
SOUTH FLORIDA WATER MANAGEMENT DISTRICT



Audit of the Prescribed Burning Program

Report #00-16

Prepared By
Office of Inspector General

Allen Vann, Inspector General
Gregory Rogers, Lead Consulting Auditor



SOUTH FLORIDA WATER MANAGEMENT DISTRICT

3301 Gun Club Road, West Palm Beach, Florida 33406 • (561) 686-8800 • FL WATS 1-800-432-2045 • TDD (561) 697-2574
Mailing Address: P.O. Box 24680, West Palm Beach, FL 33416-4680 • www.sfwmd.gov

MGT 08-06F

February 2, 2001

To: Audit Committee Members:

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RE: Audit of the Prescribed
Burning Program –
Report # 00-16

This audit was performed pursuant to the Inspector General's authority set forth in Chapter 20.055, F.S. The audit focused on the safety of the District's Prescribed Burning Program. Fieldwork was conducted July 2000 through November 2000. This report was prepared by Gregory Rogers.

Sincerely,

Allen Vann
Inspector General

AV/gr
Enclosure

c: Frank Finch
James E. Blount

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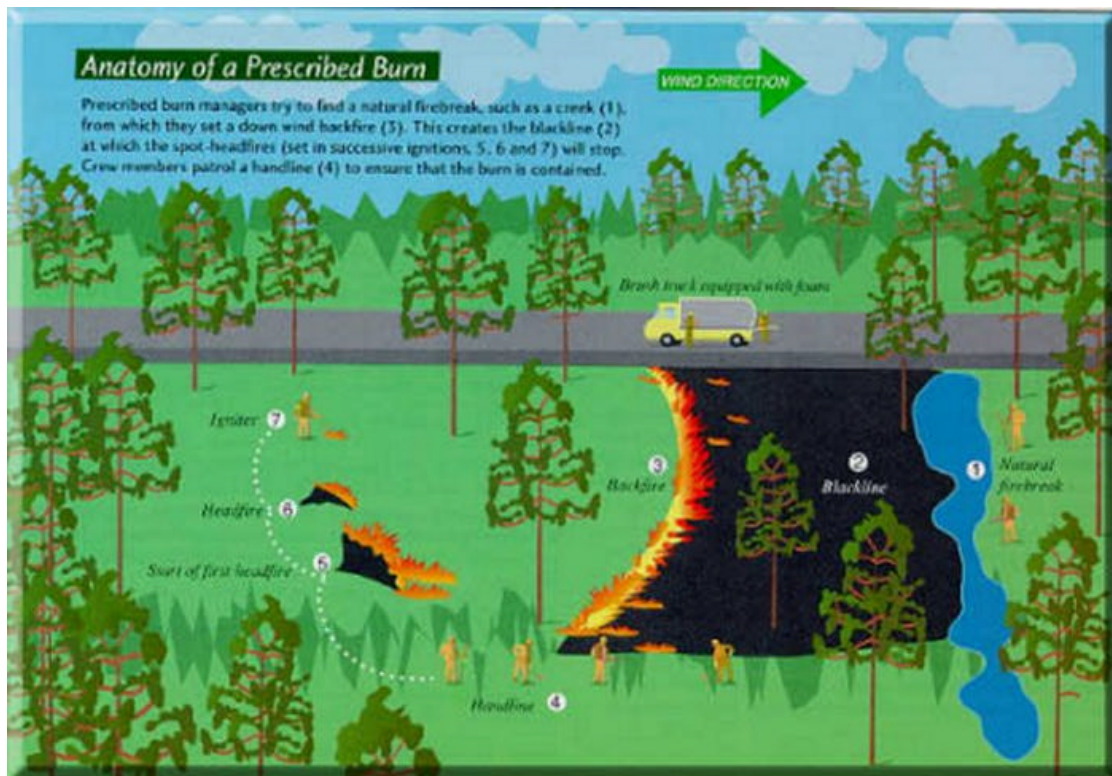
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INTRODUCTION

Since 1985 the South Florida Water Management District (the “District”) has acquired more than 400,000 acres and spent \$700 million from the Water Management Lands Trust Fund and Preservation 2000¹. The Water Resource Operation’s Land Stewardship Department (“Land Stewardship”) is primarily responsible for managing these acquisitions.

One of the tools that Land Stewardship uses to carry out its mission is prescribed burning. The goal of prescribed burning is to recreate the affects of periodic fire that is a natural element of native Florida ecosystems. Fire has played a major role in determining the distribution of plants in Florida. Land Stewardship uses fire-trained personnel to conduct both ground and aerial ignition prescribed burning on more than 95,000 acres of its fire-dependent lands. Land Stewardship attempts to maintain a fire interval on its lands in accordance with historical natural occurrence.



¹ Source – Save Our Rivers 2000 land Acquisition and Management Plan.

