# Ponds in Your Landscape:

## Not Just Another Pretty Place

Wooten Pond near Sperryville

# Presentation Outline

- Ponds and Their Many Uses and Benefits
- Pond Construction and Regulations Etc. (Culpeper Soil and Water)
- Hydrology and Ponds
- Pond Ecosystems
- Pond Water Quality
- Eutrophication
- Importance of Buffers Around Ponds
- Fish Kills
- Plants and Your Pond
- Frog Protection (Marshall Jones- Speaker)
- Ponds of Rappahannock

# Ponds: Many Uses and Benefits

- Ponds are an ideal spot for many forms of outdoor fun
  - Swimming
  - Fishing
  - Hunting and Trapping
  - Camping and Picnicking
  - Bird-watching and Wildlife Observation
- Ponds can contribute to the state's water resources, most notably by providing water for cattle and other livestock, as well as providing a water source and surplus for irrigation
- Ponds can also provide a water supply for rescue vehicles involved in fire extinguishing (via dry hydrants)
- Provide a stormwater management area

# Swimming

- Children and dogs agree, ponds are the place to be in the summertime heat!

# Fishing Your Pond

- Farm ponds can offer some of the best fishing around when properly stocked and maintained
- Virginia Department of Game and Inland Fisheries recommend stocking the following species of fish:
  - Largemouth Bass
  - Bluegill
  - Red-ear Sunfish
  - Channel Catfish
  - Trout

Largemouth Bass

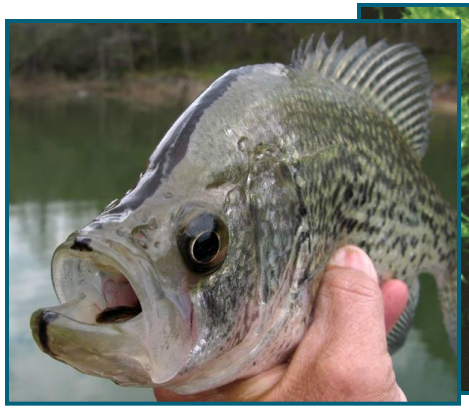
Channel Catfish

# Stocking

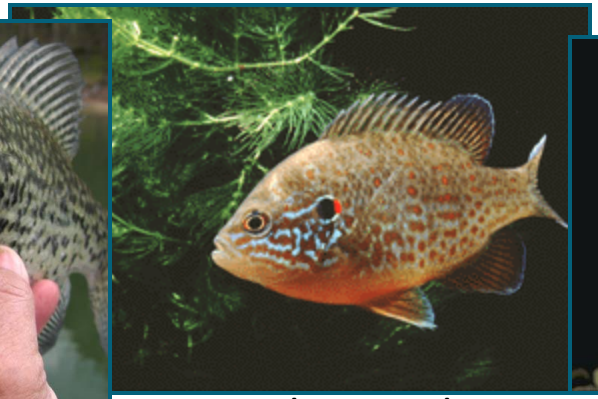
- Commercial hatcheries produce fish for sale to pond owners. Virginia Game and Inland Fisheries recommend consulting several suppliers to compare prices and delivery schedules.
- Gradually add pond water to shipping container over the course of at least 30 minutes to ensure that fish become adjusted to your pond's water chemistry. Failing to do so will result in fish death!

# Fish to Avoid

- Crappie, bullheads, yellow perch, pumpkinseed, and green sunfish should not be stocked because they tend to become overpopulated and stunted
- Carp and suckers are not recommended because they stir up pond bottoms causing water to become muddy
- Flathead and blue catfish are not recommended because they can consume the sunfish resulting in unbalanced fish populations



