

# Sustainable Landscape Demonstration Garden

SC Horticulture Industry Conference  
Myrtle Beach, South Carolina  
January 21, 2016

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Senior, Horticulture Major  
Clemson University

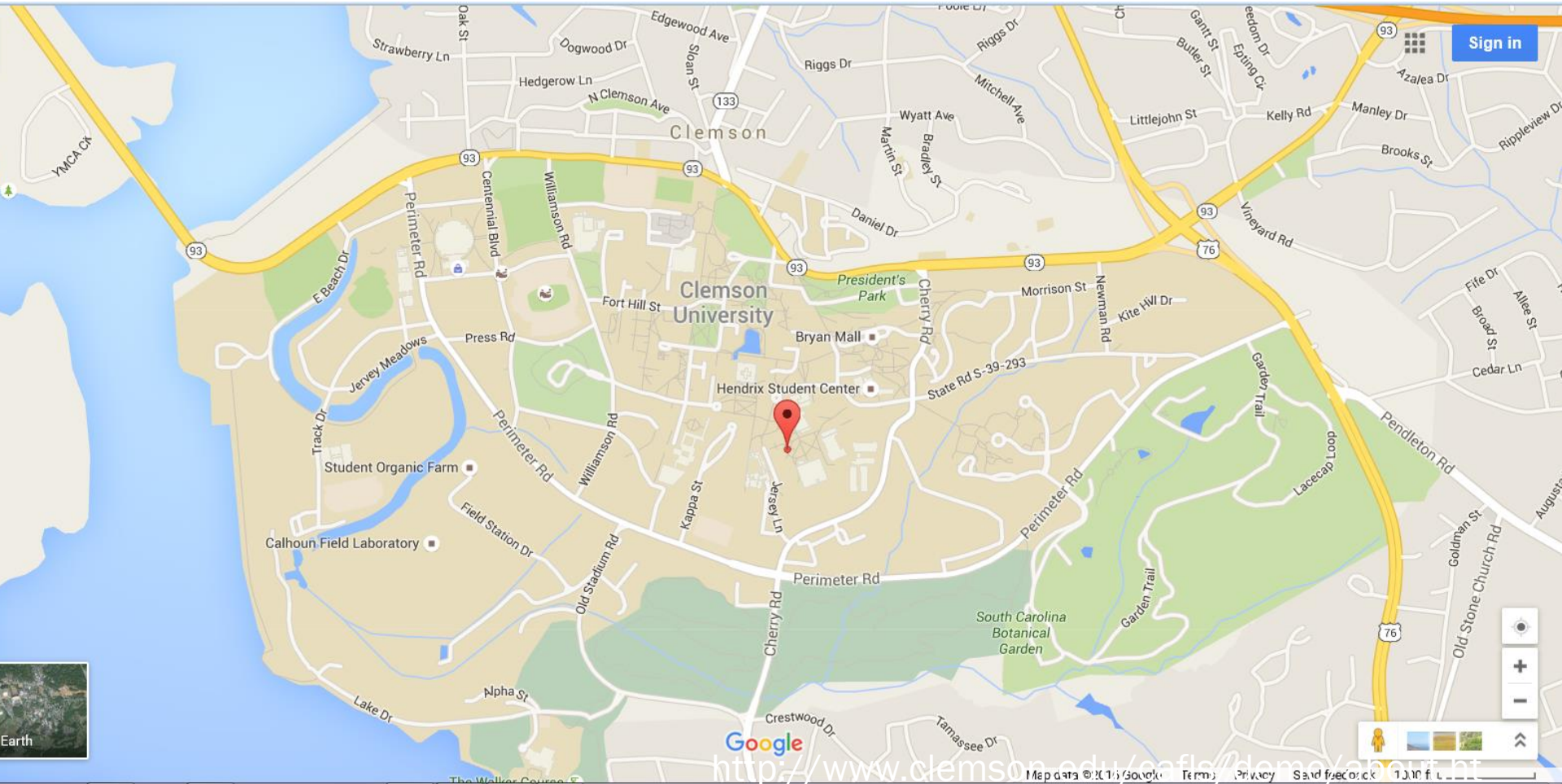
# The Class

- HORT 408 Horticulture Discovery & Inquiry
- Dr. Ellen Vincent
- 3 Credits

## Project Title:

- Sustainable Landscapes: Demonstration Garden
  - Creative Inquiry #827
- 
- Garden research and maintenance