Vegetation types and recommended burn frequencies are:

Type	Frequency (yrs.)
Flatwoods	1-10
Wet Prairie	2-4
Dry Prairie	1-4
Depression Marsh	1-10
Floodplain Swamp	1-10
Scrub	10-70
Floodplain Swamp	30-200
Hydric Hammock	Rare
Bottomland Forest	Infrequent to rare

Source: Land Stewardship Department

Land Stewardship uses prescribed burning to reduce hazardous buildup of vegetative fuel load, enhance wildlife habitat, and encourage restoration of native plant communities. To reduce high fuel conditions on lands, Land Stewardship also uses other management techniques, particularly on lands where natural fire has been suppressed. Roller chopping crushes and reduces the height of understory fuels that can lead to high intensity damaging fires. Herbicide treatment may also be used to kill exotic vegetation that fire will later consume.



The importance of fire is recognized by many governmental, non-profit and private entities. The Nature Conservancy stated:

“[T]here is currently no known alternative management treatment that provides the same biological affects as fire management.”

The National Park Service stated:

Prescribed fire has become a recognized management technique to accomplish beneficial objectives including fuel treatment and reduction, site preparation, seedbed preparation, species conversion, forest stand thinning, wildlife habitat improvement, livestock forage enhancement, watershed stabilization, ecosystem health maintenance, and numerous other objectives.

The following table is a Summary of Land Stewardship's prescribed burning activity for each FY 1995-2000.

Project Name	1995 Acres Burned	1996 Acres Burned	1997 Acres Burned	1998² Acres Burned	1999 Acres Burned	2000³ Acres Burned
DuPuis Reserve	2,515	4,364	4,821	3,684	2,097	5,947
Other East Coast	20	342	-	-	20	-
West Coast Region	850	620	330	314	813	987
Upper Lakes Region	600	273	180	300	870	5,625
Everglades Region	20		20			
Kiss/Okeechobee Region	1,894	1,608	650	745	730	
TOTAL	5,899	7,207	6,001	5,043	4,530	12,559

Source: Land Stewardship Department

During the 1999 fiscal year, Land Stewardship spent \$58,519 to prescribe burn 4,530 acres at an average cost of \$12.91 per acre of treatment. The cost per acre to burn varies based upon the size of the burned parcel. Smaller burns require the same basic resources (crew, igniting equipment, suppression equipment) as burning larger parcels. Different habitats also have different cost factors. For example, the prairie/marsh type habitat of the Kissimmee/Okeechobee regions are less costly to burn than the pine flatwood area of DuPuis. The District's average cost per acre is consistent with average costs noted in the southern United States⁴.

Statutory Authority

Florida Statute Chapter 590, Forest Protection, describes the need for and the requirements of prescribed burning. Sections 590.125(3)(a)(2) and 590.125(3)(a)(4) state:

Most of Florida's natural communities require periodic fire for the maintenance of the ecological integrity. Prescribed burning is essential to the perpetuation, restoration, and management of many plant and animal communities.

² The Florida Division of Forestry issued a prescribed fire ban for part of the fiscal years 98-00.

³ DuPuis Acreage is through July 17, 2000.

⁴ Source: Mississippi State University Extension Service average cost of prescribed burning in the southern United States is \$13.08 per acre.

Significant loss of the state's biological diversity will occur if fire is excluded from the fire-dependent systems.

The state purchased hundreds of thousands of acres for parks, reserves, wildlife management areas, forests, and other public purposes. The use of prescribed burning for management of public lands is essential to maintain the specific resource values for which these lands were acquired.

Section Statute 590.125(3)(c) addresses the liability for damages from prescribed burning and states:

A property owner or his or her agent is neither liable for damage or injury caused by the fire or resulting smoke nor considered to be in violation of subsection (2) [non-certified burning] for burns conducted in accordance with this subsection [certified burning] unless gross negligence is proven.

The requirements of a certified burn are listed in section 590.125(3)(b) and are summarized below:

1. Certified prescribed burn manager on site,
2. Written fire prescription,
3. Consent of the landowner,
4. Authorization from the Division of Forestry (DOF),
5. Adequate firebreaks, sufficient personnel and fire fighting equipment,
6. Is in the public interest, and
7. Is a property right of the owner.

Based upon our audit of the prescribed burning program, we concluded that Land Stewardship is in compliance with these statutory requirements. We did note some areas of the program that could be strengthened, these are discussed in the findings and recommendations section below.

OBJECTIVES, SCOPE AND METHODOLOGY

Our audit scope encompassed Land Stewardship's prescribed burning function.

The objectives of our audit was to determine if Land Stewardship's prescribed burning program is:

- In compliance with State and District requirements,
- Accomplishing the stated goals of habitat improvement and fuel reduction,
- Following recommended prescribed burning requirements,
- Properly documenting the planning and results of the program.