Crappie



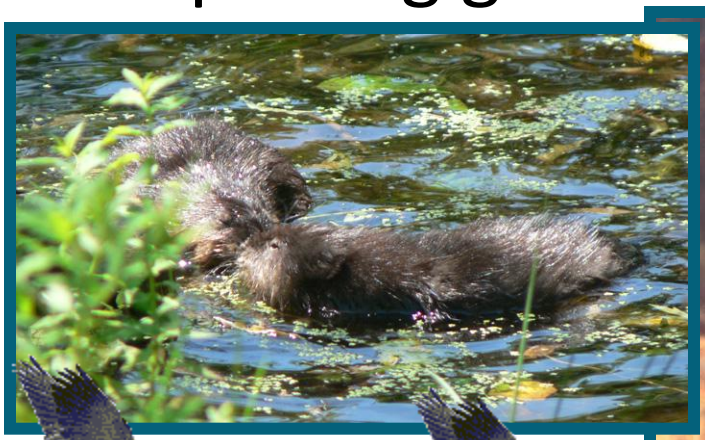
Pumpkin Seed

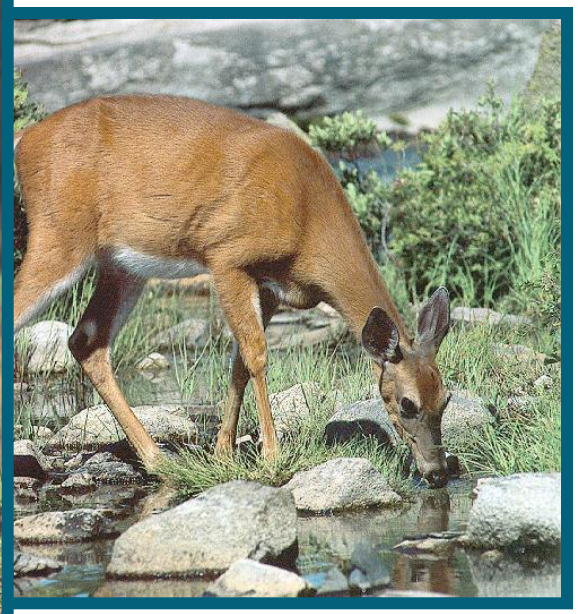
Yellow Perch

Carp

# Hunting and Trapping

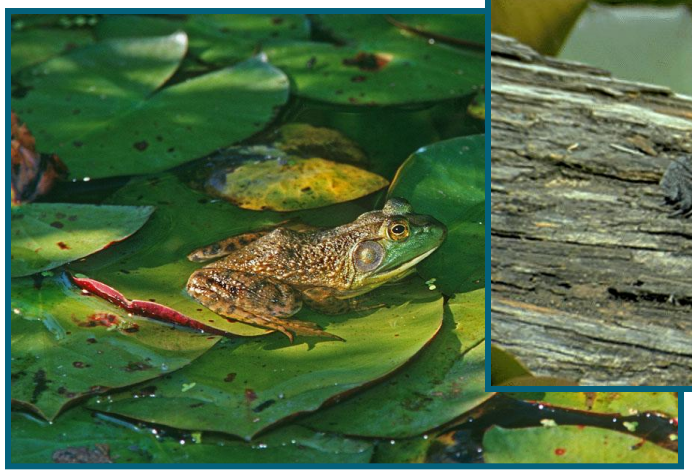
- Duck, deer and muskrat may be commonplace in or near a pond and provide sporting game to hunt and trap





# Wildlife Attraction

- Farm ponds can provide the perfect habitat for amphibians, birds and other wildlife. All they require is nesting or denning cover, food supply, escape cover and winter cover. Properly maintained and buffered ponds provide all of these requirements and will attract wildlife to your pond



Frogs

Turtles

Dragonflies

Herons

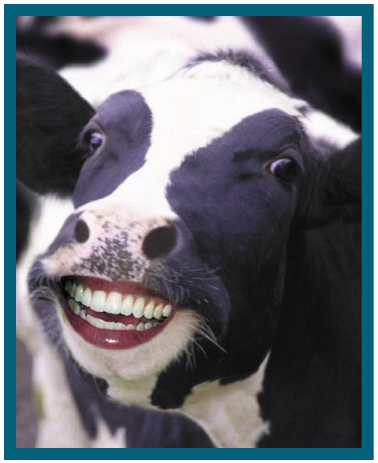
# Livestock Water Source

- Cows can cause irreparable damage to ponds in many ways
  - Destruction of pond banks
  - Unmanageable influx of nutrients and bacteria

