

Pond Uses, Site Selection, Design, Construction, and Maintenance



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Land Owner's Pond Handbook

A pond can be both an aesthetically pleasing and very useful addition to your property. It can provide enjoyment for your family and friends, water for your livestock or crops and fire protection for your home. In addition a pond is a valuable part of wildlife habitat, providing a place for animals to breed, bathe, feed and live. This booklet will discuss the various uses for a pond, information on selecting a pond site, aspects of pond design and construction as well as information regarding pond maintenance. At the end of this booklet you will also find a glossary of terms and a listing of phone numbers you may need as you go through the different steps of planning, building and maintaining your pond.



Good luck, the environment will thank you!

Uses for a Pond

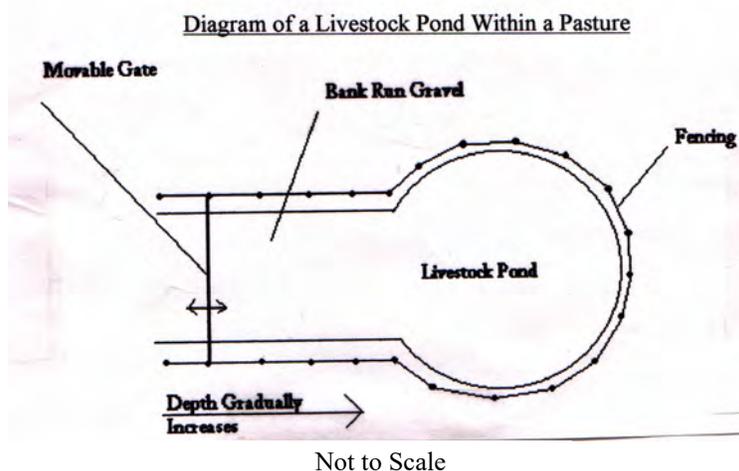
The purposes for which you plan to use your pond will influence its location, design and size. The following are common uses for ponds.

Recreation

There are many recreational uses for a pond that can be enjoyed by Monroe County residents, including wildlife observation, boating, fishing, swimming and skating. If a pond is to be used for swimming, a gently sloping beach and shore is a necessity. The swimming area should be clearly marked and free of debris. If the pond is intended for public use it is especially important to have vehicle access roads near by in the case of an emergency and sanitary facilities should also be available. Be sure to contact the Monroe County Department of Health regarding public health issues for a public recreational pond. (See Appendix A for phone numbers)

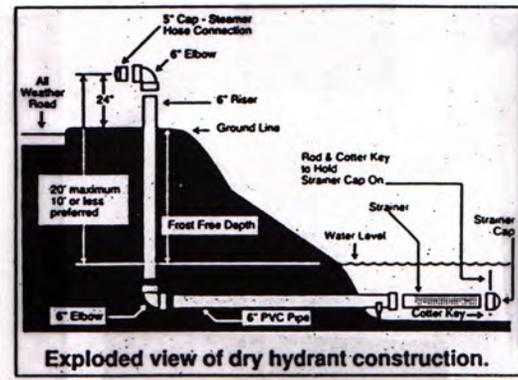
Livestock

A pond can be a long term and efficient solution to watering your livestock. The quantity and location of livestock ponds are important aspects to be addressed. Watering areas should be distributed so that livestock travel no more than $\frac{1}{4}$ mile over rough terrain or 1 mile over even terrain to reach water. This not only ensures the safety of your livestock, but reduces weight loss and lack of milk production for dairy cows. In addition, it promotes uniform grazing, which improves the condition of your pasture and prevents excess erosion. If located inside the pasture, the pond should be fenced in with a watering ramp or trough. This prevents livestock from trampling the shore and polluting the water with manure and sediment. The gate can be moved closer to or away from the pond depending upon the water level. This allows you to control how far into the pond area your livestock can travel.



Fire Protection

If your buildings are out of reach of existing fire hydrants, a pond can be a valuable safety feature for your land. Accessibility to fire trucks and emergency vehicles is very important in selecting location. The installation of a dry hydrant will allow the fire department to make use of the water in your pond at all times and seasons. It is important that the dry hydrant you install be compatible with your fire department's equipment. It is recommended that you call your local town hall. The fire marshal will be able to work with you and your local fire department on the proper specifications for your fire protection pond. (See Appendix B for phone numbers)



Irrigation

If the intended use of your pond is crop irrigation, location and capacity are very important. Economically speaking, the pond should be accessible to your fields so as to avoid the need to move water over long distances. However, field runoff containing fertilizers and pesticides must be diverted from the pond. When deciding on the size of the pond, you must consider the needs of the crops you will be irrigating. Your local Cornell Cooperative Extension has information regarding specific crops and their needs. (See Appendix A for phone numbers)

The water needs of crops will be greatly affected by the major climactic factors involved.

Climactic Factor	Crop Water Need	
	High	Low
Sunshine	Sunny (no clouds)	Cloudy (no sun)
Temperature	Hot	Cool
Humidity	Low (dry)	High (humid)
Wind Speed	Windy	Little Wind

In calculating the average water requirements for crops, it is useful to take a “reference crop” and determine how much water it needs per day. In the following table, a standard grass crop has been chosen.

Climactic Zone	Mean Daily Temperature		
	Low	Medium	High
	Below 60°F	60-77°F	Above 77°
Desert/arid	4-6 mm	7-8 mm	9-10 mm
Semi arid	4-5 mm	6-7 mm	8-9 mm
Sub-humid	3-4 mm	5-6 mm	7-8 mm
Humid	1-2 mm	3-4 mm	5-6 mm

For example, the standard grass crop grown in a semi – arid climate with an average temperature of 65° needs approximately 6.5 mm of water a day. Using the chart below, you can determine the amount of water these crops need in relation to grass. For example, in the same area, barley will need 10% more water than grass. 10% of 6.5 is 0.65 mm. Therefore, barley would need $6.5 + 0.65 = 7.15$ or 0.28 inches of water a day. (inches = mm x 0.03937)

30 % less than grass	10% less than grass	Same Requirements as Standard Grass	10% more than grass	20% more than grass
Citrus	Cucumbers	Carrots	Barley	Paddy Rice
Olives	Radishes	Crucifers(cabbage, broccoli, etc)	Beans	Sugar Cane
Grapes	Squash	Lettuce	Maize	Banana
		Melons	Flax	Nuts & Fruit Trees
		Onions	Small Grains	
		Peanuts	Tomato	
		Peppers	Eggplant	
		Spinach	Lentils	
		Tea	Millet	
		Grass	Oats	
		Cacao	Peas	
		Coffee	Potato	
		Clean cultivated nuts and fruit	Safflower	
			Sorghum	
			Soybeans	
			Sunflower	
			Wheat	

Fish Production

A fish pond can be both recreational and profitable. The size and depth of your pond will be determined by the type and quantity of fish you wish to stock it with. It is important to enhance the habitat of your pond to provide a healthy environment for your fish. Piles of stone, large rocks and anchored logs provide hiding places for predator fish. Anchored brush piles give minnows appropriate habitat until aquatic vegetation can grow. Shallow areas should be available for spawning. Each type of fish or aquatic invertebrate has its own requirements. See our fish pond packet for additional information. (See Appendix C for a contact list of local hatcheries)



Wildlife Habitat

Ponds can create an invaluable habitat for wildlife. They provide resting places for migratory waterfowl, breeding places for ducks and watering holes for all types of wildlife. In addition they enhance water quality and landscape diversity. It is important to provide an environment that is attractive to the wildlife it is intended for. Large amounts of vegetation including tall grasses and other plants should surround the pond. The pond should have both shallow and deep areas and be in a somewhat quiet and secluded location.

