow well on their property. The *Tea* was held a few weeks and nine of her neighbors attended. Two of them have since taken *Gardening Green*.

- Lake Whatcom with some shoreline: Alice wanted to eliminate all of her lawn and add native plants. She decided to participate in the HIP-DIY program.
- Two site visits to past participants to tour completed on-the-ground projects and talk about their next project phase.
- One site visit to a past participant that have completed all intended landscape changes/BMP's and was wanting suggestions for additional actions they could undertake to further improve sustainability.
- Organizing two buying trips with *Gardening Green* instructors (for plant consultations) to Fourth Corner Wholesale Native Plant Nursery. One in the spring and the second in the fall.

Outreach to the General Public

Gardening Green instructors provide community outreach in the form of displays at community events and workshops to garden clubs and other community groups. A booth at Whatcom Water Week festival focused on assisting community members to identify the watershed they live in. An interactive display of non-toxic pest management tools and strategies provided information about integrated pest management for a natural approach to maintaining the landscape and protecting water quality. The booth was visited by more than a hundred people.

COMMUNITY OUTREACH EDUCATION: SUSTAINABLE LANDSCAPING WEBSITE

WSU Extension in partnership with the City of Bellingham and Whatcom County are developing a sustainable landscaping website to expand this outreach education effort to the broader community beyond those that are available to take a multi-week course. Extension's in kind contribution includes hosting and maintaining the website within WSU Whatcom Extension website. In addition IT staff support for the design and development for the website, videos, and other formats included in the presentation of information. Sue Blake, WSU faculty, and Sue Taylor, *Gardening Green* coordinator, are the lead site design and development team.

Two focus groups were convened in September 2017 outside of this contract. They provided input on the format and content of the site. The insights they shared about the elements they deemed essential to them to inspire exploring the site beyond the home page were especially helpful in the design and content of the Sustainable Landscaping Home Page. A final report regarding the results of the focus groups was provided to both Whatcom County and City of Bellingham and is not covered here.

Each topic area will begin with a home page that outlines the key points and learning objectives for the section as well as links to other information that can be trusted for our region. The format for presentation of information will include: slideshows, short videos, photography galleries, workbooks, and documents. A website menu moves the audience through the process of learning about site conditions, sustainable strategies, planning landscape changes, selecting appropriate plants, installing the landscape, and maintaining a sustainable landscape. The content of the website has been informed by the experience gained hosting years of *Gardening Green* classes. The draft plan was completed during this contract period and included input gathered during two Focus Groups conducted in September.

The homepage will have a left side menu that will move users through the site. The table below shows the organization of content. The development of this content is the next step.

SUSTAINABLE LANDSCAPING HOMEPAGE				
GETTING STARTED	**ADOPTING SUSTAINABLE STRATEGIES**	**PICKING THE PERFECT PLANT**	**PUTTING IT ALL TOGETHER**	**NATURAL CARE OF YOUR PIECE OF THE EARTH**
Map Your Yard *Document* Evaluate Your Landscape *Document* Site Analysis *Slideshow, Video & Workbook* Needs & Wants Document Resource Links	Managing Water Managing Soil Saving Energy Creating Habitat Shoreline Living *Slideshows* *Best Management Practices Document* Resource Links	Right Plant / Right Place *Slideshow* Native Plants *Slideshow* Plant Data Record *Document* Planting Plan *Slideshow & Workbook* Resource Links	Create Your Dream Garden *Slideshow* Buying Healthy Plants *Slideshow* Right Planting Technique *Video* Project Materials *Recycle, Repurpose* Resource Links	Integrated Pest Management *Slideshow* Low Impact Maintenance *Slideshow* Miracle Of Mulch Document Maintenance Techniques Traditional vs Sustainable *Document* Resource Links

EVALUATION OF OUTCOMES

This project also gathers information about the extent to which strategies are implemented and associated outcomes achieved (program evaluation). Evaluation and survey information are collected to determine possible program effectiveness and make changes that may increase program success and cost effectiveness.

Participant Evaluation Of The Project Format

The evaluation results indicate that the project format is well received and that the presentation, tours and activities materials enhanced their understanding. All participants reported that the presentation materials and class manual enhanced understanding, the presenters communicated concepts and ideas well or very well, the pace of the class was just right, lectures, tours, and activities were well coordinated and enhanced understanding, and that they would recommend the class to others.

Participant Self-Rating Of Their Knowledge Level

Participants report their level of knowledge as a percentage from 0 - 100%. This is a very subjective rating and students have asked for guidance on rating their knowledge level. The box on the right shows the guidance provided.

