# Forest Stewardship Workshop:
# Use Prescribed Fire Safely and Effectively

**September 27, 2016; 8:30 am – 3:00 pm, CT**
Blackwater River State Forest, Bear Lake Pavilion


Prescribed fire is applied to thousands of acres in the South each year to achieve forestry, agricultural and/or wildlife management objectives. Under the right conditions prescribed fire is an effective tool for reducing fuel loads and improving wildlife habitat, aesthetics and access. This workshop will provide an overview of the uses of fire in natural resource management and the proper planning necessary for a successful prescribed burn. A burn demonstration will be planned and executed, if conditions allow.

**Tentative Agenda:**

| | |
|---|---|
| 8:30 am | **Sign-in, meet and greet** at Bear Lake Pavilion |
| 9:00 | **Welcome and Introduction**, Mike Hudson, Florida Forest Service (FFS) and Chris Demers, UF/IFAS School of Forest Resources and Conservation |
| 9:15 | **Why Use Fire?**, Maria Wilson, FFS |
| 10:00 | **Prescribed Burning Factors and Issues**, David Smith, FFS |
| 10:45 | Break |
| 11:00 | **Plan it! - The Who, What, Where, When, Why, How**, Gary Holley, FFS |
| 11:45 | **Prescribed Burn Associations and Cost-share Assistance**, Arlo Kane, Florida Fish and Wildlife Conservation Commission |
| 12:00 pm | **Lunch** |
| 1:00 | **Executing the Burn: Equipment and Firing Techniques** - **in the field**, Gary Holley, FFS and all staff |
| 3:00 | Conclusion, evaluation, adjourn |

**Funding for Florida's Forest Stewardship Program is provided by the USDA Forest Service through the Florida Department of Agriculture and Consumer Services Florida Forest Service and the Florida Sustainable Forestry Initiative Implementation Committee.**

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-2016 Florida Forest Stewardship Program Sponsors on back cover-

## Workshop Resource Contacts


**John Doyle Atkins**
Extension Agent
UF/IFAS Santa Rosa Extension
PO Box 37
5259 Booker Lane
Jay FL 32565
(850) 675-6654
srcextag@ufl.edu

**David Godwin**
Program Coordinator
Southern Fire Exchange
University of Florida
Tallahassee, Florida
(850) 893-4153 ext. 261
drg2814@ufl.edu

**Arlo Kane**
Regional Landowner Assistance Coordinator
Florida Fish and Wildlife Conservation Commission
3911 Highway 2321
Panama City, FL 32409
(850) 767-3616
Arlo.Kane@myfwc.com

**Charles "CC" Christensen**
Forest Area Supervisor
Florida Forest Service
11650 Munson Hwy
Milton, FL 32570
(850) 957-5719
Charles.Christensen@freshfromflorida.com

**Gary Holley**
Forest Area Supervisor
Florida Forest Service
7050 N Hwy 189
Baker, FL 32531
(850) 689-7838
Gary.Holley@freshfromflorida.com

**David Smith**
Forestry Operations Administrator
Florida Forest Service
11650 Munson Highway
Milton, FL 32570
(850) 957-6140 x. 112
David.Smith@freshfromflorida.com

**Chris Demers**
Extension Program Manager
UF/IFAS School of Forest Resources
and Conservation
PO Box 110410
Gainesville, FL 32611
(352) 846-2375
cdemers@ufl.edu

**John "Mike" Hudson**
Forestry Maintenance Administrator
Florida Forest Service
11650 Munson Highway
Milton, FL 32570
(850) 957-6140 x. 102
John.Hudson@freshfromflorida.com

**Maria Wilson**
Okaloosa County Forester
Florida Forest Service
7050 N Hwy 189
Baker, FL 32531
(850) 689-7838
Maria.Wilson@freshfromflorida.com


Questions about this or other Forest Stewardship Program activities can be directed to Chris Demers, (352) 846-2375 or by email at cdemers@ufl.edu.
For more information and events see the Florida Forest Stewardship Program web site at:

**http://www.sfrc.ufl.edu/forest_stewardship**

# Florida's Forest Stewardship Program

**Forest Stewardship** is active management of forests and related resources to keep these lands in a productive and healthy condition for present and future generations, and to increase the economic, environmental and social benefits of these lands. Forest Stewards are landowners who manage their forestlands on a long-term basis by following a multiple resource management plan.

***The Forest Stewardship Program addresses the improvement and maintenance of timber, wildlife, soil and water, recreation, aesthetics, as well as forage resources.***

## Eligibility

Private forest landowners with at least 20 acres of forest land and have a desire to manage their ownerships according to Stewardship principles can participate in the Forest Stewardship Program. Also, adjacent landowners, with similar management objectives, may combine their holdings to meet this acreage limitation.

## Benefits to Landowners

- A customized management plan that is based on the landowner's objectives. The plan will include forest stand characteristics, property maps, management recommendations, and a five-year time line for future planning. This plan also serves as documentation of active management on the property that may help reduce tax liability.
- An opportunity for future public recognition as a certified "Forest Steward".
- Educational workshops, tours and a quarterly Stewardship newsletter developed and distributed by the University of Florida, IFAS Cooperative Extension Service.

## Getting into the Program

Contact your local Florida Forest Service County Forester and tell them that you would like to have a Forest Stewardship Plan prepared for your property. More information and application here:

**http://FreshFromFlorida.com/ForestStewardship**

# Tree Farm Program

The American Tree Farm System® is a program of the American Forest Foundation and was founded in 1941 to promote the sustainable management of forests through education and outreach to family forest landowners. Nearly 26 million acres of privately owned forestland and 80,000 family forest landowners in 46 states are enrolled in this program and committed to excellence in forest stewardship. About half of all Tree Farms are located in the South.

## Eligibility

Private forest landowners with at least 10 acres of forest land and have a desire to manage their ownerships according to sustainable forestry guidelines can participate in Tree Farm.

## Benefits to Landowners

Tree Farmers are good stewards of their forestland committed to protecting watersheds and wildlife habitat and conserving soil. They manage their forestland for various reasons, including timber production, wildlife, recreation, aesthetics, and education/outreach. Tree Farmers receive many benefits:

- Representation on local, state, and federal issues affecting forestland owners.
- Exposure to a network of forestry professionals and landowners committed to sustainable forestry.
- Access to seminars, field days, and workshops to help manage their Tree Farm even better.
- Certification that meets international standards of sustainable forest management.
- Participation in local, state, regional, and national Outstanding Tree Farmer of the Year awards and recognition.

