



# Forestry, Wildlife & Fisheries Update Newsletter

Department of Forestry, Wildlife and Fisheries  
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October 2007  
Website: <http://fwf.ag.utk.edu>

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Sugar Hill Manor, New York

“I never before knew the full value of trees. Under them I  
breakfast, dine, write, read, and receive my company.”

~Thomas Jefferson ~

“The cultivation of trees is the cultivation of the good,  
the beautiful, and the ennobling in man.”

~ J. Sterling Morton

“Trees are the Earth’s endless effort to speak to the  
listening heaven.”

~ Rabindranath Tagore

“For in the true nature of things, if we rightly consider,  
every green tree is far more glorious than if it were made  
of gold and silver.” ~ Martin Luther, German theologian



“Acts of creation are ordinarily reserved for gods and poets. To plant a pine, one need  
only to own a shovel.” ~ Aldo Leopold

*Aldo Leopold (1887-1948) is considered the father of wildlife ecology and a true  
Wisconsin hero. He was a renowned scientist and scholar, exceptional teacher,  
philosopher, and gifted writer. It is for his book, A Sand County Almanac, that Leopold  
is best known by millions of people around the globe. The Almanac, often acclaimed as  
the century's literary landmark in conservation, melds exceptional poetic prose with  
keen observations of the natural world. The Almanac reflects an evolution of a lifetime  
of love, observation, and thought. It led to a philosophy that has guided many to  
discovering what it means to live in harmony with the land and with one another.*

## **Learn More about the Forest Resources on the Cumberland Plateau and Mountains**

*Wayne K. Clatterbuck, Professor, Forest Management and Silviculture*

With the recent controversies expressed about forests in the Cumberlands of Tennessee, particularly with the divestiture of many forest industry controlled lands, southern pine beetle problems, increased urban development and parcelization of forests; and considering that more than 70 percent of these forests are family-owned, a conference entitled “*Scientific Foundations of Conservation Planning in the Cumberland Plateau and Mountains*” will be held November 13 and 14, 2007 in Knoxville, TN at the UT Conference Center. The conference objective is to identify, summarize and evaluate scientific information that is highly relevant to conservation planning in the Cumberlands.

The Conference Steering Committee includes representatives of Oak Ridge National Laboratory, The Nature Conservancy in Tennessee, University of Tennessee – Knoxville, USDA Forest Service Southern Research Station, and National Council for Air and Stream Improvement. The number of conference participants will be limited by the capacity of the meeting space. Registrations (\$75) will be accepted until the capacity is filled. The conference program and registration information are posted at <http://www.ncasi.org/Programs/Events/Detail.aspx?id=122>

If you are interested in the past, present and future of the forests in the Cumberlands, take a look at the conference agenda and plan to attend.

*For more information, contact Wayne Clatterbuck at 865-974-7346 or e-mail at [wclatterbuck@utk.edu](mailto:wclatterbuck@utk.edu).*

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## **Fall Leaf Color for 2008**

*Wayne K. Clatterbuck, Professor, Forest Management and Silviculture*

We wish we could be more definitive with leaf color predictions because people want to make plans to view the landscape when leaf color is at its peak. However, leaf color really depends on the weather in the next few weeks. Can we confidently predict the weather two or three weeks in advance? Leaf color will depend on cool nights with temperatures in the high 30's and in the 40's and the amount of moisture we have in the next few weeks.

The color of leaves changes first at the higher elevations where it is cooler and progresses to the valleys at the lower elevations. Color generally begins in the mountains during the second week of October and advances to the valleys by the end of October and even lasting into the first two weeks of November. The changing leaf color is triggered by the shorter days of sunlight, and then influenced by temperature and moisture. The questions about leaf color that we have this year include how vibrant will the color be, when will the color occur and how long will the color last? The tentative answers to those questions are based on the prevailing and unusual weather conditions, primarily extended drought and warm temperatures extending into mid-October.