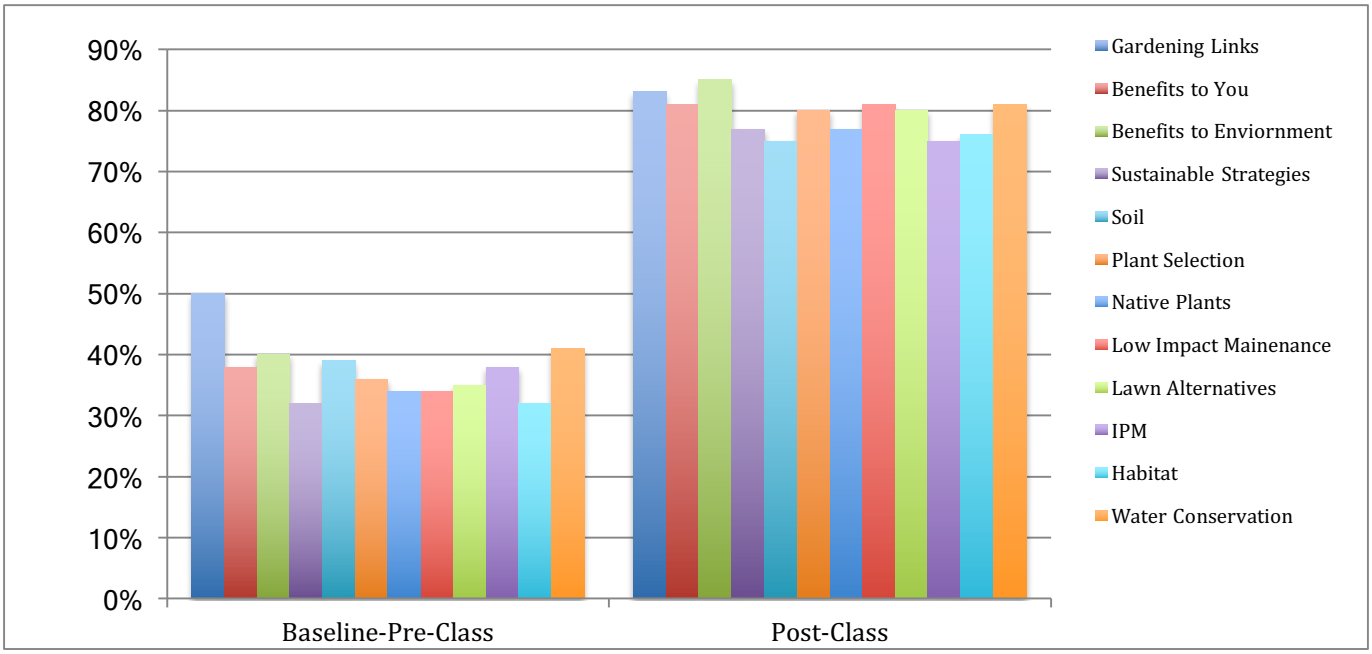
Guidance on knowledge level percentage ratings:
- 0% - 24% none or little knowledge of topic
- 25% - 49% limited knowledge of topic
- 50% - 74% informed about the topic,
- 75%-100% very knowledgeable about the topic

Baseline (pre-class) knowledge ratings vary significantly among participants. Some are Master Gardeners or lifelong gardeners and others are just getting started with gardening experiences.

- A review of their level of knowledge change is used to highlight opportunities for improvement to the curriculum.
- Baseline ratings allow us to track the level of knowledge about each topic the 'average' student has prior to taking this class. It helps us target a starting point for complexity of information offered.
- The post-class knowledge level rating offers a indication of the effectiveness of the presentations and activities and whether the program is presenting new information that stimulates learning.
- A comparison of pre and post knowledge levels (compiled as an average for all students) demonstrates

the level of knowledge change.

Average Baseline (pre-class) and Post Class Knowledge Levels by Topic



Baseline Data

- Participants indicated that they had limited baseline knowledge (25% - 49%) about most of the topics covered in class.
- The only topic they felt informed about (50%) was the link between gardening behaviors and water quality decline.

Post Class Data

- All participants reported that they had increased their level of knowledge about every topic.
- On average, participants felt that they had become very knowledgeable about every topic.

The largest increase in self-rated knowledge:

1. Use of low impact maintenance strategies such as grouping plants by water and sun needs, mulching, weed management, pruning, and smart watering techniques.
2. The benefits to the environment from a sustainable approach to landscaping.
3. Sustainable landscape strategies for environmental issues such as storm water management, climate change, or reducing energy needs.
4. Strategies to reduce/eliminate lawns and landscaping options for lawn alternatives.
5. Creating wildlife habitat and supporting biodiversity in plants, animals and beneficial insects.
6. Right Plant/Right Places: selection of plants to match site conditions, purchase of healthy plants, and good planting technique.

Participant Report on Landscape Tours:

All participants reported that the landscape tours were very valuable and stimulated ideas for how to renovate their landscape to be more sustainable. Visiting sustainable landscapes provides an opportunity for participants to see sustainable strategies implemented in landscapes that are very different sizes and

styles. Most of the landscapes we visit are class alumni. Some landscapes have been recently renovated and others are mature landscapes.

Development Of Skills Needed To Design A Sustainable Landscape:

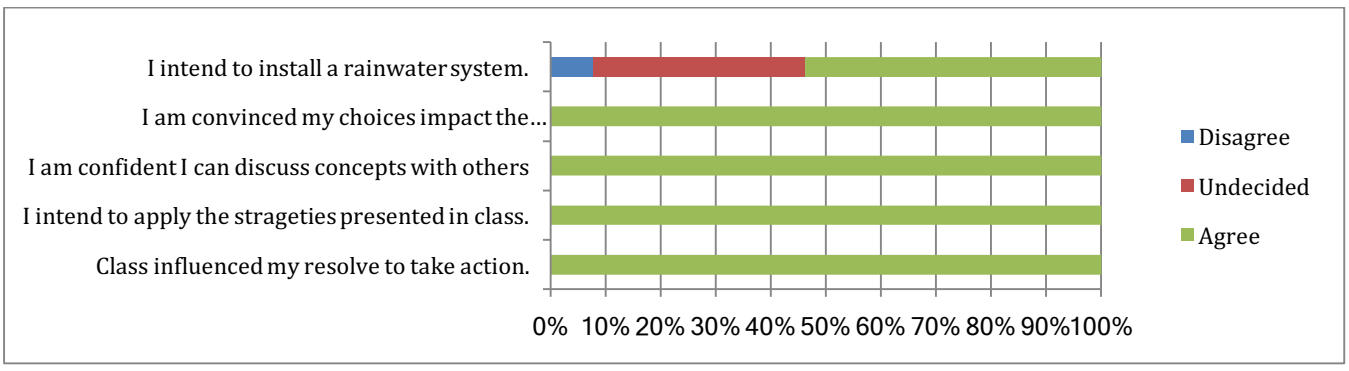
All participants reported an increase in the skills needed to plan and design a sustainable landscape. The class's, *Sustainable Landscape Workbook*, provides written step-by-step instructions to supplement class discussions, activities, and demonstrations. About 85% of the participants rated themselves as having little to no skills in planning a landscape including draw a site plan, conduct a site analysis, generate several schematic plans, and create scaled drawings prior to class. By the end of the class all but one had produced a scaled site plan showing planned changes to their landscape design. They shared their plans with the class on the last day. One student had completed her site analysis, landscape plan and compiled plant lists by the end of the class. Most other students had developed their landscape plan layout, identified the BMP's to implement, but were still researching specific plants for varying site conditions. One student did not complete a plan because they were in the process of buying a new house.