# Garden Location

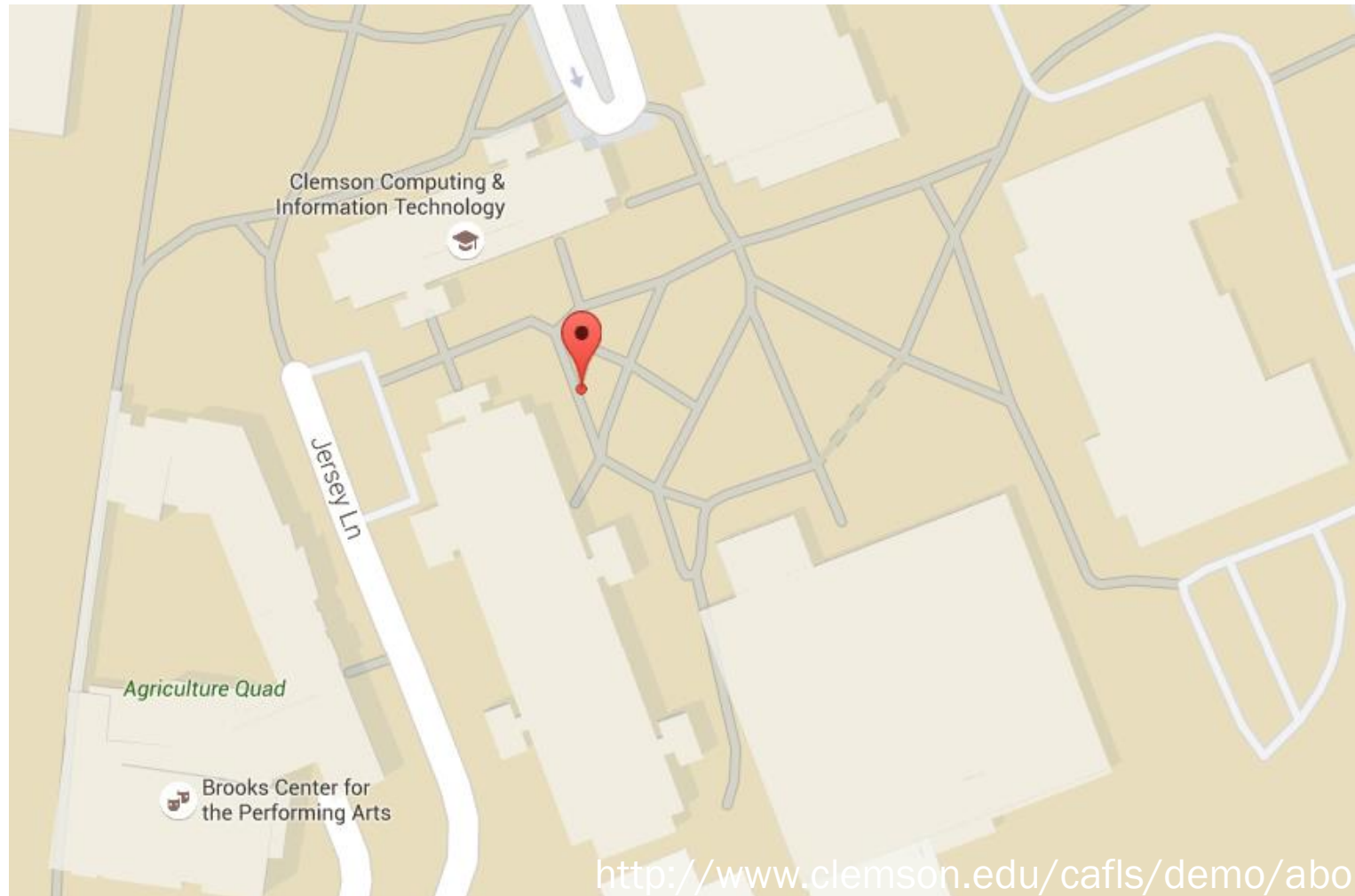


Google

[http://www.clemson.edu/cafs/clemson\\_garden.html](http://www.clemson.edu/cafs/clemson_garden.html)

Map data © 2011 Google Terms Privacy Sitemap

# Garden Location



# Two Beds

Area:

- 1400 ft<sup>2</sup>
- 1800 ft<sup>2</sup>

# Public Garden

- Maintenance
  - Mulching
  - Weeding
  - Watering
- Advice
- Entered data
- Cleanup