If we continue with warm, dry weather, the leaf color probably will not be as vibrant and it will be short-lived, probably a week or so at any one location. The drought will also probably delay the timing of leaf color by a week or so. However, if we get some moisture and we have cool nights (not below freezing) and sunny days, leaf color will be retained longer and be more pronounced. It could still be a great year for leaf color if the weather cooperates.

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## **Changing Colors of Leaves**

*Wayne K. Clatterbuck, Professor*

Forest Management and Silviculture

Differing shades of red, yellow, orange and purple. Autumn in full color. What triggers the color change? What color or colors do each species of trees turn? What causes the variations in color?

The factors that influence autumn leaf color are shorter day lengths, weather (primarily cooler temperatures and less moisture) and changing levels of leaf pigments. The only constant factor from year to year is the shortening day length. As days become shorter and nights grow longer, biochemical processes in the leaf initiate changing leaf color. All the other factors vary annually, making the prediction of autumn color unreliable.

**What causes the color?** Several pigments in leaves are responsible for color: chlorophyll, carotene, xanthophyll and anthocyanins.

Chlorophyll is the pigment in chloroplasts of plants that reflects green light. Plants use the energy absorbed by chlorophyll in photosynthesis to produce food for plant growth and development. Chlorophyll is continually broken down during photosynthesis and being replenished by the plant.

Carotene and xanthophyll are pigments that reflect orange and yellow light respectively. Both are present in the chloroplasts, with chlorophyll enabling the plant to absorb a wider range of wavelengths of light and thus capture more energy. These pigments are in such small quantities that they are masked by the more dominant chlorophyll during the growing season.

With the passing of summer, days become shorter. The phytochrome, the light-sensing mechanisms in leaves, recognizes the shorter day lengths. The shorter days and lower temperatures arrest chlorophyll production. Chlorophyll breaks down faster than it is replaced, allowing the yellow and orange pigments to be unmasked.

The molecules reflecting red wavelengths, anthocyanins, are water-soluble pigments that occur in the cell sap creating the red, pink, and purple hues. Not all trees produce anthocyanins. These pigments are not present during the summer, but their formation is encouraged during a succession of cool nights and sunny days. During these days when photosynthesis and chlorophyll production are decreasing, an abundance of sugars accumulates in the leaf. The cool nights promote a separation layer of cells in the petiole, where the leaf attaches to the twig, that prevents sugar from flowing out of the leaf, and also arrests the flow of nutrients into the leaf. The formation of anthocyanin requires bright light, a diminishing water supply and the accumulation of sugars trapped in the leaf.

**How does weather affect color?** The amount, duration and brilliance of autumn color depend on weather conditions that occur before and during the time chlorophyll in the leaves is declining. Temperature, light and water supply are the primary factors that influence the synthesis of carbohydrates (sugars) that favors anthocyanin formation and bright fall color. Cool, but not freezing, temperatures favor anthocyanin production. Early frost is more likely to kill leaves, making them turn brown and fall sooner from the trees. Bright light favors red colors, so red color often develops on exposed leaves. Water supply also affects anthocyanin production, with mild drought favoring bright reds. Rainy days occurring near peak coloration will decrease color intensity. Late summer droughts can delay the onset of fall color by a few weeks. Temperature, sunlight and moisture are highly variable each year, assuring that no two autumns are alike.

Individual trees of the same species growing together often show differences in leaf color because of variations in the amount of sugars in the leaves and genetic predisposition. Some reach their peak color earlier than others. Variations among species in the rate of color change reflect differences in chlorophyll breakdown, production of anthocyanin and exposure of carotene and xanthophyll.