Improper Method for

# Cows and Ponds CAN Co-Exist!

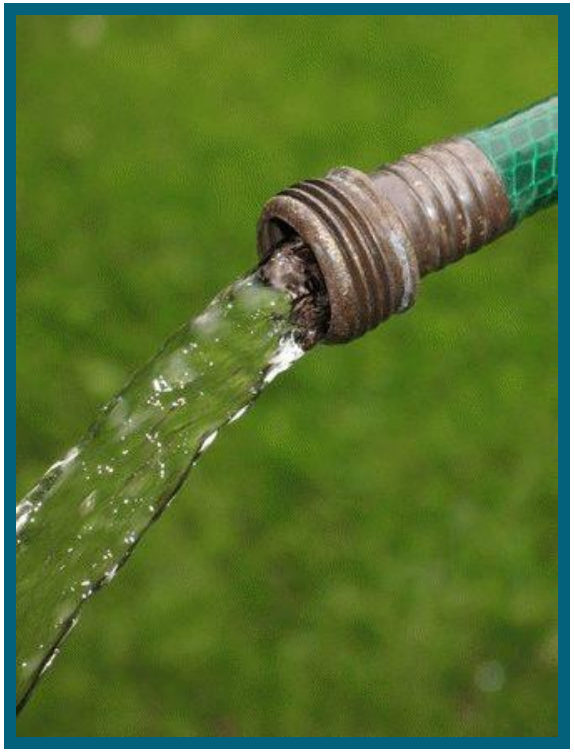
- Livestock should be fenced out of the pond and off the pond dike. A planned point of access away from the dike and pond outlet can be provided with a gravel bottom to prevent erosion. Gravity fed troughs are ideal, and keep cows entirely outside of the pond



Clean Water = Happy Cows!

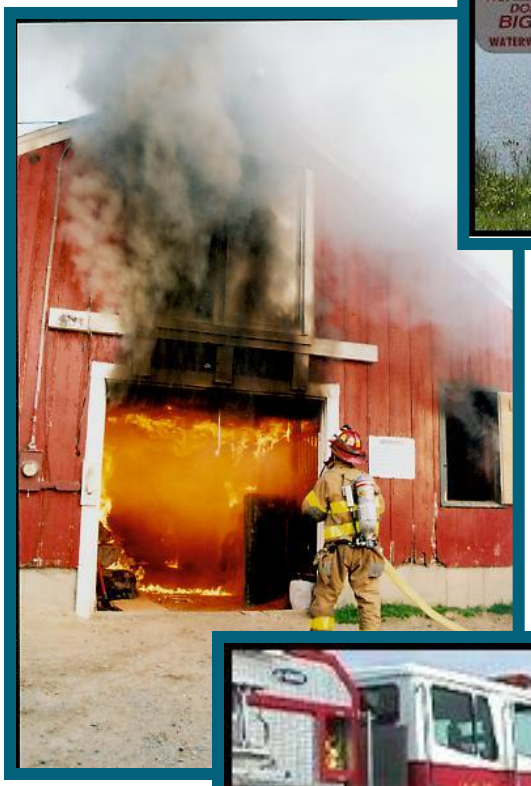
# Irrigation

- Farm ponds are ideal sources of water for permanent crops such as fruit trees, or field crops and vegetables during dry seasons
- Pond capacity must be adequate to meet your crop requirements
- Water may need to be filtered prior to pumping to prevent clogging equipment, particularly when using drip lines



# Fire Suppression

- Ponds can provide thousands of gallons of water in an emergency to help provide the necessary water needed to extinguish large farmstead and rural property fires
- Improperly maintained ponds used for this purpose may restrict the amount and ability of the water needed by emergency personnel

