A wildfire ripples through the grasses, oak, cedar and loblolly pine at Camp Swift in Bastrop. It’s just three miles from where the state’s most devastating blaze destroyed 1,660 homes in 2011. But this fire is different. This is a good fire.

Prescribed – or controlled – burning is one of many tools that natural resource managers use to maintain healthy ecosystems, improve wildlife habitat and remove hazardous vegetation, which, if left unchecked could lead to the spread of wildfire.

Texas A&M Forest Service’s Smithville-based Lost Pines Task Force is composed of some of the state’s most skilled firefighters at prescribed burning. The task force conducts projects from border to border across the state to reduce vegetation, or “fuel.” In addition to prescribed burns, Texas A&M Forest Service crews also do chipping, mulching and thinning projects.

Cities and counties that work with TFS to develop a Community Wildfire Protection Plan – a document that identifies risks and outlines mitigation strategies – often partner with the state agency on projects that reduce hazardous vegetation. Prescribed burns typically are cooperative ventures with agencies such as Texas Parks and Wildlife Department and can be used as training opportunities for municipal fire departments. Texas A&M Forest Service does not burn on private lands.

TFS Program Coordinator Rich Gray recently worked with the Texas Army National Guard and Bastrop County officials to develop a plan for the Lost Pines crew to burn 2,745 acres within the county during the peak spring burning months.

“Texas is cautiously receptive to prescribed fire,” Gray said. “Not everyone has had positive exposure to fire. It’s a continuous education process. I’m actually much more concerned with smoke issues than a prescribed fire getting away
from us. A split second of smoke can hamper visibility and cause a fatal accident.”

According to the U.S. Forest Service, only about one-half of 1 percent of prescribed fires become uncontrolled wildfires.

The Prescribed Burning Board of the Texas Department of Agriculture sets standards for prescribed burning and oversees the certification and training of burn managers.

Conducting a burn
Gray, who has worked as a burn manager in four states over the past 28 years, ensures that his crew goes through an intricate process before each burn is conducted.

They prepare their tools the night before and have a plan in place by the time they arrive. The plan covers how many acres will be burned, the purpose or goal of the burn, resources needed to ignite a fire and keep it active and ideal weather conditions for fuel consumption, smoke management and intended fire behavior.

“As a firefighter, you’re responsible for day-to-day situational awareness,” Gray said. “That means knowing what type of fire behavior you can expect: where and how that fire is going to burn.”

Texas A&M Forest Service offers a host of products that show the forecast fire danger, observed fire danger and fuel moisture throughout the state, which helps crews determine whether a prescribed burn could be carried out safely. They also can assess the wildfire risk for a particular area by using the Texas Wildfire Risk Assessment Portal.

While the burn plan guides where the fire will occur and how much acreage will be consumed, the “prescription” is the combination of scientific factors and conditions that must converge in order for the fire to do what the crew wants it to do.

“A prescription is a template, but you fine-tune the dosage,” Gray said. “You determine the best method to reduce the vegetation.”

For example, the wind needs to be a certain speed and direction. Relative humidity also is a factor because it determines how dry the fuels are. Typically an RH above 50 percent is too high for a burn to be effective and RH less than 20 percent is too dangerous.

“Many times we’ve gotten on site and observed that the weather is out of prescription or adverse enough that we wouldn’t be able to keep the fire in the burn block,” Gray said. “On those days, we pack it up and we don’t burn or we wait until the weather changes.”
Firefighters also will check the Haines Index, which shows the potential for dry air to contribute to the development of a wildfire. Other tools are available to study probability of ignition, transport winds, cloud cover, predicted humidity recovery and energy release components.

If a fire burns too hot, it can rise to the crowns of pine trees and kill them, so firefighters take precautions to ensure they preserve the trees they want to keep. While burning, a crew member is assigned to assess weather conditions at least every hour. Fuel mitigation – in the form of prescribed burning and other methods – is always done with the goal of creating a healthy forest, not getting rid of trees unless they are hazardous, Gray explained.

Safety is also a key component of any prescribed burn. Firefighters are required to wear protective, fire-resistant clothing and complete a wildland training course and fitness test before they can participate in a prescribed burn.

The crew includes a burn boss who oversees the operation from start to finish, an ignition boss with a group of igniters and a holding boss who ensures the burn is kept within the area identified in the plan.

Before burning, the crew is expected to notify the local media, the Texas Commission on Environmental Quality, local fire departments and local property managers.

**Conducting research**

Texas A&M Forest Service has worked extensively with the National Institute of Standards and Technology (NIST) and the U.S. Forest Service to collect fire behavior data during prescribed burns.

Researchers use unmanned aerial vehicles (UAV) with infrared thermal imaging to capture high-resolution photos and videos. The small aircraft flies over the burn and researchers can use the collected data to show things like how fast a fire moves under certain conditions. The data also can be used to refine fire behavior models.

In the future, NIST researchers want to deploy UAV over wildland fires to provide real-time information to incident management teams for tactical decision-making.

Mike Hennig, who serves as “pilot at controls” for the NIST wildfire research project, is considered a leading expert in UAV research. The UAV he uses weighs about 35 pounds, he said, and can carry a load of up to three pounds.

Hennig works alongside NIST researcher Alex Maranghides, who is developing data collection methodology for wildfires in the wildland urban interface (WUI). Maranghides’ research includes collecting data from prescribed burns in Texas, which is then shared nationally.

“If we can determine specifically how WUI fires start and spread and share that information on a national scale, we can potentially prevent the destruction of thousands of acres of land and structures, and save countless lives,” Maranghides said in an article for FireRescue Magazine.

Texas A&M Forest Service also has worked with the National Weather Service, Texas A&M Engineering Extension Service and Baylor University to study various technicalities of prescribed fire from retardant application to impacts on Golden-cheeked Warbler habitat.

“We’re always trying to learn more and study the ‘why and how’ of fire so we can best conserve and protect the lands of Texas,” Gray said. “As we learn more, we refine our procedures. It’s a scientific process that continues to show us new things.”
The Lost Pines Task Force is:
Program Coordinator Rich Gray
Resource Specialists Robbie Curles, Nathan Decker, David Ivy, Steven Moore, Wade Powell, Mark Stinson and Steven Willingham.
Seasonal Employees Colton Curles, Kyle Jacobsen, Steve Moore and Eric Schneider.

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