*picture by Sarah Clatterbuck*

**When is the best time for autumn color?** In Tennessee, autumn color begins first at the higher elevations in response to cooler temperatures and shorter days. The color progresses to the lower elevations, extending the duration of fall color. The average peak period of fall color in Tennessee ranges from the last week in October through the first week in November. Two trees recommended for a wide array of leaf color are sugar maple and sweetgum. Sugar maples turn yellow then orange and sweetgum color can vary among individual trees from yellow to red and purple. A few trees with dazzling yellows are ginkgo, hickories, honeylocust and ash. Vibrant reds include red maple, blackgum and red oaks.

The University of Tennessee Agricultural Extension publication SP514, **Small Trees for Fall Splendor**, lists some of the small trees such as dogwoods, sumacs and sourwood that are recommended for fall color. For more information about the fall coloration of larger trees, see SP529 **Changing Colors of Leaves** on the website [www.utextension.utk.edu/publications/spfiles/SP529.pdf](http://www.utextension.utk.edu/publications/spfiles/SP529.pdf).

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### **Things in The Forest**

*Larry Tankersley, Forest Specialist*

Smooth patches on a tree's bark? Judy Hubbard and Cynthia Ash from the University of Minnesota, provide the following description:



“**Smooth patch** is a condition in which the outer, rough bark of a tree falls off in patches, leaving smooth, somewhat depressed areas. This condition, caused by the fungus, *Aleurodiscus oaksii*, causes smooth patch on a number of hardwoods and conifers, including elms, sugar maple and oaks. However, in our area smooth patch is most commonly seen on white oak.

The fungus colonizes the dead outer layers of bark on living trees causing the bark to slough off. The smooth, light colored depression is usually irregular in shape and size, ranging from a few inches to more than a foot across. Since the fungus does not invade living tissue, smooth patch is not harmful to the tree.

The reproductive structures of the fungus, also called fruiting bodies, are sometimes noticeable in wet weather. They are usually small, 1/8" or 1/4" in diameter. The structures form flat, leathery discs, cream-colored to light gray or beige, and curled at the edges. They grow in clusters on the affected bark and are sometimes described as looking like lichens. In dry weather, the fruiting bodies shrivel up and become inconspicuous. Fruiting bodies may persist on the tree all year”.

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## **Silvics of Oak**

*Wayne K. Clatterbuck, Professor, Forest Management and Silviculture*

The establishment, development, growth and culture of oaks are unique and highly variable among oak species. The oak genus is the largest of native tree species in the eastern United States. Natural regeneration is relied on for most oak types. Therefore, forest managers must have a thorough knowledge of oak silvics in order to manage oak stands successfully. The oaks are classified as intermediate in tolerance to shade, however they vary from very shade intolerant to shade tolerant. Only a few species will tolerate flooding, inundation and poorly-drained soil conditions.

Acorn production is sporadic and unpredictable. The white oaks require one year for seed to develop and the mature acorns germinate soon after they fall in October and November. Red oak seeds require two years to mature and the acorns fall in the autumn and then germinate the following spring. Large seed crops generally occur at intervals of 3-10 years and are species specific. Early seedling growth and development is generally slower than or barely competitive with other non-oak species. To favor the growth of oaks, these competitors must be controlled. The ability of oak species to sprout vigorously is an important attribute. However, sprouting is species specific, and varies with age, size, growth rate and may vary by geographic region. Epicormic branching can be a significant problem that can have adverse effects on bole quality when implementing partial cuts such as a thinning or an improvement cut.

In general, most oak species tend to be fairly drought tolerant. This most likely is due to one or more of the following: early seasonal root growth, deep root systems, high water-use efficiency and stomatal closure only at very low water potentials.

Historically, oak regeneration success is often linked to fire, grazing/browsing, and the loss of American chestnut in some areas. A few factors that favor the regeneration of oaks include:

1. thick bark of oaks
2. oak's ability to resprout following top damage of seedlings
3. reduced population of acorn-eating insects following fire
4. reduced mid- and understory competition from fire-intolerant species
5. fire creates favorable conditions for acorn caching by rodents and birds
6. fire removes or reduces thick litter-layers

Given the unique silvical characteristics just described, oaks are a "disturbance" species. Oaks tend to thrive in environments that are disturbed periodically, especially during the establishment/regeneration phase and when faster-growing species are present that may supplant the development of oaks.