## Getting into the Program

Contact your local Florida Forest Service County Forester and tell them that you would like to join the Tree Farm program. More information here:

**https://www.treefarmsystem.org/florida**

# Florida Forest Service
# Silviculture Best Management Practices

### Silviculture Best Management Practices (BMPs)

Silviculture BMPs are the minimum standards necessary to protect our state's waterbodies and wetlands from degradation and sedimentation that can sometimes occur because of erosion from forestry operations. Silviculture BMPs should be applied on all bonafide ongoing forestry operations, especially those adjacent to waterbodies and wetlands, and may be enforced by federal, state and local authorities.

### Silviculture BMP Courtesy Checks

Silviculture BMP courtesy checks are available for landowners, land managers, and loggers. These courtesy checks provide a "report card" on Silviculture BMP implementation for recent or ongoing forestry operations. This helps future management planning and evaluates the performance of contractors on your property.

### Silviculture BMP Site Assessments

On-the-ground Silviculture BMP site assessments are available to determine which Silviculture BMPs apply to planned operations on a specific site. This helps with harvest plan development, road layout, mitigation of existing problem areas, etc.

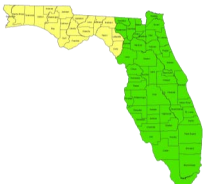
### Silviculture BMP Notice of Intent

The Silviculture BMP Notice of Intent (Rule 5I-6 F.A.C.) is a voluntary, one-time pledge that a landowner signs, indicating intent to adhere to Silviculture BMPs on their property. Once a landowner has signed the Notice of Intent, he or she will become eligible to receive a *presumption of compliance* based on reasonable evidence with state water quality standards during future ongoing forestry operations. This is very important if a landowner's property falls within an area covered by a Florida Department of Environmental Protection Basin Management Action Plan for impaired waters.

### Additional Services

For information on the services listed above or any other services provided by the Florida Forest Service's hydrology section, please contact your local BMP Forester.


**Roy Lima**
Panhandle Area
Roy.Lima@FreshFromFlorida.com
(850) 681-5942


**Robin Holland**
Peninsula Area
Robin.Holland@FreshFromFlorida.com
(352) 732-1273



Florida Department of Agriculture and Consumer Services
Adam H. Putnam, Commissioner

# Forestry
# Wildlife Best Management Practices for State Imperiled Species

- Forestry Wildlife Best Management Practices for State Imperiled Species (WBMPs) were adopted into Florida Administrative Code (Rule 5I-8) on October 21, 2014.
- WBMPs were developed through a partnership between the Florida Department of Agriculture and Consumer Services' Florida Forest Service and the Florida Fish and Wildlife Conservation Commission (FWC).
- WBMPs are **voluntary** practices designed as a practical approach for avoiding and minimizing the loss of **State Imperiled Species** due to silviculture operations.
- WBMP practices address the 16 State Imperiled Species which are considered to be potentially vulnerable to silviculture operations including ten aquatic species, two burrowing animals, and four nesting birds.
- WBMPs are designed to supplement the existing water quality-based Silviculture BMPs which already provide many valuable benefits to the conservation and management of fish and wildlife in Florida.
- Landowners and other forestry resource professionals can enroll in the voluntary program by completing a WBMP Notice of Intent. Those who do not wish to enroll will continue to be subject to all current laws and regulations regarding State Imperiled Species.
- Once enrolled, applicants who **properly implement** WBMPs will no longer be required to obtain a permit authorizing the incidental take of State Imperiled Species during bonafide ongoing forestry operations. In addition, they will not be subject to any fines or penalties associated with an incidental take of the State Imperiled Species covered by the WBMP Manual.
- WBMPs are not designed to facilitate wildlife habitat restoration or species recovery and expansion. Also, they do not address any Federally Listed Species. For information on Federally Listed Species, refer to FWC's online "Florida Wildlife Conservation Guide."
- To obtain more information or a copy of the WBMP Manual and Notice of Intent, contact your local Florida Forest Service BMP forester (see below) or a FWC Landowner Assistance Program biologist (850) 488-3831.

<u>Florida Forest Service BMP Foresters</u>


Roy Lima
Panhandle Area
(850) 681-5942
Roy.Lima@FreshFromFlorida.com

Robin Holland
Peninsula Area
(352) 732-1273
Robin.Holland@FreshFromFlorida.com

# Got Invasives?

## Invasive exotic plant problem? Find a program to help by using FloridaInvasives.org.

The Florida Invasive Species Partnership has collected, evaluated and categorized assistance programs into a single resource, making it easier to find the financial and/or technical assistance available to Florida landowners to prevent or control invasive exotic species problems. FloridaInvasives.org has an online resource of management assistance programs to help in your fight against problematic plant species. This resource takes the guesswork out of finding the agencies or organizations offering assistance and will direct you to available programs. The Landowner's Incentives Database will also provide the requirements for each program, to help you decide if they are a good match for your needs.

### Why was FloridaInvasives.org developed?

Invasive species have been identified as being costly ecologically and economically statewide in Florida. The Florida Invasive Species Partnership (FISP) is a collaboration of public and private entities in Florida, formed to link efforts at preventing and controlling invasive exotic plants across agency and property boundaries. FISP has developed an on-line tool of available financial and technical assistance sources to make it easier for landowners and land managers to find them.

### How does FloridaInvasives.org help you?

FISP has created a searchable database, the Florida landowner incentives database, accessible at FloridaInvasives.org that allows you to find an assistance program for your needs. Search by your county, target species or other pertinent information into the online tool, and you will retrieve a current list of available programs. Floridainvasives.org will help provide focus to your search so that you can get the right person at the right program.

FloridaInvasives.org:

- Builds community awareness,
- Leverages limited resources through cooperation and
- May reduce individual land management costs.

This resource will be regularly updated with the most current program information to provide you the most up-to-date opportunities.

Go to FloridaInvasives.org to find out more.