Increases in Commitment And Resolve:

Many class activities are designed to increase commitment and the resolve to not only implement BMP's but to reinforce sustained independent actions to become partners in outreach about sustainable practices to protect water quality. For example:

- *Program Staff* provide on-site consultations addressing any barriers, guidance in the selection of plants, and suggestions for mitigations that allow for family uses without impacting the goal of water quality protection.
- *Present and past participants* act as partners in community outreach by sharing their knowledge, skills, and commitment of sustainable concepts and strategies to family, friends, and neighbors.
- *Participants* leave the class with a master plan of sustainable changes to their existing landscape that they have invested a lot of time and thought in creating increasing the likelihood of it being implemented.
- *Participants* make a public statement about their commitment to change when they present their plan to their classmates. They display their landscape plan, describe the on-the-ground changes they intend to make, and share how they will implement their plan.
- *Participants* sign a pledge to implement specific Best Management Practices for the design and maintenance of their landscapes.
- *Past Participants* demonstrate long-term adoption of sustainable values by assisting with class presentations, hosting landscape tours for the current class, and sharing their reasons for and commitment to sustainable landscaping.

Changes in levels of commitment to make sustainable changes



Participant's Pledged Education Outreach Plans:

As a result of the information provided in the class, participants can formulate informed actions to address storm water management and other sustainability attributes both on an individual level with changes to their own landscape design and gardening practices as well as assuming a leadership role in educating neighbors. Students lead by example. They demonstrate sustainable landscape strategies by inviting friends, family and neighbors for a tour. They assist others in planning for changes in their landscapes or maintenance practices. They serve as a resource for others in their social group. Below is a list of actions planned by this class:

1. Tell others about this class.
2. Help my daughter implement BMP's on her property; work with neighbors to spread the word.
3. Share what I have learned with as many people as possible, especially neighbors who live in the watershed. Tell people about this class at my book club.
4. Talk to friends and neighbors about sustainable landscape strategies.
5. Talk to friends and neighbors about sustainable landscaping.
6. Share what I learned on Facebook.
7. Share my landscape with future classes.
8. Invite all my neighbors on South Bay to a Green Gardening Ladies Lunch.
9. Make my future yard available to tour, create notebook of native plants I add to my landscape, talk to friend about sustainable landscaping strategies.
10. Spread the word about mason bees and pollinators.
11. Talk to people I know with lawns about alternative landscaping ideas.
12. Share on Facebook about soil and mulching.
13. Sharing my enthusiasm for class and changes in my yard with friends and neighbors. One I already talked to is just finishing a degree in landscape architecture and wants to take the class.
14. Write an article for Lake Views magazine.
15. Talk to our friend and neighbors and host a garden party to show them the ongoing changes happening in our yard.

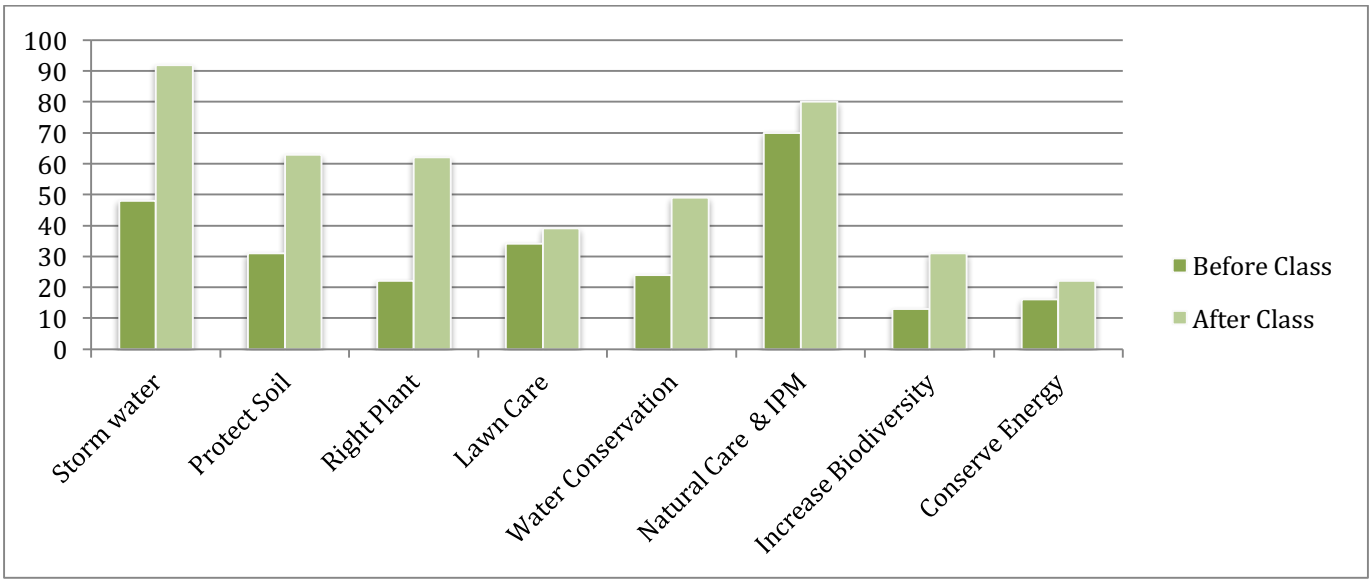
Written Comments from the Program Evaluation and follow-up emails:

1. Information on selection of plants, use of native plants, low impact maintenance practices and strategies to reduce or eliminate the lawn were SO HELPFUL.
2. Love, love this class. Thank you Sue and Jill for being so available! And not just during class but as a resource beyond this time. Especially liked the contrasts of yards on the tour.
3. Also – a new measurement system to replace the percentage.
4. Wonderful class! Thank you so much. Very knowledgeable instructors, the tours are a well mix of information and ideas. Loved it. The classroom material was helpful and informative. Everyone in class was engaging, ready to take a new direction with planting and a new attitude to make a difference in the environment.
5. Thank you for doing this class! Much appreciated!
6. Great instructors! Great resources and information. Wish that all who live in the watershed had to take a shorter version of this class so we all understand how our actions affect our water quality! Feel more confident about my abilities.
7. For a 'non-gardener' like me it was a steep learning curve, but now I have the basic tools to avoid big mistakes and create a workable and sustainable landscape for myself on my property – that will be a BIG improvement.
8. I loved the course! The binder was a little confusing to follow during a lecture. That's my only complaint. I truly appreciated ALL the information and hard work that Jill and Sue contributed to the course. It will benefit myself and family for years to come. Thank you!
9. Thank you so much for coming to my house last week! Will be receiving 2 cubic yards of "hog fuel" from Grow Source next week and getting beds weeded in preparation. Couldn't believe you were here for an hour-and-a-half! And so complimentary, and gentle with suggestions. Many thanks.