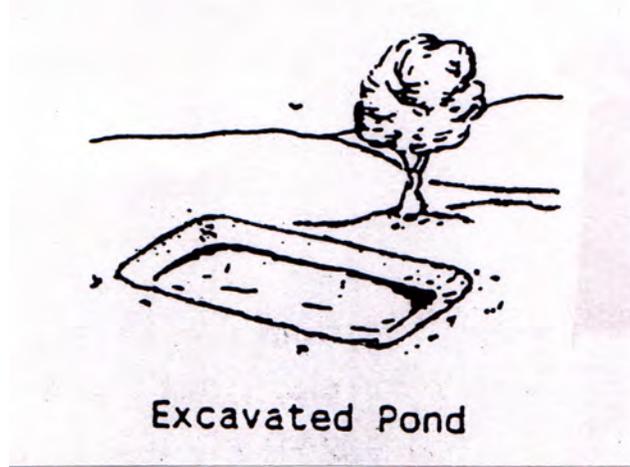
Stormwater Management

Often bare soil areas on construction sites can create excess stormwater runoff.. Unless managed, this stormwater can dump sediment and pollutants into receiving streams. A stormwater pond can be an effective way to carry out sediment control and protect water quality. Stormwater can be diverted into a pond where it sits for a minimum of 24 hours. During this time aquatic plants take up nutrients and sediment settles out of the water before it drains into our water resources.

Major Types of Ponds

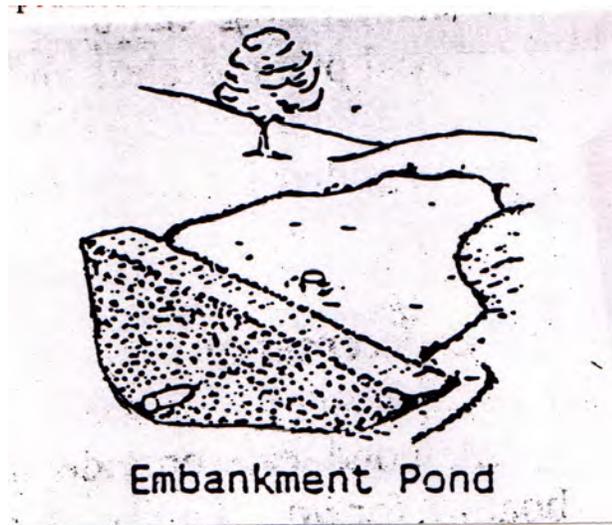
Excavated Pond

An excavated pond is often built on level terrain and its depth is achieved solely by excavation. An excavated pond is relatively safe from flood damage, is low maintenance and can be built to expose a minimum water surface area in relation to volume. This is beneficial in areas of high evaporation losses and a limited amount of water supply. Your budget may limit the size of this type of pond due to the cost of excavation and soil removal.



Embankment Pond

This type of pond is built by creating an embankment or dam used to impound water and is usually constructed in a valley or on gently sloping land. It is not recommended to build an embankment pond on greater than a 4% slope. Less excavation may be needed to build this type of pond. However, there are New York State regulations that must be followed regarding the amount of water that can be impounded behind a dam. This will be discussed below.



Things to Consider Before You Build a Pond

Regulations on the land and/or permits that are required

Depending upon size, intended use, capacity of water impounded and location of your pond, there may be regulations that must be considered. State and federal agencies and sometimes towns often require permits for different aspects of pond construction. Listed below are some permits required by the New York State Department of Environmental Conservation. Copies can be found at the back of this handbook or on the NYSDEC web-site, www.dec.state.ny.us. These are only a few of the most common permits required. Contact the NYSDEC Region 8 office or visit their web-site for additional information and the application process. (See Appendix A for NYSDEC phone numbers)

A **Protection of Waters Permit** is needed for the following activities:

- **Disturbance of the bed or banks of a protected stream or watercourse.** Check with the NYSDEC for the classification of any stream you may disturb. The banks of a protected stream extend fifty feet from the shoreline if the slope of the shore is less than 45 degrees, or to the crest of a slope if the slope is 45 degrees or greater.
- **Construction, reconstruction or repair of dams and other impounding structures.** A permit is required if a dam is between 6 feet and 15 feet in height and impounds greater than 3 million gallons of water or if the dam is greater than 15 feet and impounds greater than 1 million gallons of water. The height of a dam is measured from the downstream outside toe of the dam at its lowest point to the highest point at the top of the dam. Maximum impounding capacity is measured as the volume of water impounded when the water level is at the top of the dam.

***Exception to Dam Rules:** If the dam is less than 6 feet high, constructed with settled fill, the NYSDEC does not require a permit for construction.

A **Freshwater Wetlands Permit** is required if you plan to disturb land within 100 feet of a NYSDEC regulated wetland. Contact the NYSDEC Region 8 office to find out if you are within this type of regulated area.

An **Aquatic Pest Control Permit** is required if you wish to apply pesticides to New York State waters greater than 1 acre or with an outlet to surface waters.

A **Farm Fish Pond Permit** is required for a body of water impounded by a dam with a surface area, when full, of 10 acres or less. This permit entitles the owner to manage the pond for the production of fish.

A **Stocking Permit** is required to place fish or fish eggs in any New York State waters.

A **Triploid Grass Carp Permit** is required to import, export, own or possess, acquire or dispose of live Grass Carp or hybrid Grass Carp within New York State or to place them in New York State waters.

A **Mined Land Reclamation Permit** is required for excavating or moving off-site 1000 tons or more of soil and minerals.

The U.S. Army Corps of Engineers also regulates navigable waters, wetlands and other water bodies. There is a joint application form available through the NYSDEC. With this form, all application materials will be forwarded to the Army Corps and you will be contacted if necessary.

In addition, it is recommended that you call your town hall for any local regulations that may concern your project and Dig Safely New York to be sure there are no pipelines or cables buried across your site. (See Appendix A and B for phone numbers)

These departments and agencies often require 60 days or more to process applications. Though they do attempt to do so in a timely manner, unforeseen circumstances can cause applications to be delayed. To ensure that your project can begin on time, be sure to send in applications early and allow ample time for them to be processed.

Excess Soil

Much of the soil excavated from your pond site may be used to build the dam, fill low lying areas nearby and to replace topsoil on disturbed areas. Soil may be left over and can be expensive to move. Consider selling the topsoil, it is a valuable commodity. Many contractors and land owners may be interested in purchasing it and transporting away from your site. Contact your town hall and the NYSDEC to be sure there are no ordinances regarding moving the soil offsite first. (See Appendix A and B for phone numbers) Or you may want to use the topsoil to build something additional on your land. Small mounds or hills can be constructed and then seeded and planted with vegetation. This may create an aesthetically pleasing landscape in addition to wildlife habitat.

