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Today’s Presenters

Jamie Anderson EDCSC

Peter S. Puglionesi, PE, BCEE
Stormwater and Your Property
What is your watershed address?
Pre Development Versus Post Development

How Much Rain Water?

• 1” of rain that falls over 1 sq. ft. of impervious surface creates 0.6 gallon of water

• So, 1” of rainfall on a 1,000 sq. ft. roof will produce 100 gallons of rainwater (1,000 sq. ft. x 0.6 gal. = 600 gal.)

• The Philadelphia area averages 42.05 inches of rain annually.

• A roof this size in this area yields 5,256 gal. of run off / year. (0.6 gal. x 42.05 in. x 1,250 sq. ft. = 31,538 gal.)
When it Rains it Drains

Increased Discharge = Flooding
Urbanization and Stream Channels

Common Practices that Result in Stormwater Pollution
Common Practices that Result in Stormwater Pollution

Uncontrolled Stormwater Runoff = Impaired Streams
The American Ideal?

Use Creek Friendly Lawn Care

- Lawn grasses do not infiltrate rainwater well and modern lawn care practices use too much fertilizer and too many toxic chemicals that make their way into our waterways harming water quality.
- Mow High – requires less water, shades out weeds.
- Leave the grass clippings on the lawn, they will breakdown and fertilize lawn.
- Test your soil before you apply fertilizer.
- Use organic fertilizers, only what you need, and only if your lawn needs it.
- Water longer and less often. A
- Aerate early in spring and the fall. Reduces compaction, allows more air flow around roots and better water penetration.
- Do NOT put your leaves in a stream!!!
What’s in Your Soil?? Test before you treat

- Penn State Extension
- http://www.aasl.psu.edu/ssft.htm
- Standard Individual Soil Test Kit $9.00

Go Native!!

- Consider replacing some lawn area with native flowers, shrubs and trees.
  - Drought tolerant, adapted to this area, climate and conditions.
  - Require less watering, fertilizers and pesticides
  - Provide better habitat and serve as a food source (berries and seeds) for insects, birds and other wildlife. Good Biodiversity.
- Bring Nature Home by Doug Tallamy
- https://www.dcnr.pa.gov/Conservation/WildPlants/LandscapingwithNativePlants/Pages/default.aspx
Be on the lookout for Invasives!

Think twice about the common plants that you can buy at your local big box store.
TREES – Vital for Water Quality

Water Quality Benefits

• Trees intercept small rainfall events that are responsible for the most stormwater pollution

• A typical medium sized deciduous tree can intercept 2,380 gallons of rainfall/year

• A typical evergreen tree can intercept 4,000 gallons of water/year
RIPARIAN BUFFERS
Let nature do the work of stabilizing your streambanks and filtering pollutants!

- Buffers stabilize streambanks and filter overland runoff of pollutants. They also shade a stream allowing cold water fish species to thrive.
- Can start with a no-mow zone (be careful to manage for invasives)
- Use Native shrubs and trees
- The wider the better.
Riparian buffers protect stream habitat, filter nutrients and sediments, and disperse concentrated runoff and help to stabilize the streambanks.

Healthy Versus Unhealthy Stream Habitat

**A Healthy Riparian (Stream) Habitat**
- Good shade, cool water
- Abundant woody and organic items in stream
- Abundant vegetation and roots to protect and stabilize banks
- Gravelly, narrow, deep channel
- Good fish and wildlife habitat
- Good water quality
- High forage production
- High water table and increased storage capacity
- High late summer stream flows

**An Unhealthy Riparian (Stream) Habitat**
- Little shade, warm water
- Lack of woody and organic debris in stream
- Little vegetation and roots to protect and stabilize banks
- Silty, wide, shallow channel
- Poor fish and wildlife habitat
- Poor water quality
- Low forage production
- Low water table and decreased storage capacity
- Reduced late summer stream flows
Downspout Flow Through Planters
Rain Gardens
All Shapes, All Sizes benefit clean water
Somewhat typical Havertown lots - 52’ by 135’ or about 7,000 SF of land each
Add two 1940s two-story brick house with additions = 2,875 SF (20% impervious)