10. Great! We really appreciate the opportunity to have you visit & provide some guidance.
11. Shared our conversation about turning our field into a meadow by adding wildflowers, native shrubs and a grove of trees. My husband loved it. He is so excited to not keep mowing 2 acres!

Best Management Practices Pledge (BMP)

A Best Management Practices Pledge (63 BMP's divided into eight categories) was completed at the end of the class indicating what BMP's students were using *before* they took the class and *additional new practices* they intended to implement based on the information they learned in Gardening Green. The Pledge shows that participants intend to increase the number of best management practices that they use. The entire BMP Pledge is in the appendix.



Collectively participants:

- Baseline Pre-class: 258 best management practices
- Pledged Post-class: 437 best management practices
- Combined total: 695 best management practices

Most Frequently Pledged BMP's from each category.

STORM WATER MANAGEMENT

- Maintain 3 or more layers of canopy cover in landscape beds.
- Expand the size of densely vegetated landscape areas.
- Reduce or eliminate lawn.

PROTECT HEALTHY SOIL FUNCTION

- Mimic nature by leaving plant litter where it falls for self-sustaining soil health in permanent landscape beds. EPA reports that this practices increases storm water management by 35%.
- Maintain woody mulch cover on all landscape beds to protect soil and reduce supplemental watering.
- Feed the soil, not the plants. Reduce/eliminate fertilizer use.

RIGHT PLANT /RIGHT PLACE /RIGHT TECHNIQUE

- Group plants by sun exposure and watering needs to reduce plant stress and supplemental watering.
- Use the right planting technique.
- Select plants adapted to climatic zone for hardiness.
- Plan for mature size of plants to reduce pruning and green waste.

WATER CONSERVATION

- Allow lawns to go dormant in the dry season.
- Use smart watering techniques.
- Plant drought tolerant plants

LOW IMPACT MAINTENANCE AND INTEGRATED PEST MANAGEMENT

- Inspect plants for disease, pests, or damage prior to purchase to reduce need for pesticide use.
- Eliminate the use of cosmetic pesticides such as herbicides used to manage weeds not plant health.
- Reduce the use of all pesticides. Select pest resistant or native plants.

SUPPORT BIODIVERSITY

- Grow a species rich landscape of regional native plants.
- Create a wildlife habitat sanctuary.
- Do not grow noxious weeds or aggressive exotic plants that can escape and crowd out native plants.

Follow-up Survey of BMP Pledges and Outreach Efforts

Participants were sent a survey in October, six months after the class, to determine if their commitment to making sustainable changes in their landscape resulted in on-the-ground changes and sustained commitment to making changes. Sixteen participants responded to the survey. The results of the entire survey are in the appendix.

Survey responses indicated that all of the participants had begun to implement the pledged BMP's.

- 67% had implemented SOME of the pledged actions and 27% had implemented MOST of the pledged actions.
- 100% of the respondents reported implementing management actions to protect soil, selecting appropriate plants for their site conditions, and improving wildlife habitat through the use of native plants.
- Over 60% reposted taking steps to conserve outdoor water use, reduced the use of fertilizers and other chemicals, and reduced the size of their lawn.
- 30% had implemented their storm water BMP's.

The six month follow up survey shows participants from this class are about half way to their goal of 160 community contacts. Most of the participants (88%) had shared information with about 85 other community members so far. Two responded that they still have plans to share information but have not yet had an opportunity. Each participant has a goal of contact to 10-12 community contacts to share information about sustainable landscaping as well as other actions they plan themselves.

Suggestions for improving the class from the six month survey:

1. To get together in the Fall to tour each others changes.
2. Reorganize the notebook to follow order of class presentations.
3. A user friendly website would be wonderful
4. Narrowing down information / types of plants to help people craft a landscape on their property that is multilayered and textured – say you gave small groups of combinations of plants that work well together both visually and biologically – hmmm just thinking off the cuff but I'm wondering how to make going from class to the end product feel more attainable.

INFORMING FUTURE OUTREACH

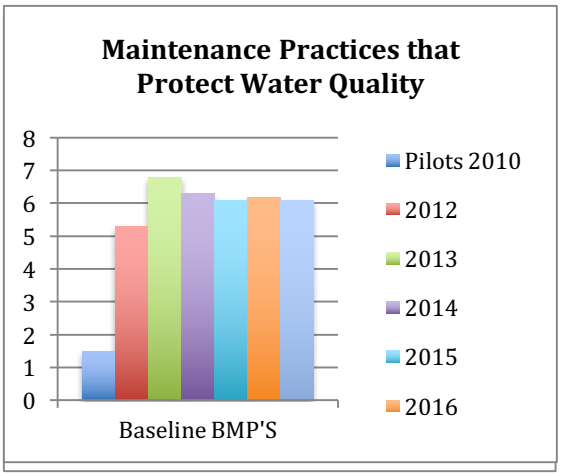
One of the objectives of this project is to gather data that informs future outreach educational efforts. Baseline data of where the community is in terms of sustainable landscaping knowledge is an important component of understanding the audience.

The following charts track the baseline pre-class best management practices class participants have reported over the seven years as on BMP's pledges. The question we seek to answer is if there has been any baseline behavior changes over the last seven years.

