

Using Prescribed Fire to Reduce the Risk of Smoke Related Traffic Problems on I-95

Steven R. Miller, Chief, Land Management Bureau, St Johns River Water Management District

Abstract—In many areas of the United States, prescribed burning near highways is considered too risky because of the potential for smoke to obscure the highway. In one area in Florida, prescribed fire is used to reduce the risks of smoke related impacts to Interstate 95. The St Johns River Water Management District manages over 400,000 acres of land. Seventy percent of those lands are wetlands, and nearly 200,000 acres of the wetlands are marsh ecosystems that require fire for their perpetuation. Some marsh acres are immediately adjacent to Interstate 95 near Cocoa, in Brevard County, Florida. Prior to 1993, the District had no formal wildland fire program and all wildland fire management responsibilities were abdicated to the Florida Division of Forestry. In the 1980's Florida suffered several severe droughts and associated wildfire seasons and as a result, the marshes next to I-95 supported lightning-ignited wildfires on several occasions because they were so dry that organic soils began to burn. These wildfires burned for weeks, resulting in prolonged smoke impacts to I-95, and even smoke-related vehicle accidents. In 1989, the Division of Forestry requested that the Water Management District participate in a program to use prescribed fire on a frequent basis, at least every third year, in an effort to reduce the risk of wildfires that could ignite the organic soil. It took until 1996 for the District to build a program capable of conducting a complex 4,600 acre prescribed burn using aerial ignition immediately adjacent to an Interstate Highway. Since that time, that area has been burned five additional times, and to date there have been no smoke-related accidents from either prescribed burning or wildfires. In fact, despite being subject to several severe droughts, the area has not supported a wildfire since managed fire began in 1996.

Keywords: Prescribed Fire, Smoke, Fire Prevention

Introduction

When prescribed fire managers are asked to identify the factors that limit their ability to complete prescribed fires, smoke management and wildland urban interface concerns are commonly listed in the top five reasons (Melvin 2012). Headlines such as the one shown in Figure 1 paralyze many prescribed fire managers and prevent them from even considering a large burn immediately adjacent to an interstate highway. Yet, burning land adjacent to well traveled roads,

such as an interstate, may actually improve public safety and reduce overall risk.

Prescribed burns conducted under specific weather conditions and desired timeframes, can reduce the risk of unplanned ignitions occurring under less desirable conditions and at less desirable times (Koehler 1993). The act of prescribing the conditions and the timing under which an area may burn offers improved public safety and reduces risk (Koehler 1993). This paper will emphasize the importance of, and the benefits offered by taking a proactive approach to fire management.

Figure 1—Headlines from the Florida Today Newspaper in Melbourne Florida from January 1, 1989. The article reports on car accidents resulting from diminished visibility from fog and smoke from a lingering wildfire in wetlands within River Lakes 8.



In: Keane, Robert E.; Jolly, Matt; Parsons, Russell; Riley, Karin. 2015. Proceedings of the large wildland fires conference; May 19-23, 2014; Missoula, MT. Proc. RMRS-P-73. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 345 p.

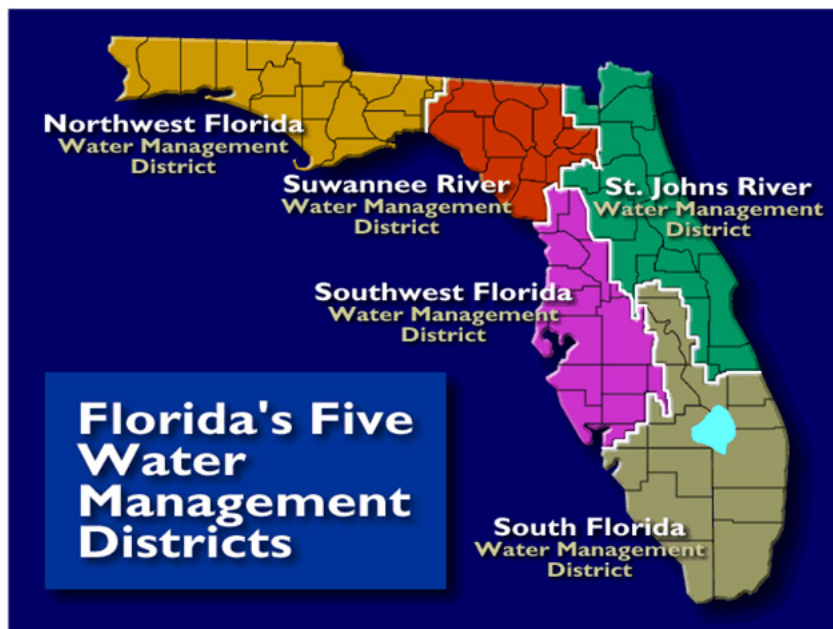


Figure 2—Map of the five Water Management Districts within the state of Florida.