Our audit methodologies included:

- Observation of a prescribed burn at DuPuis Reserve,
- Observation of a prescribed burn of Lake Okeechobee marsh,
- Review of fire manuals from several agencies and organizations,
- Interviews with Department personnel involved in the prescribed Burning program,
- Interviews with Department of Forestry personnel,
- Review of Department prescribed burning goals and objectives.

Our audit was conducted in accordance with generally accepted governmental auditing standards.

FINDINGS AND RECOMMENDATIONS

Results in Brief

A safely designed prescribed burning program lessens the possibility of catastrophic wildfires by reducing combustible vegetation on District properties. Our audit found that the prescribed burning program is in compliance with all recommended safety procedures. The Land Stewardship Department requires all prescribed burn personnel to pass an interagency Basic Prescribed Fire course that culminates with a practice burn.

The Land Stewardship Department does not have a Burn Manual that outlines procedures staff must follow for the prescribed burning program. Designating the Florida Division of Forestry's burn manual as the Department's official burn manual would provide a centralized official resource for how staff plan and implement fire management. Similarly, while planning for prescribed burns is good, the documentation of the planning process could be improved by using a checklist. The checklist could assist in making go/no-go decisions.

Because of the risk of wildfires, State officials ordered burn bans during parts of the last three fiscal years. These bans limited Land Stewardship from meeting or exceeding its annual targets for the program. When District property conditions are optimal, requesting and obtaining exemptions from burn bans should be considered. The District reports all wildfires to DOF. The suppression methods used by DOF have included the use of an ecologically damaging fire plow. Land Stewardship should consider establishing a fire suppression agreement with DOF that capitalizes on the ecological benefits of a wildfire so that it is managed in the least aggressive manner.

Increased mechanical and chemical treatments should be required to reduce the undergrowth that heighten wildfire risk on those District properties where prescribed burns cannot take place because of their proximity to urban areas. Also, broadcasting on the District's web site could increase public awareness about prescribed burns. The notification would have links to separate pages describing the Land Stewardship Department's prescribed burning program and the dangers of wildfire.

Finally, fire crew communications could be improved through upgrading current radios to the latest communication technology such as two-way

radio/cell phone communication devices. Also, roads on burn maps should be labeled with official and common names.

Prescribed Burning Program Follows Recommended Safety Procedures

The most important aspect of a prescribed burn is safety. An escaped burn can have many unintended consequences to the ecosystem, neighboring properties and the program itself.

In order to maximize the safety of the prescribed burning program, the following training and safety standards are followed:

All crewmembers on prescribed burns are required to pass an interagency Basic Prescribed Fire course that culminates with a practice burn. Based upon our review of this course and other prescribed burning programs, we concluded that Land Stewardship follows recommended safety measures.

The minimum crew size for a Department prescribed burn is six. There are separate crews for burns on the East Coast and West Coast of the District's territory. The crews receive significant experience through the District's burning program and crewmembers are cross-trained for the different duties of a prescribed burn (igniting, securing fire lines, spot-over monitoring, recording weather)



The crews are outfitted with personal protection equipment including helmets, goggles, fire coats and portable fire shelters. Fire suppression equipment used by Land Stewardship includes a Fire Truck with a 400-gallon water tank, a 1 ton flatbed truck with a 250-gallon water tank, ATV's with water tanks, and a tractor with disk

attachment. Additionally, many Department burns use a rental helicopter for aerial ignition that also monitors for spot over fires.

A safely designed prescribed burning program lessens the possibility of catastrophic wildfires by reducing fuel loads on District properties.

Fire Procedures and Planning Should be Documented in a Burn Manual and Checklist

Burn Manual

Land Stewardship uses the guidelines provided in the *Basic Prescribed Fire Training* course for carrying out their prescribed burns. However, Land Stewardship does not have an official Burn Manual that would serve as a central documentation source for the prescribed burning program.

We reviewed the burn manuals of several agencies and organizations,⁵ a burn manual details the fire procedures used and sets standards in the following areas:

- Fire leader and fire crew member qualifications,
- Personal protection equipment,
- Communications equipment,
- Fire management plans,
- Fire suppression equipment,
- Interagency coordination,
- Weather forecasts, before and during a burn,
- Fire crew size,
- Burn size – urban and rural,
- Burn checklist and crew briefing,
- Smoke management,
- Test fire,
- Post burn departure, evaluation, and
- Fire prevention and fire education.

Land Stewardship creates management plans for each managed property. These plans may include information about fire management and prescribed fire planning and application. This fire management information could be strengthened to include localized information from the above list of standards.

In addition to the management plans, designating DOF's *Basic Prescribed Fire Training* burn manual as the District's official fire manual would allow the Department to have a centralized official resource for all areas of the prescribed burning program. It would document how Department

⁵ Including Florida Division of Forestry, National Park Service, The Nature Conservancy, and the Noble Foundation.

personnel plan and implement fire management ensuring a consistent conservative approach that will help protect the welfare of the District's constituents.