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## **Alternative Timber Harvesting to Minimize Visual Disturbance**

*David Mercker, Extension Specialist I, Forest Management*

When forest landowners are asked to rank the reasons why they own forestland, the non-consumptive reason of “to enjoy the scenery” often ranks above the more consumptive reasons of “timber production.” This is not to say that landowners do not wish to derive income from logging; but it could suggest that logging should maintain the forest scenery as best as possible.

An array of practices can be incorporated into a logging operation to minimize loss of aesthetics. Here’s what this entails:

1. Ensure that all forest structures are present - provide for a variety of tree and plant species, in a variety of heights, diameters, and crown layers; included should be herbaceous understory, shrubs, snags, downed woody debris, and both “newer growth” and “older growth” trees;
2. Combine harvesting methods – Try to emulate natural disturbances when harvesting; this can include the creation of group selection openings (of various sizes) coupled with intermediate harvesting practices such as thinning, crop tree release, sanitation cutting, and/or single tree selection; group selections mimic natural disturbances to the forest, while intermediate harvesting emulates normal tree mortality;
3. Leave visual buffers – especially near roads and trails, ponds, creeks and other areas of high recreational use or aesthetic enjoyment; harvest these areas lightly or not at all;
4. When selecting a tree (or groups of trees) for harvest ask the question, “Will this (these) tree(s) improve in quality, value, and vigor by leaving them for future harvests?” If not, harvest them; in so doing, this may release better quality, younger trees nearby.
5. Leave some look-em-at-em’ trees – commonly called culls, wolf trees, trees of unusual species or form; look-em-at-em’ trees are those that make the forest experience special; their monetary value may be low, but their scenic value can be immeasurable.

This approach to forest management is a viable alternative for those forest landowners who appreciate forest aesthetics. It is also a method that is less likely to attract attention.

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###

**EITs and TIMOs: New Owners of Industrial Forest Lands**

*Adam Taylor, Assistant Professor, Wood Products Specialist*

In Tennessee, most of the forest land is privately owned. The government owns only about 14%, while 70% is held by small, private landowners. The forest industry and other corporations own the rest.

However, industrial forest ownership is changing in Tennessee and across the country. It is estimated that half of all U.S. timberland has changed hands in the past decade. And it is predicted that more than 44 million acres of private forest land, an area twice the size of Maine, will be sold over the next 25 years.

In the past, most major forest products companies owned large areas of forest land. These companies managed the land for timber to supply their sawmills and pulp and paper operations. In recent years, many forest products companies have sold their forested acres to REITs and TIMOs. A REIT (real estate investment trust) is a tax designation for a corporation investing in timberland (or other real estate) that reduces income taxes. A TIMO (timberland investment management organization) helps institutions (such as REITs) to manage their timberland investments. In 2002, approximately \$14 billion in land in the United States was managed by TIMOs. TIMOs have bought over a third of the 30 million acres of private industrial forests already sold.

While selling forest land offers the forest industry a source of cash and helps them to avoid taxes, it deprives them of direct control over their timber supply. Because of this, timberland sales often come with long-term timber supply agreements with the forest products companies that are selling the land. However, the goal of a REIT is to maximize the value of their land investments. This could include the future conversion of forestland to other purposes such as housing developments.

The forests of Tennessee are vast and growing at about twice the rate of harvest. However, as more industrial forestland is sold to private investors, and as the population of the state continues to expand into the forests, some forest products companies may encounter challenges in getting the timber that they need.

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## **Proper Care and Handling of Game Meat**

*Tennessee Wildlife and Resource Agency Website*

Hunters tend to spend a great deal of time planning to take game and little time on planning to take care of the animal when they are successful. As a result, game meat often has “that wild taste”. Properly cared for game meat has its own delicious taste, uniquely different from the meat of their domestic counterparts. To insure the game meat you bring home is of the highest quality and best taste, be prepared to handle the animal properly.

