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POND BUFFERS PLANT SELECTION AND MAINTENANCE

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Good afternoon! My name is Samantha Porzelt and I am a Water Resources Agent with Clemson Extension serving Charleston, Berkeley, and Dorchester counties. As apart of my role, I co-coordinate the Ashley Cooper Stormwater Education Consortium which is a group of municipal and educational stormwater partners who work to identify and produce stormwater educational programs and resources. One topic we often cover are stormwater pond buffers, and in todays presentation I will be covering plant selection and maintenance considerations for stormwater pond buffers.

Shoreline Erosion

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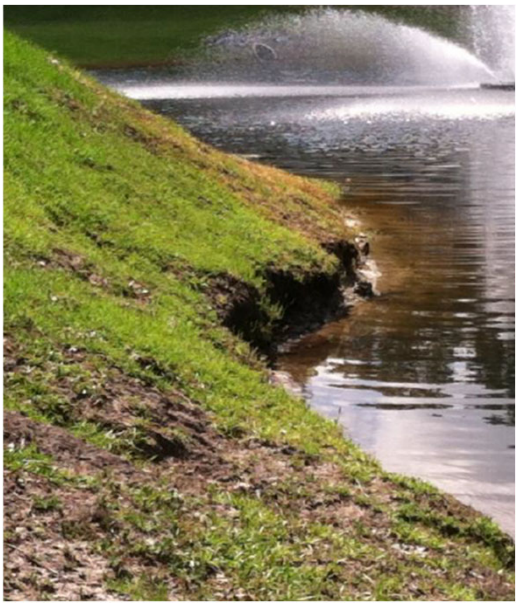
- Turf grass along pond banks can lead to:
  - Erosion
  - Sedimentation
  - Property loss
  - Poor water quality
  - More frequent dredging
  - Repair costs
  - Unpleasant appearance



Let's first start by looking at why a buffer is needed. As a water resources agent, one of the most frequent calls we receive are issues with shoreline erosion along stormwater pond banks. When we get these calls, we will schedule a site visit where we often see ponds with turf grass growing up to the edge of the water. As you all may know, turf grass is not ideal for shoreline vegetation because it lacks a dense root system and lacks tolerance for wet soil conditions that occur along pond edges. These short roots are not effective at stabilizing the bank, which leads to erosion in the pond.

One of the first issues we see as banks erode is sedimentation. Your stormwater pond is designed to trap sediment to help manage pollution and at some point, it will need to be dredged. However, shoreline erosion can make this happen more quickly, shortening the life span of your pond and meaning that dredging may need to happen more frequently. As banks continue to erode, this can also lead to property loss in many cases. For example, if you have lost two feet of your shoreline to erosion, that is two feet of shoreline that you are paying taxes on and no longer exists. This can also impact the value and aesthetics of a property. Lastly, shoreline erosion can impact water quality. Sediment itself can be a pollutant and can impact

water temperature, photosynthesis, and dissolved oxygen issues. Instead of turf grass, we recommend considering native wetland plants.

Benefits of a Native Plant Buffers

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A native wetland plant is a plant that has evolved naturally in a habitat inundated with water or periodically saturated soils, without human introduction. These plants have deep extensive root systems that tolerate wet soil conditions and fluctuating water levels, making them the most effective at stabilizing soil along pond banks. As stormwater sheet flows into the pond, native plants buffers can allow the water to slow down and infiltrating into the ground. Native plant buffers in the emergent zone of a pond can help absorb nutrients in the water and improve water quality, which can also help control nuisance aquatic weeds through nutrient removal.

We also often see geese populations establishing at ponds that have primarily turf grass. Once geese become permanent residents at a pond, their waste can significantly contribute to poor water quality. However, when a wide buffer is established about the circumference of a pond, geese are less likely to become permanent residents, and will likely continue with their natural migration.