# Cleanup



**Image: Kathy Hollifield**

# Coarse and Fine Mulch





# Coarse and Fine Mulch

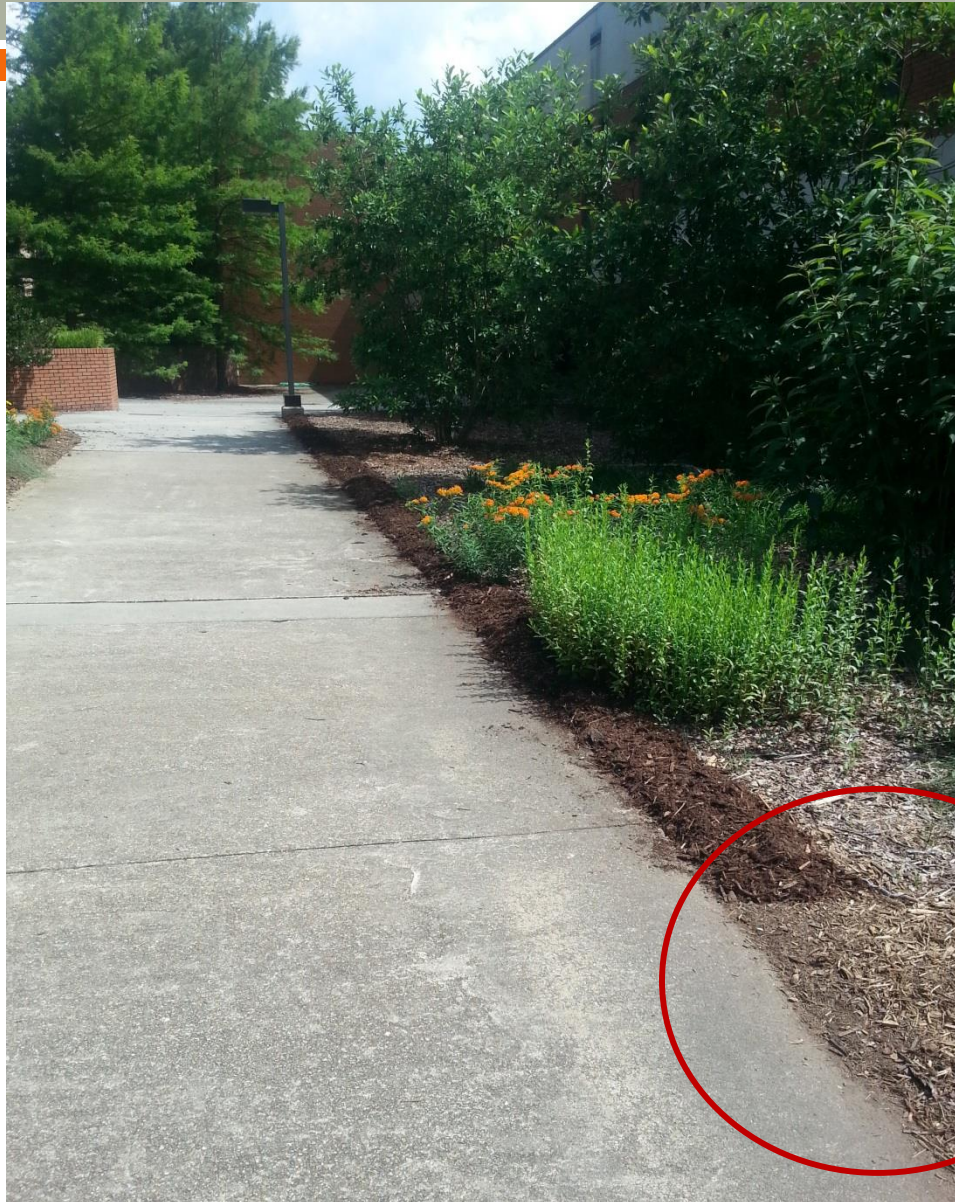


Image: Kathy Hollifield

# Garden

2011

- Design

2012

- Installation

Clemson Computing &  
Information Technology



Jersey Ln

Agriculture Quad



Brooks Center for  
the Performing Arts

[http://www.clemson.edu/cafls/demo/about.ht  
ml](http://www.clemson.edu/cafls/demo/about.html)



# Before



1800 ft<sup>2</sup>



1400 ft<sup>2</sup>

Courtesy of Dr. Ellen Vincent

# During



Courtesy of Dr. Ellen Vincent



# Soil Amendment

- 6" of leaf compost
- Tilled to 8" depth
- Topped off with 3" of mulch

# After





# Summer 2015





# Summer 2015



**Image: Kathy Hollifield**

# Native Plants in the Landscape

What comes to mind?