Pre-burn checklist

Based upon our observations, Land Stewardship properly plans their prescribed burns. However, their documentation of the planning process could be improved by the use of a Pre-burn checklist that also serves as a go/no-go decision checklist.

Highlights of proper planning steps include:

- Writing a fire prescription,
- Obtaining a permit,
- Notifying neighbors,
- Deploying proper equipment,
- Briefing crew,
- Obtaining weather forecast, and
- Conducting a test burn.

A planning checklist helps ensure that all key factors have been addressed before proceeding with the burn. A planning checklist also serves to document the go/no-go decision analysis, and the determination that conditions on the burn site were consistent with the burn plan.

Recommendations:

The Land Stewardship Department should:

- 1. Strengthen land management plans through inclusion of localized fire procedures and standards, and designate the Florida Division of Forestry's *Basic Prescribed Fire Training* manual as the Department's official prescribed burning manual.**

Management Response: Management concurs. Currently, all LSD burn crewmembers are required to complete the state prescribed burn course. Each staff member receives a Florida Division of Forestry Basic Prescribed Fire Training Manual issued for this course. This manual has most of the important generic prescribed burn information and has been designated as the LSD program's

reference manual. However, some of the generic information contained within these manuals and more specific site information is already available in fire management plans and prescriptions written for specific areas. The boilerplate section containing this information included in each fire plan will be expanded to include additional information.

Responsible Department: Land Stewardship

Estimated Completion Date: October 2001

2. Utilize a pre-burn checklist to document prescribed burn planning steps.

Management Response: Management concurs. As noted in the audit, a pre-burn checklist would help to ensure that all key factors have been addressed prior to burning. A checklist would also provide clear evidence of plan implementation to anyone that reviews the burn planning. In addition, a checklist would provide procedural consistency for the various District burn managers and could be attached to the burn prescription. However, this checklist should not be considered a quick "cookbook" rationale to a go/no-go decision. This view would dangerously oversimplify a more complex analysis and although the checklist would be part of the briefing package it should not substitute for on-site burn crew briefings.

Responsible Department: Land Stewardship

Estimated Completion Date: June 2001

Management Should Consider Requesting Exemptions From Burn Bans When Property Conditions Are Proper

During the last three fiscal years, a burn ban was in place for part of the year limiting the amount of acreage burned through Land Stewardship's prescribed burning program. The State issues burn bans when regional or statewide conditions indicate severe drought conditions or extraordinary fire hazard conditions.

Florida statute 590.081 states "the Commissioner of Agriculture may declare a severe drought emergency" where "it is unlawful to set fire to . . . any wildlands . . . "unless a written permit is obtained from the division or its designated agent."

Further, Florida statute 590.082 states if "the drought emergency continues until the wild lands become so dry or parched as to create an extraordinary fire hazard . . . the Governor may by proclamation declare an extraordinary fire hazard to exist." There is no provision in the statute for obtaining a permit during an extraordinary fire hazard declaration.

The declaration of a severe drought emergency or an extraordinary fire hazard limits Land Stewardship's prescribed burning program. With a typical wet/dry season pattern there are two windows of time when the majority of prescribed burning is accomplished. During fall, at the end of the wet season, the window of opportunity for burning opens as the property becomes dry enough to burn and the window closes when it becomes too dry for proper control of a fire. In spring the window is open once again after the ground becomes moist enough to safely burn but before it becomes too wet to carry fire.

The prescribed burn at DuPuis that we observed was conducted a few days after the lifting of the most recent burn ban. During the burn, we observed an area near a cypress dome that didn't burn well. A member of the fire crew pointed out dead and dried St. John's wort along with sawgrass in the area, both of which should carry fire under proper conditions. However, an examination of the ground surface indicated that the soil was too moist for the fire to penetrate into the area surrounding the cypress dome. If the ground were drier it would carry a fire and help clear out the bushy vegetation (willows, sawgrass, wax myrtle) that grows around the edge of a cypress dome. According to the land manager, the DuPuis reserve had been out of a drought situation for several weeks and conditions were proper for prescribed burning if not for the burn ban. However, the burn ban was statewide and despite the differences in soil

moisture between southern and northern Florida, it was not possible to burn until the ban was lifted from the entire state. The burn ban resulted in the loss of several weeks of the window of prescribed burning opportunity.

A burn ban has affected the burn seasons of the last three years and with below average rainfall in calendar year 2000, a burn ban in 2001 would not be surprising. The following table compares Land Stewardship's prescribed burning goals and actual results in the recent years affected by the burn bans.

