



EXTENSION

Aquatic Weeds - Problem Solving Steps

December 2021

**The Oklahoma Cooperative Extension Service
WE ARE OKLAHOMA**

The Cooperative Extension Service is the largest, most successful informal educational organization in the world. It is a nationwide system funded and guided by a partnership of federal, state, and local governments that delivers information to help people help themselves through the land-grant university system.

Extension carries out programs in the broad categories of agriculture, natural resources and environment; family and consumer sciences; 4-H and other youth; and community resource development. Extension staff members live and work among the people they serve to help stimulate and educate Americans to plan ahead and cope with their problems.

Some characteristics of the Cooperative Extension system are:

- The federal, state, and local governments cooperatively share in its financial support and program direction.
- It is administered by the land-grant university as designated by the state legislature through an Extension director.
- Extension programs are nonpolitical, objective, and research-based information.
- It provides practical, problem-oriented education

for people of all ages. It is designated to take the knowledge of the university to those persons who do not or cannot participate in the formal classroom instruction of the university.

- It utilizes research from university, government, and other sources to help people make their own decisions.
- More than a million volunteers help multiply the impact of the Extension professional staff.
- It dispenses no funds to the public.
- It is not a regulatory agency, but it does inform people of regulations and of their options in meeting them.
- Local programs are developed and carried out in full recognition of national problems and goals.
- The Extension staff educates people through personal contacts, meetings, demonstrations, and the mass media.
- Extension has the built-in flexibility to adjust its programs and subject matter to meet new needs. Activities shift from year to year as citizen groups and Extension workers close to the problems advise changes.

Marley Beem

Extension Specialist for Aquaculture

Recognition of excessive plant coverage and early corrective actions are key parts of successfully managing a pond. If a pond owner develops the habit of regularly checking their pond for increasing amounts of plant coverage, it will be much easier to correct problems. Aquatic weed management in ponds and lakes is a nuanced undertaking. Ponds differ biologically and hydrologically. They are also influenced by the surrounding land characteristics and usage. Owners are no less diverse, varying in their resources, abilities, and objectives for their pond.

To best assist pond owners in managing pond plants effectively and to avoid potentially serious adverse impacts, a variety of information needs to be gathered.

Oklahoma Cooperative Extension Fact Sheets are also available on our website at: extension.okstate.edu

Everything is hard before it is easy - Goethe

Topics Investigation Checklist

1. Identity of the problem plant – the essential first step
 - Provide the best plant image possible. Usually this is a good close-up photo of one or two plants, taken from the pond and laid against a light-colored background. Show as many characteristics as practical (leaf shape and arrangement, stem, roots, flowers, “buds” or any similar features). Take the photo from about 12 inches away.
2. Estimate of the percentage of the pond covered or filled by the problem plant
3. History of the problem
 - Was it a problem last year?
 - Previous efforts to manage plants and results?
 - How many years does your knowledge of the pond cover?
4. Description of the pond
 - Photos of the pond and surrounding watershed
 - Size
 - Watershed - Animal manure or chemical fertilizer runoff? Heavy leaf fall? Livestock usage?
 - Age
 - Depth – Percentage that is less than 3.5 feet?
 - Black smelly organic layer on pond bottom?
 - Are other aquatic plants present in the pond? Described the abundance level.
 - If there are no other pond plants, is the reason known? Have they been repeatedly treated with herbicides?
5. Uses of the pond
 - Livestock...what kind(s)?
 - Fishing
 - Swimming
 - Irrigation
 - Household use
6. Pondowner ranking of objectives for the pond
 - Livestock
 - Fishing
 - Swimming
 - Irrigation
 - Household use
 - Attractive appearance – If important, describe the desired appearance. Is some plant coverage acceptable?
7. Off-target risks:
 - If there is overflow of herbicide-treated water, what will be impacted? Other ponds, creeks, or aquatic areas?
 - Is there a groundwater connection/potential to contaminate an aquifer? Does pond have an active spring and fill from the bottom up? Depth to groundwater?
8. Pond owner capabilities and preferences
 - Able to do herbicide application?
 - i. Physical ability
 - ii. Application equipment available – boat, sprayer, granule spreader
 - iii. Ability to calculate application rate and calibrate application equipment
 - Is the cost of the herbicide affordable?
 - Attitude toward herbicides ([Are Herbicides Safe to Use in My Pond?](#))