- The average percentage of participants using each BMP is used because the number of participants in each class differs.
- Annual data shown is for a combination of both classes held each year.
- 2017 data includes both the Spring and Fall class.

Keeping in mind that this is a small sample of our community, these results should taken as an indicator but not as a definitive statement of what our audience knows and how they manage their home landscapes.

The trend does show that the community knowledge about these topics has grown. The year to year changes have not been a smooth line. Each class comes with a wide range of knowledge and skills.



Locate landscaping to reduce/eliminate stormwater runoff by infiltrating it in the soil: base of slopes, property perimeter, adjacent to lawns, impervious surfaces, pet kennels, food growing areas, and covered compost.

Add more plants to enhance evapotranspiration and increase infiltration: multiple layers of canopy cover, more trees, reduce/eliminate lawns, expand existing landscape areas, and create a woodland.

Use earthworks such as terraces to modify steep slopes, infiltration ditches under paths, remove impervious surfaces, or infiltrate rooftop water in infiltration wells, seasonal ponds, or rain gardens.

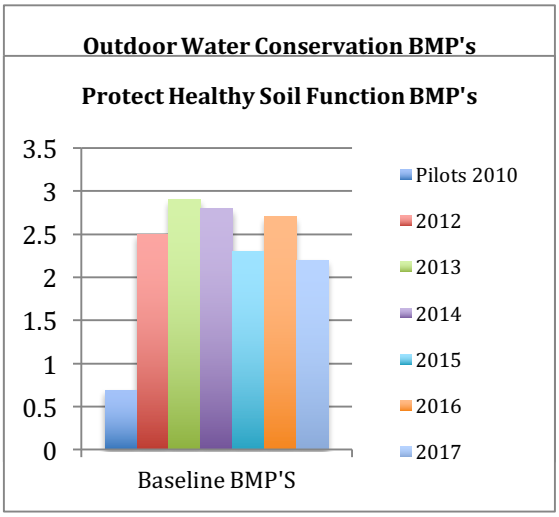
Maintenance and management techniques have an impact on water quality and outdoor water use. Integrated Pest Management is a combination of common sense practices for long-term protection from damage by plant pests. The decision making process for treatment always begins with the least toxic methods. Pesticide use is a last resort only if all other approaches fail.

Sustainable approaches to reducing maintenance chores and reducing green waste benefit both the gardener and the garden.

· Reduce the need for irrigation by selecting drought tolerant and native plants and planting in multiple canopy layers. Use a woody mulch to cover all bare soil to reduce soil moisture evaporation.

Practice smart watering: use drip irrigation or soaker hoses, water in the morning, water deeply & infrequently to encourage deep roots.

Allow lawns to go dormant.

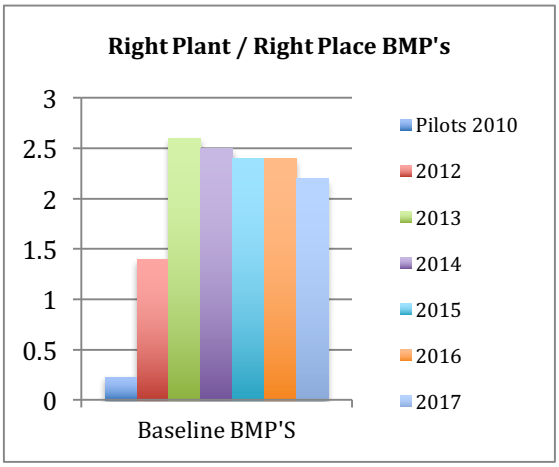


Mimic nature by leaving plant debris where it falls.

Feed the soil / Not the plant. Fertilize with top dressing of woody mulch and if needed plant based compost rather than manufactured fertilizer.

Maintain a woody mulch cover on all bare soil.

Create pervious paths for foot traffic to reduce soil compaction.



Plants grown in their preferred environmental conditions will develop healthy immune systems to manage insects and disease without the need for pesticides.

Use native plants as the backbone of the garden for less need for resource inputs and to attract birds and beneficial insects that manage plant pests.

Buy healthy plants. Inspect plants at the nursery so you don't bring plant pests into the garden. Trees should have branches on all sides. Check roots for spiraling and disease.

APPENDIX I: Class Schedule

April 24 – May 10 9:00am-2:00pm At 1000 N. Forest St.

		GETTING STARTED	Homework
Mon April 24	9:00 9:20 10:45 11:00 12:10 12:30	**Class Orientation** **Sustainable Landscaping & Design Development– Sue** BREAK **The Garden Link – Sue B** *TOUR* *Stimpson Reserve– Guided Native Plant walk*	***SUSTAINABLE LANDSCAPE WORKBOOK*** DESIGN DEVELOPMENT p. 2 - 11 • Map Your Yard • Landscape Evaluation • Photographic Inventory • Conduct Site Analysis PLEASE READ: Horticultural Myths: • ***Soil Amendments*** https://puyallup.wsu.edu/lcs • Click on: Linda Chalker-Scott
Wed April 26	9:00 10:00 10:15 11:20 11:35 12:15 1:00	**Healthy Soil & Landscape Planning - Sue** CLEAN UP & BREAK **Rainwater Harvesting & Conservation – Anitra** *TOURS* *Michael – infiltration trench, cisterns, natives, project phases* *Jenny & Bill – rain garden, cisterns, natives* *Barbie*	
Mon May 1	9:00 10:30 10:45 12:00 12:15 1:15	**Environmentally Informed Design & Landscape Planning– Sue** BREAK **Right Plant, Right Place, Right Technique - Jill** *TOUR:* *Dorcie – No lawn, food, repurpose* *Mary & Michael – Small lawn/reel mower, sustainable everywhere*	***SUSTAINABLE LANDSCAPE WORKBOOK*** LANDSCAPE PLANNING pp. 12 – 13 1. Imagine Your Dream Garden 2. Needs Assessment & Goals 3. Determine Your Style 4. Best Management Practices MASTER PLAN RECORD pp. 14-15 1. Creating several schematic designs 2. Establish Maintenance Zones
Wed May 3	9:00 10:15 10:30 11:45 12:00 1:00	**Landscaping with Native Plants & Master Plan - Sue** BREAK **Low Impact Maintenance Techniques – Jill** *TOURS:* *Ron – front yard make over, drip irrigation tutorial* *Sue K – garden rooms, maintenance zones*	PLEASE READ: Horticultural Myths: • ***Fertilizers*** • ***Maintaining Trees & Shrubs*** • ***Mulches*** • ***Planting Technique***
Mon May 8	9:00 10:30 10:45 12:00 12:15	**Creating Wildlife Habitat** **Planting Plans** BREAK **Bird Watching - Paul Woodcock & Pam Borso** *TOURS:* *Sue T– habitat, stormwater, slopes (with Paul & Pam)*	***SUSTAINABLE LANDSCAPE WORKBOOK*** MASTER PLAN pp. 15-17 1. Planting Plan PHASES & MAINTENANCE pp. 18-20 PLEASE READ:Horticultural Myths: • ***How Plants Work***
Wed May 10	9:00 10:30 10:45	**Integrated Pest Management – Jill** BREAK **CELEBRATE GARDENING WITH A PURPOSE!** • Student's Share Plans & Food	**SET UP YOUR ON-SITE CONSULTATION WITH SUE** sl-taylor@comcast.net 360-671-3891

