

POND SITE SELECTION AND SURVEY

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.

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 your septic system. If unavoidable, divert

the drainage from your 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.

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 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

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.

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.

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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".

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.

Embarkment 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.

PRINCIPLES OF FISH POND DESIGN AND CONSTRUCTION

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
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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.