Benefits of a Native Plant Buffers

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- Native wetland plants provide:
  - Shoreline stabilization
  - Slows down runoff
  - Water filtration
  - Provides shelter and habitat for wildlife
  - Provide food source for wildlife
  - Deter nuisance resident geese

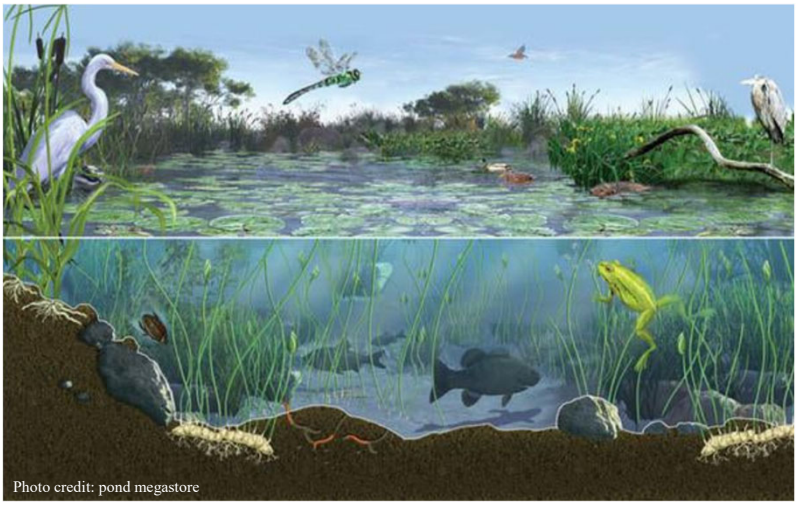

Photo credit: pond megastore

Native plants are well-adapted to local conditions and are an important part of pond and ecosystem health. They provide shelter and food sources for beneficial wildlife like shorebirds, amphibians, small reptiles, and insects such as dragonflies and pollinators. Native plants in the emergent zone also provide food and shelter for aquatic insets and fish, while also helping to improve water quality.

Wetland Indicator Status

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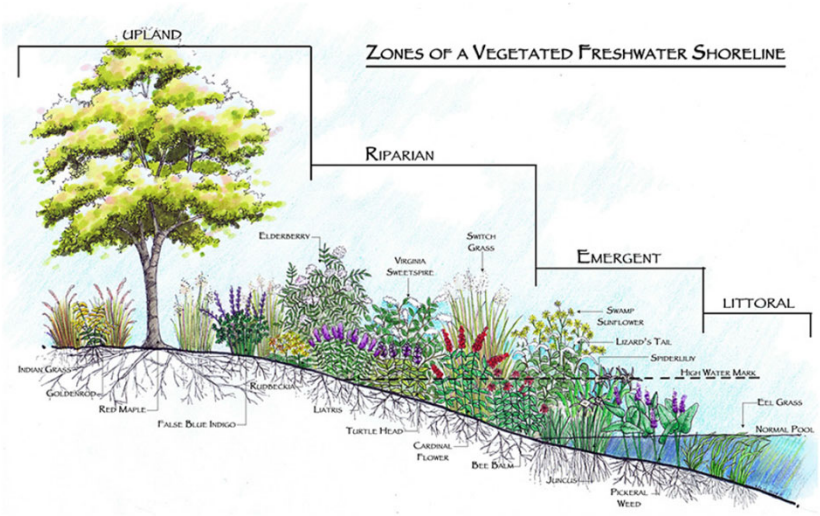
- **Obligate** (OBL) – plants that are always found in wetlands
- **Facultative** (FAC) – plants that are sometimes found in wetlands, and sometimes found in non-wetland habitats
- **Upland** (UPL) – plants that will not be found in a wetland



When selecting native plants for pond buffers, it's important to know their wetland indicator status to know which zone they will fit best in.

Obligate wetland plants are those that are always found in wetlands and therefore need to be in wet conditions that do not experience drought. These plants are ideal for the emergent zone of the pond where the bank is just below the water and less than 12 inches deep.

Facultative wetland plants are those that are usually found in wetlands but can also be found in non-wetlands habitats. They usually thrive in saturated soils but can tolerate soils with average moisture too. These plants are ideal for the riparian zone of the pond, where the bank slope is above the water surface but where the soil is permanently saturated.