(2,875 SF, 20% impervious)

Everyone needs a road to get to your home = 1,850 SF (13% impervious)

(4,725 SF, 34% impervious)
Add two 1940s two-story brick house with additions = 2,875 SF (20% impervious)
Everyone needs a road to get to your home = 1,850 SF (13% impervious)
Add a sidewalk = 650 SF (5% impervious)

(5,375 SF, 38 % impervious)

Add a driveway, walks, decks, and paved area for parking = 2,400 SF (17% impervious)

(7,775 SF, 56 % impervious)

100% of the water that lands on those surfaces immediately turns into stormwater runoff.
What Can We Do? – Build A Rain Garden

Using our 0.6 gal./sq. ft. a 1” storm would generate 1,125 gal. or runoff.

The typical lot example we used generates 4,665 gal.

How can we stop 3,440 gal. of runoff from getting to the streams?

A 12’ by 12’ (about the size of a typical bedroom) rain garden 2’ deep will hold about 2,160 gal. of water.

Then all you need is a second one 8’ by 10’ (about the size of a typical bathroom) to hold 1,280 gal. of water.

\[ 2,150 \text{ gal.} + 1,275 \text{ gal.} = 3,440 \text{ gal.} \]

*80% of our rain storms are less than 1” of rain*

There we go 1” managed!

What is a Rain Garden?

- An area in a man-made landscape that captures water and holds it for a short time
- Runoff water is captured and infiltrated into the soil in an indented area where plants and soils utilize and filter the water
- An attractive addition to your landscape
Capture that Water Before it Becomes Runoff!

How does a rain garden work?

Gutters & Down Spouts
Assist with directing rain water from your roof to your rain garden.

Deep Roots
Plants with a deep root system encourage infiltration and help absorb nutrients.

Berm
A berm holds water in the garden during heavy rains.

Native Plants
Native plants are adapted to local conditions and are easy to maintain once established. Plus, they attract birds, butterflies and other pollinators.

Purpose of Rain Gardens

• Captures runoff from impervious areas such as roofs, driveways, patios
• Reduce runoff leaving landscape to become storm water reducing volume entering local waterways
• Standing water should last no more than 72 hours after rain stops
A Rain Garden Can Be...

- a butterfly habitat
- along a sidewalk
- trees and shrubs
- a parking island
- a wet meadow
- a perennial garden
**Benefits of Rain Gardens**

- Beautiful landscape feature, low maintenance, low water use
- Increases infiltration of rainwater in landscapes with impervious surfaces - infiltrates as much as 30% more water than a flat or sloped lawn area
- Reduces flooding risks and stream bank and bed erosion
- Increase habitat for birds and insects

**Where Should A Rain Garden Go?**

- At least 10 feet from your foundation
- At least 10 ft from your neighbors property
- Where the overflow will not create problem (i.e., icing on sidewalks)
- Where it is easier to get water to garden.
- Where water can enter the rain garden via a pipe or overland runoff
Rain Garden Locations to Avoid

• NOT over a septic tank
• NOT near a drinking water well.
• Call PA One Call to locate your utilities so you know where you cannot dig!
• Make sure to know where you might have underground wiring.
• Stay outside of the dripline of trees and avoid disturbing their roots.
• NOT in a wet area in your yard (unless you know how to design your way out of it)!

What about my soils?

• Simplified rain gardens can be constructed using native soils present as long as they will infiltrate water that enters the garden within 48 hours. You can determine this using a simplified soil infiltration test.
What About my Soils?

<table>
<thead>
<tr>
<th>Time to Essentially Drain</th>
<th>Likely Soil Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;6 hrs</td>
<td>Sandy</td>
</tr>
<tr>
<td>6-24 hrs</td>
<td>Silty</td>
</tr>
<tr>
<td>&gt;24 hrs</td>
<td>Clayey</td>
</tr>
</tbody>
</table>

How Big Should My Rain Garden Be?

