



## CREATING a POND

Many landowners create ponds as aesthetic and recreational amenities or as water sources for agricultural and other business related

pursuits. Planning for a pond requires consideration of various site conditions to ensure that a suitable location is chosen. Federal, state and local agency regulatory requirements must also be satisfied prior to initiating construction. Technical and regulatory



Photo courtesy of Sally Dewes

expertise is required for the majority of pond creation projects. This brochure briefly outlines the elements of pond siting, design and regulatory compliance and provides points of contact for obtaining technical assistance and regulatory information.

### Siting Factors

#### **Water Source**

An adequate water source is needed to maintain water levels. A supply is available from four types of sources.

Overland drainage - Surface runoff from precipitation or a flowing spring traveling overland as sheet flow or concentrated in a drainage way, can be collected in a pond basin. Ponds with this type of water source are located on or below sloping lands. Annual precipitation rates and drainage area characteristics determine the adequacy of the water supply for each potential pond site.

Groundwater - In areas where groundwater is near the surface, excavating into and below it will create a pond. Groundwater fed ponds are generally located in flat low lying areas and do not require a surrounding embankment.

Flowing waters by in-stream impoundment - Constructing a water impounding structure or dam across a water course will capture water and create a water body. Careful consideration should be undertaken before pursuing a pond of this nature. Environmental concerns such as blockage of fish passage or warming of down stream waters can cause adverse impacts. Also, sediment from upstream areas will become trapped behind the structure requiring periodic removal to prevent loss of water depth in the pond basin.

Flowing waters through diversion - A water source can be provided by diverting a portion of a stream's flow to an impoundment area or excavated basin. The diversion may use a weir or similar structure to direct water through a pipe or ditch to the pond site.

#### **Drainage Area**

Drainage area is a measure of the amount of land surface contributing water by runoff to a pond site and is presented in square miles or acres. Runoff volumes are determined by precipitation, soil type, vegetative cover and topography. For ponds relying on surface runoff the drainage area must provide an adequate supply of water to maintain pond water levels. Too large a drainage area should be avoided as excess runoff during storms can damage embankments and spillways or result in pond washout.

#### **Soils**

Ponds fed by surface runoff must have impermeable soils beneath the pond basin to prevent excess downward seepage, otherwise the pond will not maintain water. Soils containing a sufficient percentage of silt or clay content are best suited to pond establishment. The excavating of test pits at the proposed pond site allows for an evaluation of soil type and suitability. If suitable soils are not available on site, appropriate soils or soil amending products may be obtained from off site.

#### **Pond Design Options**

Materials and structure choices vary depending on

your needs and site conditions. The basic design options are as follows:

Dugout Pond - A basin for holding water is created by excavating soils in an area which is generally flat or in a depression or low point within a broad drainage way. This type of pond obtains its source of water from overland runoff, a diversion of flowing water or from groundwater.

Vegetated Earthen Impoundment Structure-The pond is created by erecting an earthen embankment across a water course or overland drainage way. These structures are placed on sloping lands to accommodate incorporation of the embankment with natural ground on the up-slope side of the pond. Often, the soils for the embankment are obtained from within the pond site during the shaping and deepening of the pond basin. Establishment of a hardy vegetative cover of grasses and legumes (not trees or large shrubs) provides an erosion resistant slope.

Impounding Structures Made of Other Materials - Rock, wood, concrete and steel or a combination of these materials can also be used to construct dams. The design and construction of structures of this nature are often complex and more costly than a totally earthen structure, but may be necessary to ensure long term structural integrity.

#### **Design Considerations**

Some important pond design basics are:

Pond Size, Depth and Configuration Determining adequate pond surface area and depth are often a function of volumes of water necessary to meet usage needs such as livestock watering, irrigation, or fire protection. Pond depth may also be predicated on recreational uses such as swimming, fish rearing, or wetland creation. The configuration or shape of the pond is often a matter of aesthetic consideration. An irregular shoreline that blends in with the surrounding terrain is generally most pleasing to the eye. Physical conditions may also dictate pond dimensions, such as depth of impermeable soils or slope of lands adjoining the pond site. Site conditions that result in back flooding of neighboring properties must be avoided.