The first important step to high-quality game meat is a clean kill. A downed animal should be field dressed immediately, taking care not to puncture the stomach, intestines or bladder. Immediate field dressing is especially important for deer sized and larger game, but is also important on medium or small game in order to maintain the meat quality.

Animals should be kept clean as they are transported from the field. This is generally more of a problem with animals such as deer that must be dragged from the field. Take care to make sure field-dressed carcasses are not tainted with debris as the animal is removed from the field.

Temperature is another important consideration. When hunting in warm weather, preparation should be made in advance to cool carcasses. Small carcasses can be placed on ice in an ice chest. When temperatures are above 50 degrees Fahrenheit, large carcasses, such as deer, should be transported to a walk-in-cooler or placed on ice. At temperatures of 40 - 50 degrees Fahrenheit, large carcasses can be hung in a shady spot, skinned and propped open to promote cooling. The carcass will stay in good condition for two to three days, but should be protected from insects with black pepper and a game bag. At cooler temperatures, the hide may be left on the carcass until you are ready to butcher the animal. Frequent freezing and thawing, however, will also decrease meat quality. Tennessee Wildlife Resource Association has an excellent publication on their website, [www.state.tn.us/twra/pdfs/gamehandling.pdf](http://www.state.tn.us/twra/pdfs/gamehandling.pdf), regarding “Proper Field Dressing and Handling of Wild Game and Fish” compiled by Catherine D. Cutter, Assistant Professor, Food Science Department, Pennsylvania State.

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## **The Secret to Moist and Delicious Venison and Game Meats**

Reprint from Riverside Retreat

~ 250 DEGREES ~

We have all had dry roasts and steaks from wild meats. It is one of the most common complaints of people eating and preparing venison. Deer and elk as all wild game meats and are low in fat. The fat that is present is not mixed or marbled throughout the meat fibers as in beef. This makes the meat tend to become dry as it is cooked. Even when adding fats to sausages and wrapping around and on top of wild meat as it is cooked, the moisture is still lost through the cooking process and dry meat is the result.

After many years of enduring dry roasts and not so good steaks, we have found the secret to really good and moist wild meat cooking. 250 degrees Fahrenheit. This is it! Very simply put! Cooking wild meats at this low temperature will be the difference between ordinary dry meat and a really good meal. Try your favorite recipe with the temperature reduced and the cooking time increased and see if you agree.

###



## **Wildlife Management Calendar for November**

*Craig Harper, Associate Professor, Wildlife Management*

### **Habitat Management**

Spray non-native perennial cool-season grasses (such as tall fescue and orchardgrass) for quality wildlife cover.

- October through early November is the optimum time to kill these grasses!
- spray to release the seedbank or in preparation to plant native warm-season grasses next spring
- use 1.5 – 2 quarts per acre of a glyphosate herbicide (such as Roundup) with a surfactant
- using glyphosate to kill cool-season grasses after a frost will not harm desirable warm-season grasses and forbs as they will be dormant
- refer to A Landowner's Guide to Native Warm-Season Grasses in the Mid-South, PB 1746, or Native Warm-Season Grasses: Identification, Establishment and Management for Wildlife and Forage Production in the Mid-South, PB 1752, for additional information on eradicating non-native perennial cool-season grasses; <http://www.utextension.utk.edu/publications/wildlife/default.asp>



Disk strips in old-fields for brood habitat

- will stimulate desirable forb growth next spring
- will reduce grass dominance where needed
- will reduce woody encroachment by sweetgum, elms, maples and other undesirable woody saplings in the field

Disk firebreaks around fields and woods before the ground freezes so they'll be ready to burn next March/April

- disking now will stimulate forbs next spring
- winter wheat can still be sown, if desired, or leave fallow
- don't disk firebreaks immediately adjacent to the woods; come out beyond the drip line of the trees, 50 feet from the trees, and allow a soft edge to develop

Begin dormant planting native warm-season grasses

- don't plant too deep – no more than ¼ inch!
- don't forget preemergence weed control next April/May; it is critical!

