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 (325,900 gallons in 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 2 to 2.5 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 technical advice or questions regarding planning and maintenance contact:

Culpeper SWCD 540-825-8591
Natural Resources Conservation Service (NRCS) 540-672-1638

Questions?

For questions on **zoning and setbacks** contact your County's Planning & Zoning department.

Culpeper County:

Planning & Zoning	540-727-3404
Army Corps of Engineers	540-548-2517
Department of Environmental Quality	703-583-3800

Greene County

Planning & Zoning	434-985-5282
Army Corps of Engineers	540-886-4221
Department of Environmental Quality	540-574-7812

Madison County

Zoning Administration	540-948-6102
Army Corps of Engineers	540-548-2517
Department of Environmental Quality	703-583-3800

Orange County

Planning & Zoning	540-672-4347
Army Corps of Engineers	540-548-2517
Department of Environmental Quality	703-583-3800

Rappahannock County

Zoning Administration	540-675-5330
Army Corps of Engineers	540-548-2517
Department of Environmental Quality	703-583-3800

351 Lakeside Drive
Culpeper, VA 22701
Phone: (540) 825-8591 Fax: (540) 825-8637
www.culpeper.vaswcd.org

Culpeper Soil and Water Conservation District

Serving the Counties of Culpeper, Greene, Madison, Orange and Rappahannock

Pond Planning!

A Landowner's Guide to Ponds

This is a typical earthen pond at Cedar Springs Dairy in Madison County

PONDS

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

Permits

There are five primary permits when building a pond.

1. Land-Disturbing Permits
Agricultural ponds used for watering crops and livestock are exempt from land-disturbing permits issued by the County

Residential or commercial ponds used for recreation or stormwater management that disturb more than 10,000 square feet require a Land-Disturbing Permit from the County.

2. Virginia Stormwater Management Permit (VSMP)
In addition to the County permit, non-agricultural ponds disturbing more than one acre require a VSMP from the Commonwealth. 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 804-371-6095)
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, Division of Dam Safety. Under these regulations, ponds require an operating permit, annual inspections & development of an action plan.

5. Wildlife Impacts (Call 434-296-4731)
Ponds in watersheds known to support andromous fish (shad, herring) spawning require construction of a fishway over the dam by Virginia Department of Game and Inland Fisheries (VGIF).

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:
The amount needed is at least 1/4 acre-feet of storage.