- Determine the size of the impervious cover that will drain into the rain garden.
- Understand your slope
- Determine how big and how deep the garden should be.
Finally, determine the rain garden’s size:
1. Use Table 2 to determine the size factor.
2. Multiply the size factor by the drainage area. This is the recommended rain garden size.

<table>
<thead>
<tr>
<th>Table 2</th>
<th>Depth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soil Type</td>
<td>3.5 in</td>
</tr>
<tr>
<td>Sand</td>
<td>0.19</td>
</tr>
<tr>
<td>Silt</td>
<td>0.34</td>
</tr>
<tr>
<td>Clay</td>
<td>0.43</td>
</tr>
</tbody>
</table>

\[
\text{Size Factor} \times \text{Drainage Area} = \text{Rain Garden Area}
\]

Note: If the rain garden is > 30 ft away from the drainage area then the area of the rain garden can be a half size smaller than calculated above. This is because a large amount of stormwater will be absorbed along the pathway that leads to the rain garden.

Calculate the slope to determine the rain garden’s depth:
1. Place one stake at the uphill end of the rain garden and another at the downhill end as illustrated in Figure 1.
2. Level the string between the two stakes.
3. Measure the total length of the string and the height of the string at the downhill stake in inches.
4. Divide the height by the length and multiply the result by 100. This is the slope.
5. Use Table 1 to determine the recommended rain garden depth.

<table>
<thead>
<tr>
<th>Table 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slope</td>
</tr>
<tr>
<td>&lt; 4%</td>
</tr>
<tr>
<td>5-7%</td>
</tr>
<tr>
<td>8-12%</td>
</tr>
</tbody>
</table>

Figure 1: Determine the slope of the landscape.
What Shape Should My Rain Garden Be?

- Whatever shape you want!
- The shape should blend into your landscaping

How to Get the Water Into the Garden

- Overland Flow
- Vegetated Swale
- Piping

**Gutter Extensions**: Specifically shaped to attach to the end of your downspout.

**PVC & Plastic Corrugated Piping**: Can be attached to gutter extensions and buried to carry stormwater underground.

**Grass-lined & Rock-lined Swales**: Can be used to direct water to the rain garden. Swales should be sloped at a 2:1 ratio (1 ft rise for every 2 ft across). Ideal for heavy flows from roads or parking lots.
What About an Overflow?

- In large storm events, the rain garden will fill, and need to overflow.
- The overflow should be directed away from any structures and not be directed into a neighbors yard.
- The water can be directed back to the path it took before the garden.

Developing a Planting Plan

- Consider light – is it shady or sunny
- The plants on the bottom will need to be tolerant of wet conditions
- The plants on the sides and the berm will be in dry conditions
Rain Garden Property Assessment and Construction Steps Examples

Soil Texture - Augering
# Accelerated Percolation Test (4 to 6” dia., 12” Deep)

<table>
<thead>
<tr>
<th>Address:</th>
<th>Performer By:</th>
<th>Date:</th>
<th>Preset Start Time:</th>
<th>End Time/Net Hrs:</th>
<th>0:00</th>
</tr>
</thead>
</table>

Excel will calculate shaded cells. Preset a 4” hole by filling to top and allow to drain if feasible. If zero level is found the next day, enter 0:00 and note it was zero at bottom (last avg. Inch/hr reading will not be valid). 

**Notes:** ended perc early due to slow drain and rain in preceding days, wet soil.

<table>
<thead>
<tr>
<th>Time (min)</th>
<th>Real Time</th>
<th>Net (in)</th>
<th>Water Level</th>
<th>Drop in Wtr Level</th>
<th>Inches/hr</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>U (Starting Reading)</td>
<td>U (Starting Reading)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Sometimes Redirecting Water is Easy

Driveway is crowned in the middle and pitched toward the front lawn. Sitting garden at edge of driveway allowed runoff flow from downspout to driveway to Rain Garden

How Can You Tell?