- Messy
- Too much work
- Beautiful



# PRE & POST INSTALLATION SURVEY DATA

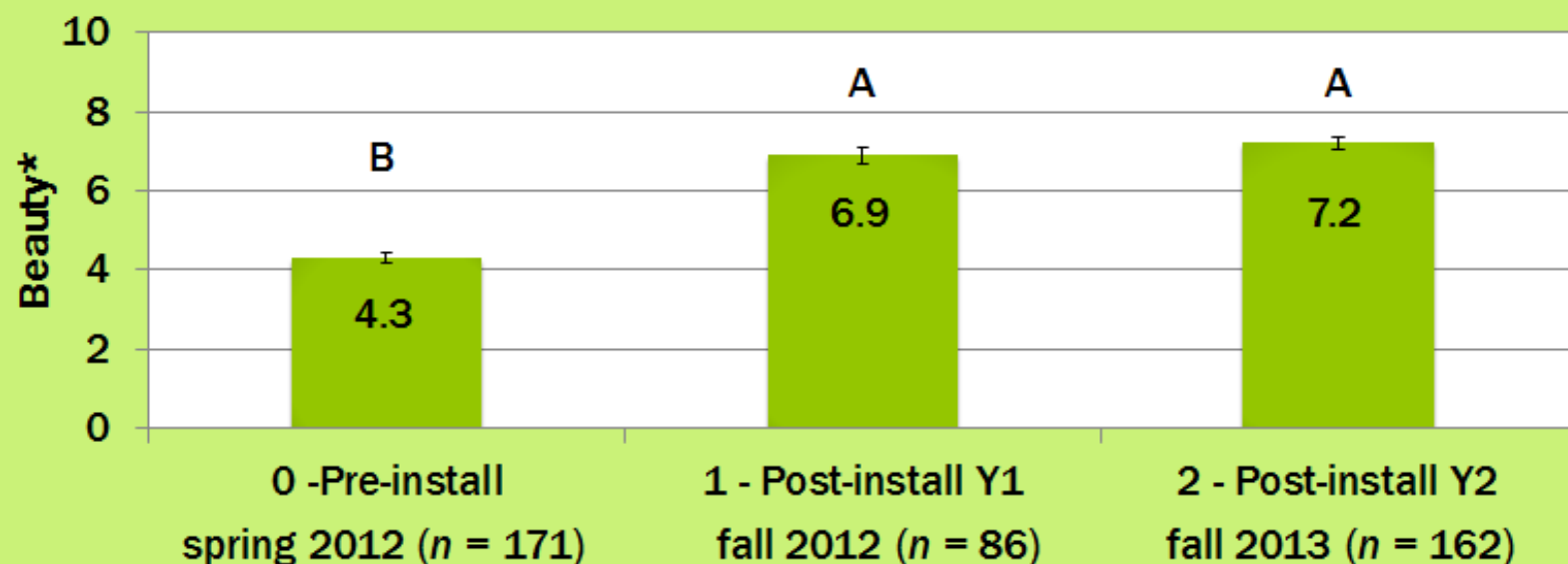
On a scale of 1 to 10, how **aesthetically pleasing** (beautiful) is the landscape to you?

Extremely poor

Average

Extremely high

1 2 3 4 5 6 7 8 9 10



\*LS Means Differences Tukey HSD ( $P < 0.0001$ )

# Now what?

- **Passerby surveys conducted**
- **Data gathered (database)**
- Plants added
- Plants removed

# CITI Certification in Social and Behavioral Research (SBR)

## COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI PROGRAM) COURSEWORK REQUIREMENTS REPORT\*

\* NOTE: Scores on this Requirements Report reflect quiz completions at the time all requirements for the course were met. See list below for details. See separate Transcript Report for more recent quiz scores, including those on optional (supplemental) course elements.

- **Name:** Katherine Hollifield (ID:
- **Email:** klosey@g.clemson.edu
- **Institution Affiliation:** Clemson University (ID:
- **Curriculum Group:** Human Subjects Protections Course
- **Course Learner Group:** Group 1 Investigators Conducting Social and Behavioral Science Research (SBR) at Clemson University
- **Stage:** Stage 1 - Basic Course
- **Report ID:** 16212929
- **Completion Date:** 06/03/2015
- **Expiration Date:** 06/02/2017
- **Minimum Passing:**
- **Reported Score\*:**

REQUIRED AND ELECTIVE MODULES ONLY	DATE COMPLETED	SCORE
Belmont Report and CITI Course Introduction (ID:1127)	06/03/15	
History and Ethical Principles - SBE (ID:490)	06/02/15	
Defining Research with Human Subjects - SBE (ID:491)	06/03/15	
The Federal Regulations - SBE (ID:502)	06/02/15	
Assessing Risk - SBE (ID:503)	06/03/15	
Informed Consent - SBE (ID:504)	06/03/15	
Privacy and Confidentiality - SBE (ID:505)	06/03/15	
Clemson University (ID:823)	06/03/15	

For this Report to be valid, the learner identified above must have had a valid affiliation with the CITI Program subscribing institution identified above or have been a paid Independent Learner.

CITI Program  
Email: [citisupport@miami.edu](mailto:citisupport@miami.edu)  
Phone: 305-243-7970  
Web: <https://www.citiprogram.org>

Collaborative Institutional  
Training Initiative  
at the University of Miami

# Surveys

## In-person landscape preference survey | 2015

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_ Paper or iPad

Verbal Script:

Hello, my name is \_\_\_\_\_, and I'm a student in Dr. Vincent's Environmental Horticulture class at Clemson University. I am conducting a survey about landscape preferences and would like to ask you a few questions. The questions will take less than four minutes and the information you provide will only be used in the study and will never be used to identify you personally in any way. Would it be okay to begin with my questions?

Thank you.

(1) Can you please tell me why you are here in this space today?

- a. I am passing through on my way somewhere else.
- b. This place is my destination.
- c. Other: \_\_\_\_\_

(2) On a scale of 1 to 10, how aesthetically pleasing (beautiful) is the landscape to you?

Extremely poor                      Average                      Extremely high  
1      2      3      4      5      6      7      8      9      10

(3) On a scale of 1 to 10, how well maintained does the landscape here appear to you?