Costs

A pond can be an expensive, but worthwhile endeavor. Many factors can influence the cost of your pond. Be prepared for unforeseen circumstances that may arise and produce additional costs. (i.e. a large storm that requires the contractor to drain the pond before continuing) One way to prevent some hazards is to dig test pits before starting construction. Test pits are an important preliminary step to pond design and are discussed further in “Site Selection”.

Site Selection

There are many factors to be considered when selecting the location of your pond.

Think Economically

Choose an area where a limited amount of excavation will be required to contain, or hold back, a large volume of water. A valley where a dam can be constructed at a narrow pass is a good example. Think about where you will get the water to fill your pond. There are four general water sources to consider.

- **Overland Drainage:** This is surface runoff from precipitation, melting snow or a spring flowing overland. Drainage area and annual precipitation rates will determine if the water supply will be adequate. In Monroe County it is recommended that when building a pond you have a minimum of 20 acres of watershed to 1 acre of water.
- **Ground Water:** Ponds which acquire water mostly from ground water are often called water table ponds. They are built by excavating below the water table at the location. The level of the water will be equal to that of the water table at any given time. In some cases an underground spring may be present. Springs flow year round regardless of season.
- **Impounding Flowing Waters:** This can be a plentiful water source for a pond. However, impounding flowing water can have adverse effects. It can block fish passage, warm the water downstream, add excess nutrients to your pond and cause sediment from upstream to fill in your pond. The latter will require occasional removal. Heavy flows can also be difficult to contain. Often federal, state and local permits are required. Generally, more problems are encountered with this type of pond and are not recommended to be built in this way.
- **Other Sources:** If water cannot be obtained from the preceding natural sources, other options are available. Diversion ditches can be constructed to catch water from overland drainage that may bypass the pond. Roof runoff can be collected and sent to the pond or a sump pump drain can be directed to the pond. If your house and out buildings are nearby, place a snow fence or plant a living fence up wind of your pond. This will reduce evaporation in the summer and intercept snow in the winter to fill the pond. Winter snow will recharge the pond when it melts in the spring.

Remember Your Intended Uses

Moving water is expensive, if the pond is to be used for irrigation or fire protection, it should be located in a place that is accessible to the fields and buildings you have in mind. Livestock ponds should be evenly distributed throughout a pasture and animals should not have to travel farther than $\frac{1}{4}$ mile over rough terrain or 1 mile over even terrain. A pond used for recreation must be accessible to emergency vehicles. If it is for public use, there should be surrounding space for other public facilities and a gently sloping shore if swimming will occur. If a pond is being built to provide wildlife habitat, a quiet secluded area is best.

Pollution

Pollution of the water in your pond should be an important consideration when selecting a site. Pollution can come from many sources, including crop land and lawn runoff, livestock farm drainage, road drainage, septic systems and waterfowl waste. If possible, eliminate these sources of pollution. Do not over apply fertilizer, use erosion control practices and properly design and maintain you septic system. If unavoidable, divert the drainage from you pond. Construct diversion ditches or other stormwater management systems to deal with the runoff. If possible, never construct your pond less than 150 feet from a septic system.

What Will Your Neighbors Think?

Be aware of how your pond will affect neighboring property. Do not back up water or release overflow water onto adjacent property unless it is into an existing drainage ditch. In the case that your dam fails, look to see what would be in the path of the rushing water, assess how severe the effects would be and consider your liabilities. Certain regulations must be met if the NYSDEC issues a dam permit. If these regulations are not followed, construction on the dam may be not be allowed to continue.

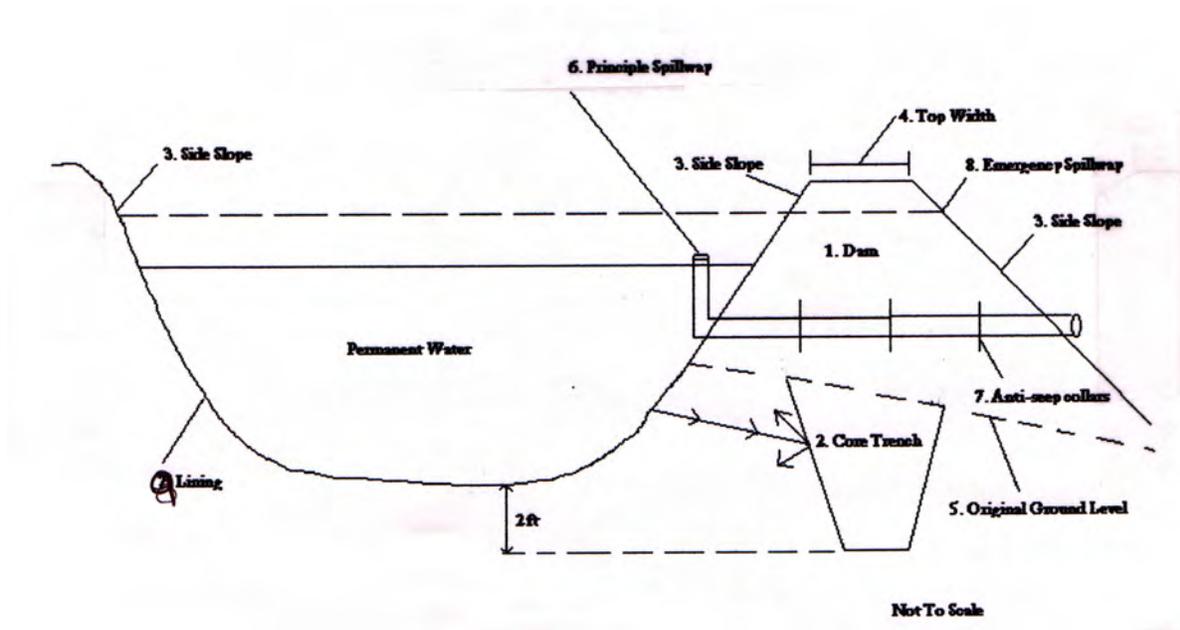
Soil Test Pits

Test pits are holes dug in the earth at various points in the proposed pond location. It is very important that a number of test pits are dug, and that they are inspected by someone who is familiar with soils. They are excavated to a depth two feet below the planned depth of your pond and are used to determine the feasibility of your site for a pond. This allows you to detect any potentially problematic areas such as bedrock, or gravel and sand seams which may cause you to lose water from your pond. It also allows you to calculate how much good material will be available to build your dam and other structures. This is a very important step, which can help to save money later on. It can cost much more to deal with hazards that could have been avoided

Design and Construction

The information in this section is not a construction design. It is intended to increase your knowledge of the basic components of a common pond. Each component of a well constructed pond has a specific function and if omitted, could lead to pond failure. Refer to the numbered descriptions of each portion of the following diagram.