- Go out in the rain
- Do a water test with hose - pick 3-4 uphill spots and run a gentle stream of water and watch gravity do the rest

Doesn’t Work If

- Flat driveway, concave in the middle, sloped to run to fast to the street
Clayey soil shallow, but sandy deep & percolated pretty well

Used middle soil factor of 0.25 times about 900 sq ft drainage area to yield 225 sq ft garden area

Notice tree stump - could be a problem for construction, depending on age, location and type of tree

**Planting Plan**
- Considers Sun / Shade

**Grading Plan**
- Water flow in upper left side by cutting ~ 12” soil out on uphill side
- Berm on downhill side
- Berm tapers so top of berm is level
- Bottom of the garden is almost level, with a very small slope to the downhill side
- Rototill the bottom before planting
- Cut an overflow in the berm on the downhill side and line with stone
Sometimes Redirecting Water is Hard

Had to cut a channel from downspouts on very flat side of house to Rain Garden

How Can You Tell?

- Water pooled in this area, so we knew before construction and ran a level on ground where we wanted water to flow
- As you built the swale run level along the entire route of flow - it should continuously slope toward the garden

Doesn’t Always Work

Gravity works, water doesn’t flow uphill!
Rain Garden Design Exercise

Soil Analysis:
- Topsoil: thin sandy loam, with some silty clay mixed in, down to 6" deep.
- Water flow: Currently the water from gutters on the left side of the property drains directly onto the driveway (via a disused grass strip) and down to the street and nearby storm drain. The right side enter a flatter lawn area and most probably percolates into the ground. The property in the Cedar Creek Watershed and downhill neighborhoods have experienced flooding in very heavy rain.

Drainage Area:
- About half of both of the 1 roof sections drain to the downsputs on the left side.

Slopes:
- Soil left of the house has some slope toward the front yard also. The slope of the front yard is about 2%, but then falls off more quickly near the sidewalk.

Percolation Rate Soils:
- Homeowner reports that water drains quickly after a storm. This is borne out by an accelerated precipitation test that places it between the two soil infiltration categories shown on the chart.

Location:
- Immediately north of the yard, in a garden area on the left side of the property, which is higher than the front lawn this area is more suitable for grass or larger shrubs.

Sun/Shade:
- Front lawn gets FULL SUN most of the day with some early/late shade.

Interest:
- The homeowners maintain their yard and landscaping and are interested in having a rain garden.

---

Residential Rain Garden Preliminary Assessment/Scoring

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Description/Explanation/Comments</th>
<th>Rating</th>
<th>Weights</th>
<th>Score (X2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Visible to Community?</td>
<td>3=Very</td>
<td>x 5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Stormwater current</td>
<td>3=Yes, removes water from storm sewer</td>
<td>x 5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Soil Suitability by Soil Type or Drainage characteristics (1 = deep)</td>
<td>3=Sandy or clayey</td>
<td>x 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Square footage (sq ft)</td>
<td>3=100 sq ft</td>
<td>x 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Garden Location / Slope/Drainage toward neighbor house?</td>
<td>3=10 ft, slopes away from house</td>
<td>x 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Area Free of Standing water/Inadequate Rain is very</td>
<td>3=Drafts instantly</td>
<td>x 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Ease of Redirecting/Runoff into area by moving soil or a new drain pipe?</td>
<td>3=Naturally flow to area</td>
<td>x 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Does the homeowner have a good overview or location that will not negatively affect the area?</td>
<td>3=Flow to current drainage path or larger area, away from southerly neighbors</td>
<td>x 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Homeowner has the ability and intention to maintain the garden.</td>
<td>3=Yes and gardener</td>
<td>X4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