Extremely poor                      Average                      Extremely high  
1      2      3      4      5      6      7      8      9      10

(4) On a scale of 1 to 10, how safe do you feel in this landscape space?

Extremely unsafe                      Average                      Extremely safe  
1      2      3      4      5      6      7      8      9      10

(5) What type of plant here in this landscape do you most value or appreciate?

- a. Turfgrass
- b. Groundcovers
- c. Flowers
- d. Ornamental grass
- e. Shrubs
- f. Trees
- g. Other: \_\_\_\_\_

(6) Does this landscape or the gardens right here teach you anything about soil, plants, or water?

- a. Yes
- b. No
- c. Unknown

## In-person landscape preference survey | 2015

(7) Do you think this landscape or the gardens right here are good for the environment?

- a. Yes
- b. No
- c. Unknown

(8) Do you think this landscape or the gardens right here are good for human health and well-being?

- a. Yes
- b. No
- c. Unknown

(9) If you could add anything to this landscape or garden space to make it better for you what would it be?

\_\_\_\_\_

(10) If you could copy anything that you see or experience here in this landscape to have at your own home what would it be?

\_\_\_\_\_

The following four questions are about you.

(1) Which of the following best describes you?

- a. Student
- b. Staff
- c. Faculty
- d. Visitor

(2) What is your gender?

- a. Male
- b. Female

(3) What is your age group?

- a. 18-29
- b. 30-59
- c. 60 or older

(4) Which college area are you affiliated with?

- a. College of Agriculture, Forestry & Life Sciences
- b. College of Architecture, Arts & Humanities
- c. College of Business & Behavioral Sciences

# Now what?

- Passerby surveys conducted
- Data gathered
- Plants added
- **Plants removed**



# Removed

## *Passiflora incarnata*: Passion Vine





# *Vaccinium*



**Image: Kathy Hollifield**



# Leaf Analysis

# Deficiency



Agricultural Service Laboratory  
171 Old Cherry Road, Clemson, SC 296  
Phone: 864-656-2068 Fax: 864-656-2061

Date: 9/30/2015

Soil Report for:

VINCENT, ELLEN  
173 P&AS BLDG  
CLEMSON SC, 29634

Lab Number:

15092385

Account:

ELLEN, AV

Farm Id:

VINCENT, ELLEN

Sample Id:

BLUEBERRY

Soil Code:

3

## Analysis

## Results

Soil pH

7.5

Buffer pH

7.80

Low | Medium | Sufficient | High | Excessive

Phosphorus (P)

31

lbs/acre

Potassium (K)

180

lbs/acre

Calcium (Ca)

6339

lbs/acre

Magnesium (Mg)

383

lbs/acre

Zinc (Zn)

11.8

lbs/acre

Manganese (Mn)

96

lbs/acre

Boron (B)

2.7

lbs/acre

Copper (Cu)

0.7

lbs/acre

Sodium (Na)

13

lbs/acre

Sulfur (S)

lbs/acre

Soluble Salts

mmhos/cm

Nitrate Nitrogen

ppm

Organic Matter

% (LOI)

Courtesy of Dr. Ellen Vincent



# Not Applied

- Pesticides
- Fertilizers

# Removed



**Image: Kathy Hollifield**

# Now what?

- Passerby surveys conducted
- Data gathered
- **Plants added**
- Plants removed

**Where can you find out more  
about the Sustainable  
Landscape Demonstration  
Garden?**



# <http://www.clemson.edu/cafls/demo/>

CU > CAFLS > Sustainable Landscape Demonstration > Sustainable Landscape Demonstration

## Sustainable Landscape Demonstration

The ***Sustainable Landscape Demonstration Garden***, located in the McGinty Mall or Agriculture Quad, is the result of a campus-wide collaborative effort that brought together multiple departments within the **School of Agricultural, Forest, and Environmental Sciences (SAFES)**, university landscape services, campus planning, extension, and the SC Botanical Garden. This project was funded by a one-time grant from **Public Service** and is an example of the creativity and teamwork happening in SAFES and across campus.



We hope the Sustainable Landscape Demonstration Garden will serve as a model for urban organizers and extension agents and that it will become a gathering place and a place of repose for people from across the Clemson University campus.

# The Garden



College of Agriculture, Forestry and Life Science

[CU](#) > [CAFLS](#) > [Sustainable Landscape Demonstration](#) > [About the Garden](#)

Sustainable  
Landscape  
Demonstration  
About the Garden  
Designs  
Plant Profiles  
Project Team  
Related Classes  
Links & Resources  
Contact Info  
Always in Season!  
> Autumn  
Garden Research

## About the Garden

Sustainable landscapes can serve as a model for educational advancement by demonstrating innovative installation, maintenance, and research strategies that seek to instill sustainable environmental stewardship understanding and skills.