Enhance the cover around old-fields by thinning (killing) undesirable trees 100 feet into the woods

- girdle unwanted trees and spray wound with a mixture of Garlon and Arsenal AC
- use 2 quarts Garlon 3A and 12 ounces Arsenal AC filled to 1 gallon of water
- dead standing trees (snags) provide perching, roosting, denning, feeding sites for many wildlife species
- increased groundcover is stimulated by the additional sunlight, improving forage and nesting cover for many wildlife species

Plant trees/shrubs for wildlife

- establish hedgerows across fields with soft-mast bearing trees and shrubs
- hedgerows can be used to break up fields into sections
- also plant trees/shrubs in blocks at end of fields or in "odd" areas
- wild plum, crabapple, persimmon, elderberry and others are good choices
- refer to Improving Your Backyard Wildlife Habitat, PB 1633, for a list of other trees and shrubs to consider

Fertilize/prune trees/shrubs for increased soft mast production

Continue to strip-mow or silage chop dove fields to provide seed and hunting opportunities

- strips can be disked and top-sown with winter wheat (2 bushels per acre) to provide additional forage opportunities
- migrating doves appreciate your efforts and the late dove seasons can offer great shooting

Spray perennial forage food plots for weed control if necessary

- refer to *Growing and Managing Successful Food Plots for Wildlife in the Mid-South*, PB 1743, for specific information; <http://www.utextension.utk.edu/publications/pbfiles/PB1743.pdf>

Soil test now for spring plots

- applications of lime require about 6 months before full effect on pH is realized

Flood waterfowl impoundments

- a depth of 8 – 12 inches is ideal for dabbling ducks

Continue Timber Stand Improvement activities

- stimulate growth among oaks, beech, cherry, persimmon, and other mast producers by killing surrounding competitors
- girdle unwanted trees and spray wound with a mixture of Garlon and Arsenal AC
- use 2 quarts Garlon 3A and 12 ounces Arsenal AC filled to 1 gallon of water

Build brushpiles from thinned trees and pruned limbs

- put large limbs on bottom and small limbs on top for crevice space and overhead protection

Clean out bluebird boxes to allow more room for roosting bluebirds when cool weather arrives

- 10 or more bluebirds may roost in a single box on cold nights

Clean out wood duck boxes and replace old wood shavings with fresh shavings

- screech owls and squirrels may use the boxes through fall and winter
- repair/install predator shields if necessary

Put out bird feeders and keep them full

- it's not too early
- refer to *Improving Your Backyard Wildlife Habitat*, PB 1633, for information on specific feeders and seed for birds; <http://www.utextension.utk.edu/publications/pbfiles/PB1633.pdf>

### **Wildlife Damage/Population Management**

- close crawl spaces under the house and check for openings in the attic
- helps keep snakes, skunks, and squirrels from getting into places where they are not welcome
- rodents are beginning to cache food for the coming winter; take action now to keep them out of your house
- glueboards are very effective in trapping mice, snakes, and lizards looking for a warm place inside your basement or garage
- refer to *Managing Nuisance Animals and Associated Damage Around the Home*, PB 1624, for additional information; <http://www.utextension.utk.edu/publications/pbfiles/pb1624.pdf>

Blackbirds and starlings have gathered into large winter flocks

- don't allow them to roost in your trees; if they start, they'll form a habit
- repel them with noise makers (shotguns, firecrackers, banging metal pans together)
- be persistent

Deer season is underway

- allow hunters access to your land if you have a problem with too many deer
- shoot the females (does); concentrating on bucks does little to control overpopulation
- in many overpopulated areas, it is necessary to kill 1 doe per 10 acres (sometimes more) before the population is reduced to acceptable levels
- where Quality Deer Management is desirable, reduce the population so plenty of forage is available, shoot does to even the sex ratio, and allow bucks to reach 3 ½ years of age before shooting them
- refer to Quality Deer Management: Guidelines for Implementation, PB 1643, for additional information; <http://www.utextension.utk.edu/publications/pbfiles/PB1643.pdf>
- take a kid hunting!