The St Johns River Water Management District (the District) is located in northeast Florida (Figure 2). Its mission is to “ensure the sustainable use and protection of water resources for the benefits of the people of the District and the state of Florida.”(SJRWMD 2014). To accomplish this mission, the District is expected to strike a balance in water needs by educating the public about water conservation, setting rules for water use, conducting research, collecting data, managing land, restoring and protecting water above and below the ground, and preserving natural areas. Regarding land management, Florida Statute 373.1391 states *“Lands titled to the governing boards of the districts shall be managed and maintained, to the extent practicable, in such a way as to ensure a balance between public access, general public recreational purposes, and restoration and protection of their natural state and condition.”*

Currently the District manages a multiple use program on 420,000 acres of land. An active fire management program is essential to meeting this legislative charge as this is the subject of the paper. However, that was not always the case. By the late 1980’s, the District acquired 270,000 acres of land for water resource and flood control purposes. Prior to August of 1992, when the District created a Division of Land Management, it had no formal land management program, and relied heavily on other agencies for fire management. Prior to that time, fire management was primarily the responsibility of the Florida Division of Forestry, with such management limited strictly to wildfire suppression.

Seventy percent of the lands owned by the water management district are wetlands (SJRWMD 2014). Nearly 200,000 acres of wetlands are natural freshwater marshes (SJRWMD 2014). Functionally these marsh ecosystems are dependent on a regime of flooding and frequent fire (FNAI 2010, Miller 1998). In the absence of frequent fires, one fire every three to five years, marshes are invaded by woody vegetation until they eventually succeed to forested ecosystems (FNAI 2010,

Miller 1998). In the absence of water, the accumulated organic matter will oxidize either slowly or rapidly through combustion (Meyers 1990).

Problem

During the late 1980’s, Florida experienced several periods of drought (FSU 2014). As a result, wildfires in the District’s marsh lands were frequent, and often large (Koehler 1989) Drought conditions create dry organic soils in wetland systems and ideal conditions for wildfires to grow large. Once wildfires ignite organic soil, they are likely to burn for weeks to months. Fire suppression options under these conditions are limited to securing a perimeter and waiting for either rain to flood the fire area or for complete consumption of the organic soil, thereby depriving the fire of additional fuel.

Interstate 95 is east of the many wetlands owned by the District. River Lakes Conservation Area is near I-95 (Figure 3). Several fires burning organic soils within District land during the late 1980’s produced smoke for weeks (Figure 4). Because of the close proximity of the wetlands to I-95, that smoke reduced visibility for drivers using the highway, contributing to several accidents, which in turn resulted in the highway being intermittently closed for weeks at a time (Koehler 1989).

Solution

Tired of a reactive approach that included dealing with smoke impacts to I-95 for weeks at a time, John Koehler, the Orlando District Forester for the Florida Division of Forestry (now the Florida Forest Service), contacted the District and suggested a more proactive approach. He proposed to cooperatively develop a prescribed fire program that would use