Species Shown from top to bottom:
Mexican Petunia, Boston Fern, Mimosa, Cogongrass, Camphor

FISP
Florida Invasive Species Partnership

*Think Locally, Act Neighborly*

invasive species know no boundaries!

# Prescribed Burning
## Factors and Issues

by Dave Conser, Florida Forest Service, April 28, 2016

Fire is vitally important to almost every ecosystem in Florida.
"Florida is designed to burn, and burn it will." - John Bethea, former Director of the Florida Division of Forestry

We cannot just "Let it burn" any old way. We have suppressed natural fires for so long that we must bring fire back in a properly managed way. This is prescribed burning.

## Objectives

Your objectives as a landowner are paramount. What do you want your land to be? What condition is it in now? How do you get to the future condition you desire? This is your objective. Some landowners need to know what the possibilities are. Then they often have an "Ah ha!" moment. "Now I know what I want!" Then the issue becomes, how does my land get there?

Prescribed burning is like any other land management practice. What are your objectives? How can prescribed burning help meet your objectives? What is your objective for burning? Every landowner is unique, every forest is unique, and every fire is unique.

Here are some possible objectives for prescribed burning:

Ecosystem Restoration
Wildlife Habitat
Aesthetics
Wildfire Hazard Reduction
Competition Control
Insect and Disease Control
Site Preparation
Grazing
Access

These objectives determine the type of fire we need.

What type of fire helps move toward restoring the forested ecosystem, creating diversity and resiliency? Improves wildlife habitat? Controls competition? Reduces the hazard of a wildfire?

Prescribed fire on your property depends on 3 things: Objectives, Weather and Fuels.
The "Prescribed Burning Triangle"!

As a burner I must consider these 3 things. Given your objective I will look at the current condition of the fuels that will burn, and then choose a day with weather parameters that will coordinate these 3 things. If you haven't burned in a long time, if ever, then the fuel loading is probably high. I will choose a day with weather that will consider the high fuel loading, so I can still meet your objectives. Understand, prescribed burning is an art and a science, and inexact at that! There is an unpredictability to nature, and in particular, weather.

*If you as a landowner have an aversion to losing any trees, or very few, burning is not for you. An ugly truth of prescribed burning is this: The hazard of having to harvest your stand because of unintended damage from a prescribed burn is higher than the hazard of a wildfire damaging your forest to the point of necessitating a salvage harvest. (About 1% in north central Florida.) This compares to selective harvesting (thinning).*

## Fuels

Fuels are what carry the fire. They are the dead, dry, fine material at the ground level. Pine needles and dead grass are great fuels. Discontinuous fuels make for a discontinuous fire. Without fuel at the ground level, the vegetation above the ground level will not burn. A field full of tall, dead weeds will not burn without ground fuels below, regardless of how flammable it looks from a distance!

Without burning, fuels build up to dangerous levels. A prescribed fire will reduce the hazard of a wildfire destroying your forest. A prescribed fire will also accomplish many other things that make it very worthwhile.

Given the fuels in an area to be burned, a good prescribed burner then considers what weather parameters are needed to accomplish the objectives.

In most cases, we want the fuels to be dried out in the surface of the duff (the leaves and vegetative debris right at the ground surface), but moist in the lower portions of the duff. Stick your hand down in the duff and feel! The highly scientific and effective "hand method"! One area we must check duff moisture is at the base of trees. If this duff is dried out in the lower portions we stand a good chance of killing our trees, since this duff will bake for a long time, cooking the inner layers of the trees. A burned out doughnut shape around the base of trees is a very bad sign.

The number of days since rain has a tremendous impact on proper fuel moisture. Dry days, with low relative humidity, obviously dry out fuels.

## Weather

We choose a range of weather parameters that will hopefully meet our objectives, considering the fuels.

Minimum relative humidity, wind speed and wind direction are most critical.

### Relative Humidity

It needs to be dry enough to burn well without being so dry that it burns too well! Depending on the situation, good relative humidity may range from 30% to 50%.

### Wind

Proper wind speed causes the fire to spread properly, and keeps excessive heat out of the tree tops. Too little wind and the fire just doesn't move well. Even a fire that backs against the wind (backing fire) moves better with wind than without. Too much wind and we may have control issues. I like wind speeds of 5 to 15 mph, depending.

Consistency of wind direction is also extremely important. For cooler burns we need the fire to not run with the wind, called a head fire. For these type burns, 2 to 4 days after a cold front passage, in winter, often results in consistent northwest, north or northeast winds. This is also when we can often count on duff moisture to be dry in the top, and moist below. First burns are often best done in these conditions.

Wind direction determines how we light the fire, and where our smoke goes.

Other weather factors include dispersion index, temperature, transport wind speed, mixing height, drought indices, Lvori index, cloud cover, chance of sea breeze wind shifts, and others.

## Season of Burn

We can burn in the winter, or dormant season, or we can burn in the late spring – summer, or growing season. We have traditionally burned in the dormant season, because it's easier. But nature burned the woods in the lightning season, or growing season. Statistics show most of north central Florida burned in May, June and July. Only limited acreage burned earlier or later. May 15 through June is the sweet spot in my opinion. Vegetation responds better to this seasonality of burn than any other. Wiregrass seed production only occurs with growing season burning. The wildlife are adapted to burning during this time. Turkey nesting is a great example.

First burns should almost always occur in the dormant season, in order to reduce fuel loading. Sandhill sites are sometimes an exception to this rule.

Growing season burns are more difficult. Wind direction is more variable. Temperatures are higher, creating a greater hazard for damage to trees. However, growing season burns control hardwood competition much more effectively. Hardwoods have expended their stored food reserves and have not replenished them in May and June. Hardwoods burned in the dormant season resprout and do ok. Hardwoods burned in May or June often die after the second time around.

## Technique

Given our Prescribed Burning triangle of Objective, Weather and Fuels, we choose a technique.

How will we burn this particular tract on this particular day? We almost always establish a blackline, a barrier to the fire getting away. We do this with a fire break of some type, on the downwind side of the tract, and light a back fire that backs into the wind. Once we've established a wide enough space of burned area (the blackline), we then choose a number of techniques.