Pond Structures



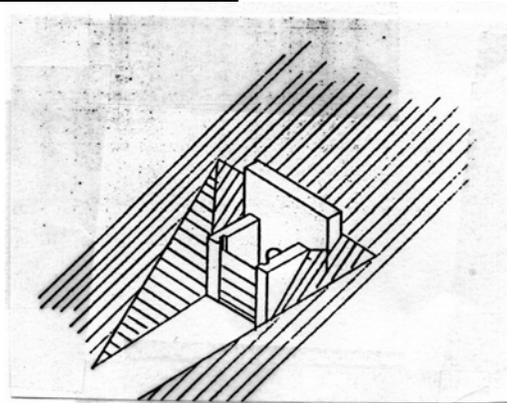
1. The dam is an earth embankment designed to impound water. It must be constructed of material that has a high clay and silt content and is well compacted. As the dam is built, the material should be added in no more than 6 inch layers and compacted. Good dam construction is essential.
2. The core trench is another essential element of a pond. It is constructed by digging a trench the length of the dam. The trench should be dug beneath the dam to a depth of 2 feet below your proposed pond bottom elevation. The core trench should be filled in with the same material that the dam is built with and compacted in the same manner. Poor core trench construction, or the lack of one all together, is one of the major reasons a pond will leak and go dry in the summer.
3. The side slopes are described by using a ratio of horizontal to vertical distance along the slope. For Example, a slope of 2:1 is 2 feet horizontal to every 1 foot vertical. The slope of the side of the dam facing the water should be 2:1. The slope of the backside of the dam should be a minimum of 3:1 for stability. If you plan to mow it, the backside should be at least 6:1. The slopes are constructed as the dam goes up. The grade of the side slopes elsewhere around your pond will determine the type and amount of vegetation that will grow. Slopes flatter than 2:1 inside the pond will have more aquatic vegetation growth.
4. The top width of the dam should be a minimum of 10 feet wide. It should be seeded and a good vegetative cover should be maintained. The following is a good mix for erosion control and wildlife habitat: 2 lbs./acre White Clover, 10 lbs./acre Perennial Rye Grass, 20 lbs./acre Creeping Red Fescue, 2 lbs./acre Redtop and 8 lbs./acre Empire Bird's Foot Trefoil. This cover should be mowed about once a year to prevent the growth of woody shrubs. The root systems of shrubs and trees

can weaken your dam in addition to creating paths for water to seep out. Be sure to mow between August 1st and August 30th. Most ground-nesting birds are off their nests by the 1st and the grasses will have ample time to recover before winter so that you have a good crop in the spring. If you wish to deter geese and ducks from invading your pond, do not keep the grasses around your pond closely manicured. These birds do not like tall grasses where they cannot see stalking predators.

5. Original ground level
6. The level of the principle spillway is that of the proposed water level. It should be able to handle most of the runoff from you pond. There are many different types of principle spillways, the one in the diagram is one type of drop inlet pipe spillway. A professional designer or contractor will be able to help you determine what type of spillway is appropriate for your pond.
7. Anti-seep collars are flat plates attached to the pipe inside the dam. They prevent water from seeping along the outside of the pipe if your soils are not compacted properly around the pipe.
8. The emergency spillway is usually constructed of sod and built to the side of your dam in native soil. It is there to handle excess flows as the result of a storm or spring thaw. It will prevent water from rushing over the embankment and destroying your dam. The emergency spillway should be well seeded and maintained.
9. If the soils around your pond are not of the type that will adequately hold water, it is recommended to line your pond with at least a 12 inch layer of soil with a high clay content. This is called lining your pond, which helps to prevent water from seeping out the sides and bottom of the pond.

Concrete Box Spillway

This is an example of another type of spillway. The concrete box spillway allows you to raise and lower the water level with boards.



Pond Maintenance

Vegetation

Algae and aquatic plants are an integral part of the ecosystem of your pond. They consume carbon dioxide, oxygenate the water, provide food for small aquatic organisms and create hiding places for fish. The aquatic organisms are in turn eaten by predators such as larger fish, which then provide food for waterfowl and other animals. Aquatic plants also clarify the water by taking up nutrients, cool the water by creating shade and provide shelter and breeding sites for fish and waterfowl.

Though some aquatic vegetation is necessary, excessive amounts can become a nuisance. They can interfere with the uses of your pond in addition to being detrimental to the ecosystem within it. The first step in controlling aquatic plants is to identify them. Many control methods target groups of plants with similar growth habits. The following are five broad classifications of aquatic plants. "Pond Life" published by Golden Books is a great guide to aquatic life.

Phytoplankton: These are single-celled algae that float within the water. Individually they can not be seen by the naked eye. However, if large numbers are present in your pond, the water may appear a translucent green, brown or red depending on the species present.

Submersed Plants: These plants are rooted in the sediment at the bottom of the pond and have their leaves and stems completely submerged. The stems of these plants are thin and flexible, allowing them to rise and fall with the water level. They easily absorb nutrients and include such species as eelgrass, curly-leafed pondweed and Eurasian milfoil.

Rooted Floating Leaf Plants: Like the submersed plants, these are also rooted in the sediment and have flexible stems. They however, have large, flat leaves that float on the surface and include such plants as water lilies.

Emergent Plants: These are also rooted in the sediment, but have rigid leaves and stems allowing them to project above the surface of the water regardless of the water level. These include species such as the common cattail and bur-reed.

True Floating Plants: This type of aquatic plant floats on the surface of the water and is not rooted in the sediment. The roots are suspended in the water and float freely about the pond. Examples of such plants are duckweed, water chestnut, planktonic and filamentous algae.

The following contains information regarding methods of aquatic vegetation control.

Physical Removal: This includes removal by hand with a rake or hoe, which allows selection of specific plants to be removed. The roots are usually removed which provides a somewhat permanent effect. Machine harvesting is another method of physical removal. It is more convenient for larger beds of aquatic plants. However, harvesters are expensive and the use of them results in a large amount of weeds to dispose of. The technique does not remove roots and creates many plant fragments. Fragments of some species can reestablish themselves. Eurasian milfoil is one example. Mowing can be done along shorelines to deter the continued growth of invasive emergent plants such as cattails and giant reed grass. They must be mowed frequently to prevent the above ground portion of the plant from photosynthesizing. Eventually, energy reserves will be depleted and the plants will die. Large mowing equipment is needed and mowing can be difficult in higher waters. Dredging is the most permanent physical method due to the fact that it removes the entire plant. It requires a backhoe for emergent species along the shoreline or suction dredges for submersed plants. It can be quite an expensive method and often requires skilled operators to run the equipment.

Nutrient Input Control: An excessive quantity of nutrients present in a pond can promote aquatic plant growth to extreme levels. Good indicators of the presence of excess nutrients in your pond are algae blooms. These nutrients can come from streams, surface water and ground water. To manage nutrient input, reduce the amount of lawn fertilizers used. Be sure any agricultural land within your watershed is properly managed in respect to its fertilizer use and erosion control practices. If a stream is involved consider digging a small catch pool upstream to trap sediment or introduce streamside plantings to act as buffers reducing the amount of nutrients entering your pond. This type of control requires involvement by surrounding land-owners that may have no concern for your pond. In addition, it does not address the presence of nutrients which have already accumulated in the sediment of your pond. Remember also that, if your pond is in a wooded area, the surface runoff from these woods will be carrying lots of nutrients from the rotting leaf and other organic matter.

