

# PONDS

A pond may be constructed for a variety of uses such as recreation, fire suppression, agricultural, fish production and stormwater management. Ponds should always be designed by a **licensed engineer** to insure safety and longevity. This brochure is intended as a general guide to landowners for pond planning and permitting needs.

## PERMITS

There are five primary permits to consider when building a pond.

### 1. Land-Disturbing Permit (Call 276-694-6094)

Ponds used for primarily agricultural purposes may be exempt from land-disturbing permits issued by the Patrick County ESC Office.

Residential or commercial ponds used for recreation or stormwater management that disturb 10,000 square feet or more require a land-disturbing Permit from the Patrick County ESC Office.

### 2. Stormwater Permit (Call 276-694-6094)

In addition to the a land-disturbing permit, non-agricultural ponds disturbing one acre or more require a VSMP Authority Permit from the Patrick County SWM Office and a VAR10 Construction General Permit from the Commonwealth (DEQ). Disturbance includes pond access roads, stockpiles, borrow pits, clearing, and grading.

### 3. Wetland and Stream Impacts

Please contact the Army Corps of Engineers (ACOE) and the Virginia Department of Environmental Quality (DEQ) on the back panel.

### 4. Dam Safety (Call 540-394-2550)

Ponds with dams of 25 feet or greater in height and with an impoundment capacity of more

than 15 acre-feet and ponds with dams of 6 feet or greater in height and with an impoundment capacity of more than 50 acre-feet are regulated by the Department of Conservation & Recreation (DCR), Division of Dam Safety. Under these regulations, ponds require an operating permit, annual inspections & development of an action plan.

### 5. Wildlife Impacts (Call 757-247-2255)

Impoundments within wetlands or streams may require permits or certain restrictions by the Virginia Marine Resources Commission (VMRC).

## UNDERSTANDING PONDS

There are two types of pond construction:

**1. Embankment ponds:** A pond formed by the construction of a dam across a stream or watercourse.

**2. Excavated Ponds:** A hole dug out of nearly level ground. These ponds are more expensive and can only accommodate a small supply of water.

Both designs require a source of water, usually from a spring, live water source or surface runoff.

## CHOOSING A SITE

The pond site selection needs to consider adequate water supply, type of watershed, topography and soils.

There should be adequate water supply to handle all of your needs. Factors that influence water supply include base flow of the stream/spring, rainfall, evaporation and watershed size and characteristics.

The watershed can determine the quality of your water supply. An urban watershed may have more impacts on water quality than a predominantly rural or forested watershed.

Topography determines the length of the permanent pool and height of the dam. Steep side slopes and high grade changes can affect construction and use of the pond.

Good soil quality is needed for an adequate embankment. The soil needs to be 20 percent clay to provide proper compaction and prevent seepage through the embankment. Consult a soil scientist or geotechnical engineer for more information.

## WATER NEEDS

The amount of designated water storage is determined by the intended use of the pond.

### Livestock watering:

Beef cattle/horses	15 gal/head/day
Dairy cows (drinking)	15 gal/head/day
Dairy Operations	35 gal/head/day
Hogs	4 gal/head/day
Sheep	2 gal/head/day

### Irrigation:

This amount needed depends on effective rainfall, evaporation, crop usage, growing season and efficiency of irrigation method. **Contact your local Extension Office.**

### Fire Suppression:

A typical firehose line consists of 500 feet of 3 inch fire hose with a 1 1/8 inch smooth nozzle. A centrifugal pump operating at 63 lb/sq.in. provides a stream of 265 gallons per minute with a nozzle pressure of 50 lb/sq.in. Such a stream running for 5 hours requires 1/4 acre-foot of water. You should provide enough water storage to run several such streams.

## Estimating Pond Capacity in Acre-Feet

1. Establish normal pool elevation and stake the waterline at this elevation (average depth 6 feet minimum).
2. Measure width of valley at this elevation and compute the surface area in acres (43,560 square feet per acre).
3. Multiply surface area by 0.4 times maximum water depth in feet = acre-feet (325,900 gallons = one acre-foot).

## Determining Watershed Size for Storage

Ponds supplied with surface runoff require adequate watershed size to meet the desired depth and storage capacity. Generally, in our region every acre-foot of pond storage needs 1.5 to 2 acres of watershed area.

A larger watershed area is needed for ponds built in shallow or flat valleys and smaller watersheds for steeper valleys.

## Are You Still Thinking about Constructing a Pond?

If you intend to build a pond, always consult a licensed Engineer for embankment and spillway design.

For more detailed technical information regarding pond planning, design and construction download the following Handbook:

[Agricultural Handbook 590](#)

## Questions?

For questions on permits contact:

[Army Corps of Engineers \(ACOE\)](#)

Western Section, Field Office (804) 323-3782

[Department of Environmental Quality \(DEQ\)](#)

Blue Ridge Regional Office (540) 562-6700

[Patrick County](#)

ESC & SWM Office (276) 694-6094



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## *Pond Planning!*

## A Landowner's Guide to Ponds