**Spot fires** are the best. Plain and simple. This is a technique of setting individual spots of fire a certain distance upwind of the backing fire and a certain distance from each other. They burn with the wind (head fire), sideways to the wind (flank fire) and back against the wind (back fire). We pick a distance apart so that the head fire part of each spot won't get too hot before it runs into the backing fire. When 2 fires come together fire intensity goes up. So we consider that. Actually, we make a guess, and then adjust. Also, as the day goes on, it gets drier and sometimes more windy. So we adjust as we go through the day. We adjust for flame length – how long are the flames, and how much good or bad might they do. I use a spot fire technique about 90% of the time.

Other main techniques include strip head fires, flank fires, and ring fires. The book you have with your

materials, “Introduction to Prescribed Fire in Southern Ecosystems”, details and diagrams these techniques. A spot fire technique is depicted on the front cover. For good reason.

**Strip head fires** are solid strips of fire that head into the backing fire. We set strip heads a certain distance back from the backing fire so that we get just the flame length and fire behavior we want. These are particularly appropriate where fuels and weather combine to limit flame lengths too much with other techniques. One disadvantage of strip heads is that they have a greater potential to trap critters between 2 fires.

**Flank fires** are appropriate where wind direction is quite consistent, or fuels are such that periodic heading of the flank fire won't get too hot. We set flank fires by lighting lines of fire straight into the wind. Hot spots occur where the flanks burn together. Flank fires are good for burning a lot of area with less ignition work.

A **ring fire** is the most exciting technique. We light a back fire, establish a black line, then light the sides, or flanks, finally lighting the upwind side, to head into all the rest of the fire. A ring of fire. It's most appropriate for site preparation burns. It has the highest potential to trap critters.

## Assistance, Training and Liability

Sources of assistance include the following:

Florida Forest Service
Private Contractors
Burn Teams

Or, you can become comfortable and competent to burn your own land.

Training is available, in the form of several courses. These include S-130, S-190, Certified Prescribed Burn Manager, etc.

Becoming a Certified Burner has advantages in the area of liability. The Florida Legislature passed a statute that protects burning when carried out by a Certified Burner. To be found liable, a Certified Burner would have to be found grossly negligent, rather than simply negligent.

# PRESCRIBE BURNING ASSOCIATIONS

A New Opportunity For Florida Landowners

Arlo Kane, Regional Coordinator
Florida Fish and Wildlife Conservation Commission

## Why don't people burn more?

- Liability
- Lack of knowledge and experience
- Not enough people to help
- Not enough equipment
- cost

## How do you overcome these obstacles?

- Insurance
- Attend workshops and training
- Hire people
- Buy Equipment

Does this solve the problem? NO !

## Then What is the answer??

A Prescribed Burning Association

- Insurance
- Attending burns and gaining experience
- Pool equipment (tractors, disk, sprayers)
- Landowners helping landowners

## What is a Prescribed Burning Association

*Landowners helping other landowners implement prescribed fire for wildlife habitat, wildfire protection and forest health*

## Goals and Objectives of a PBA

- Share Equipment
- Share Labor
- Train membership
- Foster good relations between Neighbors

## Where are PBA's already established

Texas has 10 PBA's

Nebraska has 10

Kansas has 10

Missouri has 1

North Carolina has 1

Illinois has 1

Oklahoma has 21

Colorado & Mississippi ?

## How do you get started?

- Assemble a group of landowners
- Involve key player – FFS, FWC, NRCS, etc.
- Pick a leader
- Set some goals and the area to work in
- Incorporate as a LLC and get a FEID number and bank account so you can apply for grants to purchase equipment
- Accomplish a task

## Guidelines for PBA's

- Elect officers – President, VP, secretary/treasurer
- Dues: $25/year is average
- Organize annual fire training for members
- Require burn plans for each burn
- Each landowner should have property or liability insurance
- Have a list of equipment that is available for burning
- Require minimum number of burns to assist on before your land gets burned

## What can a Prescribed Burning Association do for You?

- Support of a locally led and run organization of neighbors helping neighbors
- Reduced cost of fire management
- Reduced risk through increased experience, equipment, training, and technical assistance
- Ability to get more prescribed burning done on your land and your neighbors land
- More frequent burning means more wildfire protection for your land and better wildlife habitat


## How can we help?

- We are looking for groups of landowners who are interested in forming a PBA
- We can help with organizing informational meetings… getting you started
- We can provide training on burn plans, maps, and logistics

## Cost-Share Programs – NRCS and FFS


## We do not want to become California!

ADAM H. PUTNAM
COMMISSIONER

Florida Department of Agriculture and Consumer Services
Florida Forest Service

# PRESCRIBED BURNING PLAN
# (P R E S C R I P T I O N)

Use Fire Wisely

| | | | | | | |
|---|---|---|---|---|---|---|
| Forestry Center/District: | | | Authorization Number: | | | |
| Landowner: | | | | | | |
| Address: | | | | | | |
| Telephone Number | Section | Township | Range | County: | | |
| | | | | | | |
| **Latitude** | | | **Longitude** | | | |
| DEG | MIN | SEC | DEG | MIN | SEC | |
| | | | | | | |
| Acres to Burn: | Distance to Plow: | Previous Burn Date: | | | | |
| Stand Description: | | | | | | |
| Overstory Type: | Understory Type: | Height to Bottom of Crown: | | | | |
| Fuel Description: | Fuel Model: | Topography and Soil: | | | | |
| Purpose of the Burn: | Burn Objectives: | | | | | |
| Firing Techniques & Ignition Methods: | | | | | | |
| Personnel Needs: | Equipment Needs: | | | | | |
| Maximum Crown Scorch Acceptable: | Passed Smoke Screening System: | | | | | |
| Listed Possible Smoke-Sensitive Areas: | | | | | | |
| Special Precautions: | | | | | | |
| Adjacent Landowners to Notify: | | | | | | |

| MONITORING & EVALUATION PROCEDURES | | |
|---|---|---|
| PRE-BURN | BURN | POST BURN |
| | | |

| WEATHER FACTORS | PREFERRED | ACTUAL |
|---|---|---|
| Surface Winds | | |
| Transport Winds | | |
| Minimum Mixing Height | | |
| Dispersion Index (DAY) | | |
| Dispersion Index (NIGHT) | | |
| Maximum Temperature | | |
| Minimum Relative Humidity | | |
| Fine Fuel Moisture | | |
| Rate of Spread | | |
| Starting Time | | |
| Burn Technique | | |
| Flame Length | | |

| Days Since Rain: | Date Burned: | Distance Plowed: |
|---|---|---|

## BURN CHECK LIST

FIRE BOSS: Initial each item to indicate compliance.