Bottom Barriers: This method entails lining problem areas with plastic fabric, dark burlap or geotextiles in early summer. This prevents light from reaching the soil and inhibits plant growth. It is effective for small areas but the cloth can be hard to handle. Gas released from the sediment can create pockets under the cloth and cause it to float to the surface. Punch small holes every 2 feet to release the gas. The fabric tends to slide down steeper banks and can become covered with sediment resulting in plant growth.

Winter Draw Down: With this method, the water level must be lowered consistently to expose the shoreline each winter. Seeds, rhizomes and other reproductive material of many species will be destroyed along with any leeches that are present. This method does not work for floating species. This technique will work for the following plants: alligator weed, hydrilla, cutgrass, bushy pond grass, smart weed, leafy pond weed, and soft stem bulrush.

Barley Straw: It has been shown that the growth of new phytoplankton and filamentous algae will be reduced by the presence of barley straw, but it will not affect existing algae. The straw should be placed loosely in net bags and floated on the surface of your pond. This should be done early in the spring. The amount of barley straw to be used depends on the density of algae to be controlled. Refer to the Barley Straw application guide for more information.

Biological Control: The introduction of Grass Carp can be an effective method of weed control in your pond. The species used, Triploid Grass Carp, are sterile, non-predatory fish that feed exclusively on aquatic vegetation. Fish should be stocked at 5 to 10 fish per acre and require restocking approximately every 5 years. Grass Carp are selective in their eating habits, preferring tender plant species to those with more rigid stems. They also convert plant material to fish excrements, thus releasing large quantities of nutrients into the water. This may result in Algae growth. **You must get a permit from the NYSDEC before purchasing and stocking Triploid Grass Carp.** Also, Goldfish, Koi and Golden Shiners consume filamentous algae. These fish, however, do not require a permit. Once proper permits are obtained Triploid Grass Carp and other fish can be purchased through the Monroe County Soil and Water Conservation District and local hatcheries. (See Appendix C for phone numbers)

Insects can also be used as a method of control for species such as Eurasian milfoil. Accurate identification of the plants to be destroyed is necessary, as insects tend to be host specific. The destruction of the plant varies with the density of the insect populations, a variable over which you have little control. In addition costs can be quite high with this method.

Chemical Control: Powder dyes, such as “Aqua shadow” can be used to prevent the penetration of certain wavelengths of light preferred by the plants you wish to dispose of. They are usually inert, vegetable-based dyes and are fairly inexpensive. Herbicides can also be used. Many different types are available commercially but most are based on seven specific chemicals. They are species specific and convenient to use. Most require time between chemical application and use of water for swimming or fishing. They may cause rapid decomposition of plant material resulting in release of excess nutrients into the water and a decrease in oxygen, which may result in a fish kill. Algae blooms may also appear. Both powder dyes and herbicides are ineffective in water that is constantly being flushed with runoff out of the pond. Herbicides require a NYSDEC permit for their purchase and use in ponds. Call the Cornell Cooperative Extension or visit their website for an updated list of chemicals appropriate for use in your pond. (See Appendix A for phone numbers)

Erosion Control

Exposed surfaces of the dam, spillways and any other disturbed areas should be protected by planting a good grass cover. The same mix suggested earlier for the top and sides of your dam is also appropriate for other areas around your pond. Protection from wave action can be achieved by installing booms to absorb the majority of the force of the waves. These are a single or double line of logs floating approximately six feet upstream of the dam. Riprap can also be used for this purpose. Riprap is a loose assembly of rocks used to line the shore of the pond and protect it from wave action. The rocks should be large enough not to be moved under the force of the waves. The riprap should extend from approximately two feet above your pond's water level to at least two feet below the lowest expected water level.

Inspect Your Dam

Fill in any holes in your dam with compacted material and re-seed the area. Be sure to keep the spillway clear of any debris. Watch for animals burrowing into the dam. Poultry wire fence can be layered flat on the slope of the pond above and below the proposed waterline to discourage burrowing animals such as muskrats. When the slope is seeded the grass will grow through the fence and it will not be seen, but the fence will be protecting your slopes.

Glossary of Terms

Auxiliary (Emergency) Spillway: The spillway designed to convey excess water around a dam. Installed in native undisturbed soils.

Conduit (pipe): Any channel intended for the conveyance of water.

Core Trench: The trench in the foundation material beneath an earth embankment or dam in which special material is placed to reduce seepage.

Dam: A constructed barrier, together with associated spillways, across a natural water course or drainage area which permanently impounds and stores water, traps sediment and/or controls flood water.

Earthfill: Soil, sand, gravel or rock construction materials used to build a dam and its components.

Foundation: The surface upon which a dam is constructed.

Freeboard: The difference in elevation between the minimum settled elevation of the top of the dam and the highest elevation of expected depth of flow through the auxiliary spillway.

Principle Spillway: The primary spillway designed to convey normal, lowflows from the pond.

Riprap: A loose assemblage of broken limestone commonly placed on filter cloth on the earth surface to protect it from the erosive forces of moving water or wave action. Usually designed and sized for the severity of the erosive forces of water.

Sealing: The process used to close openings in soil materials and prevent seepage of water.

Sediment: Solid material, both mineral and organic, that is being transported in suspension or has been removed from its site of origin by water, air, gravity or ice.

Side Slope: The ratio of horizontal to vertical distance measured along a slope. Usually expressed in the form $n:1$ (n being the number of horizontal units to one vertical unit)

Spillway: An open or closed channel, conduit or drop structure used to convey water from a pond.

Top Width: The horizontal dimension across the top of a dam, perpendicular to the center line.

Appendix A

New York State Department of Environmental Conservation (NYSDEC)

Region 8 – Division of Regulatory Affairs
6274 E. Avon-Lima Road
Avon, NY 14414-9519
(585) 226-2466
<www.dec.state.ny.us>

United States Army Corps of Engineers

Regulatory Branch
Buffalo District, Corps of Engineers
1776 Niagara Street
Buffalo, NY 14207
(585) 879-4313
<www.usace.army.mil>

Monroe County Soil and Water Conservation District

145 Paul Road, Bldg. 5
Rochester, NY 14624
(585) 753-7380
<www.monroecountyswcd.org>

Cornell Cooperative Extension

Main Office
365 Roberts Hall
Ithaca, New York 14853-5905
(607) 255-2237
<www.cce.cornell.edu>