###

### **Pond Management Web-Site Resource**

reprint of article by Samuel Jackson, Forestry

This month's focus is on pond management. Throughout the year, calls come in to county offices across the state wanting information about pond construction, pond management, and problem solving. When providing information to landowners, keep in mind that there is a good, web-based resource for pond information.

NC State University has developed a pond management website as part of their Fisheries Extension program (<http://www.ces.ncsu.edu/nreos/wild/fisheries/>). One of the features available on the site is a pond management manual guide that covers everything from site selection and construction, to chapters on solving problems with weeds, fish parasites, etc. The entire guide is available online. The site also offers a pond management video that landowners can view free of charge. It's a 23-minute video covering the basics of ponds.

There is also information about aquatic weed management, lists of fish suppliers, and other pond management topics. Though developed for North Carolina, the site offers a literal "boat" load of information for Tennessean's interested in ponds! Check it out today!

## **Looking Ahead: Winter Drawdown, A Useful Management Tool for Farm Ponds**

Southern Regional Aquaculture Center and Mississippi State University

One of the most useful and most inexpensive pond management practices is called a "winter drawdown." This practice is the reduction of water levels in a pond to some predetermined level, and generally is designed to expose 35 to 50 percent of the pond-bottom area. Winter drawdowns can be useful in controlling aquatic weeds, and can be invaluable in manipulating fish populations and facilitating pond repairs, redesign, and liming. The primary disadvantage is that the pond must have a drain pipe that will allow the water levels to be lowered and kept down throughout the winter. Ponds without a drain pipe can be retro-fitted, and detailed information on how this is accomplished is available through your county Soil Conservation Service office.

Aquatic weed problems are common in farm ponds, and usually represent a challenge to overcome. Of the three basic weed control methods (mechanical, biological, and chemical), mechanical control can be the least expensive and most convenient, if it consists of a winter drawdown. Winter drawdown exposes weeds to air-drying and freezing temperatures. This can be an effective weed control technique, especially if done in successive years, and it has other advantages related to fish population management.

For effective weed control, drop the water level of the pond to expose aquatic weeds in the more shallow portions of the pond. Usually, water levels are reduced enough to expose 35 to 50 percent of the pond bottom, but this percentage may vary greatly, depending upon topography and design of the pond. Maximum drawdown should be accomplished by mid- to late November, and the water level should remain low through February. Spring rains will fill the pond.

After reflooding, if weeds persist and begin to sprout, apply an appropriate herbicide. The combination of a winter drawdown and effective early spring herbicide application usually does a good job of eliminating or greatly reducing aquatic weed infestations. For additional information on aquatic weed management and control see publications SRAC 360-369; 3600-3699 at <http://srac.tamu.edu/fulllist.cfm>.

Winter drawdown is also a good fish population management technique in bass/bluegill ponds. By reducing the water level and pond area, forage fish, such as bluegills, are driven out of shallow water refuges and concentrated in open water, making them more vulnerable to bass predation. This is a good technique to use in ponds classed as "crowded bluegill," but still have viable bass populations in them. The increased predation by bass reduces bluegill numbers and provides additional food for the struggling bass population. In some cases, routine annual drawdowns have helped the pond manager maintain a balanced bass/bluegill fishery.