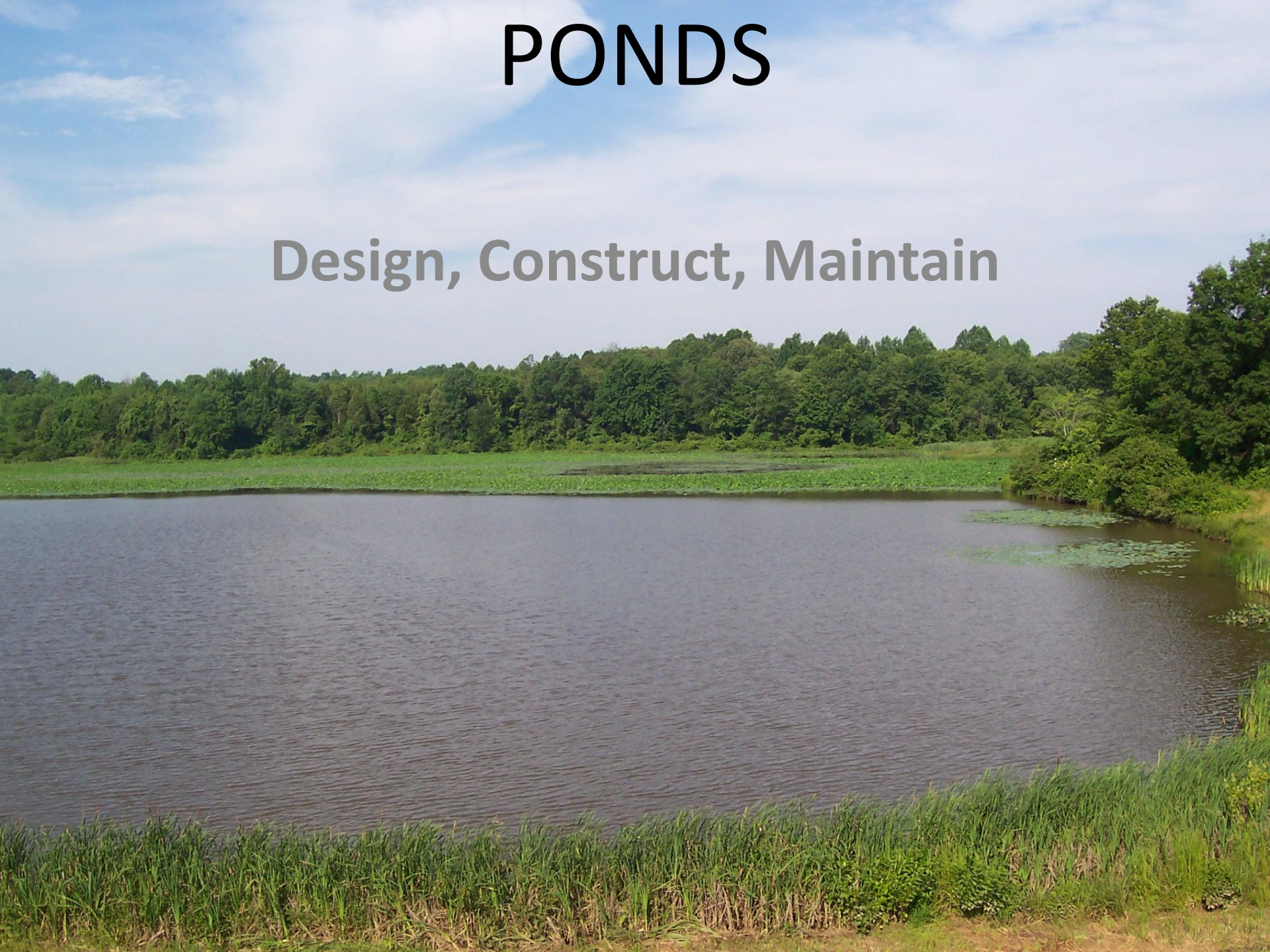
# Ponds as Stormwater Management

Farm ponds can be constructed to act as stormwater management ponds:

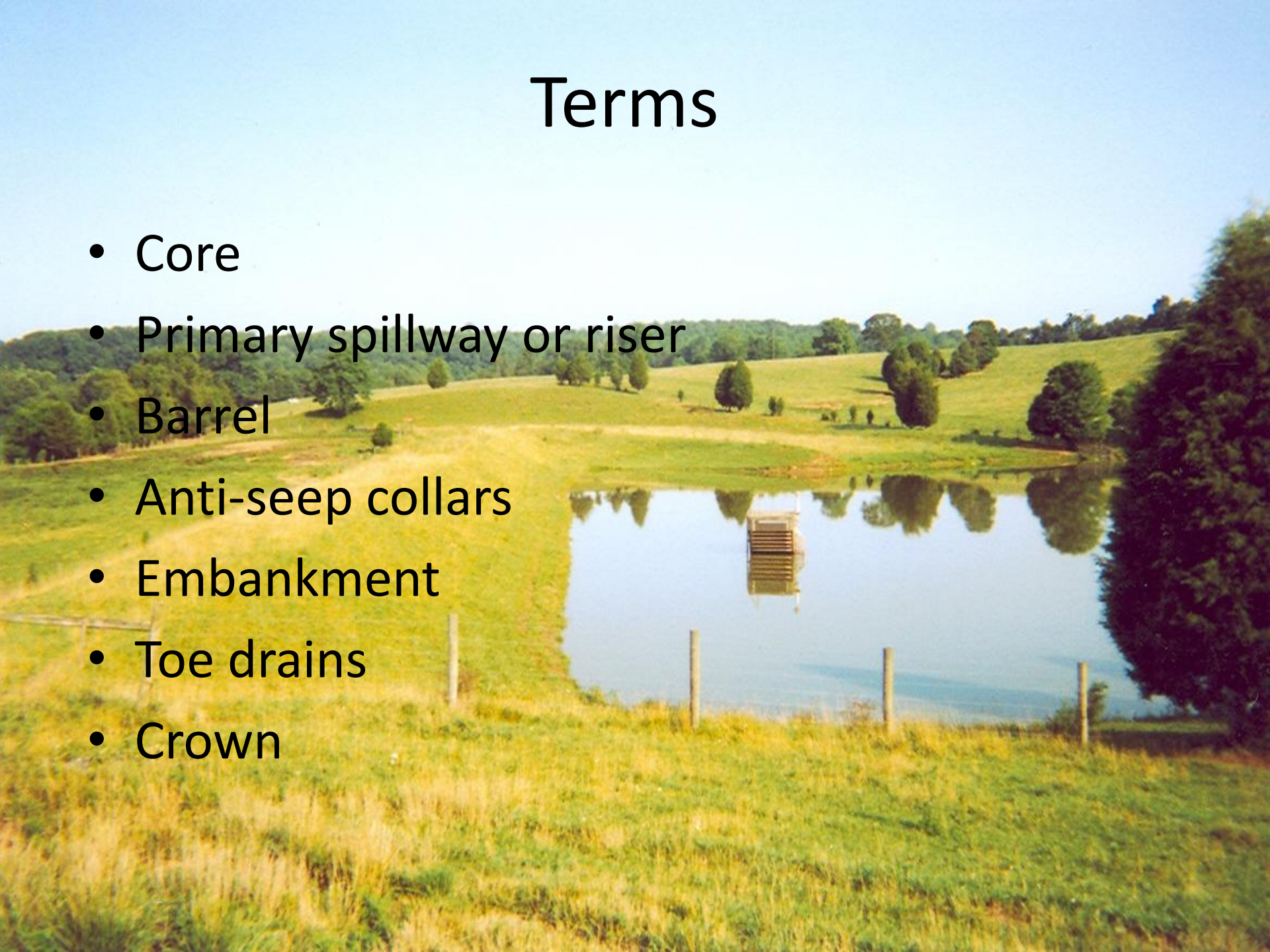
- Ponds are designed to slow the flow of stormwater and discharge it at a rate to minimize downstream flooding.
- A properly designed stormwater pond will remove a substantial amount of sediment and other non-point source pollutants from stormwater before releasing this water downstream.