TOTAL SCORE
<table>
<thead>
<tr>
<th>Plant</th>
<th>Common Name</th>
<th>Height</th>
<th>Color</th>
<th>Light</th>
<th>Water</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amsinckia 'Blue Ice'</td>
<td>Blue aster</td>
<td>12-15 in</td>
<td>Light Blue</td>
<td>Part Sun, Full Sun</td>
<td>Drought tolerant, Dry Moist</td>
</tr>
<tr>
<td>Aquilegia can. 'Little Lantern'</td>
<td>Columbine</td>
<td>12-16 in</td>
<td>Red</td>
<td>Part Sun, Full Sun</td>
<td>Average-Moist, needs well drained soil</td>
</tr>
<tr>
<td>Asclepias incarnata</td>
<td>Swamp milkweed</td>
<td>3-5 ft</td>
<td>Pink</td>
<td>Full Sun, Part Sun</td>
<td>Average-Moist, needs well drained soil</td>
</tr>
<tr>
<td>Asclepias verticillata</td>
<td>Horseshoe milkweed</td>
<td>1-3 ft</td>
<td>White</td>
<td>Full Sun, Part Sun</td>
<td>Drought tolerant, Dry Average</td>
</tr>
<tr>
<td>Aster cordifolius</td>
<td>Blue Wood Aster</td>
<td>2-3 ft</td>
<td>Blue</td>
<td>Full Shade, Part Sun</td>
<td>Dry-Moist</td>
</tr>
<tr>
<td>Aster m. 'Purple Dome'</td>
<td>New England aster</td>
<td>10 in</td>
<td>Purple</td>
<td>Full Sun</td>
<td>Average-Moist, needs well drained soil</td>
</tr>
<tr>
<td>Carex lax. 'Bunny Blue'</td>
<td>'Hobby' Sedge</td>
<td>6-12 in</td>
<td>Full Shade, Part Sun</td>
<td>Average-Moist, needs well drained soil</td>
<td></td>
</tr>
<tr>
<td>Carex musk. 'Little Midge'</td>
<td>Palm Sedge</td>
<td>2-3 ft</td>
<td>Full Shade, Part Sun</td>
<td>Average-Moist, likes wet soil</td>
<td></td>
</tr>
<tr>
<td>Carex plantaginea</td>
<td>Seersucker sedge</td>
<td>6-10 ft</td>
<td>Full Shade, Part Sun</td>
<td>Full shade, part sun, moist</td>
<td></td>
</tr>
<tr>
<td>Echinacea purpurea</td>
<td>Purple Coneflower</td>
<td>2-3 ft</td>
<td>purple</td>
<td>Full Sun, Part Sun</td>
<td>Drought tolerant, well drained soil</td>
</tr>
<tr>
<td>Iris Versicolor</td>
<td>Blue Flag</td>
<td>2-3 ft</td>
<td>Blue Violet</td>
<td>Part Sun, Full Sun</td>
<td>Moist, salt tolerant, deer resistant</td>
</tr>
<tr>
<td>Lobelia cardinalis</td>
<td>'Black Truffle'</td>
<td>2-4 ft</td>
<td>Red</td>
<td>Full Shade, Part Sun</td>
<td>Average-Moist, mos, wet soil, average-moist</td>
</tr>
<tr>
<td>Matteuccia struthiopteris</td>
<td>Ostrich fern</td>
<td>3-4 ft</td>
<td>red</td>
<td>Full Shade, Part Sun</td>
<td>Full shade, Part Sun, Moist, wetlands, well-drained</td>
</tr>
<tr>
<td>Monarda didyma Jacob Cline</td>
<td>Beebalm</td>
<td>2-3 ft</td>
<td>red</td>
<td>Full Sun, Part Sun</td>
<td>Well-drained, average-moist</td>
</tr>
<tr>
<td>Monarda fistulosa</td>
<td>Wild bergamot</td>
<td>2-5 ft</td>
<td>purple</td>
<td>Full Sun, Part Sun</td>
<td>Dry-Moist, drought tolerant, well-drained</td>
</tr>
<tr>
<td>Osmunda cinnamomea</td>
<td>Cinnamon fern</td>
<td>2-3 ft</td>
<td>purple</td>
<td>Full Shade, Part Sun</td>
<td>Salt-tolerant, well soil</td>
</tr>
<tr>
<td>Panicum vir. 'Shenandoah'</td>
<td>Switchgrass</td>
<td>2-3 ft</td>
<td>red</td>
<td>Full Sun, Part Sun</td>
<td>Average-Moist, salt &amp; drought tolerant, well-drained</td>
</tr>
<tr>
<td>Panicum virgatum</td>
<td>Switchgrass</td>
<td>3-5 ft</td>
<td>wheat</td>
<td>Full Sun, Part Sun</td>
<td>Average-moist, salt &amp; drought tolerant, well-drained</td>
</tr>
<tr>
<td>Phlox pan. Peacock White</td>
<td>Garden phlox</td>
<td>18-24 in</td>
<td>white</td>
<td>Full Sun</td>
<td>Average moisture, salt tolerant</td>
</tr>
<tr>
<td>Phlox paniculata Xana'</td>
<td>Garden phlox</td>
<td>4-5 ft</td>
<td>pink</td>
<td>Full Sun, Part Sun</td>
<td>Average-moist, well-drained</td>
</tr>
<tr>
<td>Purse'</td>
<td>Creeping phlox</td>
<td>6-10 in</td>
<td>purple</td>
<td>Full Shade, Part Sun</td>
<td>Average-moist, drought tolerant, well-drained</td>
</tr>
<tr>
<td>Physostega v. 'Pink Manners'</td>
<td>Cabbage plant</td>
<td>3 ft</td>
<td>Light Pink</td>
<td>Full Sun</td>
<td>Average-Moist, well-drained</td>
</tr>
<tr>
<td>Rudbeckia ful. 'Goldsturm'</td>
<td>Back eyed susan</td>
<td>2-3 ft</td>
<td>golden yellow</td>
<td>Full Sun, Part Sun</td>
<td>Average, drought tolerant, well-drained</td>
</tr>
<tr>
<td>Rudbeckia triloba</td>
<td>Brown eyed susan</td>
<td>2-3 ft</td>
<td>yellow</td>
<td>Full Sun, Part Sun</td>
<td>Dry-Moist, drought tolerant, well-drained</td>
</tr>
</tbody>
</table>
Maintaining Your Rain Garden