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Issued in furtherance of Cooperative Extension work, acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, Director of Oklahoma Cooperative Extension Service, Oklahoma State University, Stillwater, Oklahoma. This publication is printed and issued by Oklahoma State University as authorized by the Vice President for Agricultural Programs and has been prepared and distributed at a cost of 40 cents per copy. 12/2021 HE.

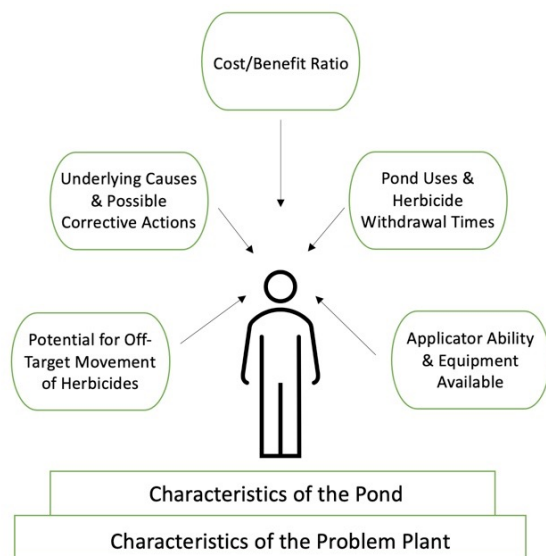


Figure 1. The Extension Educator or other pond management professional must first be knowledgeable of relevant plant and pond characteristics and then consider five other factors to best diagnose the problem and arrive at a set of appropriate and effective management recommendations.

Additional Considerations

- **Reassessment is needed following any herbicide application or other management action.** Plant management is an ongoing process, not a one-shot deal. Typically, herbicide applications provide short to medium-term effects but the problem will return unless underlying conditions are corrected or the pond owner does follow-up herbicide treatments whenever plant growth is in the early stages of overabundance.
- **The applicator is responsible for any adverse consequences associated with the herbicide application.** It is good to ensure pond owners understand this before they do an application. They should be encouraged to read [Aquatic Herbicides: Essential Information for New Applicators](#).
- **Overuse of herbicides and suppression of all pond plant growth typically leads to problems:**
 - If fishing is an objective, dropping below 20% plant coverage of the pond will deny smaller fish the cover needed to protect them against over-predation by large bass and reduce the production of insects that small fish must have as food.
 - Plants also protect shorelines against wave erosion, help prevent the muddiness that comes from excessive disturbance of bottom sediment, and work to inhibit excessive growth of algae.

Why are the checklist topics important?

1. Identity of the problem plant
 - If herbicides will be used, they must be selected based on effectiveness against the target plant.

See Table 1 in [Aquatic Weed Management: Herbicides](#).