# PONDS

## Design, Construct, Maintain



# Terms



- Core
- Primary spillway or riser
- Barrel
- Anti-seep collars
- Embankment
- Toe drains
- Crown

# Terms

- Emergency spillway
- Pool area, normal pool elevation, maximum pool elevation
- Watershed or drainage area
- Outlet basin or stilling basin
- Water supply value

# Why a Pond?

- Fishing
- Swimming
- Wildlife
- Livestock
- Fire suppression
- Zen
- “Wanta” club

# Selecting the Site

- Drainage area
- Embankment vs. excavation
- Economics
- Utility
- Accessibility
- Flat Area
- Watershed impacts
- Property boundaries

# If You Dig It Will It Fill?

- Clay – 20% or greater
- Adequate compaction – ball test
- Permeability
- Organic material
- Bedrock
- Depth of investigation
- Import soil

# Design Considerations

- Engineering
- Water use
- Shoreline
- Islands
- Maintenance drawdown
- Riser materials
- Emergency spillway
- Shallow edges/ deep edges

# Topography

- Impact on embankment size and costs
- Impact on volume of storage
- Extent of excavation
- Post construction erosion
- Speed of runoff

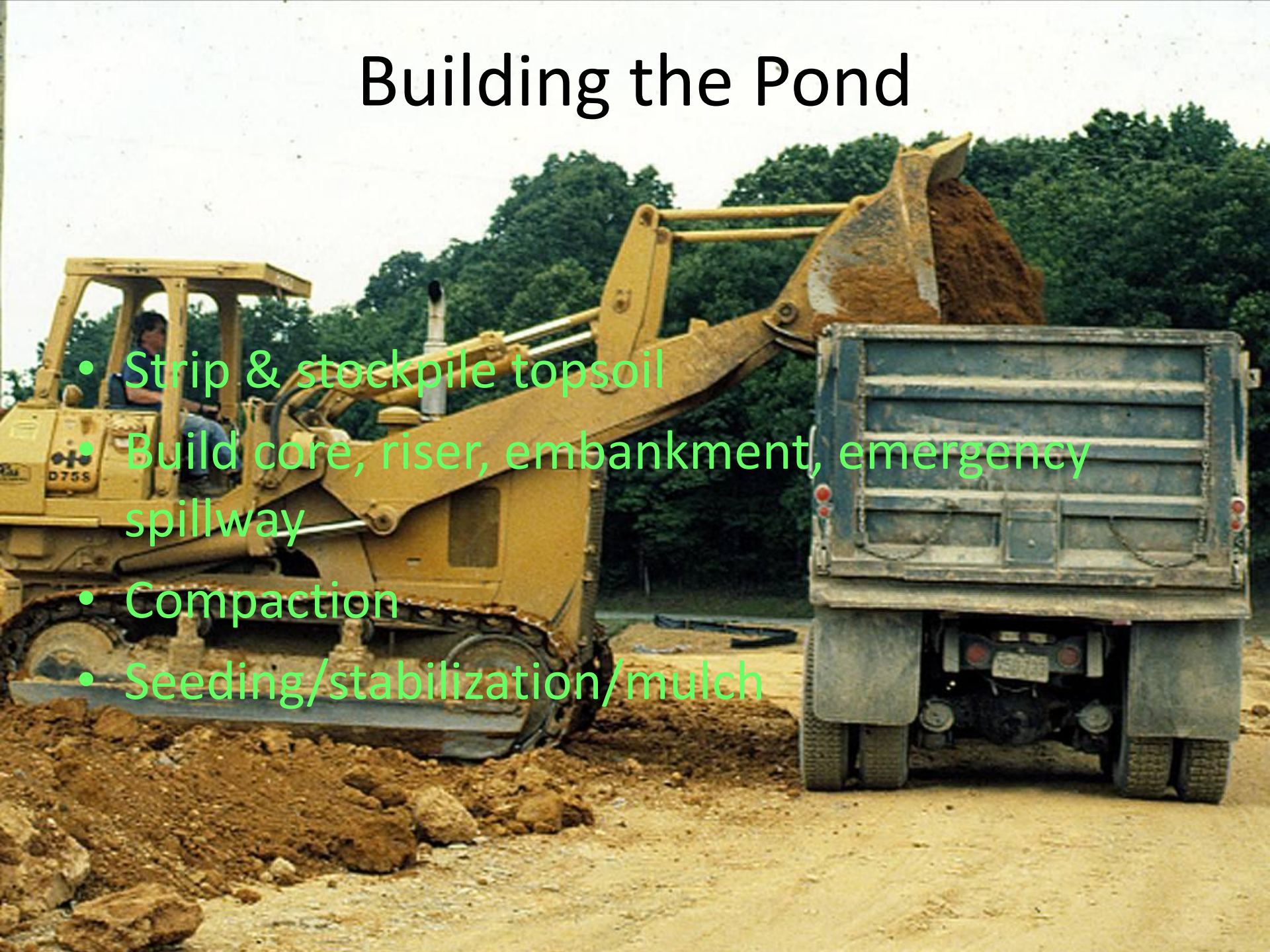
# Permits & Regulations

- Local
- State
- Regional
- Federal

# Building the Pond

- Competent contractor, references, several bids
- Good oversight
- Contract??
- Install erosion control/sediment control measures
- Clear brush, trees, stumps from embankment area & borrow area

# Building the Pond



- Strip & stockpile topsoil
- Build core, riser, embankment, emergency spillway
- Compaction
- Seeding/stabilization/mulch

# Maintenance

# Older Ponds/Common Problems

- No engineering originally
- Poor construction – poor compaction
- Corroded/failed primary spillway (riser)
- Eroded embankment
- Woody vegetation dominates
- Loss of pool capacity -- sedimentation

# Older Ponds/Common Problems

- Aquatic weeds
- Seepage
- Drought induced perceptions
- Rodents
- Geese

# Inspections

- http://www.dcr.virginia.gov/forms/DCR199-098.pdf

DCR
Virginia Department of Conservation & Recreation
State Parks • Soil & Water Conservation • Natural Heritage
Chesapeake Bay Local Assistance • Land Conservation