Upland plants thrive on the part of the bank above the riparian zone where soils do not stay permanently moist. This zone often dry because the slope forces water to runoff rather than seep into the ground. In most cases, native plants that are commonly used in the home landscape are useful in this zone.

Emergent Zone Plants

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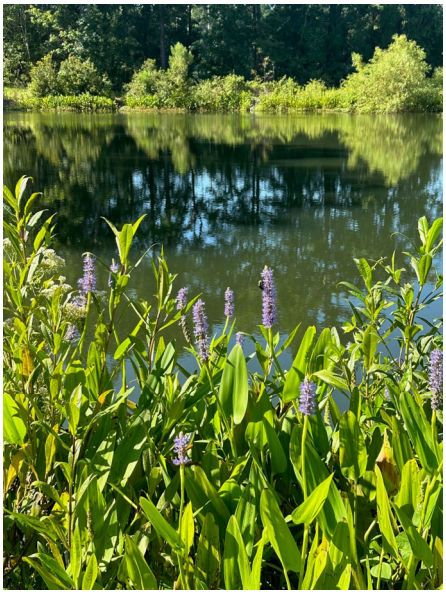
- Pickerelweed (*Pontederia cordata)*
- Arrowhead (*Sagittaria latifolia)*
- Arrow arum (*Peltandra virginicus)*
- Lizard's tail (*Saururus cernuus)*
- Alligator flag (*Thalia dealbata)*
- Golden canna (*Canna flaccida)*
- Soft rush (*Juncus effusus)*



The next few slides will list some of the native plant recommendations for each zone of a pond buffer. In the Emergent zone, there are several great options that prefer to grow in shallow standing water. Pickerelweed and soft rush are two of our most commonly use species. These species have deep roots and rhizome roots that spread quickly to fill in a space and stabilize the soil. Arrowhead, lizards tail, alligator flag, and native canna are all great options for the emergent zone as well.

Riparian Zone Plants

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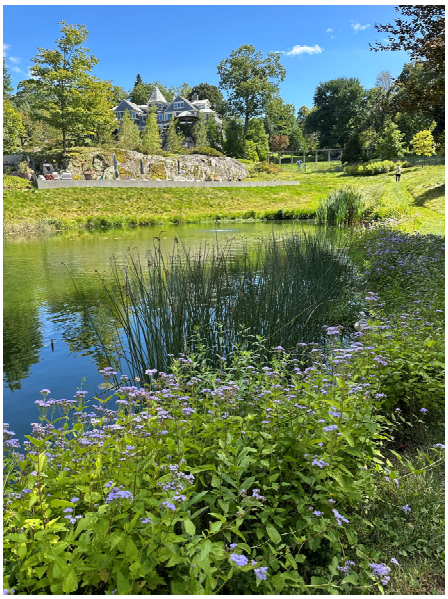
- Blue mistflower (*Conoclinium coelestinum*)
- Soft rush (*Juncus effusus)*
- Southern blue flag (*Iris virginica)*
- Spider lily (*Hymenocallis palmeri)*
- Marsh mallow (*Hibiscus moscheutos)*
- Swamp sunflower (*Helianthus angustifolius)*
- Cardinal flower (*Lobelia cardinalis)*
- Bog lily (*Crinum americanum)*
- River oats (*Chasmanthium latifolium)*
- White-top sedge (*Dichromena colorata)*
- Lizard's tail *(Saururus cernuus)*
- Joe pye weed (*Eupatorium fistulosum*)



There are many species that perform well in the riparian zone of a stormwater pond including Southern blue flag iris, white-top sedge, and joe pye weed. One of my favorites is blue mistflower which is can be an underutilized species in these settings, but I came across this beautiful example of mistflower on a pond buffer while on vacation in Connecticut. Blue mistflower has a wide native range including across South Carolina and is often found growing naturally in moist or wet areas like along stream banks and ditches. I'd love to see if utilized in more pond buffers in South Carolina. It has a very attractive purple bloom and is in the mint family, which means it is very efficient at spreading and filling in spaces quickly.