- ☐ All prescription requisites met (preparation and day of burn).
- ☐ Authorization obtained.
- ☐ Adjacent landowners notified within past seven days of plan to burn.
- ☐ Local contacts made day of burn to advise (FHP, SO, Fire Dept., media, etc.)
- ☐ Smoke screening performed and documented.
- ☐ All equipment required on scene and fully operational.
- ☐ Each crew member has proper personal gear and clothing.
- ☐ Low Visibility Risk Index checked.
- ☐ Smoke on the Highway signs in place, if needed.
- ☐ Test burn performed and fire behavior within expectations.

## CREW BRIEFING

- ☐ Objectives of burn.
- ☐ Exact area of burn.
- ☐ Hazards discussed (volatile fuels, spotting potential, weak points in perimeter lines, terrain features, etc.).
- ☐ Crew Assignments made.
- ☐ Ignition technique and pattern. Holding method(s).
- ☐ Location of extra equipment, fuel, water, vehicle keys.
- ☐ Authority and communications.
- ☐ Contingencies covered including escape routes or procedures.
- ☐ Sources of nearest assistance. Nearest phone and emergency numbers.
- ☐ Special instructions regarding smoke management, contact with the public and others.
- ☐ Questions.
- ☐ Crew members given opportunity to decline participation (is there anything that is going to prevent full physical performance?).

| Prescription Done by: | Certification Number: |
|---|---|
| Title: | Date: |

CERTIFIED BURN MANAGER SIGNATURE:

ADAM H. PUTNAM
COMMISSIONER

Florida Department of Agriculture and Consumer Services
Florida Forest Service

# PRESCRIBED BURNING PLAN
# (P R E S C R I P T I O N)

Use Fire Wisely

| | | | | | |
|---|---|---|---|---|---|
| Forestry Center/District: Waccasassa | | | | Authorization Number: 2016- | |
| Landowner: (LO # ) | | | | | |
| Address: | | | | | |
| Telephone Number | Section | Township | Range | County: Alachua | |
| | | S | E | | |
| **Latitude** | | | **Longitude** | | |
| DEG | MIN | SEC | DEG | MIN | SEC |
| N29. | | | W-82. | | |

| | | |
|---|---|---|
| Acres to Burn: | Distance to Plow: chains | Previous Burn Date: Unknown. Long time if ever. |

Stand Description: Primarily large natural pine, BA approx. 50. Minor area of planted pine (2 ac) and some hardwoods.

| | | |
|---|---|---|
| Overstory Type: Pine | Understory Type: Light uplands brush, some ladder fuels | Height to Bottom of Crown: 30' plus |

| | | |
|---|---|---|
| Fuel Description: Pine needles | Fuel Model: 7 | Topography and Soil: 0-2% slope, upland pine soils |

| | |
|---|---|
| Purpose of the Burn: Hazard reduction, wildlife habitat enhancement | Burn Objectives: Consume 90% pine needle fuel, reducing wildfire hazard, leave lower duff unburned |

Firing Techniques & Ignition Methods:
Backfire starting in NW corner, moving east and south as winds dictate. Then spot fires at intervals that generate 1'-6' flame lengths most of the time. Episodes of longer flame lengths are to be expected, but strive for no extended periods of flame lengths over 10'. Use water and firing techniques to protect structures, prevent escape.

| | |
|---|---|
| Personnel Needs: 3+ | Equipment Needs: 1 Tractor-Plow unit, 1 brush truck |
| Maximum Crown Scorch Acceptable: 30% | Passed Smoke Screening System: Yes |

Listed Possible Smoke-Sensitive Areas:
US 301 at 1.6 miles, SR 26 at 1.7 miles. CR 1469 is not a smoke sensitive area.

Special Precautions:
No escape to the west (pine plantation). Extinguish quickly if escape occurs.
Watch for snakes.
Personnel hydration. Watch for wind shifts. SE winds can shift significantly. If radical wind shift the burn may need to be suspended.
Protect structures

Adjacent Landowners to Notify: Neighbors to the north in particular. Also neighbors to the east. Go door to door and personally communicate.

| MONITORING & EVALUATION PROCEDURES | | |
|---|---|---|
| PRE-BURN | BURN | POST BURN |
| | | |

| WEATHER FACTORS | PREFERRED | ACTUAL |
|---|---|---|
| Surface Winds | 5-15 mph | |
| Transport Winds | 9 mph plus | |
| Minimum Mixing Height | 1700' | |
| Dispersion Index (DAY) | 30-80 | |
| Dispersion Index (NIGHT) | N/A | |
| Maximum Temperature | 85 degrees | |
| Minimum Relative Humidity | 25% | |
| Fine Fuel Moisture | Low-med | |
| Rate of Spread | 1-40 chains/hr | |
| Starting Time | 1000+ | |
| Burn Technique | Back, spot | |
| Flame Length | 1-6 feet | |

| | | |
|---|---|---|
| Days Since Rain: 3-10 days | Date Burned: | Distance Plowed: |

## BURN CHECK LIST

FIRE BOSS: Initial each item to indicate compliance.

- ☐ All prescription requisites met (preparation and day of burn).
- ☐ Authorization obtained.
- ☐ Adjacent landowners notified within past seven days of plan to burn.
- ☐ Local contacts made day of burn to advise (FHP, SO, Fire Dept., media, etc.)
- ☐ Smoke screening performed and documented.
- ☐ All equipment required on scene and fully operational.
- ☐ Each crew member has proper personal gear and clothing.
- ☐ Low Visibility Risk Index checked.
- ☐ Smoke on the Highway signs in place, if needed.
- ☐ Test burn performed and fire behavior within expectations.