- Some plants have characteristics which may make certain management techniques undesirable. For example, certain plants can reproduce from fragments, so mechanical removal can spread the problem plant rather than control it.
2. Percentage of the pond covered or filled by problem plant
 - It is the pond owner's prerogative to eliminate all higher plants if they wish, but they need to understand the possible downsides:
 - From a fishing point of view, between 20 and 30% coverage by aquatic plants is considered optimal for producing insects that are an essential fish food and for providing protective cover for smaller fish to hide from big bass.
 - Pond plants also provide shorelines with protection from wave erosion and help prevent stirring of the bottom that will produce muddiness.
 - The lack of higher pond plants (having features e.g. leaves, flowers) often allows algae to grow in excessive amounts.
 - Never allow a plant to completely blanket the pond and prevent sunlight from penetrating into the water column – this will prevent submerged higher plants and algae from producing oxygen, leading to a fish kill.
 3. History of the problem
 - Most weed issues develop over multiple years. Often there are changes in pond management or watershed use practices that need to be taken into account (e.g. past herbicide use or bare, eroding areas in the pond's watershed).
 4. Description of the pond
 - Photos of the pond and watershed are advisable in cases where an on-site visit is not possible or you are consulting with others who cannot visit the site.
 - Size – Weedy areas often exceed the limits of what many pond owners can or wish to tackle on their own. Commercial applicators may be an option. A list is maintained by the Oklahoma Department of Agriculture. It is available by going to <http://www.kellysolutions.com/OK/applicators/index.asp>, then "Search for Certified Applicators by Category", then "Aquatic Pest Control".
 - Watershed factors – Although we are primarily concerned about nutrient and sediment sources, many other activities in the drainage area may also pose a threat.
 - Age – Ponds go through an aging process in which organic matter and sediment accumulates. This can reduce pond depth pushing the pond toward excess growth of plants. Expensive removal of sediment may be needed.
 - Depth – Develop a "picture" of the parts of the pond basin that are shallow. This will often correspond with the areas filled by plants. Deepening can be considered, perhaps during a drought period. Consult with the [Natural Resource Conservation Service](#) about on-site soil characteristics and the risk of breaking the pond's "seal".
 - Organic matter buildup on pond bottom – Check to see if there is a thick, black layer on the pond bottom by wading or using a can nailed to the end of a pole. In many cases such buildups of organic matter will release phosphorous, fueling the excess growth of pond plants.
 5. Uses of the pond
 - Many herbicides specify a withdrawal period during which fishing, swimming, livestock watering etc. must be suspended. In many cases a pond owner may not be willing or able

to suspend that use. See Table 2 in [Aquatic Weed Management: Herbicides](#) for an overview, but the herbicide label provides definitive guidance.

- Household use is uncommon but some homeowners do use pond water for domestic purposes.
6. Objectives of the pond owner
 - Understanding the owner's desires is of fundamental importance before making any management recommendations.
 - Different objectives may conflict, so it is important to know which are of greater importance. For example, if fishing is the most important objective and livestock watering a distant second, then having a large herd of cattle with unrestricted wading access is not advisable.
 7. Off-Target Risks
 - When doing spray applications adjust nozzles to produce coarse droplets and avoid windy days in order to prevent tiny droplets that are easily carried by the wind.
 - Be especially cautious with ester formulations of 2,4-D. They can vaporize and the vapor can be transported for miles by a breeze – see the product label for temperature and other guidelines.
 - Ponds overflow – Know what is at risk below the pond. Major red flags include public drinking water supply lakes and sensitive aquatic resources such as other ponds, creeks, lakes, and wetlands. Do not apply herbicides when heavy rains are forecast or when the pond is full.
 - A few ponds have direct connections to groundwater aquifers (e.g. river bottom ponds, gravel pit ponds). Do not use herbicides in ponds that fill from the bottom up.
 8. Pondowner capabilities and preferences
 - Ability – Herbicide applications are usually strenuous and may require access to a boat or special application equipment. Doing a safe and effective application requires calculating application rates, calibrating the application equipment, awareness of adverse weather factors like wind and temperature, and use of [basic personal protective gear](#).
 - Cost – Few herbicides are inexpensive. Pond owners need to understand that the effectiveness of an application is usually for only one growing season. In addition, cost must be weighed against effectiveness for the target plant.
 - Preferences – Pond owners vary in their acceptance of herbicides, despite their being approved for use under state and federal regulations. Mechanical measures and biological controls (e.g. [sterile grass carp](#)) are sometimes appropriate but only if the benefits outweigh the disadvantages. Grass carp often have negative impacts when and if they eliminate submerged plants. Grass carp are not effective at controlling some nuisance plant species.