The McGinty Mall demonstration garden is a contemporary urban adaptation of the traditional ornamental landscape plant field trial. The multiple layers of project participants (researchers, students, consumers, and commercial stakeholders) are intended to build environmental stewardship capacity over time. The garden site (between Barre Hall and Lehotsky) is ideally situated for this type of research due to heavy-foot traffic patterns. This pilot site will







# The Designs



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Sustainable  
Landscape  
Demonstration

[About the Garden](#)

[Designs](#)

[Plant Profiles](#)

[Project Team](#)

[Related Classes](#)

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[Contact Info](#)

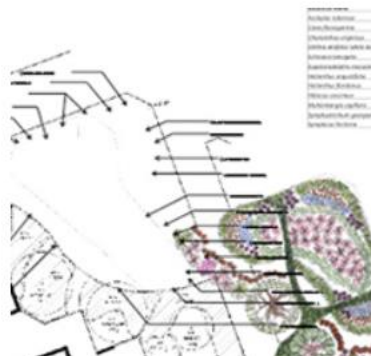
[Always in Season!](#)

> [Autumn](#)

[Garden Research](#)

## Designs

### Rain Garden Design



### Native Plant Design



# The Team



- Planning Team
- Designers
- Installation & Maintenance (web summary)



# Web Summary



Kathy Hollifield  
Garden Maintenance/Survey Research  
CITI Certified in Human Subjects Behavioral Research  
HORT 408\_007 Summer 2015

Kathy is a senior horticulture major at Clemson University. She grew up helping her parents and grandparents care for their flower and vegetable gardens in Ohio. Kathy loves learning as much as she can about plants. She loves nature and finds working with plants to be very soothing. She performed weekly maintenance in the Sustainable Landscape Demonstration Garden such as applying mulch, weeding, trash pickup and watering (only when necessary). She also collected plant tissue and submitted it to a lab for analysis. Kathy enjoyed educating passersby regarding the types of plants in the garden, finding out their garden preferences via anonymous surveys and listening to them describe the joy that the garden brought to their lives. This experience has taught her that caring for a public garden is quite different than caring for a private garden. Kathy works full-time at Greenville Technical College and hopes to bring much of what she has learned at Clemson University to her job.



# The Plants



College of Agriculture, Forestry and Life Sciences

CU > CAFLS > Sustainable Landscape Demonstration > Plant Profiles > Plant Profiles

Plant Profiles

Sources



Home & Garden  
Information

Extension

Agricultural Services

Environmental Sciences

## Plant Profiles

- **PLANT RATING SHEETS** (PDF)
- *Amsonia tabernaemontana*: Eastern Blue Star
- *Andropogon glomeratus*: Bushy Bluestem
- *Asclepias tuberosa*: Butterfly weed
- *Baptisia australis*: Blue False Indigo

# Plant Rating Sheets

## **Sustainable Landscape Garden Demonstration**

### **Plant Rating**

- Please answer the following questions by filling in the blanks or circling the best description.
- Please enter a **specific, complete plant name** in the box.
- Please rate each plant by checking the box where 1 is poor, 3 is average and 5 is excellent.
- Please initial each page and return to Dr. Ellen Vincent (office, email and fax # at bottom of page).

Name: \_\_\_\_\_ Email: \_\_\_\_\_

Phone #: \_\_\_\_\_

Date of viewing/rating (please circle):

2013   2014   2015   2016   2017   2018

Jan   Feb   March   April   May   June   July   Aug   Sept   Oct   Nov   Dec

Gardening Experience (please circle):   No experience   Student   Master Gardener   Professional

Other: \_\_\_\_\_

Plant name:	Average					N/A	Comments
	Poor				Excellent		
	1	2	3	4	5		
Bloom color							
Bloom shape							
Foliage color							
Foliage habit (behavior)							


**Plant profile sheets...**



# Echinacea laevigata

: Landscape Demonstration > Plant Profiles > Echinacea laevigata: Smooth Purple Coneflower

## Echinacea laevigata: Smooth Purple Coneflower

<b>Latin name:</b> <i>Echinacea laevigata</i>	
<b>Common name:</b> Smooth Purple Coneflower	
<b>Flowers:</b> Purple to pink, showy and delicate drooping purple rays. Blooms June to August <sup>12</sup>	
<b>Fruit:</b> Not significant <sup>13</sup>	
<b>Height &amp; Width:</b> 2-5' x 1.5-2' <sup>12</sup>	
<b>Type:</b> Herbaceous perennial <sup>12</sup>	
<b>Habit:</b> Upright, cascading, mound <sup>16</sup>	
<b>Wetland indicator category**:</b> No Wetland indicator was available for this plant.	
<b>Texture:</b> Fine <sup>16</sup>	
<b>Growth rate:</b> Moderate <sup>12</sup>	
<b>Light:</b> Full sun to part shade <sup>12</sup>	
<b>Moisture:</b> Dry to medium <sup>12</sup>	
<b>Soil:</b> Tolerates clay soil, dry soil, shallow and rocky soil <sup>12</sup>	
<b>Zones:</b> 3-8 <sup>12</sup>	
<b>Origin:</b> Southeastern United States <sup>16</sup>	
<i>Note: This plant is on the United States threatened and endangered species list<sup>16</sup></i>	

**Features:** Beautiful, purple showy flowers are an attractive addition to a planting bed. The long-blooming flowers provide for longer color interest in the native plant garden. It can grow to be 2 to 5 feet tall, so placement must be made accordingly. Butterflies and other wildlife are attracted to the habitat this plant provides<sup>12</sup>.