Winter drawdown also provides a good opportunity to do repairs on piers, docks, and boat ramps, as well as minor dam repairs and shoreline renovation. Fish attractors, such as brush tops and gravel beds, can be easily put in place while the water is down, and this is a good time to deepen edges to the recommended minimum depth of 18 to 24 inches. Dirt from the shoreline-deepening operation can be used to construct earthen piers at various locations around the pond. These piers serve to increase the shoreline area of the pond, and also provide increased access for fishermen. For more information see the SRAC 104 Repairing Fish Pond Levees and SRAC 105 Renovating Leaky Ponds at <http://srac.tamu.edu/fulllist.cfm>.

While the pond is down, take soil samples and analyze for the pond lime requirement. Use the following procedures in sampling pond soils:

- > If pond is larger than 3 acres, partition the pond into 3-acre blocks and sample each block separately. (If pond is less than 3 acres, collect 3 samples per acre and treat each acre as a block.)
- > Collect about a pint of soil from each of 10 locations per block.
- > Thoroughly mix the 10 samples together in a bucket.
- > Take one sample from the mixture and air-dry; then place this sample in a soil sample box and submit to the Soil, Plant and Pest Center, 5201 Marchant Dr, Nashville, TN 37211. Website is <http://soilplantandpest.utk.edu/>. Be sure to indicate on the submission form that this sample is for a farm pond.

Repeat this procedure for each 3-acre block in the pond. The sample will be analyzed, and you will receive a report indicating if your pond needs lime and how much to apply.

Generally, from 1 to 2 tons of lime per acre are required. The lime should be in the form of agricultural limestone, not quicklime, slaked lime, or hydrated lime. Although these alternative liming materials can be used, they pose a potential threat to fish by increasing pH too high too rapidly.

Apply lime in the fall. A drawdown provides opportunity to spread the lime on the exposed soils, which is ideal. Keep in mind that liming is intended to increase the pH of the **soil**, and application of the lime directly to the soil is the most efficient method of liming a pond. Although it is **best** to apply lime to the soil, this often is not practical, and application can be made directly to the water. Liming ponds with lime is the best way to increase and maintain alkalinity levels. **Since agricultural lime takes several months to react with bottom muds, it needs to be applied in the fall and winter, so time is getting short!** If applied in the warm months, the lime causes the available phosphate to precipitate out of the water and be unavailable for producing phytoplankton. For detailed information of liming ponds see publication SRAC 4100, Liming Ponds for Aquaculture at <http://srac.tamu.edu/>.

If the soil test indicates a need for lime, be aware that a fertilization program is a waste of time and money unless you lime the pond. Fertilizers are ineffective in a pond that has a lime requirement, and all phosphorus applied to such a pond will be quickly tied up into the soils, rather than becoming available in the water column. For detailed information on pond fertilization see publication SRAC 471 Fertilization of Fish Ponds at <http://srac.tamu.edu/>.

In most farm ponds, lowering the water level 2 to 3 feet exposes the proper percentage of the pond bottom; however, this is only a rule of thumb. You must consider the topography of the pond, amount of shallow water, and pond shape and design. As recommended for weed control, reach the maximum depth of drawdown by late November, and the water must remain down through February for the technique to be effective. The stand pipe can be raised a little earlier, perhaps mid-February, to allow the pond to refill and not hamper bass spawning activities.

Winter drawdown can be a useful tool for the farm pond manager if executed properly. It poses no threat to the fish population, and costs nothing if the pond is equipped with a water control structure. Drawdowns should only be done in the winter, however; never during summer! The extreme temperatures during summers, coupled with the increased metabolism of fish and reduced oxygen levels in warm water, would prove disastrous in most farm pond situations.

For more information contact:

Western District Fisheries Agent, Ron Blair at 731-968-5266 or [rblair3@utk.edu](mailto:rblair3@utk.edu)

Central District Fisheries Agent, Creig Kimbro at 931-592-3971 or [ckimbrow@utk.edu](mailto:ckimbrow@utk.edu)

Eastern District Fisheries Agent, Kelly Amonett at 423-346-3000 or [damonet1@utk.edu](mailto:damonet1@utk.edu).

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