Fiscal Year	Prescribed Burn Acreage Goal	Actual Acres Burned
1998	5,000	5,043
1999	13,000	4,530
2000	10,000	12,559

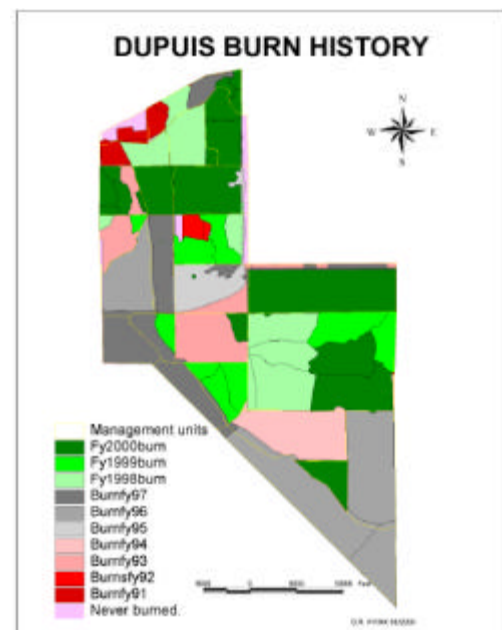
Source: Land Stewardship Department

The burn ban contributed to Land Stewardship not reaching their burn goals during 1999. Without the burn ban, Land Stewardship could have greatly exceeded their goals in 1998 and 2000.

For example at DuPuis, as shown in the graphic, Land Stewardship has been able to stay within the 2-10 year interval of burning.

However, they would prefer to burn areas every two years to lessen fuel loads and restore a more open canopy of pines.

When property conditions are proper, requesting and obtaining exemptions from burn bans could allow Land Stewardship to meet and exceed their burning goals.



Recommendation:

3. The Land Stewardship Department should consider asking for an exemption to the declaration of severe drought emergency when supported by conditions at a particular property.

Management Response: Management concurs. The DuPuis staff has asked for exemptions from the regional office of the Division of Forestry (DOF) on previous occasions when a burn ban was declared but has been unsuccessful. Reasons given were that 1) giving DuPuis an exemption would cause them to have to give others an exemption and, 2) the ban was declared at the state level and nothing could be done at the regional level (the audit points out that this is not necessarily true). Perhaps by approaching Forestry before hand with a more formal request and with more time for discussion and approval, an agreement could be reached. This is a good recommendation and should be pursued. We have already provided similar recommendations to the Governor's task force and have discussed with local DOF officials. Authorization for such regional autonomy would probably have to be granted from Tallahassee and this has not happened to date. The LSD program would not request an exemption under the most severe droughts.

If this recommendation is approved, staff will draft a letter from Frank Finch to Earl Peterson reiterating our comments to the Governor's task force and asking DOF to consider allowing more policy flexibility specifically for DuPuis where adequate equipment and staff are present. This letter would include suppression issues (#4 below) specifically for DuPuis.

Responsible Department: Land Stewardship

Estimated Completion Date: October 2001

Fire Suppression Agreements Should be Executed With the Division of Forestry

Land Stewardship reports all wildfires (whether naturally ignited or escaped prescribed burns) to the Division of Forestry (DOF). If Land Stewardship's fire crew can't suppress the fire with their equipment, then DOF becomes responsible for fire suppression. How the wildfire is managed on the property is then at the discretion of the DOF. The suppression methods used by DOF can include use of a fire plow that can cause significant ecological damage. In order for DOF to consider the ecological benefits of a wildfire and manage it accordingly, specific criteria and objectives should be detailed and agreed to in a fire suppression agreement. Negotiation of a fire suppression agreement can be a useful method to agree on less ecologically damaging fire suppression methods.

These agreements detail the methods that the DOF would use to suppress any wildfires or escaped fires that occur on District properties.

Key components of a fire suppression agreement include:

- Physical description of the site (fuels, fire-sensitive areas, ecologically sensitive areas),
- A narrative of the procedure to be followed in the event of a wildfire (notification, suppression action),
- Identification of the local office of the Division of Forestry that will be responsible for suppression in the area, with contact phone numbers,
- Communication procedures including radio frequencies and cell phone numbers,
- Maps including named roads, fire lines, and gates,
- Natural firebreaks such as wetlands, ponds, streams, and
- Availability of contingent resources.

DOF has an existing fire suppression agreement with Jonathan Dickinson State Park⁶ that could be used as a model for Land Stewardship's agreements.

Having a Fire Suppression Agreement in place may help lessen the amount of ecological damage to District properties from the required fire response of the DOF. At DuPuis, due to its rural location, the fire

⁶ Source: Martin County Fire Superintendent.

suppression agreement could include allowing the fire to burn out into other areas within the reserve.