Spillway Capacity - The spillway, such as a vegetated earthen channel around the dam, provides an outlet for excess water. It is

critical that the spillway be sized to pass flood waters and be stabilized to prevent erosion or washout of the structure.

Structural Integrity - Foundation preparation, construction specifications and spillway design, are the most important components of a pond created by an impounding structure. These factors determine the structural strength, water retaining capability and safe function of the structure.

Other Design Considerations - The steepness of pond basin side slopes affects light penetration to the pond bottom. If you wish to minimize areas supporting rooted aquatic vegetation, pond side slopes should be steep to maximize the area of deep water. Shallow tapering side slopes create broader areas for establishment of rooted aquatic vegetation. You may wish to provide a structure that allows draining of the pond or provide for a constant release of water from the pond bottom. This can be accommodated through installation of a pipe under a dam or embankment with a valve for controlling water flow. A drop inlet trickle tube can be installed to release normal overflow waters through the pipe, rather than regularly utilizing an over the top of structure spillway.

#### **Fish Stocking and Rearing**

Most ponds can serve as a recreational fisheries resource in addition to serving other primary functions. Fish stocking in private ponds requires a permit from the NYSDEC. A permit and advice on fish species and management choices can be obtained from the Bureau of Fisheries located in offices of each of the Department's nine regions.

#### **Pesticide Use**

Pesticides may be applied to ponds to control weed growth, algae blooms or to remove undesirable fish. Chemical treatment must be performed by a registered pesticide applicator. A NYSDEC pesticide permit is required for pesticide applications in aquatic environs. A wetlands permit is also required for the use of pesticides, if the pond is contained within a regulated wetland.

## **NYSDEC Construction Permits**

Pond construction or establishing structures to obtain a source of water may require a NYSDEC permit. The permits types most commonly applicable are:

A **Dam Safety Permit** for construction of an impoundment structure unless the structure satisfies one of the following permit exemption criteria:

- a. maximum height is 6 feet or less;
- b. maximum impounding capacity is one million gallons or less;
- c. maximum height is between 6 feet and 15 feet and the maximum impounding capacity is less than three million gallons

Maximum height is measured from the down stream (outside) toe of the dam at its lowest point to the highest point at the top of the structure.

Maximum impounding capacity is measured at the volume of water impounded when the water level is at the top of the structure.

A **Stream Protection Permit** for the disturbance to the bed or banks of a protected stream. Protected streams are determined by their assigned water classification.

A **Freshwater Wetland Permit** for undertaking excavation or placing fill in or within 100 feet of a freshwater wetland regulated by the NYSDEC. Regulated wetlands are identified on official NYSDEC Freshwater Wetland Maps.

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

Other approvals may be required depending on specific circumstances. To determine if a proposed pond site contains a protected resource or construction involves activities that will require a permit from the NYSDEC, contact the Regional Permit Administrator responsible for the area in which the pond is to be located. See the list of NYSDEC offices and the

counties they cover to determine the appropriate contact location.

**More Information** on activities requiring permits and permit application procedures is available in the NYSDEC Website at <http://www.dec.state.ny.us>. Navigate to Regulatory Information, Permits, Application page.

### **Permits From Other Agencies**

In some locations, permits may be required from other agencies. Activities resulting in fills in waterways or wetlands may require a permit from the U.S. Army Corps of Engineers under the Clean Water Act. Contact your local building department to determine if local approvals are needed. If you are located within the Adirondack Park, also contact the Adirondack Park Agency before initiating construction activities.