# Muhlenbergia capillaris

CU > CAFLS > Sustainable Landscape Demonstration > Plant Profiles > Muhlenbergia capillaris: White Muhly Grass

Plant Profiles

Sources



Home & Garden  
Information

Extension

Agricultural  
Services

Experiment Station

Livestock-Poultry  
Health

Regulatory Services

Centers & Institutes

Public Service

Clemson University



## Muhlenbergia capillaris: White Muhly Grass

<b>Latin name:</b> <i>Muhlenbergia capillaris</i>
<b>Common name:</b> White Muhly Grass
<b>Flowers:</b> Showy <sup>12</sup>
<b>Fruit:</b> Not noticeable <sup>12</sup>
<b>Height &amp; Width:</b> 3' x 3' <sup>12</sup>
<b>Type:</b> Perennial ornamental grass <sup>12</sup>
<b>Habit:</b> Upright grass <sup>12</sup>
<b>Wetland indicator category**:</b> FACU <sup>17</sup>
<b>Texture:</b> Fine textured basal foliage <sup>12</sup>
<b>Growth rate:</b> Medium <sup>12</sup>
<b>Light:</b> Sun to light shade <sup>12</sup>
<b>Moisture:</b> Very drought tolerant <sup>12</sup>
<b>Soil:</b> Well drained soil does well in hot dry sandy sites <sup>12</sup>
<b>Zones:</b> 6-9 <sup>12</sup>
<b>Origin:</b> Western-central United States <sup>12</sup>



**Features:** An airy inflorescence colored creamy white, which dries to a light grey in early November. These grasses have dark green glossy leaves and are excellent winter interest plants<sup>9</sup>. The cultivar White Cloud exhibits the same traits as the pink muhly grass except that it flowers white.

**Siting:** Belongs in well-drained soils because it is very drought tolerant, also does well in sandy soils. Should be planted in mass to create a statement in the landscape, does well in edging and borders as well as centerpieces<sup>13</sup>.

**Care:** Plant in suitable site with adequate soil organic matter so that the crown of the plant is at the soil surface<sup>18</sup>. Ensure

# Muhlenbergia capillaris

CU > CAFLS > Sustainable Landscape Demonstration > Plant Profiles > Muhlenbergia capillaris: Pink Muhly Grass

Plant Profiles

Sources



Home & Garden  
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## Muhlenbergia capillaris: Pink Muhly Grass

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<b>Growth rate:</b> Medium <sup>12</sup>
<b>Light:</b> Sun to light shade <sup>12</sup>
<b>Moisture:</b> Very drought tolerant <sup>12</sup>
<b>Soil:</b> Well drained soil does well in hot dry sandy sites <sup>1</sup>
<b>Zones:</b> 6-9 <sup>12</sup>
<b>Origin:</b> Western-central United States <sup>12</sup>



**Features:** Airy inflorescence often colored pink purplish red, purplish gray dries to a light buff; dark green glossy leaves. Excellent winter interest ornamental grass, flowers remain pink into November<sup>12</sup>.

**Siting:** Belongs in well-drained soils because it is very drought tolerant, also does well in sandy soils. Should be planted in mass to create a statement in the landscape, does well in edging and borders as well as centerpieces<sup>15</sup>.

**Care:** Plant in suitable site with adequate soil organic matter so that the crown of the plant is at the soil surface<sup>18</sup>. Ensure

# Eupatorium maculatum

CU > CAFLS > Sustainable Landscape Demonstration > Plant Profiles > Eupatorium maculatum: Spotted Joe Pye Weed

Plant Profiles

Sources



Home & Garden  
Information

Extension

Agricultural  
Services

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Livestock-Poultry  
Health

Regulatory Services

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Clemson University



## Eupatorium maculatum: Spotted Joe Pye Weed

**Latin name:** *Eupatorium maculatum*

**Common name:** Spotted Joe-Pye Weed

**Flowers:** Flat-topped clusters with 9-15 flowers<sup>3,13</sup>

**Fruit:** Inconspicuous<sup>10</sup>

**Height & Width:** 5-7' x 4'<sup>3</sup>

**Type:** Herbaceous perennial<sup>10</sup>

**Habit:** Upright<sup>10</sup>

**Wetland indicator category\*\*:** FACW<sup>17</sup>

**Texture:** Medium<sup>18</sup>

**Growth rate:** Medium<sup>18</sup>

**Light:** Sun to part shade<sup>10</sup>

**Moisture:** Wet to moist<sup>10,13</sup>

**Soil\*:** Loamy and calcareous soils<sup>10,13</sup>

**Zones:** 4 - 8<sup>3</sup>

**Origin:** Eastern North America<sup>16</sup>



**Features:** *Eupatorium maculatum* is a tall herbaceous perennial that performs well in moist or wet landscapes<sup>10</sup>. The stems are usually spotted or solid purple and lined with whorls of narrow leaves<sup>13</sup>. Clusters of mauve flower heads attract a number of beneficial pollinators in the late summer to autumn months<sup>3,10</sup>.