Recommendation:

- 4. The Land Stewardship Department should consider entering into fire suppression agreements with the Division of Forestry for selected properties.**

Management Response: An agreement with the Division of Forestry that would allow District staff to take charge of the suppression or burn-out of wildfire on District properties could only be effective in those infrequent situations where circumstances would allow (i.e., available staff & equipment are on site, appropriate weather exists, there is available daylight, fuel loads are such that allowing the fire to burn would not cause unacceptable damage, etc.). Given the requirement of available staff, equipment, etc. this agreement could only realistically apply at DuPuis. In a past wildfire situation at DuPuis, forestry responded with their plow unit but honored the District's request and allowed District personnel to suppress the fire. Division of Forestry understands the District's concern of the ecological damage caused by the use of the fire plow and is willing to restrain its use when District personnel, equipment and other conditions are favorable. Allowing the District to turn a wildfire into a controlled fire would be a desirable thing but as things presently exist could happen rarely. As the District reduces fuel loads over more area and burns more frequently, this may become more practical. Understanding Forestry's mission, responsibility and complexity of their job (and the importance of their job to the District), it would not be practical or prudent to present Forestry with a proposed agreement that would "detail the methods used to suppress any wildfires or escaped fires that occur on District properties." Instead of an agreement, we should pursue a better verbal understanding with Forestry's county supervisor(s) and regional director(s) regarding burn-out flexibility in wildfire situations through more pointed discussions.

Responsible Department: Land Stewardship

Estimated Completion Date: October 2001

Various Methods are used to Control Fuel Loads on Wildland/Urban Interface Lands

As population in the District continues to grow, the “wildland/urban interface”⁷ also increases, especially along properties on the east coast and the Kissimmee Chain of Lakes.

This wildland/urban interface increases the difficulty of prescribed burning, which can result in a build-up of burnable fuels. The build-up of fuels increases the risks of wildfire.

Despite the added difficulties of prescribed burning, fuel loads need to be reduced through a combination of mechanical, chemical and prescribed burning techniques.

For example, at DuPuis Reserve, the land management plan combines chemical treatment of exotics, and mechanical crushing of vegetation with prescribed burning to keep fuel levels low. Although the property is in a rural area, there are interfaces with a state road, buildings, Florida Power and Light transmission lines, and neighboring agricultural interests along the edges of the property. In these areas, prescribed fire is limited and nearly all fuel control is performed through chemical and mechanical methods.

Recommendation:

- 5. The Land Stewardship Department should continue to use all three methods (prescribed fire, chemical and mechanical) to reduce fuel loads on Department properties. On properties where the wildland/urban interface reduces prescribed burning opportunities, significantly increased mechanical and chemical treatments should be required to reduce fuels that heighten wildfire risk.**

Management Response: Management concurs. The interface of District land with urban areas should be of particular concern for reducing vegetative fuels and keeping them at a non-threatening level. Mechanical treatment to thin out and reduce fuel height is the preferred method in these situations. Chemical treatment will kill the vegetation but without immediate removal will actually exacerbate

⁷ Definition source: United States Department of Agriculture's Forest Service.

the fire danger. Once these areas are thinned, fire can be used to maintain them or if fire is not practical then periodic mechanical treatment may be used. LSD will continue to use appropriate mechanical control of vegetation to enhance the safety and effectiveness of prescribed burning. LSD will continue to use herbicides to control exotic vegetation to meet restoration goals. However, LSD will not use herbicides indiscriminately on native vegetation to enhance prescribed burning program and must weigh the benefits of these other control efforts against possible costs (i.e. increased soil disturbance, tree stress and mortality, etc.). These problems have been associated with the practice of using standard drum choppers leading the LSD program to consider acquiring more environmentally sensitive equipment. LSD will investigate lease/options to determine efficiency of alternative equipment.

Responsible Department: Land Stewardship

Estimated Completion Date: On-going



Communications Could Be Improved Between Fire Crewmembers and With the General Public

Public Communications

A risk associated with the prescribed burning program is smoke. Next to managing the actual burn, smoke management may be considered the most critical element of using prescribed fire. There is the potential for smoke to create a public nuisance and serious highway traffic hazards. A prescribed fire is lit only when conditions are in agreement with the “prescription” for wind direction and speed. Additionally, to mitigate the adverse affects of the smoke, the Property Manager informs neighboring landowners of the burn to make them aware that their property will be affected by smoke.

Florida Statute 590.125(3)(a)5 states:

A public education program is necessary to make citizens and visitors aware of public safety, resource, and economic benefits of prescribed burning.

When the Burn of the Lake Okeechobee shoreline was performed on July 20, 2000, a District news release was prepared and placed on the District’s website. In combination with calling adjacent landowners, this is a good tool for informing the public about the fire’s potential smoke problems and the planned benefits of the prescribed burn.

Part of the public education program is to inform the public of the differences between destructive wildfires and beneficial prescribed burns – which often look identical to the untrained eye. This could be accomplished by providing links on the web site notification to separate pages describing Land Stewardship’s prescribed burn program, the benefits of prescribed burning, and the dangers of wildfire.



Crewmember Communications

During the DuPuis fire observation it was at times difficult to understand radio communications because of static and interference. This was especially evident during the communications from the helicopter.