Outdoor Recreation Planning • Dam Safety & Floodplains

Date Prepared: _____
Prepared By: _____

# ANNUAL INSPECTION REPORT FOR VIRGINIA REGULATED IMPOUNDING STRUCTURES

Reference: Impounding Structures Regulations, 4VAC 50-20-10 et seq., including 4VAC 50-20-105, Virginia Soil and Water Conservation Board

**Owner's Information**

Name of Dam: _____ Inventory Number: _____
Owner's Name: _____ Location-County/City: _____
Contact Person (if different from above): _____ _____
Owner's Address: _____ Hazard Classification: _____
Name of reservoir: _____
Purpose of reservoir: _____
Telephone No.: (Residential) _____ (Business) _____
Other means of communication: _____

**Owner's Engineer**

Name of Engineering Firm and Engineer: _____
Professional Engineer Virginia License Number: _____
Mailing Address: _____
_____
_____
Telephone No.: (Business) _____

**Directions: Make note of all pertinent conditions and changes since the last inspection, or, if this is the first inspection, since the filing of a design report.**

**Date of This Inspection** _____
**Date of Last Inspection** _____

**1. EMBANKMENT**

a. Any alteration made to the embankment? _____
b. Erosion on embankment? _____
c. Settlement, misalignment or cracks in embankment? _____
d. Seepage? If so, seepage flow rate and location (describe any turbidity and observed color within the flow): _____

**2. UPSTREAM SLOPE**

a. Woody vegetation discovered? _____
b. Rodent burrows discovered? _____
c. Remedial work performed? _____

**3. INTAKE STRUCTURE**

a. Deterioration of concrete? _____
b. Exposure of rebar reinforcement? _____
c. Is there a need to repair or replace the trash rack? _____
d. Any problems with debris? _____
e. Was the drawdown valve operated? _____

**4. ABUTMENT CONTACTS**

a. Any seepage? If so, estimate the flow rate and describe the location of the seep or damp areas (describe any turbidity and observed color within the flow): _____

**5. EARTHEN EMERGENCY SPILLWAY**

a. Obstructions to flow? If so, describe plans to correct: _____

b. Rodent burrows discovered? _____

c. Any deterioration in the approach or discharge channel?