- Water weekly until plants are established
- Weed, especially during the first few years
- Look out for invasive plants!
- Prune dead vegetation and deadhead flowers each spring.
- Check for sediment buildup at the entrance & erosion
- Mulch as necessary until the plants grow together
- Replant as necessary

A Rain Garden Over Time
Watering

New rain gardens will need to be watered for the first one or two years until the garden is established!

Soaker Hose
From Rutgers Univ. RG Training

Landscape Fabric and Mulch

Use mulch in garden, no fabric in garden except under stone
Weeding

• Weeding more often will limit the amount of time you will have to spend weeding
• Watch for overly-aggressive species
• Some weeds can be spread aggressively by underground rhizomes

Pruning

• Pruning directs growth of plants, improves health, and increases production of flowers and fruits.
• How does pruning a rain garden differ from my other gardens?
  – In a rain garden, dense shrub growth is encouraged to provide increased filtering capacity.
Mowing

- After season, can remove stems and seed-heads or just leave as habitat and in some areas, aesthetics.
- A string trimmer can be used to maintain over-competitive growths.
- Dead plant material can also be removed by a string trimmer or mower, if the mowing deck can be raised to cut at least 8” high.

From Rutgers Univ. RG Training

Re-Planting as Necessary

- After 1st season, learn what was successful and what plants did not work in your rain garden.
  - Weather / flow drastically different than the design?
  - Was flow too fast through the basin, damaging?
  - Getting too little water?
  - Not draining in spots?

Photo by Linda Brazaitis

From Rutgers Univ. RG Training
Re-Planting as Necessary

- Replace dead or diseased plant material
- Re-seed your berm if areas of exposed soil
- Replace rocks that may be diverting flow away from garden
- Build up areas where more height is needed

From Rutgers Univ. RG Training

Cleaning of Gutters

- Make sure rain gutters clear of debris.
- If the flow of water is blocked in the gutter, the rain water may not get to your rain garden.

From Rutgers Univ. RG Training
Harvest Plants

- Seeds /cuttings from successful plants can be used elsewhere in the garden or shared with another garden.

Invest in Your Home - Invest in Clean Water

The Stormwater House Call is a free program created to assist homeowners in assessing their properties for ways to better manage stormwater through Best Management Practices. This helps improve water quality and reduce downstream flooding.

Visit: streamsmarthousecalls.org
Questions?

Enter your questions in the Q&A or Contact Us

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