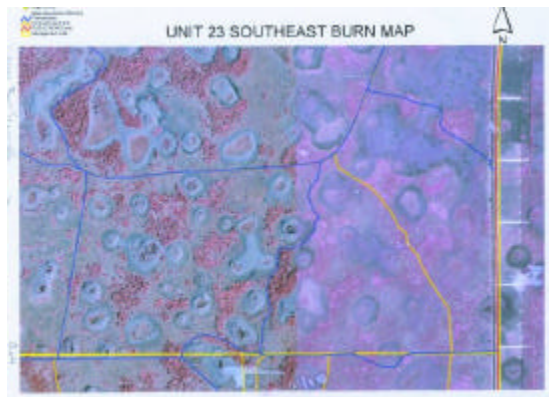
The fire crews experience is that the VHF radios tend to reach up to a mile (fire boundaries are often greater than that) so communication beyond that can be poor. Cell phone coverage is very spotty on DuPuis making communications with the office inconsistent.

Because of the static, fire crewmembers have to ask for instructions to be repeated, which could exacerbate an emergency situation. A solution to the communication difficulties may be upgrading to the latest communication technology such as two-way radio/cell phone communication devices.

Burn Map

The prescribed burn fire crewmembers are issued maps to help with their orientation of the burn unit. However, labeling roads with official and common names could improve the maps.

The fire map provides a topographical view of the area and is labeled with fire lines, and (unlabeled) nonpublic and public roads.



The map of a burn area is essential for fire crew members to find the most efficient route to reach another point on the fire line or to react to an emergency situation.

Adding official and common road names to the map could save valuable time for crewmembers, especially members who do not have local knowledge of a particular fire site.

Recommendations:**Land Stewardship Department Management should consider:**

- 6. Posting an announcement of all prescribed burns on the District's web site. The announcement could contain links to warn areas that could be potentially affected by smoke, and explain the benefits of prescribed burns on District lands and the potential dangers of wildfire.**

Management Response: Management concurs. Information on the benefits of prescribed burning or general information on the District's use of fire would be beneficial to web site users. However, putting notification of specific burns or warning of potential smoke problems would not be as useful. The decision to burn is usually made that morning and that late notification would not be of practical use to web users. Putting out notifications earlier and then canceling at the last minute would be confusing to the viewer and too much additional work for the burn planner. LSD will investigate a procedure for posting general burn information on the web site (both District and new DuPuis website when completed). This task will be the responsibility of Casey Brown who will be the DuPuis site webmaster. LSD will continue to work with Lee Henderson to expand our website to include more detailed management activity information.

Responsible Department: Land Stewardship

Estimated Completion Date: October 2001

- 7. Improving communications on prescribed fires through upgrading to the latest communication technology such as combination two-way radio / cell phones.**

Management Response: Management concurs. The use of new technology would improve burn communication, burn efficiency, and safety. LSD agrees with the importance of reliable communication and has initiated efforts to acquire new technology such as the Nextel.

Responsible Department: Land Stewardship

Estimated Completion Date: April 2001

8. Labeling burn maps with official and common road names.

Management Response: Management concurs. We are improving our burn maps with the help of our GIS mapping. Fire maps have been improved and we will continue to be upgraded.

Responsible Department: Land Stewardship

Estimated Completion Date: October 2001



APPENDIX – FIRE OBSERVATION

Background and Fire Preparation

On Tuesday July 18, 2000 staff from the Office of Inspector General observed an approximately 850 acre prescribed burn of a pine flatwood at DuPuis Reserve which encompasses 21,875 acres in northwestern Palm Beach and southwestern Martin Counties.



The burn unit habitat consisted of a slash pine flatwoods interspersed with cypress domes. The flatwoods have an overstory of slash pine trees up to 40 feet tall and an understory of saw palmetto, cabbage palm and wax myrtle. The forest floor consisted of native grasses, sledges, and pine seedlings. Invasive plant species included brazilian

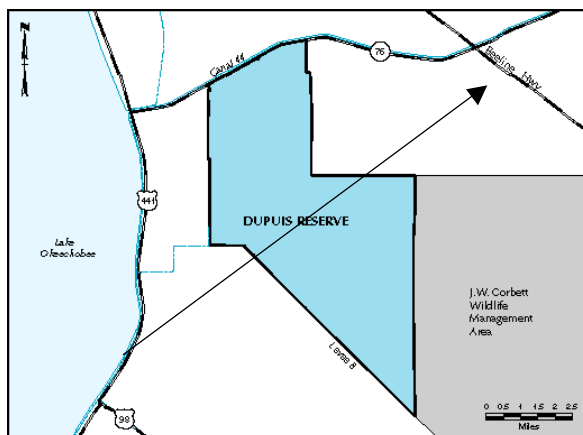
pepper, melaleuca, and lygodium (climbing fern).