**6. CONCRETE EMERGENCY SPILLWAY**

a. Deterioration of concrete? _____

b. Exposed steel reinforcement? _____

c. Any leakage below concrete spillway? _____

d. Obstructions to flow? If so, lists plans to correct: _____

**7. DOWNSTREAM SLOPE**

a. Woody vegetation discovered? _____

b. Rodent burrows discovered? _____

c. Are seepage drains flowing? _____

d. Any seepage or wet areas? _____

**8. OUTLET PIPE**

a. Any water flowing outside of discharge pipe through the Impounding Structure? _____

b. Describe any deflection or damage to the pipe: _____

**9. STILLING BASIN**

a. Deterioration of concrete structures? _____

b. Exposure of rebar reinforcement? _____

c. Deterioration of the basin slopes? _____

d. Repairs made? _____

e. Any obstruction to flow? _____

**10. GATES**

a. Gate malfunctions or repairs? _____

b. Corrosion or damage? _____

c. Were any gates operated? If so, how often and to what extreme? _____

**11. RESERVOIR/WATERSHED**

a. New developments upstream of dam? _____

b. Slides or erosion of lake banks around the rim? _____

c. General comments to include silt, algae or other influence factors: _____

**12. INSTRUMENTS**

a. List all instruments _____

b. Any readings of instruments? _____

c. Any installation of new instruments? _____

**13. DOWNSTREAM/HAZARD ISSUES**

a. New development in downstream inundation zone? _____

_____

b. Note the maximum storm water discharge or peak elevation during the previous year. _____

c. Was general maintenance performed on dam? If so, when? _____

d. List actions that need to be accomplished before the next inspection: _____

_____

_____

**14. OVERALL EVAULATION OF IMPOUNDING STRUCTURE AND APPURTENANCES**

(Check one) ☐ **EXCELLENT** ☐ **GOOD** ☐ **POOR**

General Comments: _____

_____

_____

_____

_____

_____

Recommendations: _____

_____

_____

_____

_____

**CERTIFICATION BY OWNER'S ENGINEER (required only when an inspection by an engineer is required)**

I hereby certify that the information provided in this report has been examined by me and found to be true and correct in my professional judgment.

Signed: _____ Virginia Number: _____
Professional Engineer's Signature Print Name

This _____ day of _____ , 20 ____ .

Engineer's Virginia Seal:

**CERTIFICATION BY OWNER**

I hereby certify that the information provided in this report has been examined by me.

Signed: _____
Owner's Signature Print Name

This _____ day of _____ , 20 ____ .

**Mail the executed form to the appropriate**
**Department of Conservation and Recreation**
**Division of Dam Safety and Floodplain Management**
**Regional Engineer**

# Resources

- www.culpeper.vaswcd.org & click on Pond Planning
- Ponds – Planning, Design, Construction: http://www.vaex.edu/wneal/Pond_Management/pdf/NRCS590.pdf
- Private Pond Management: http://www.dgif.virginia.gov/fishing/pondmanagement/

# Resources

- Control Methods for Aquatic Plants in Ponds: http://www.vt.edu/pubs/fisheries/420-251/420-251.html
- Pond Construction: Some Practical Considerations http://www.ext.vt.edu/pubs/fisheries/420-011/420-011.html

# Resources

- Virginia Impounding Structure Regulations: Search “Virginia Administrative Code” Title 4 Agency 50 Chapter (4VAC50-20)
- Search for other land grant universities