Monroe County Branch
249 Highland Ave
Rochester, NY 14620
(585) 461-1000

Monroe County Department of Health

111 Westfall Road
Rochester, NY 14620
(585) 274-6068
<www.co.monroe.ny.us/health/>

Dig Safely New York

1-800-962-7962
www.digsafelynewyork.com

Appendix B

Town and Village Offices

Brighton

2300 Elmwood Ave.
Rochester, NY 14618
(585) 784-5250

Brockport

49 State St.
Brockport, NY 14420
(585) 637-5300

Chili

3333 Chili Ave.
Rochester, NY 14624
(585) 889-3550

Churchville

PO Box 613, 23 E. Buffalo Rd.
Churchville, NY 14428
(585) 293-3720

Clarkson

3710 Lake Rd.
Clarkson, NY 14430
(585) 637-1130

East Rochester

120 W. Commercial St.
East Rochester, NY 14445
(585) 586-3553

Fairport

31 S. Main St.
Fairport, NY 14450
(585) 2230313

Gates

1605 Buffalo Rd.
Rochester, NY 14624
(585) 247-6100

Greece

1 Vince Tofany Blvd.
Rochester, NY 14616
(585) 225-2000

Hamlin

1658 Lake Rd.
Hamlin, NY 14464
(585) 964-2421

Henrietta

475 Calkins Rd.
Henrietta, NY 14467
(585) 334-7700

Hilton

59 Henry St.
Hilton, NY 14468
(585) 392-4144

Honeoye Falls

5 East St.
Honeoye Falls, NY 14472
(585) 624-1711

Irondequoit

1280 Titus Ave.
Rochester, NY 14617
(585) 467-8840

Mendon

16 West Main St.
Honeoye Falls, NY 14472
(585) 624-6060

Ogden

269 Ogden Center Rd.
Spencerport, NY 14559
(585) 352-2100

Parma

PO Box 728, 1300 Hilton-Parma Rd.
Hilton, NY 14468
(585) 392-9461

Penfield

3100 Atlantic Ave.
Penfield, NY 14526-9798
(585) 340-8600

Perinton

1350 Turk Hill Rd.
Fairport, NY 14450-8796
(585) 223-0770

Pittsford (village)

21 N. Main St.
Pittsford, NY 14534
(585) 586-4332

Pittsford (town)

11 South Main St.
Pittsford, NY 14534
(585) 248-6200

Riga

6460 East Buffalo Rd.
Churchville, NY 14428
(585) 293-3880

Rush

5977 E. Henrietta Rd
Rush, NY 14543
(585) 533-1312

Scottsville

PO Box 36, 22 Main St.
Scottsville, NY 14546
(585) 889-4700

Spencerport

27 West Ave.
Spencerport, NY 14559
(585) 352-4771

Sweden

18 State St.
Brockport, NY 14420
(585) 637-2144

Webster (village)

28 West Main St.
Webster, NY 14580
(585) 265-3770

Webster (town)

1000 Ridge Rd.
Webster, NY 14580-2917
(585) 872-1000

Wheatland

PO Box 15, 22 Main St.
Scottsville, NY 14546
(585) 889-1553

Mark Colf Excavation Contracting Inc.
4501 Rte 21 South
Canandaigua, NY 14424
Phone: (585) 394-4445
Fax: (585) 394-8885
Mobile: (585) 738-5160

Dredging, Pond Construction, Wetlands
Creation, Drainage Improvement, Erosion,
Control, Land Grading, Fencing, Trenching,
Shoreline Stabilization
Special Equipment: Drag Line

Pittsford Excavating
23-B Cullens Run
Pittsford, NY 14534
Phone: (585) 385-9328

Dredging, Pond Construction, Wetlands
Creation, Drainage Improvement, Erosion
Control, Land Grading, Shoreline
Stabilization, Concrete Work, Trenching
Storm Sewer Work

Pooler Enterprises, Inc.
PO Box 436, 783 Wangum Road
Fishers, NY 14453

Re-Surface Inc.
745 Brooks Ave
Rochester, NY 14619
Phone: (585) 436-6306
Fax: (585) 436-7329

Pond Construction, Drainage Improvement,
Land Grading, Concrete Work, Fencing,
Trenching

Victor Excavating
777 Brownsville Road
Victor, NY 14564
Phone: (585) 924-1934
Fax: (585) 742-3243

Pond Construction, Drainage Improvement,
Land Grading

Villager Construction, Inc.
Richard Clark
425 Old Macedon Center Road
Fairport, NY 14450
Phone: (585) 223-7697
Fax: (585) 223-7787

Drainage Improvement, Land Grading,
Shoreline Stabilization, Concrete Work,
Trenching

References

- “Advantages and Limitations of Different Control Options.” Cornell University, Department of Natural Resources. 2002. <dnr.cornell.edu/ext/wetlands/ponds/adv-limitations.htm>
- Burkunas, Vytautas, J. Fish Pond Information. Monroe County Soil and Water Conservation District. January, 1993.
- Burkunas, Vytautas, J. Personal Interview. May, 2002.
- “Crop Water Needs”. Food and Agriculture Organization. 2002 <www.fao.org/docrep>
- Engineering Field Manual, Chapter 11. USDA – Soil Conservation Service.
- “Farm Fish Pond Management”. New York State Department of Environmental Conservation. 2002. <dec.state.ny.us/website/dfwmr/fish/farmpdmg.html >
- “Fish Pond Management in New York Ponds.” Cornell Cooperative Extension. 2002. <dnr.cornell.edu/ext/fish/pond1.htm>
- General Types of Pond Plants. Cornell University, Department of Natural Resources. 2002. <dnr.cornell.edu/ext/wetlands/ponds/adv-limitations.htm>
- “Grass Carp: An Alternative Method to Pond Weed Control.” Cattaraugus County Soil and Water Conservation District. 1999.
- Johnson, Robert, L., and Peverly, John H. Aquatic Plant Management and Control. Cornell Cooperative Extension. 1987.
- Lewandowski, Stephen. Pond Siting Handbook. Ontario County Soil and Water Conservation District, 1991.
- Mattinson, Mary R., ed., Glasscock, Lovell S., ed. Ponds – Planning Design and Construction Agricultural Handbook 590. United States Department of Agriculture. Washington D.C., 2000.
- “Permits, Applications.” New York State Department of Environmental Conservation. 2002 <www.dec.state.ny.us/website/dcs/permits_level2.html>

FOR DEPARTMENT USE ONLY	
APPLICATION NO.	
DAM NO.	
WATERSHED	

APPLICATION FOR PERMIT

FOR THE CONSTRUCTION, RECONSTRUCTION OR REPAIR OF A DAM OR OTHER IMPOUNDMENT STRUCTURE
Read instructions on reverse side of last sheet before completing this application. PLEASE TYPE OR PRINT CLEARLY IN INK