## CREW BRIEFING

- ☐ Objectives of burn.
- ☐ Exact area of burn.
- ☐ Hazards discussed (volatile fuels, spotting potential, weak points in perimeter lines, terrain features, etc.).
- ☐ Crew Assignments made.
- ☐ Ignition technique and pattern. Holding method(s).
- ☐ Location of extra equipment, fuel, water, vehicle keys.
- ☐ Authority and communications.
- ☐ Contingencies covered including escape routes or procedures.
- ☐ Sources of nearest assistance. Nearest phone and emergency numbers.
- ☐ Special instructions regarding smoke management, contact with the public and others.
- ☐ Questions.
- ☐ Crew members given opportunity to decline participation (is there anything that is going to prevent full physical performance?).

| | |
|---|---|
| Prescription Done by: David S. Conser | Certification Number: 87-0485 |
| Title: Senior Forester | Date: |

CERTIFIED BURN MANAGER SIGNATURE:

# Smoke Screening Process

STEP 1 – DETERMINE AREA AFFECTED BY SMOKE PLUME

Using an administrative map plot wind direction, plus a 60 degree arc for these distances:

5 miles for grass fuel
*5 miles for backing fires
*10 miles for heading fires, or burns 250 acres or more
30 miles for logging debris

*Note: If palmetto-gallberry fuel, double distances to 10 and 20 miles

Now go DOWN DRAINAGE for one-half the distance determined above, but do not spread out, except to cover the "valley" or "bottom". This is your probable smoke impact area during the night. (If active fire at night, go the same distance.)

STEP 2 - IDENTIFY SMOKE SENSITIVE AREAS located within <u>both</u> probable impact areas plotted in STEP 1

(These are well traveled Highways, but include Hospitals, Schools and Airports)

- If no potential Smoke Sensitive Areas are found, you may burn as prescribed.
- If the area to be burned contains organic soils dry enough to ignite, do not burn.
- If any Smoke Sensitive Areas are found, continue screening process.

(If burning windrows, and Smoke Sensitive Areas are found, do not burn)

STEP 3 - IDENTIFY CRITICAL SMOKE SENSITIVE AREAS

Critical Smoke Sensitive Areas are Smoke Sensitive Areas ½ mile or closer for grass fuel or backing fires, 1 or 2 miles or closer for palmetto-gallberry fuel, and 3 miles or closer for logging debris or piles -- i.e. divide distances in STEP 1 by 10.

- If a Critical Smoke Sensitive Area is identified, prescribe a new wind direction and re-start screening.
- If there are no Critical Smoke Sensitive Areas within the distance criteria above, continue with the screening.

STEP 4 - ADJUST FOR FUEL TYPE

Determine fuel loading is less than 10 tons per acre, or double distances in STEP 3. Generally fuel loading is less than 10 tons per acre if it is a pine forest with fuels of the following ages:

| | | |
|---|---|---|
| Grass: | Any age | |
| Pine needle litter: | <9 years (slash pine) | <16 years (loblolly pine) |
| Light brush | <8 years | |
| Palmetto-gallberry | <6 years (slash pine) | <8 years (loblolly pine) |

Apply Rules for Logging Debris or Piles (small, round and dirt free)

1. No major highways within 5 miles or other Smoke Sensitive Area within 3 miles DOWN DRAINAGE.
2. If relative humidity is predicted to stay below 80% and surface winds above 4 MPH all night, reduce the distance in half to 2.5 and 1.5 miles, respectively

STEP 5 - MINIMIZE RISK

The following requirements must be met if Smoke Sensitive Areas are identified:

> The mixing height should be over 1,650 feet
> Transport winds should be 9 MPH or greater
> There should be at least 5 miles back ground visibility
> Put piles out 1 hour before sunset
> If fuel is older than 2 years use backing fire or complete burn by 3 pm
> For night burns, prescribe backing fire with winds > 4 mph, and RH < 80%
> Extinguish or prevent burning of stumps, snags or logs if residual smoke would be a problem

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FOR 62

# Where There's Fire, There's Smoke: Air Quality and Prescribed Burning in Florida[1]

Martha C. Monroe, Adam C. Watts, and Leda N. Kobziar[2]

Prescribed burning, the carefully planned and directed use of fire to achieve land management goals, is a useful tool for resource managers in Florida. Land owners may choose fire to achieve a variety of objectives, such as restoring a fire-dependent ecosystem, enhancing forage for cattle, improving wildlife habitat, preparing sites for reforestation, or reducing hazardous fuel loads. Prescribed burns achieve many benefits for the environment and for people, but they have a few side effects as well, chief among which is smoke. Some smoke is simply unavoidable with prescribed burning, but the potential for harm can be much reduced with the use of smoke management techniques to avoid air quality reduction or visibility problems on highways. The direction of smoke plumes can be calculated with computer programs long before anyone strikes a match, and savvy land managers avoid smoke-sensitive areas by burning under weather conditions that minimize smoke formation and problems. As a result of this watchful management (Figure 1), there is usually far less smoke from a prescribed fire than from a wildfire burning over the same area. As more people move to Florida's rural areas, more people will be exposed to smoke from these fires, and smoke management will become increasingly critical.

Figure 1. Prescribed burning in Florida is conducted by trained personnel who plan carefully to minimize the impacts of smoke to populated areas.

Smoke is a mixture of water vapor and combustion products, including tiny particles of organic matter. These particulates are considered to be an air pollutant and are regulated by federal law. This fact sheet provides some background information on air quality, the effects of smoke on human health and safety, and regulations concerning the use of prescribed fires and the smoke produced by them. We conclude with a description of some strategies that can be used to protect air quality while still gleaning the benefits of prescribed burning.

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2. Martha C. Monroe, professor, School of Forest Resources and Conservation; Adam C. Watts, graduate research assistant, School of Natural Resources and Environment; Leda N. Kobziar, associatet professor of fire science and forest conservation, School of Forest Resources and Conservation, School of Natural Resources and Environment; Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida, Gainesville, FL 32611.

## Air Quality in Florida

About 17% of Florida's 18 million residents are over 65, compared to a national average of only about 12%. In some counties, 30% or more of the population is over the age of 65. Because so many of our residents are elderly, Florida's population is more sensitive than populations in other states to pollutants and irritants in the air. Recent studies show Florida ranks thirteenth in the incidence of lung and related cancers, and well above the national average predominately because we have a large elderly population. An aging population experiences greater incidence of respiratory and pulmonary diseases as well, and this adds to concerns about Florida's air quality.