### **Technical Assistance**

Assistance in siting, designing and constructing a pond may be obtained from your local county office of the Soil and Water Conservation District or the local office of the federal government's Natural Resources Conservation Service, of the U.S. Department of Agriculture. Staff of these agencies include Land Use Planning Conservationists, soils scientists and professional engineers. These agencies and your County Cooperative Extension Service office can provide you with helpful publications on pond planning, design, construction and maintenance. The location and phone numbers for these agencies can be found in the government listings of your phone directory. For complex dam projects, you may need to hire a licensed professional consulting engineer

## **Division of Environmental Permits Regional Offices**

**REGION 1 - Stony Brook** (631) 444-0365  
Building 40 - Room 121 SUNY  
Stony Brook, NY 11790-2356  
(Nassau, Suffolk)

**REGION 2 - New York** (718) 482-4997  
1 Hunters Point Plaza, 47-40 21<sup>st</sup> Street  
Long Island City, NY 11101-5407  
(New York City)

**REGION 3 - New Paltz** (914) 256-3054  
21 South Putt Corners Road  
New Paltz, NY 12561-1696  
(Dutchess, Orange, Putnam, Rockland,  
Sullivan, Ulster, Westchester)

**REGION 4 - Schenectady** (518) 357-2069  
1150 North Wescott Road  
Schenectady NY 12306-2014  
(Albany, Columbia, Greene, Montgomery,  
Rensselaer, Schenectady)

**REGION 4 Sub-office - Stamford** (607) 652-7741  
Route 10 Jefferson Road  
HCR#1, Box 3A  
Stamford, NY 12167-9503  
(Delaware, Otsego, Schoharie)

**REGION 5 - Ray Brook** (518) 897-1234  
Route 86, PO Box 296  
Ray Brook, NY 12977-0296  
(Clinton, Essex, Franklin, Hamilton)

**REGION 5 Sub-office -  
Warrensburg** (518) 623-3671  
County Route 40, PO Box 220  
Warrensburg, NY 12885-0220  
(Fulton, Saratoga, Warren, Washington)

**REGION 6 - Watertown** (315) 785-2245  
State Office Building  
317 Washington Street  
Watertown, NY 13601-3787  
(Jefferson, Lewis, St. Lawrence)

**REGION 6 Sub-Office - Utica** (315) 793-2555  
State Office Building  
Utica, NY 13501-2885  
(Herkimer, Oneida)

**REGION 7 - Syracuse** (315) 426-7438  
615 Erie Boulevard West  
Syracuse, NY 13204-2400  
(Cayuga, Madison, Onondaga,  
Oswego)

**REGION 7 Sub-office - Cortland**  
1285 Fisher Avenue (607) 753-3095  
Cortland, NY 13045-1090  
(Broome, Cortland, Chenango, Tioga, Tompkins)

**REGION 8 - Avon** (716) 226-2466  
6274 East Avon-Lima Road  
Avon, NY 14414-9519  
(Chemung, Genesee, Livingston, Monroe,  
Ontario,  
Orleans, Schuyler, Seneca, Steuben, Wayne,  
Yates)

**REGION 9 - Buffalo** (716) 851-7165  
270 Michigan Avenue  
Buffalo, NY 14023-2999  
(Erie, Niagara, Wyoming)

**REGION 9 Sub-office - Allegany**  
182 East Union, Suite 3, (716) 372-6242  
Allegany NY 14706-1328.  
(Allegany, Cattaraugus, Chautauqua)

## **U.S. Army Corps of Engineers Offices**

N.Y. District Office	Buffalo District Office
26 Federal Plaza	1776 Niagara Street
New York, NY	Buffalo, NY
10278-0090	14207-3199
(212) 264-0184	(716) 879-4310

Albany Field Office  
1 Bond Street  
Troy, NY 12180  
(518) 270-0588

**Adirondack Park Agency Office**  
PO Box 99  
Ray Brook, NY 12977  
(518) 891-4050