Upland Zone Plants

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Big bluestem (*Andropogon gerardii*)
Muhly grass (*Muhlenbergia capillaris*)
Switchgrass (*Panicum vigatum*)
Indian grass (*Sorghastrum nutans*)
Red sage (*Salvia coccinea*)
Lanceleaf coreopsis (*Coreopsis lancolata*)
Purple coneflower (*Echinacea purpurea*)
Goldenrod (Solidago sp.)

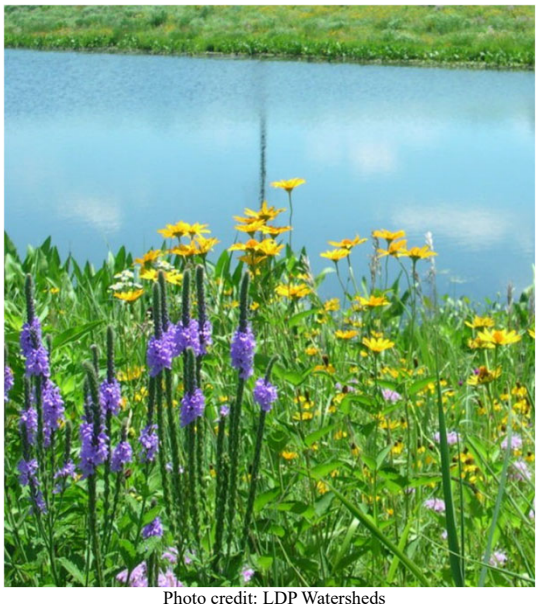

Photo credit: LDP Watersheds

Many plants have showy flowers that can add beauty to the landscape while also attracting pollinators and other beneficial wildlife. This is the case in all zones of a shoreline buffer, including the upland zone. Species in this zone are also commonly found in typical native plant landscaping settings too. This can include native grasses, native red sage, coreopsis, coneflower, goldenrod and so much more.

Sourcing Plants

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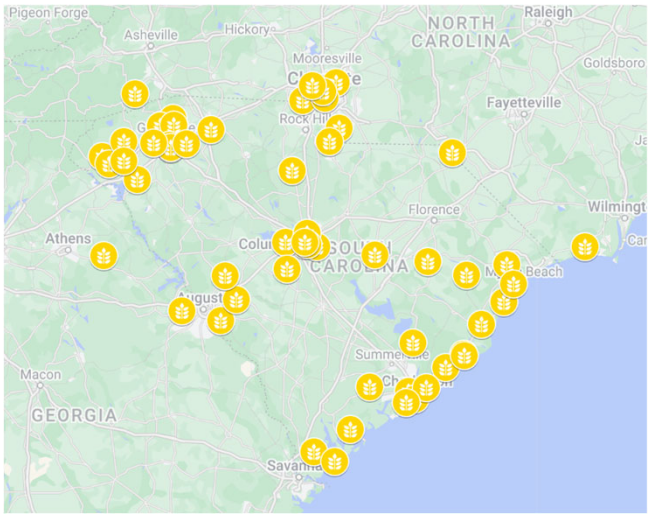
Protect
Restore
Educate
SCNPS
South Carolina Native Plant Society



We are fortunate in South Carolina to have a lot of native plant nurseries across the state, especially in the coastal region. The South Carolina Native Plant Society has an interactive map on their website listing all native plant nurseries and wholesalers with their contact information. Most pond buffer species that I've listed in this presentation are commonly available at many of these nurseries.

Additional Materials

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In some cases, your shoreline may need a little extra stabilization whether you have a lot of high energy flow across the landscape, or steep banks, and there are a few products out there that can be considered. Erosion control blankets can be used to provide temporary bank stabilization until plant roots can establish. These can come in a variety of materials including straw, or coconut core, and must be staked down typically with metal landscape staples. Seed mix are an option in conjunction with erosion control blankets as well, just be sure your supplier is providing native species in this seed mix.