## All Pollutants Are Not Equal

Air pollutants come in many varieties. Some are toxic to breathe (such as carbon monoxide) and can reduce the capacity of blood to carry oxygen. Others (like carbon dioxide, chlorofluorocarbons, and methane) alter the global climate by interacting with the upper atmosphere. Still others (like nitrogen oxides) interact with other chemicals and sunlight to form new pollutants, such as ground-level ozone or photochemical smog. In each of these examples, the pollutant is a molecule that disperses through the air. The U.S. Environmental Protection Agency (U.S. EPA) has established limits for six major air pollutants (ozone, particulate matter, nitrogen dioxide, sulfur dioxide, carbon monoxide, and lead) based on current knowledge of the health effects and environmental risks of these pollutants.

## Particulates

Although particulate matter is one of the six major air pollutants, it is not one single chemical. It includes a variety of microscopic bits of solid matter (such as dust, ash, metal oxides, and the soot that results from incomplete combustion of organic matter). Particulates may also be liquid aerosols such as the acidic water droplets that form when sulfur dioxide mixes with water vapor. Because these tiny particles and droplets can go deep into our lungs, they pose a health risk. They are also responsible for haze and impaired visibility because they scatter and absorb light.

Particulates are grouped into three categories based on their size: smaller than 2.5 micrometers (millionths of a meter, also known as microns); bigger than 10 micrometers; or in between. (For reference, a human hair is 70 micrometers in diameter, and a grain of beach sand is 90 micrometers.) Particles larger than 10 micrometers may be generated naturally or by human activities, but with a few exceptions (wildland fires, for instance) particles smaller than 2.5 micrometers are generally from human-initiated combustion of solid and liquid fuels (in power plants, wood-burning stoves and fireplaces, and engines). All particulates smaller than 10 micrometers are considered to be a concern for human health because their small size makes them hard to trap in the nose and throat. They can easily be swept into the small air passages of the lungs, where they may irritate tissues. Particles smaller than 2.5 micrometers (called PM 2.5 particulates) may even pass through the lungs and into the blood stream. Small particulates are thought to play a role in lung damage, respiratory illness, cardiovascular disease, and premature death. With new information about health problems caused by smaller particles, the U.S. EPA proposed strengthening the National Ambient Air Quality Standards in 1997 to focus on the concentration of particles smaller than 2.5 micrometers. National monitoring for these particulates began in 1999, and a 14% decrease in the U.S. average concentration was measured from 2000 to 2006.

As a result of increased regulations on activities that generate fine particulates, industries and electric utilities—previously the primary sources of PM2.5 particulates—have reduced their emissions significantly, leaving fires as an important source of fine particulates (Figure 2). For this reason the U.S. EPA and many state governments and other organizations involved with fire management have adopted various strategies to reduce the production of fine particulates by prescribed burning or the impact that those emissions have on humans.

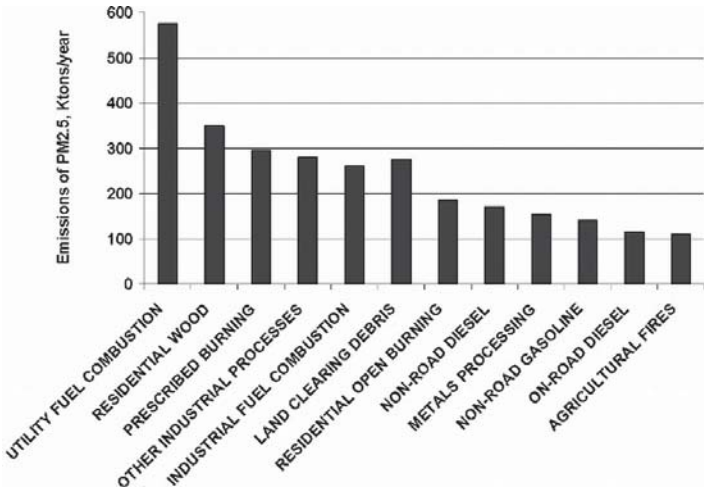


Figure 2. Emissions of fine particulates and their sources, in thousands of tons per year.

The location of the source of PM2.5 is important because distance from the source reduces the concentrations of emissions people are exposed to. The American Lung

Association and U.S. Environmental Protection Agency emphasize reducing the emissions from vehicles, particularly buses and trucks, in order to prevent lung diseases such as asthma because vehicle sources emit PM2.5 near centers of population and are therefore potentially more dangerous to people's health.

## The Regulatory Process

The Clean Air Act requires the U.S. EPA to establish National Ambient Air Quality Standards based on public health. State and local agencies are responsible for monitoring their air and determining if they meet these air quality standards. If an area has higher levels of a pollutant than the standard allows, it may be classified "non-attainment" and an Implementation Plan must be established to bring the area into compliance. In Florida, the Department of Environmental Protection (DEP) is responsible for collecting the data and enforcing our Implementation Plans. A lack of progress toward compliance may evoke sanctions such as the loss of certain federal funds to the state.

In 2006, the U.S. EPA strengthened standards for particulate matter, setting a maximum limit on particulate concentrations. Air quality monitors have been collecting data across Florida to measure the concentration of small particulates in our air for several years, and to date Florida has continued to meet even these more rigorous air quality standards.

## Prescribed Burning and Air Quality

Burning wildland vegetation can result in the release of a variety of air pollutants including aerosols of organic acids and hydrocarbons, and particulate matter of various size fractions. The type of pollutants varies with the type of fuel, its moisture content, the temperature of the fire, and the length of time materials continue to smolder after the fire. If air quality in a given region is already approaching the standard for particulate matter, prescribed burning could cause that region to exceed the daily limits. Since prescribed burning occurs irregularly, on "bad air quality days," it may be possible to restrict permits in areas at risk of being classified "non-attainment" in order to avoid violating air quality standards. Such approaches have already been in place for years in western states such as California, where non-attainment is frequent and opportunities for prescribed burning are therefore limited. The National Coalition of Prescribed Fire Councils is working closely with the U.S. EPA to ensure that the long-term benefits of prescribed burning, such as reduction of wildfire risk, are taken into consideration when balancing burning with health risks.