PROJECT DESCRIPTION

1. LOCATION On U.S. GEOLOGICAL SURVEY MAP Name of Map _____ Latitude _____ Longitude _____		2. PROPOSED USE FOR IMPOUNDED WATER		3. STATE THE HEIGHT ABOVE SPILLCREST OF THE LOWEST PART OF THE IMMEDIATE UPSTREAM ADJOINING PROPERTY OR PROPERTIES _____ Feet	
4. IS THIS PROPOSED POND OR LAKE PART OF A PUBLIC WATER SUPPLY If not, where is nearest downstream public water supply intake? <input type="checkbox"/> Yes <input type="checkbox"/> No			5. SIZE OF AREA DRAINING INTO POND OR LAKE (Acres or Square Miles)		HEIGHT OF DAM ABOVE STREAM BED? _____ Feet
6. THE DRAINAGE AREA IS COMPOSED OF: (Total = 100%) _____ % Forest _____ % Cropland _____ % Pasture _____ % Other _____ % Swamp _____ % Suburban Lands _____ % Urban Lands					
7. TYPE OF SPILLWAY <input type="checkbox"/> Service Spillway - Auxiliary Spillway Combination <input type="checkbox"/> Pip Riser ONLY <input type="checkbox"/> Single Spillway <input type="checkbox"/> Other _____			8. DESIGNER'S ESTIMATE OF CLASS OF HAZARD (As described in "Guidelines for Small Earth Dam designs") <input type="checkbox"/> Class "A" <input type="checkbox"/> Class "B" <input type="checkbox"/> Class "C" NOTE: Provide descriptive information on character of downstream area.		
9a. SPILLWAY INFLOW DESIGN FLOOD Frequency _____ Flood Peak _____ cfs Runoff Volume _____ in.			9b. SERVICE SPILLWAY INFLOW DESIGN FLOOD Frequency _____ Flood Peak _____ cfs Runoff Volume _____ in.		
10. THE SINGLE SPILLWAY OR AUXILIARY SPILLWAY IS COMPOSED OF: <input type="checkbox"/> Vegetated Earth <input type="checkbox"/> Concrete <input type="checkbox"/> Timber <input type="checkbox"/> Rock-filled Crib <input type="checkbox"/> Masonry <input type="checkbox"/> Other _____					
11. MAXIMUM VELOCITY WITHIN THE SINGLE OR AUXILIARY SPILLWAY _____ fps		12. SINGLE OR AUXILIARY SPILLWAY DISCHARGE AT DESIGN HIGH WATER _____ cfs		13. TYPE OF ENERGY DISSIPATER PROVIDED ON SINGLE SPILLWAY <input type="checkbox"/> Hydraulic Jump Basin <input type="checkbox"/> Drop Structure <input type="checkbox"/> Other _____	
14. POND OR LAKE WILL BE DRAINED BY MEANS OF _____			WATER WILL BE SUPPLIED TO RIPARIAN OWNERS DOWNSTREAM BY MEANS OF _____		
15. AREA CAPACITY DATA Answer 1, 2 and 3, OR 1, 2, 4, 5		ELEVATION, Referred to Assumed Benchmark		SURFACE AREA	
1. Top of Dam _____ Feet		_____ Feet		_____ Acres _____ Acre-Feet	
2. Design High Water _____ Feet		_____ Feet		_____ Acres _____ Acre-Feet	
3. Single Spillway Crest _____ Feet		_____ Feet		_____ Acres _____ Acre-Feet	
4. Auxiliary Spillway Crest _____ Feet		_____ Feet		_____ Acres _____ Acre-Feet	
5. Service Spillway Crest _____ Feet		_____ Feet		_____ Acres _____ Acre-Feet	
16. TYPE OF ENERGY DISSIPATER AT OUTLET OF CONDUIT: <input type="checkbox"/> Impact Basin <input type="checkbox"/> Hydraulic Jump Basin <input type="checkbox"/> Plunge Pool <input type="checkbox"/> Other _____					
IS RISER PROVIDED WITH AN ANTI-VORTEX DEVICE? <input type="checkbox"/> Yes <input type="checkbox"/> No					
17. DRAWDOWN TIMES: Answer 1 and 2, OR 1, 3, and 4		Yes No		Yes No	
1. Has provision been made to evacuate 90% of the storage below the lowest spillway crest within fourteen days?		<input type="checkbox"/> Yes <input type="checkbox"/> No		3. Can the Service Spillway evacuate 75% of the storage between the auxiliary spillway and the Service Spillway crest within seven days?	
2. Can the single spillway evacuate 75% of the storage between the maximum design high water and the spillway crest within 48 hours?		<input type="checkbox"/> Yes <input type="checkbox"/> No		4. Can the Service Spillway and the Auxiliary Spillway in combination evacuate the storage between the design high water and the auxiliary spillway crest within 12 hours?	
18. SOIL DATA - State the character of the bed and banks in respect to natural types of soil materials, hardness, perviousness, water bearing, effect of exposure to air and water, uniformity, etc. If an earth dam, describe the material to be used in the embankment. What is the source of embankment fill material? Are there porous seams or fissures beneath the foundation of the proposed dam? <input type="checkbox"/> Yes <input type="checkbox"/> No Method used to obtain the above soil data <input type="checkbox"/> Soil Bearing <input type="checkbox"/> Test Pits					
19. DESIGN ENGINEER Name of agency or individual		P.E. License No. of Individual		20. CONSTRUCTION ENGINEER Name of agency or individual	
P.E. License No. of Individual		Address		Address	
Title		Telephone No.		Title	
Telephone No.		Telephone No.		Telephone No.	

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
APPLICATION FOR FARM FISH POND LICENSE

I, _____
Name (print)
residing at _____
POST OFFICE/STREET (print) TOWN/CITY ZIP CODE
Telephone No. _____ apply for Farm Fish Pond License covering
pond located in the Town of _____ County of _____

1. Do you (own, lease) the land on which the pond is constructed?
check one _____
2. Is the pond, for which application is being made, used in connection
with a private camp, boarding house, hotel or other establishment
catering to the public? _____
3. What is the approximate size (surface acreage) of the pond? _____
4. Is this pond entirely artificial, impounded by a man made dam? _____
If not, explain _____
5. Is this pond fed by a stream, which has its source outside the lands
on which pond is located? _____ If so, explain _____

6. Is this pond fed by springs, surface water, or both? _____
7. Into what stream course of other water does your pond drain? _____

Please state name of stream of water into which your pond
finally drains even though it may leave the pond through a field drain.
For example: "Field drains into unnamed creek and then into Owego
Creek."

8. What species of fish do you wish to stock? _____

9. Where do you plan to secure stock? _____
10. Has pond been stocked previously? _____ If so, what species does
it contain? _____
11. Specify any means you may wish to use to remove fish from your pond
(other than angling). _____

Dated: _____ 19 _____
(signature of applicant)

REMARKS:

RETURN TO:

BUREAU OF FISHERIES
6274 EAST AVON-LIMA RD
AVON, NEW YORK 14414-9519

FOR LAW, SEE REVERSE SIDE

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
 BUREAU OF PESTICIDE CONTROL
 ALBANY, NEW YORK 12201

APPLICATION FOR PERMIT TO APPLY CHEMICALS FOR THE CONTROL OF UNDESIRABLE FISH

SEE INSTRUCTIONS ON REVERSE SIDE

1. NAME OF APPLICANT			2. <input type="checkbox"/> Riparian Owner(s) <input type="checkbox"/> Lessee(s) <input type="checkbox"/> Association of above persons	3. NAME OF WATER	
STREET ADDRESS				CITY, VILLAGE, TOWN	
POST OFFICE	STATE	ZIP CODE		COUNTY	

4. Acreage of Water _____ Mileage of Tributaries _____ ARE BOTH WHOLLY CONTAINED ON APPLICANT'S PROPERTY? Yes No

5. USES OF WATER BY OTHER THAN APPLICANT:
 Bathing Irrigation Watering Stock Private Watersupply Public Watersupply Other

6. ON WHAT U.S.G.S. QUADRANGLE IS THIS WATER LOCATED? Be sure this, or a similar map, on which the location of the water is marked, is submitted in duplicate with this application.