Another options are coconut core logs that are effective in stopping erosion instantly while allowing plants to grow and establish behind them. Eventually these logs will biodegradable overtime. Ymjxj%r zxy%fqxt%gj%xyfpjx%s%ucfhj%y~umfqq%itsj%| ny%| ttijs%xyfpjx3

Planting Tips

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- Seek permission prior to planting
- Keep inlets & outlets accessible
- Regrade banks if necessary
- The wider the buffer the more effective it is
- Plant in repeating clumping patterns, or a randomized natural look
- 12-16 inch spacing between plants
- Stake in new plants

Before planting a buffer check for easements and seek permission prior to planting. Avoid planting near inlets and oulets, and keep them accessible for maintenance and inspection. Ideally buffers are planted at least 3 feet wide on gradual slopes. If a bank is too steep, re-grading may be necessary before planting. This could be done with a shovel or excavator depending on the severity.

The wider the buffer is the more effective it is. Buffers are commonly planted in clumping patters with 12-16” spacing between plants to allow them to fill in over time. Garden trowels or shovels can be used to transplant new plants into the bank. Plants can be transplanted into the turf grass in some cases to help prevent erosion while the new plants are establishing. These plants should eventually outcompete and shade out the remaining turf grass.

Each new plant that is added will likely need to be staked in with metal landscaping stables to ensure they don’t float away if the pond’s water level fluctuates before they have established new roots.

Establishment

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- First they sleep, then they creep, then they leap
- The aboveground vegetation may go dormant in the winter, but the roots will still be there to stabilize the bank
- Irrigation may be necessary the first few months of after planting
- No fertilizer
- Consider a “no mow zone” sign


Photo credit: Charleston Aquatic Nurseries, Inc.

There is a saying often used for native plants “First the sleep, then they creep, then they leap” and that also applies to these wetland species. Typically their first year they have a minimal amount of aboveground growth while they are primarily working on establishing roots. The second year, the plant grows but its not yet at its full size. In the third year the plants will “leap” where they will produce more flower and may reach their mature plant size. Native plants are well adapted to local conditions and don’t need fertilizer application. Newly planted buffers may need supplemental watering for the few weeks or months depending on of the time of year they are planted, but after that, they will be established enough to get the water they need from the pond, groundwater, and rainfall.

As new buffers are establishing, it may be beneficial to add a “do not mow” sign to ensure the buffer area is not accidentally mowed down.

No Mow Zone

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- Alternate option to a planted buffer
- Native seedbank will establish
- More natural look
- More affordable
- Might be less desirable to those who like intentional or designed spaces

Another option to establishing a pond buffer is to incorporate a no mow zone around the pond. Rather than purchasing and planting wetland plants, you can allow the native seedbank that is naturally occurring in the soil the chance to grow and establish. This can be a low cost effective way and creating a buffer that will have a natural, diverse look. Whether a tidy planted buffer is preferred, or an affordable no mow zone is chosen, there is a method that can suit different community preferences. A combination of both methods can also be used.

General Maintenance

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- Can be low maintenance
- Remove invasive species
- Remove woody species
- Consider mowing once a year if needed to remove woody plants
- Keep pond inlets and outlets clear
- Perform routine inspections

Buffers are not maintenance free, but they can be low maintenance. When maintaining a stormwater pond buffer, it is important to preform routine inspections. Remove invasive species and woody species as they emerge. These species can dominate the shoreline if they become established and can be less effective at shoreline stabilization. These can be individually remove as needed, or you can incorporate a mowing regime each spring to remove the woody species. As you preform your routine inspections, be sure to maintain access and flow by keeping plants away from the pond's inlets and outlets.

