

Community and Commercial Stormwater Ponds

Challenges and Best Management Practices

Habitat and Vegetation Management

A secondary purpose in stormwater pond design is to create habitat for terrestrial and aquatic wildlife, which can add recreation value to a community. In some cases, constructed ponds may interfere with existing buffering wetlands or interrupt the natural hydrology of the landscape. In these cases, it is critical to design the pond system to mimic the natural conditions and maintain a healthy ecosystem. This starts with the vegetation used during the construction process. Various types of vegetation, including shoreline, emergent, open water and floating, can provide benefits to the ecosystem but they can also become a nuisance and reduce pond efficiency if not properly maintained. It's best to have a scheduled maintenance plan for vegetation to balance the habitat and treatment functions of ponds. Additionally, the wildlife associated with ponds should be assessed to address challenges that may arise with the concentration of nutrients and other factors affecting the stability of pond structure. Below is guidance on strategies to combat challenges arising from vegetation and wildlife management.

1. Pay attention to signs of planktonic or filamentous algae, which could indicate a developing algal bloom. This can be mitigated by best management practices in nutrient runoff or increasing aeration in pond systems. Temporary control strategies include chemical treatments by licensed professional or mechanical removal.



Filamentous algae can completely cover pond surfaces and have negative ecosystem impact if not managed correctly.

- 2.** Identify floating plants to determine invasive and nuisance species, which may lead to clogging and water quality impairments. Most floating plants require a targeted control approach based on the location of plants in the water column, ranging from biological control with fish, mechanical or manual harvesting and short-term mitigation with professionally applied commercial herbicides.
- 3.** Manage shoreline plant overgrowth to maintain aesthetics and ensure vegetation survival. Most related upkeep involves removing debris and periodic pruning, which can be done through community cleanup events.
- 4.** Keep woody plants off the levee banks and shorelines to avoid long-term issues with roots. Tree trunks and roots can cause infrastructure and pond bank issues as they grow. It's critical to ensure trees are located in areas specifically designed for them; if not, manual removal is necessary.

5. Limit clusters of geese and waterfowl to maintain a healthy ecosystem balance. These birds will feed on grass and vegetation, which are critical to contaminant removal. In addition, clusters can lead to increased fecal coliform counts and nutrients from excrement. Residents should be discouraged from feeding geese and waterfowl to prevent dense concentrations of birds.
6. Feeding other wildlife, like turtles or deer, around ponds is also discouraged due to potential domestication and concentration of harmful wastes. Runoff into ponds from feeding areas can lead to water quality impairments and should be monitored wherever wildlife congregates.
7. Check for wildlife burrows, which can damage pond structures. Invasive species like nutria can tunnel into levees, compromising structural integrity. These animals can also significantly reduce local vegetation that is critical for pond water treatment. It is common practice to consult local wildlife and fisheries about nuisance wildlife control operators and manually refill holes to discourage burrowing.
8. Pay attention to other invasive species listed on the LSU AgCenter Resource page (www.lsuagcenter.com/topics/environment/invasive%20species). In some cases, species like apple snails or carp can cause ecosystem disruption and downstream impairments. Removal of invasive species is a critical step to ensure long-term pond health.



Apple snails lay clusters of red eggs on plants and debris above water. These eggs can be easy indicators of the invasive species.

9. Shallow, stagnant pools of water should be monitored for mosquito larvae, which can be a factor in community health issues. Mosquitoes reproduce by laying eggs in still pools of water or on mud or fallen leaves and can become a community nuisance. Proper action can include adding aeration to known pooling water areas or calling a mosquito abatement office to request control assistance.
10. Pond aesthetics have been recognized to increase property values for communities and should be maintained through debris removal and landscape upkeep. It is important to continually monitor debris buildup, vegetation growth, weed intrusion, and general landscape aesthetics. By having a committed community or engaged landscape company, pond aesthetics can be quickly and efficiently addressed.

Infrastructures and Mechanical Components

Major components that support pond function, like risers, pipes and culverts, are the most difficult parts to manage. This is due to the varying levels of expertise needed to perform replacement or mitigation tasks. Citizens in the community can actively identify issues, but there should be clear guidance from the community or the homeowners' association on the next steps for assessing and fixing any issues with infrastructure. Routine maintenance and scheduled checks can be impactful in the long-term success of infrastructure components. Some issues may need the assistance of a qualified professional with the experience to inspect, propose construction options and make repairs. Some of the challenges frequently seen with pond infrastructure are outlined below.

1. Clogging can be an easily identified issue in open pond areas, but it can also build within the infrastructure. Many stormwater culverts will transport large debris that can clog inflow pipes. Monitoring water flow, especially after large storm events, can help indicate issues with major clogs in piping. At the outflow pipe, be sure there is plenty of clearance for water to pass with ease. Removal of larger debris should be done frequently to prevent clogging.



Pond infrastructures like culverts are easily clogged from storm flushing events. This issue can be magnified in high residential areas where debris is more present.

2. Bank erosion can lead to infrastructure cracking or separating. As shorelines weaken from mechanical wave action or dying vegetation, the concrete components around pipes can become exposed and vulnerable to damage. Make sure the shore is stabilized with vegetation, and there are no signs of caving or sinkholes around solid structures.

3. Wet spots around the pond or on the outside levee could indicate leaks in pipes coming to the pond. Large machinery or equipment can compact soil and stress pipes, causing cracks. The seeping water will erode the surrounding soil and cause larger issues in the future. If standing water is an issue in spots not typically associated with the pond, report to the proper management team.
4. Access to areas where water is collected can be an issue if vegetation is overgrown. This can lead to missed indicators of larger problems during routine inspection. Ensure the vegetation is being managed properly to maintain easy access to ponds, risers, and piping.
5. Mechanical functions of valves, pumps and aerators can have issues, especially from water flow impediments. Many of these issues can be mitigated with the described management practices above. For instance, invasive floating plants can accumulate in high-concentration nutrient areas, leading to clogged fountains and additional water quality impairments. The same issue can happen to internal infrastructure like valves and gates, during large flushing events from storms, as debris and vegetation are transported.

While there are many benefits from capturing runoff in stormwater ponds, many issues can prevent these ponds from efficiently holding water and removing excess nutrients and contaminants. To maintain a healthy stormwater pond, best management practices such as those outlined above should be implemented. These practices will help prevent challenges that may arise from infrastructure, landscape or water quality failures.

Resources:

Storm Water Permit Resources | Louisiana Department of Environmental Quality (<https://deq.louisiana.gov/page/storm-water-protection>)
Stormwater Wet Pond and Wetland Management Guidebook, February 2009 (www.epa.gov/sites/default/files/2015-11/documents/pondmgmtguide.pdf)

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