Appendix II: Program Evaluation

WSU Whatcom Extension - City of Bellingham

GARDENING GREEN: Sustainable Landscaping 2017

Please complete the program evaluation below to help us gage the effectiveness of the presenters, format, information, and experiences provided by this class. Your feedback assists the development and implementation of future classes. Thank you!

Where did you hear about this class?
Cascadia Weekly #4 Friend #1 WSU Extension #1 Herald Take Five #1
Neighborhood Nextdoor website #2 Native Plant Society Email #1

1) Class FORMAT: Mark the most appropriate response (# of participants selecting the response)

	1	*2*	*3*	*4*	*5*
Presentation materials (power points, demonstrations, handouts, hands-on activities)	Distracted from understanding				Enhanced Understanding
				#1	#12
Class manual	Distracted from understanding				Enhanced Understanding
				#1	#12
The presenters communicated concepts and ideas	Poorly				Very well
					#13
The pace of the class was	Too slow		Just Right		Too fast
			#13		
The lectures, tours, and activities were well coordinated and enhance understanding	Strongly disagree				Strongly agree
				#1	#12
I would recommend this class to others	Strongly disagree				Strongly agree
					#13

Written Comments:

1. *The pace of the class was a little fast but I'm glad you covered it all.*
2. *Already have recommended the class to watershed neighbors.*

2) Rate your level of KNOWLEDGE change (NA = No Answer)

Use a percentage rating between 0% (no knowledge of topic) and 100% (complete knowledge of topic) Prior to Class / After Class												
The link between gardening practices and human / environmental health issues.												
20/95%	30/70%	85/90%	60/80%	90/90%	60-80%	50/90%	40/80%	50/70%	70/90%	25/90%	50/80%	20/70%
The benefits the gardener gains by adopting a naturally sustainable approach to gardening.												
20/90%	30/70%	85/90%	20/80%	80/90%	40/80%	30/90%	20/80%	50/70%	65/85%	0/70%	25/80%	30/80%

The benefits to the environment from a sustainable approach to gardening.												
10/90%	20/80%	85/90%	30/65%	80/90%	40/80%	60/95%	20/80%	5/70%	75/100%	0/90%	50/80%	50/90%
The environmentally informed landscape strategies for storm water management, climate change, etc												
10/90%	30/70%	20/80%	60/80%	30/70%	20/60%	45/85%	0/60%	50/70%	75/100%	0/90%	50/80%	20/70%
The function of healthy soil to water quality and plant health.												
10/90%	40/60%	80/90%	20/30%	75/90%	30/70%	30/80%	10/60%	50/70%	60/90%	0/90%	70/80%	30/70%
Selection of plants: match plant needs to site characteristics, purchase healthy plants, use good planting technique.												
5/90%	40/60%	70/90%	30/70%	0/50%	75/90%	50/90%	0/80%	50/70%	70/95%	0/90%	50/90%	30/70%
Use of regionally native plants in the home landscape.												
5/90%	50/50%	45/80%	10/60%	0/50%	75/90%	45/95%	10/80%	50/70%	60/90%	0/90%	60/90%	30/70%
Use of low impact maintenance strategies: grouping plants by need, mulching, smart watering, etc.												
5/90%	40/60%	70/85%	10/80%	0/50%	75/90%	45/95%	10/80%	50/70%	70/95%	0/90%	50/90%	20/80%
Strategies to reduce/eliminate lawns and landscaping options for lawn alternatives.												
50/90%	30/70%	60/80%	10/70%	75/90%	20/60%	35/80%	0/80%	50/70%	80/100%	0/90%	30/80%	20/80%
Integrated pest management step-by-step methods to management pests using the least toxic means.												
5/80%	20/70%	75/85%	50/60%	0/50%	75/90%	45/90%	0/50%	50/70%	90/100%	5/90%	NA	40/70%
Creating wildlife habitat and supporting biodiversity in plants, animals and beneficial insects.												
5/80%	40/60%	65/85%	20/50%	20/70%	50/90%	50/90%	10/50%	0/70%	75/90%	0/90%	40/80%	40/80%
Strategies for water conservation including rainwater collection.												
5/90%	40/60%	40/70%	50/80%	40/70%	75/90%	60/95%	0/80%	20/70%	90/100%	25/90%	50/80%	50/80%

3) Rate the change of your SKILLS as a result of the hands-on activities and IDEAS FOR INCORPORATING SUSTAINABLE FEATURES from landscape tours.