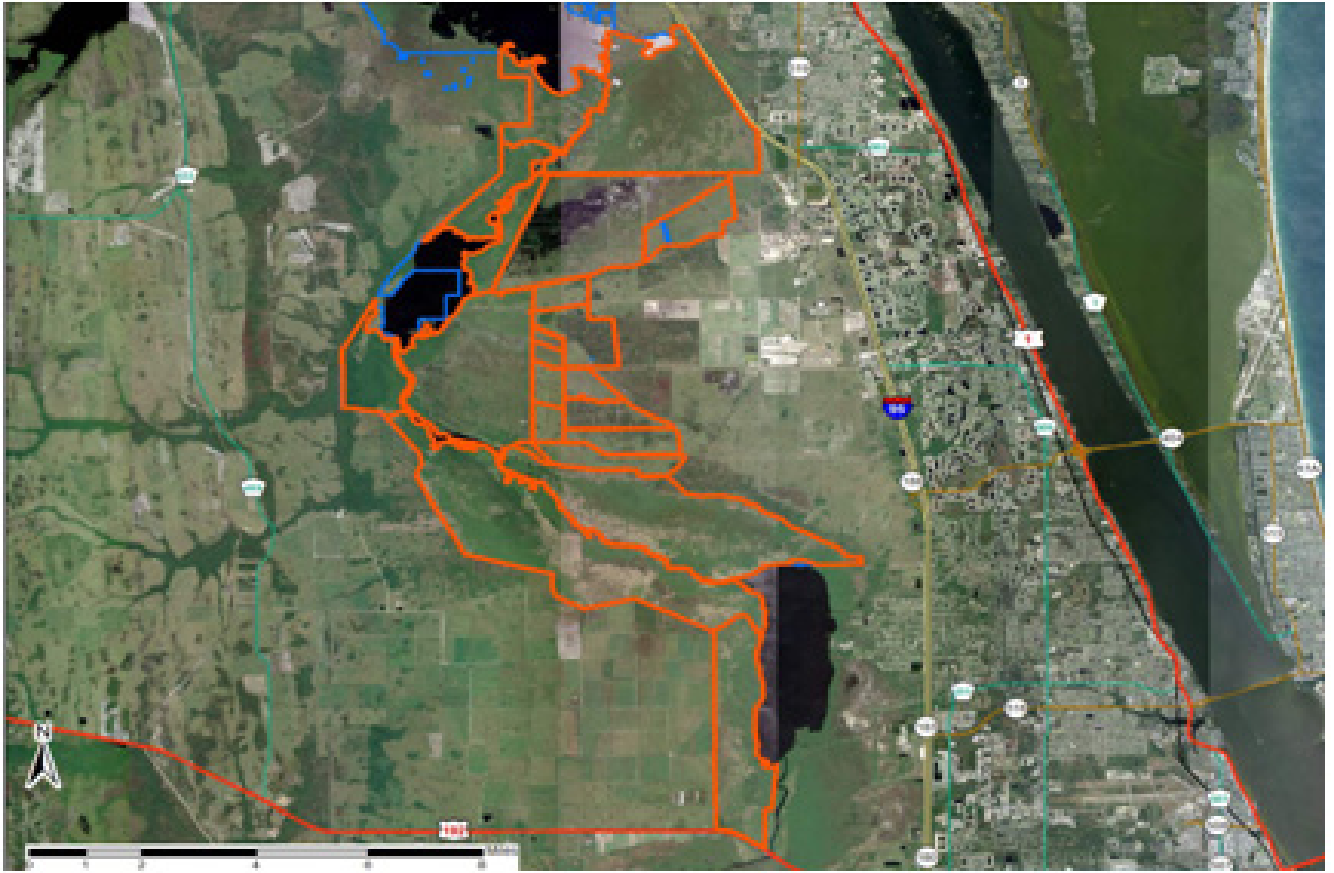


Figure 3—River Lakes Conservation Area owned by the SJRWMD and the proximity of I-95.

aerial ignition to start fires when smoke management and water level conditions were favorable. He hoped that prescribed fire would reduce the potential for wildfires to start when the soils would combust, or when smoke might impact the interstate.

Because the District had no formal Land Management program until 1992, it wasn't until 1996 that the first prescribed burn occurred as a part of Mr. Kohler's proposed plan. The River Lakes 8 burn zone became the focus of this proactive approach because it is the fire management zone