**Siting:** Spotted Joe-Pye Weed performs best in moist to wet soils with sun to part sun conditions<sup>3</sup>.



Summer 2015

More Plants In The Garden

# *Hibiscus coccineus*

## Rose Mallow



**Image: Kathy Hollifield**



# *Asclepius tuberosa*

## Butterfly Weed



**Image: Kathy Hollifield**



# *Rudbeckia fulgida* var. *sulvanti* 'Goldsturm'

## Goldsturm Black-Eyed Susan

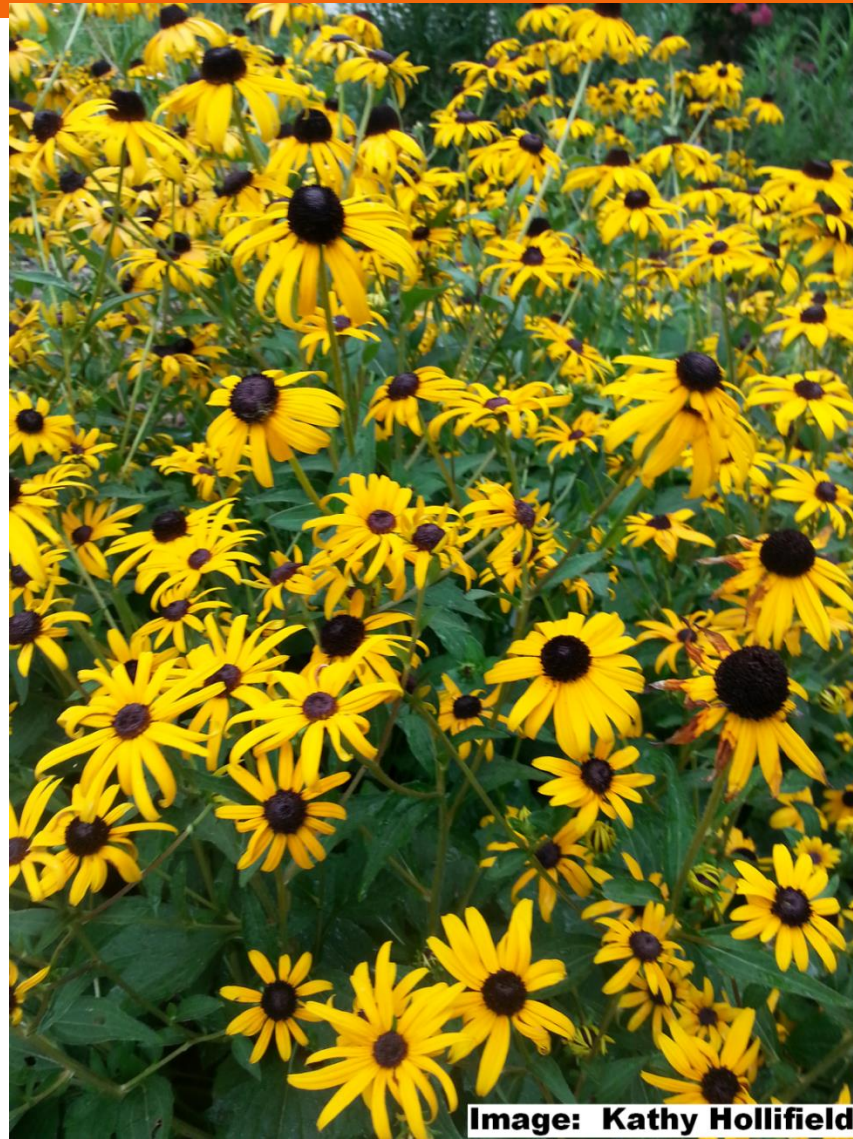


Image: Kathy Hollifield



# *Echinacea purpurea* 'PowWow Wildberry'



**Image: Kathy Hollifield**



# *Echinacea* 'Cheyenne Spirit'



Image: Kathy Hollifield

Wildlife Food Source



Image: Kathy Hollifield



# Wildlife



Image: Kathy Hollifield

# Native Plants in the Landscape

What comes to mind?

- Messy?
- Too much work?
- Beautiful?



# Summer 2015



**Image: Kathy Hollifield**



# Summer 2015



**Image: Kathy Hollifield**

# Acknowledgements

- SCNLA
- Creative Inquiry Program at Clemson University
- Dr. Ellen Vincent



# Questions?



**Image: Kathy Hollifield**