Challenges - Funding

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- Dredging or site prep costs
- Planted buffers can cost around $5-$15 per plant depending on size, supplier, and delivery fees
- Maintenance cost
- Might be an unexpected expense or not budgeted for

While there are many benefits to implementing buffers in new or established ponds, there are also a few challenges that can arise. Funding can be a challenge especially in cases where dredging is required before planting a buffer. Plants can cost anywhere from $5-$15 per plant depending on species, pot size, supplier, and if there are delivery charges. When funding is a challenge, I recommend starting small and adding a section of buffer to the budget each year. The long-term goal may be to one day have a buffer around the entire circumference of a pond, but that may need to happen one section at a time. Incorporating buffers into newly built ponds can also help avoid additional renovation costs in the future.

Challenges - Wildlife

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- Buffer plants that are resistant to waterfowl damage
  - Alligator Flag (*Thalia dealbata)*
  - Golden Canna (*Canna flaccida)*
  - Soft Rush (*Juncus effusus)*
  - Marsh Mallow (*Hibiscus moscheutos)*
  - Swamp Sunflower (*Helianthus angustifolius)*
  - River Oats (*Chasmanthium latifolium)*
  - White-top Sedge (*Dichromena colorata)*
  - Lizard's Tail *(Saururus cernuus)*
  - Native Grasses

Nuisance wildlife at ponds can trample or graze on new buffer plants. The native wetland plants on this slide are known to be resistant to waterfowl damage, meaning geese either prefer not to eat them or they are hardy enough to grow despite geese walking on them. You may also want to consider adding a "Do not feed wildlife" sign to discourage residents from feeding wildlife.

Challenges – Public Perception

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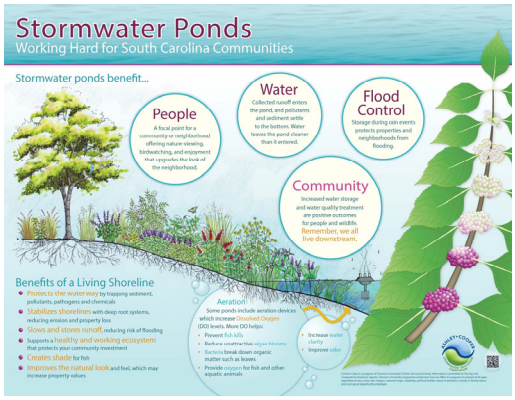
- Educate your neighbors on the benefits of buffers
- Consider a community planting event
- Add educational signage



In some cases, public perception can cause challenges for installing a pond buffer. Educating your neighbors on the benefits of buffers and the type of plants used can help reduce concerns about the appearance of a buffer. You may want to also consider a community planting event to get residents involved and active in the buffer process. Lastly, adding educational signage on buffers can help spread awareness long-term for the buffer and its benefits. Clemson Extension has created the sign shown on this slide, which we can send you in a PDF for you to print and post at your ponds if desired.

Resources

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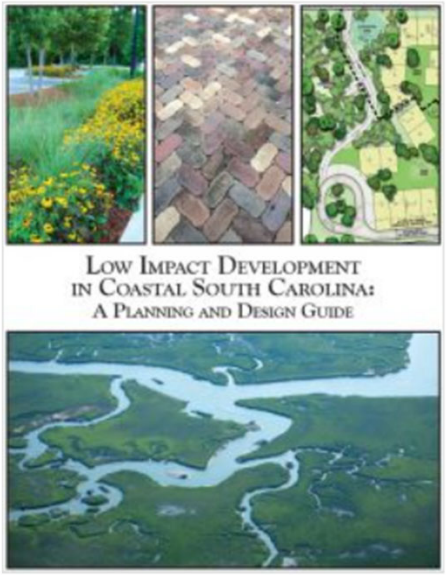

If you'd like to learn more about shoreline buffers and other stormwater best management practices, I recommend downloading a copy of the The SC Low Impact Development manual. You can access this resource for free on the South Carolina Sea Grant website.

Clemson Extension has a variety of pond related resources including our Home and Garden Information Center which is a website that houses research-based articles written by Extension agents and specialist from the University on various topics, including many pond related articles. There are also water resources agents located throughout the state and we're here to help! If you have a pond question or issue, reach out to your local water resources agent for assistance.

ASHLEY COOPER
STORMWATER EDUCATION CONSORTIUM

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QUESTIONS?

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