Use a percentage rating between 0% (no knowledge of topic) and 100% (complete knowledge of topic) Prior to Class / After Class												
The landscape tours stimulated ideas for how to renovate my landscape to be more sustainable.												
0/100%	30/70%	65/85%	0/100%	75/95%	0/100%	20/60%	50/95%	10/70%	40/60%	80/90%	50/80%	20/80%
Drawing a basic site plan showing existing conditions.												
0/99%	20/80%	75/85%	10/70%	10/80%	30/70%	25/75%	0/70%	0/20%	90/90%	5/90%	40/80%	20/70%

Performing a site analysis.												
0/50%	20/80%	50/95%	0/40%	20/50%	0/60%	0/50%	10/90%	0/50%	0/20%	70/85%	40/80%	20/80%
Generating and evaluating conceptual plans of possible sustainable site design changes.												
0/50%	20/80%	45/75%	0/40%	20/50%	0/60%	0/80%	0/70%	0/20%	NA	0/70%	40/80%	20/70%
Creating a scaled drawing and planting plan for individual landscape beds.												
0/50%	20/80%	75/90%	0/50%	20/50%	10/70%	5/80%	0/80%	0/20%	80%90	20/70%	40/80%	20/80%
Designing and installing a rainwater collection system.												
0/20%	10/70%	20/70%	0/40%	0/25%	10/40%	5/75%	0/80%	0/50%	NA	0/70%	50/80%	20/70%

4) Rate your level of COMMITMENT: Mark the most appropriate response

	Strongly disagree **1**	Disagree **2**	Undecided **3**	Agree **4**	Strongly agree **5**
This class has influenced my resolve to take actions that will protect human and environmental health.				**#2**	**#11**
I intend to apply the strategies presented in this class to the design and management of my landscape.				**#2**	**#11**
I am confident that I can discuss sustainable landscape concepts to friends and neighbors.				**#4**	**#9**
I am convinced that I can positively impact environmental issues by my landscape choices and maintenance practices.				**#2**	**#11**
I intend to install a rainwater system at my home.		**#1**	**#3**	**#4**	**#5**

APPENDIX III: Best Management Practices Pledge

APRIL 2017 GARDENING GREEN: Best Management Practices Pledges

Check the BMP's that you used PRIOR to the class in the 1st column.
Check the BMP's that you INTEND TO IMPLEMENT due to information from the class in the 2nd column.

Prior to Class	After Class	STORM WATER MANAGEMENT
2	11	Maintain 3 or more layers of canopy cover in landscape beds.
1	9	Plant more trees including conifers.
2	4	Locate landscape beds or French drains to intercept runoff at the base of slopes.
3	7	Locate landscape beds to capture runoff from lawn areas.
2	3	Locate landscape beds (can be on mounded soil) around the property perimeter to create a final barrier to run-off.
3	5	Direct run-off from impervious surfaces to densely vegetated landscape beds with healthy soil that can infiltrate it.
2	3	Remove impervious surfaces & replace them with pervious ones.
3	5	Moderate steep slopes with terracing to slow down run-off & allow the soil to absorb it & prevent erosion.
5	2	Put French drains under your paths, especially in established landscapes or lawns to enhance infiltration.
4	3	Put curves in paths that go downhill to slow rainwater runoff so it can be absorbed into the soil.
1	10	Expand the size of densely vegetated landscape beds to reduce lawn area.
3	5	Create native plant buffers near all water resources.
4	5	Create a woodland area.
0	2	Infiltrate run-off from vegetable gardens, covered compost piles & dog kennels to capture nutrients in run-off.
4	4	Install a dry well, dispersion trench, French drain, seasonal pond or rain garden to infiltrate rooftop storm water.
4	11	Reduce or eliminate your lawn.
3	7	Install a rain barrel or cistern for storm water reuse in landscape.
48	**92**	**Subtotal**
		PROTECT HEALTHY SOIL FUNCTION
9	3	Compost yard wastes for reuse on landscape beds.
4	10	Mimic nature by leaving plant litter where it falls for self-sustaining soil health in permanent landscape beds.
3	9	Top-dress soil with compost covered by woody mulch to improve soil function.
3	3	Till in 2-3" compost (depth of 8") in areas of *severely damaged* soil from compaction
1	7	Inoculate native plant beds with mycorrhizae.
3	13	Maintain a woody mulch cover on all landscape beds to protect soil.
2	7	Create pervious paths that are separate from planting areas even through lawn areas to prevent soil compaction.
5	11	Feed the soil, not the plants. Reduce/eliminate fertilizer use.
31	**63**	**Subtotal**
		RIGHT PLANT / RIGHT PLACE / RIGHT TECHIQUES
7	9	Group plants by sun exposure and watering needs to reduce plant stress & maintenance.

5	8	Use native plants as the backbone of the landscape.
1	11	Inspect plants for diseases, pests, & root problems before purchase.
2	12	Use the right planting techniques.
3	12	Select plants adapted to your climatic zone for hardiness.
4	10	Plan for mature size of plants to reduce pruning.

22 62 Subtotal

LOW IMPACT LAWN CARE

2	8	Establish pathways through lawn areas to reduce soil compaction.
10	7	Allow lawns to go dormant in the dry season.
0	4	Use eco-lawn as turf alternative.
4	4	Use only phosphorus-free fertilizer.
9	6	Hand weed lawn or tolerate a few weeds (no weed & feed).
2	4	Aerate compacted lawns & add a little compost.
7	5	Limit lawn watering to 1" per week including rainwater or less

34 38 Subtotal

WATER CONSERVATION

5	3	Separate lawn irrigation system from irrigation for trees and shrubs, which need much less frequent watering.
7	8	Use smart watering techniques – water in the mornings, water deeply and infrequently to encourage root growth.
1	8	Use drip irrigation to water only landscape plants not weeds.
4	6	Use soaker hoses instead of overhead sprinklers.
3	10	Plant drought tolerant plants.
3	2	Inspect automatic irrigation systems for leaks and adjust sprinkler head direction each monthly.
1	12	Reduce need for irrigation by using 3" of mulch and planting 3 or more layers of canopy cover in all landscape beds.