7. Name and % active ingredient of the chemical _____ pounds or gallons _____ of chemical including vehicle will be applied to _____ acre feet of water to give _____ ppm combined chemical and vehicle.

8. METHOD OF APPLICATION (If aircraft application is involved, answer question 9)

9. IF TREATMENT INVOLVES THE USE OF AIRCRAFT, ANSWER THE FOLLOWING:
Does aircraft have:
 a. a leakproof distribution system? Yes No
 b. a positive shutoff to prevent dribble? Yes No
 c. positive pump pressure to apply chemical at the prescribed rate? Yes No
 d. is there adequate insurance on the craft to reimburse individuals or property owners against losses? Yes No
 e. does the aircraft comply with pertinent Civil Air Board Regulations, including licensing, and those of the State of New York? Yes No

10. PROPOSED DATE OF TREATMENT	ARE TRIBUTARIES, IF ANY, TO BE TREATED? <input type="checkbox"/> Yes <input type="checkbox"/> No	11. IF TREATMENT BY OTHER THAN APPLICANT	
Can Water Level be Controlled? <input type="checkbox"/> Yes <input type="checkbox"/> No	HOW?	Name	
Days Flow can be Contained	Estimated flow during and after treatment c.f.s.	Street Address	
What prevents reentry of fish?		Post Office	State
		Zip Code	
		New York State Pesticide Applicator Number	

12. FISH NOW PRESENT

13. FISH TO BE STOCKED (A Department Stocking Permit required)

14. Have all riparian users, including those on the outlet, who may be required to restrict their use:
 Approved your plans? Yes No
 Agreed to restriction? Yes No

15. IF REQUIRED:
 Will you post the shorelines with suitable warning signs? Yes No
 Will you conduct tests to determine when the toxicity is dissipated and submit reports? Yes No

16. The applicant guarantees that he will employ the listed chemicals in conformance with all the conditions of the permit. In addition, the applicant certifies the truth of the above statements and agrees to accept the following conditions as a prerequisite to the issuance of a permit: that the issuance of the permit is based on the accuracy of all statements presented by the applicant; that damage resulting from the inaccuracy of any computations, improper application of the chemical, or legal responsibility for the representations made in obtaining approvals or releases, or failure to obtain approvals or releases from the riparian users likely to be affected is the sole responsibility of the applicant.

APPLICANT'S SIGNATURE	TITLE	Phone
MAILING ADDRESS		Date

SUBMIT 45 DAYS PRIOR TO TREATMENT

APPLICATION MUST BE APPROVED BY REGIONAL FISH MANAGER PRIOR TO SUBMISSION (See Reverse)

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
 BUREAU OF PESTICIDES
 ALBANY, NEW YORK 12233

APPLICATION FOR PERMIT TO USE CHEMICALS FOR THE CONTROL OF AQUATIC VEGETATION

SEE INSTRUCTIONS ON REVERSE SIDE

1. NAME OF APPLICANT		Phone	2. <input type="checkbox"/> Riparian Owner(s) <input type="checkbox"/> Lessee(s) <input type="checkbox"/> Association of above persons	3. NAME OF WATER
STREET ADDRESS				COUNTY
POST OFFICE	STATE	ZIP CODE		Are they wholly contained on applicants property? <input type="checkbox"/> Yes <input type="checkbox"/> No
TOTAL ACREAGE OF WATER		5. NUMBER OF AREAS TO BE TREATED		6. TOTAL ACREAGE TO BE TREATED
CHEMICAL REQUESTED			8. TYPE OF VEGETATION <input type="checkbox"/> Emergent <input type="checkbox"/> Submergent <input type="checkbox"/> Algae	
TOTAL AMOUNT	CONCENTRATION OF ACTIVE INGREDIENT		METHOD OF CHEMICAL APPLICATION	
PROPOSED DATE OF TREATMENT				
IF TREATMENT INVOLVES THE USE OF AIRCRAFT, ANSWER THE FOLLOWING: Does aircraft have: a. a leakproof distribution system? <input type="checkbox"/> Yes <input type="checkbox"/> No b. a positive shutoff to prevent dribble? <input type="checkbox"/> Yes <input type="checkbox"/> No c. positive pump pressure to apply chemical at the prescribed rate? <input type="checkbox"/> Yes <input type="checkbox"/> No d. is there adequate insurance on the craft to reimburse individuals or property owners against losses? <input type="checkbox"/> Yes <input type="checkbox"/> No e. does the aircraft comply with pertinent Civil Air Board Regulations, including licensing, and those of the State of New York? <input type="checkbox"/> Yes <input type="checkbox"/> No				
I. IS THERE AN OUTLET TO THE WATER? <input type="checkbox"/> Yes <input type="checkbox"/> No		ESTIMATED FLOW DURING AND AFTER TREATMENT (in cfs)		
CAN APPLICANT CONTROL WATER LEVELS AFTER TREATMENT? <input type="checkbox"/> Yes <input type="checkbox"/> No		If "Yes", how?		
FISH PRESENT: <input type="checkbox"/> Warm Water <input type="checkbox"/> Trout ARE THEY STOCKED BY THE STATE? <input type="checkbox"/> Yes <input type="checkbox"/> No		14. NAME OF APPLICATOR		N.Y.S. REG.#
IS THE WATER USED AS, OR CLOSELY TRIBUTARY TO A WATER SUPPLY? <input type="checkbox"/> Yes <input type="checkbox"/> No TYPE: <input type="checkbox"/> Private <input type="checkbox"/> Public		STREET ADDRESS		
		POST OFFICE		STATE ZIP CODE
Have all other riparian users, in the vicinity of the treated area and along the outlet stream, who may be required to restrict their usages as a result of the treatment: Approved your plans? <input type="checkbox"/> Yes <input type="checkbox"/> No Agreed to restrictions? <input type="checkbox"/> Yes <input type="checkbox"/> No		16. IF REQUIRED: Are you prepared to post the shoreline of the area to be treated with suitable warning signs? <input type="checkbox"/> Yes <input type="checkbox"/> No Will you mark or buoy the areas to be treated previous to the treatment? <input type="checkbox"/> Yes <input type="checkbox"/> No		
The applicant guarantees that he will employ the listed chemicals in conformance with all the conditions of the permit. In addition, the applicant certifies the truth of the above statements and agrees to accept the following conditions as a prerequisite to the issuance of a permit: that the issuance of the permit is based on the accuracy of all statements presented by the applicant; that damage resulting from the inaccuracy of any computations, improper application of the chemical, or legal responsibility for the representations made in obtaining approvals or releases, or failure to obtain approvals or releases from the riparian users likely to be affected is the sole responsibility of the applicant.				
APPLICANT'S SIGNATURE		TITLE		Phone
MAILING ADDRESS				Date

SUBMIT 45 DAYS PRIOR TO TREATMENT

44-19-2 (5/75)
Formerly PR-117