Uncontrolled, accidental, or natural wildfires may significantly decrease air quality across large areas because of the smoke they produce. During wildfires, nearby air-quality monitoring stations are effectively switched off—the data are not included in daily emissions counts and do not impact whether the area is "in attainment." This is because wildfires are not considered to be intentional. However, prescribed fires are always subject to air-quality standards, so their use must be planned carefully to keep the smoke they produce at acceptable levels. Florida's Smoke Management Plan (SMP) is used to establish parameters for prescribed fires, such as size, wind speed and direction, and distance to monitors or populations sensitive to smoke. For example, State Certified Prescribed Burn Managers are required to write smoke management plans before they begin a burn.

## Smoke and Traffic Safety

Just as heavy rain or fog can restrict visibility for drivers, smoke from wildfires or prescribed burning can become a traffic safety concern. As mentioned above, people who are certified to plan and lead prescribed burns in Florida undergo training to minimize the chances that smoke from a prescribed burn drifts onto highways, other roads, or airports. Sometimes, however, sudden or unpredicted changes in weather can cause the column of smoke to shift and affect highways before the burn crews are able to extinguish the fire. Land managers or burn crews can take actions to warn drivers of these potentially dangerous situations, such as installing signs along roads to warn of heavy smoke ahead. Driving in smoke is similar to driving in fog: low-beam headlights should be used, and drivers should pull to the side of the road and turn on flashers if the smoke becomes too heavy. Drivers should also keep an eye out for fire crews operating along roads.

## Florida's Smoke Management Plan

Florida's Division of Forestry (DOF) has a smoke management program (SMP) approved by the U.S. EPA that describes current activities to authorize and control prescribed fires in the state. The new Florida Fire Management Information System relies on geographical information system (GIS) technology to record smoke sensitive areas, weather, and prescribed fires. Florida's SMP enhances the DOF's ability to manage fires and air quality across the state. The SMP includes the following components:

1. To conduct a prescribed fire in Florida, the burner must receive authorization from the DOF. The DOF grants authorization after it considers all open burning activities

in the region, the weather conditions, and the impacts on air quality. DOF-certified burners are required to prepare plans for all fires. Plans include location, size, and description of the area to be burned, amount and type of vegetation, ignition patterns, acceptable weather conditions, responsible personnel, safety, and contingency plans for smoke.

2. Where possible, burners should consider alternative treatments to reach management objectives without reducing air quality. Mechanical or chemical treatments might be preferable to burning in some cases. Extremely high fuel loads may be mechanically reduced before a prescribed burn to make the fire easier to control and to enhance air quality. Burners are required to "mop up" burned areas by extinguishing smoldering fires completely before nightfall. Effective mop up helps to reduce lingering smoke emissions that could pose overnight air-quality or safety problems.

3. The DOF authorization system relies on a state-of-the-art weather forecasting model to predict smoke dispersion conditions. The new GIS model forecasts the size and direction of the smoke dispersion plume, allowing DOF to predict impacts to smoke-sensitive areas such as highways, schools, and airports. Atmospheric conditions must be appropriate for good smoke dispersion before the DOF will approve burning authorizations.

4. Current operating procedures include a request for certified burners to notify adjacent community residents of the planned burn. It is also recommended that burners keep the public informed of the outcome of the burn, so that future burns may receive more positive support.

The Florida SMP is under constant evaluation. Statute changes are made by the Florida legislature after they receive extensive input from the DOF and from their constituents. Rule changes are made in cooperation with the general public at public workshops and hearings.

## Recommendations for Prescribed Burning

Florida is a national leader in managing prescribed burns in wildlands. Our unique combination of fire-dependent ecosystems and weather that accommodates prescribed burning in every season of the year contributes to this leadership role. Florida also has about 18 million residents, many of whom are sensitive to smoke. Thus, it is particularly important for prescribed burners in Florida to manage their fires to reduce emissions whenever possible.

In addition to following Florida's SMP and other recommended guidelines, managers should consider how they can:

- reduce the amount of fuel to be burned,
- delay burns until acceptable weather and fuel moisture conditions exist,
- complete burns as quickly as possible,
- extinguish all smoking materials before nightfall,
- notify neighbors of the intended burn,
- alert the media to their smoke management efforts, and
- demonstrate concern for people in the area who are sensitive to smoke.

These actions will help improve public acceptance of prescribed fire and its accompanying smoke, particularly if these controlled burns will prevent catastrophic wildland fires that violate air quality standards for long periods of time.

## For More Information

You can learn more about air quality and prescribed fire at the following websites:

Florida DEP's Division of Air Resource Management: http://www.dep.state.fl.us/Air/

Florida Division of Forestry's Prescribed Fire site: http://www.fl-dof.com/wildfire/rx_index.html

U.S. EPA Air Quality Planning and Standards: http://www.epa.gov/oar/oaqps

U.S. EPA Office of Air and Radiation: http://www.epa.gov/oar/

American Lung Association: http://www.lungusa.org

## UF/IFAS Forest Management and Stewardship Extension Publications on EDIS:

## http://edis.ifas.ufl.edu/TOPIC_Forest_Management_and_Stewardship

- Assessing the Economic Feasibility of Short-Rotation Woody Crops in Florida
- Assessment and Management of Hurricane Damaged Timberland
- Beyond the Trees: A Systems Approach to Understanding Forest Health in the Southeastern United States
- Cooperation and Communication: Benefits for Non-Industrial Private Forest Landowners
- Dead Wood: Key to Enhancing Wildlife Diversity in Forests
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- Forest Management in the Interface: Forest Health
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- Forest Resource Information on the Internet: Connecting to Today's Online Resources
- Improving, Restoring, and Managing Natural Resources on Rural Properties in Florida: Sources of Financial Assistance
- Improving, Restoring, and Managing Wildlife Habitat in Florida: Sources of Technical Assistance for Rural Landowners
- Longleaf Pine Regeneration
- Making the Most of Your Mast
- Management Practices to Support Increased Biodiversity in Managed Loblolly Pine Plantations
- Opportunities for Uneven-Aged Management in Second Growth Longleaf Pine Stands in Florida
- An Overview of Carbon Markets for Florida Forest Landowners
- Ownership Succession: Plan Now for the Future of Your Land
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- Ten Tips for Increasing Wildlife Biodiversity in Your Pine Plantations
- Thinning Southern Pines—A Key to Greater Returns
- Tips for Integrating Land and Wildlife Management: Deer in Forests
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- What is in a Natural Resource Management Plan?
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