24 49 Subtotal

LOW IMPACT MAINTENANCE & INTEGRATED PEST MANAGEMENT

11	5	Eliminate the use of cosmetic pesticides such as herbicides used for appearance not plant needs.
10	6	Reduce the use of all pesticides. Select pest and disease resistant native or plants that are well adapted to region.
8	8	Do not fertilize woody plants unless they have been diagnosed as deficient. Use phosphorus-free fertilizer.
4	10	Regularly monitor landscape for pests. Hand pick while infestations are small.
0	8	Have pests & diseases correctly identified by Master Gardeners at WSU Extension.
7	5	Only use slug bait that is safe for pets & wildlife.
7	5	Practice tolerance for minor infestations that cover less than 30% of the plant.
3	8	Manage not control of pests and diseases. Practice I.P.M.
6	7	Remove diseased plants (Clean Green) rather than using pesticides.
4	8	Pay attention to "signal words" on pesticides. Use and dispose of according to manufacturer's directions.

10	10	Hand weed and mulch to reduce weed seed germination.
70	80	**Subtotal**

SUPPORT BIODIVERSITY

4	10	Create a wildlife habitat sanctuary to address the decline in bird, amphibian, and beneficial insect species.
2	12	Grow a species rich landscape of regional native plants to address the loss of local flora.
7	9	Do not grow noxious weeds or aggressive exotic plants that can escape and crowd out native species.
13	31	**Subtotal**

REDUCE ENERGY CONSUMPTION

4	8	Use hand tools or electric power tools whenever possible and reduce use of gas powered equipment.
4	5	Use motion detectors to activate outdoor lights rather than timers.
4	5	Plant buffers to block northeast winds in the winter to lower heating needs.
4	4	Plant deciduous shade trees on the south & west sides to cool the house & impervious surfaces.
16	22	**Subtotal**

258 Total BMP's used before taking class

437 Total NEW BMP's pledged due to information learned in class

APPENDIX IV: Six Month Follow Up Survey

Follow-up Survey sent to all class participants. All 16 participants responded.

Question	# Responses	Percentage
Do you remember the BMPs actions you pledged to take at the end of the Gardening Green class?		
• Yes	14	87.5%
• No	0	0.00%
• Somewhat	2	12.5%
If you answered yes or somewhat to the previous question, how many of these actions have you put into practice?		
• None	0	0.00%
• Some	10	66.67%
• Most	4	26.67%
• All	1	6.67%
Have you used any of the strategies taught in the Gardening Green class for (choose as many as applicable)?		
• Storm water management	5	31.25%
• Management or protection of healthy soil	16	100%
• Reduced energy consumption	3	18.75%
• Appropriate plant choices for the site	16	100%
• Conservation of water	10	62.50%
• Reduction in use of fertilizers and other chemicals	11	68.75%
• Reduction of lawn size	11	68.75%
• Improvement of wildlife habitat through the use of native plants	16	100%
Comments: **1.** *Have spoken to many friends about the value of this class and have loaned my binder to several people.* *2. Planted more trees.* *3. Applied and accepted into HIP* *4. Will participate in the HIP project. Am enrolled in June 3 introduction.* *5. Removal of invasive plant species.*		
If you did not make any changes to your gardening practices after completing the Gardening Green class, please tell us why not.		
1. n/a		
Have you shared any of the information you gained in this class with others?		
• **Yes**	14	87.50%%
• **No**	2	12.50
If you answered yes, with approximately how many others. *1. 10* *2. 3* *3. 6-12* *4. 3* *5. 3* *6. 10-20* *7. 6* *8. 7 so far* *9. 7 people – five of whom have asked how to keep informed of the nest available class*		

10. 10 *11. I plan to but haven't had the opportunity yet* *12. 3 friends but am having a ladies lunch to talk to most South Bay neighbors* *13. 3 so far* *14. 2 – just getting started* 15. *3*		
If you initiated any of the gardening practices discussed in class, did you find that you needed additional information not taught in class or provided in your notebook or CD?		
1. No *2. Not yet, but if so I will look up on an internet trusted source.* *3. Great starting point* *4. More information on deep shade plants* *5. Not yet*		
Do you have any suggestions as to how the Gardening Green class can be improved?		
1. *The notebook could be reorganized so that it follows the class topics more closely. I like to follow along and my notes are scattered throughout the book.* *2. It was a great class, a time commitment but well worth it.* *3. Better coordination by City and County on HIP.* *4. Do follow up visits to participants gardens next season (for us- Fall)* *5. Nope* *6. It was great as is* *7. I wanted fruit and vegetable information, but see why the class was focused on landscaping.* *8. A user friendly website would be wonderful* *9. Narrowing down information / types of plants to help people craft a landscape for their property that is multilayered and textured – say you gave small groups of combinations of plants that work well together both visually and biologically…hmmm just thinking off the cuff but I'm wondering haw to make going from class to the end product feel more attainable…* *10. No* *11. I cannot* *12. It is very well organized*		
Do you have any additional comments or reviews you'd like to share with us?		
1. Great class! We learned a lot and plan to use the resources as we layout, repurpose, and redesign our yardscape *2. The instructors were wonderful and I loved the various gardens.* *3. Really enjoyed the class. Got several new ideas* *4. The class was very informative and useful* *5. Let's do this again in 6 months* *6. Thankyouthankyouthankyou – Did I say many thanks?* *7. Thanks for an inspiring class. You guys are great.* *8. I absolutely relished every minute of the course!!! Thank you so much!* *9. Thanks for having this class! Hope it continues.* *10. I really liked the class format that included book/class time and field trips.* *11. I really enjoyed the class and learned a lot.* *12. Well done!* *13. It was helpful that this class had kept its scope of focus on native plants and green gardening. From the very first it was made clear that growing vegetables would not be the purpose of this class. It has taken time to step back and look and work in my yard since the end of class. Taking this class has provided me energy to re-connect with my yard, confidence that what changes/additions I do make will be sustainable.* *14. Great Class. Teachers were wonderful! I learned so much and will carry forward what I learned. Thank you Jill and Sue.* 15. *The instructors were excellent and liked the field trips which were relevant to the topic of the day.*		

APPENDIX V: April 2017 Class list

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