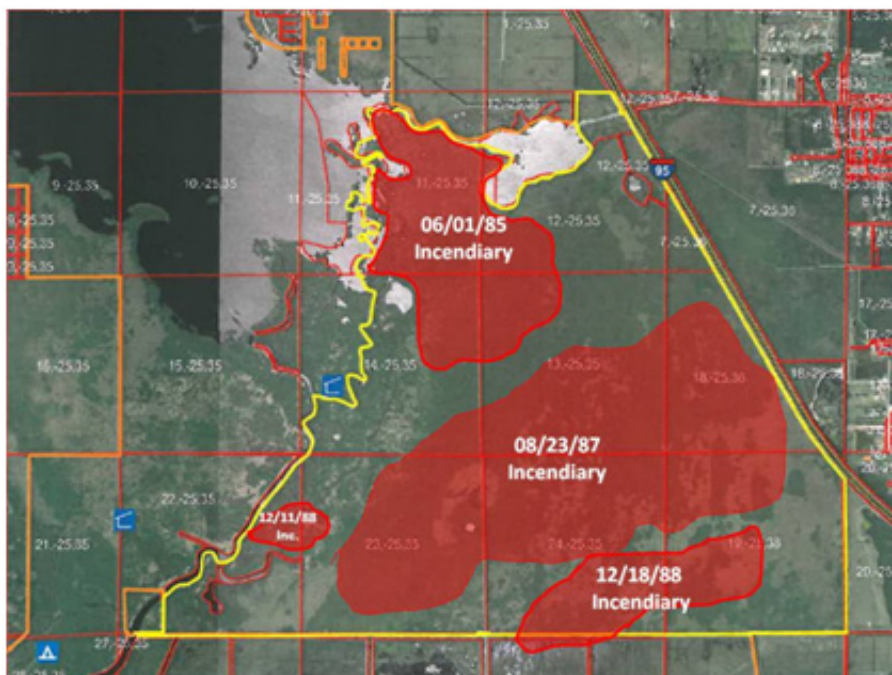


Figure 4—Map of River Lakes 8 burn zone and four wildfires that burned within the unit from 1985 through 1988. The fire ignited on 12/18/88 was the fire that resulted in the newspaper article in Figure 1.



Figure 5—The last line of aerial ignition during a prescribed burn of River Lake 8 on March 14, 2014. Image courtesy of Doug Voltolina.

closest to I-95 (Figure 3, 4). It is actually adjacent to the Interstate for nearly four miles, and wildfires burning within that zone contributed to most of the highway closures and accidents during the late 1980's.

Results

Since that first burn in 1996, River Lakes 8 has been burned seven additional times. The most recent burn was completed on March 14, of 2014 (Figure 5). During the 21-year period of prescribed burning on River Lakes 8, there have been no wildfires or any other smoke-related incidents on I-95 associated within District lands. Visual assessments indicated that, while some woody vegetation exists within the River Lakes 8 (Figure 6), marsh grasses are the dominant vegetation cover. The frequent fire return interval has provided both public safety and ecological benefits.



Figure 6—Willow within River Lakes 8 sprouting six months post burn. Note the condition of the surrounding sawgrass. At the horizon, semi trailers traveling I-95 are just barely visible.

Discussion

The keys to the success of the District's prescribed burning program have been:

1. Cooperation. Cooperation among agencies was especially important in the beginning. When the concept was new, none of the participants had conducted prescribed burns immediately adjacent to an interstate. Now, everyone knows their role. Assistance from the Florida Forest Service, Florida Highway Patrol, the National Weather Service and Brevard County Fire Rescue contributes to the safety and success of each burn.
2. Diligence. Fire managers require exacting conditions when selecting a day to burn. Because there is no way to stop a burn in River Lakes 8 once it starts, conditions must be correct. The ideal day has a wind speed greater than 10.0 miles per hour out of the northeast or east, an atmospheric dispersion index of at least 40, and water levels that at least saturate the soil.
3. Commitment. Success is not achieved by burning the zone only one time. Success results from a commitment to burn it as close to once every three years as possible.

4. Communication. Communication among the cooperators, with the neighboring landowners, and with the general public, has been critical to the success. We know efforts at communication have been successful anytime we when we can burn 4,600 acres in the urban interface, immediately adjacent to six lanes of interstate traffic and only have two telephone calls.
5. Being proactive. Too often people are convinced that taking no action is the safest approach to managing land with fire. They assume that reacting to circumstances carries less risk than taking action in the first place. The reactive approach enabled several wildfires to impact traffic safety on I-95 and resulted in several multi crashes. The proactive approach since 1993 has resulted in no wildfires, no smoke impacts to the highway, and no organic soil fires. The proactive approach has a much better record from both a public safety and from an ecological perspective.

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