Prior to the burn, the Land Manager held a fire meeting with the Burn Boss and the fire crew. Based upon the weather forecast, it was decided that it was safe to proceed with a test burn that morning.

Other preparatory procedures included preparing a written prescription for the fire, receiving a verbal prescribed burn permit from the Division of Forestry (DOF), and telephoning adjacent landowners to make them aware of the burn and to advise them of smoke from the fire.

The land manager had previously obtained the spot weather forecast from

the Division of Forestry. By providing the location longitude and latitude or the township, range and section, the spot forecast provides the temperature, relative humidity, wind speed and direction for the given location. A southwestern wind of 8 mph was forecast, therefore the eastern and northern sides were most subject



to spot-over and the risk of wildfires.

While these procedures were performed, the Burn Boss conducted a successful test burn of the burn unit. A test burn is performed to determine if the ground will carry a fire and to ascertain that wind and atmospheric conditions are proper for smoke management. With a successful test burn and a permit from the DOF, it was now possible to proceed with the prescribed burn

Fire Procedures

First, a black line was laid on the eastern edge of the burn parcel. This consists of using a drip torch to burn all available vegetation for a strip about ten yards wide through a backing fire⁸. The black line limits opportunity for fire spotover from subsequent head fires.



The control fire line at this site is considered safe as it is bordered by the L-8 canal and levee and then by the FPL powerline corridor. Immediately after the corridor is the Corbett Wildlife Management Area (CWMA).

Upon completion of the black line, a head fire was lit and run towards the black line. Smoke began flying overhead, carrying pieces of ash and burning embers, primarily from cabbage palms. A member of the fire crew noted that the largest risk was the embers catching fire in the adjacent FPL easement. However, due to recent rains, the low-lying power line easement had standing water, reducing the fire risk.



⁸ A backing fire runs against the wind and is a slower and cooler fire than a head fire that runs with the wind.

After this initial head fire had run into the black line, a second head fire was lit and allowed to run into the black line at which point the hand ignited part of the prescribed fire was completed.

From this point on, a rental helicopter was used to ignite the remaining fires. A specially designed box is attached to the helicopter which releases a series of ping-pong ball sized incendiary devises. These balls were dropped to create a series of fires. Each aerial fire line was lit further away from the initial fire line, allowing the head fire to run into already burned acreage.



A few small fires started from the blowing embers on the adjacent canal levee. A fire crew member patrolling the fire line in a fire truck extinguished these fires. In order to keep track of current weather conditions, a fire crewmember took current weather observations using hand-held instruments (temperature, humidity, wind direction, and speed).

We patrolled the eastern fire line for approximately two hours where we looked for spotovers and watched the smoke column for signs of fire in the CWMA. The smoke was moving northeast over CWMA and a plume of smoke raising vertically from the CWMA would indicate the presence of a spotover fire. We observed the helicopter fly over the CWMA to determine whether there were any spotover fires connected with the smoke. Through radio communication, it was reported that everything looked good in the CWMA.

After patrolling the eastern fire line for a few hours, we were requested by the Burn Boss to move to the north side of the fire line to watch for spotovers.

Driving to the north side of the fire required placing the truck in four-wheel drive as the road and trails were wet with some areas of standing water. There are several named and unnamed roads throughout the area, which serve as firebreaks for the burn units. These roads are maintained by disking throughout the year to keep them clear of vegetation.

We stationed ourselves along the northside of the fire on a thin dirt road (fireline) that bisected the current fire, and areas that had been prescribed burned six months ago and two years ago.

The current fire was slowly creeping along and would flare up when it hit dried patches of vegetation. I walked along the firebreak and noted palmetto bushes that had been totally blackened by the fire.



Upon examination of the previous burned areas, it was easy to see how fast an area recovers from fire. Although you could see charred areas on the trunks of the pine trees, all of the palmetto bushes, cabbage palms, and grass species had fully recovered. Wax myrtle, a species that although native can become a nuisance, was partially burned but survived the fires. A crew-member noted that many of the wax myrtle bushes were tall and would require a more intense future burn to be reduced. Alternatively, a technique known as roller chopping can be used to reduce vegetation height. This involves pulling a large rolling drum with a tractor over the palmetto and wax myrtle bushes to crush them and reduce their height. This can allow the fire to consume them and also reduces the height of the fire. On the minus side, use of the tractor disturbs the soil and the pine tree roots which can lead to an increase in exotic plants and damage to the slash pine trees.



While at the firebreak road, we noticed two individuals patrolling the area in ATV vehicles and also a swamp buggy that could access the muddy areas. These vehicles all carry water pumps to help out with fire suppression if necessary.

After less than an hour on the north side of the fire it was evident that the fire was slowly burning out and no longer throwing up any embers. We received a call to return to the eastern levee with the four-wheel drive truck to help assist with pulling some of the equipment back to headquarters.

While driving back, a fast moving thunderstorm came up which started pelting rain on the fire parcel.