FIRE in the GRASSLANDS

The prescription for habitat restoration

Story by Tom Edwards • Photos by John Brunjes

NATHAN WHITE WAVED a copy of the spot weather forecast at me as I passed by his office at 7:30 a.m.

The forecast for the day, generated minutes earlier by the National Weather Service, was custom-made for the Blue Grass Army Depot in Madison County. With the assistance of White, the depot's natural resources specialist, we hoped to conduct prescribed fire on two native grassland units on the property that day.

Blue Grass Army Depot uses fire for the maintenance and expansion of native grasslands – the kind of habitat critical to the recovery of bobwhite quail. Up to 800 acres of grasslands are burned on the 15,000-acre depot each year; the property is one of Kentucky's eight quail focus areas.

Fire and quail management go hand-in-hand. Shaker Village in Mercer County is also a Kentucky quail focus area. Don Pelly and Ben Leffew of Shaker Village, with help from Kentucky Fish and Wildlife biologists John Morgan and Ben Robinson, have converted more than 1,000 acres of old pasture to native grass. Managers now use fire to maintain the grasslands.

Fire at the right time and the right intensity can kill the woody plants that overtake grasslands. It doesn't take much to kill growing plant tissue – a temperature of 145 degrees will do it.

The time of the year also plays a major role. Plants are more sensitive to heat when they are actively growing and their moisture content is high.

Although burning in late winter or early spring isn't the best time to kill woody plants, it helps the native grasses. This is because fire injures the young growth of cool season grass like fescue. It also warms the top inch or two of soil.

With less competition from fescue, warmer soil temperatures and the flush of nutrients released by fire, native warm season plants receive a jump start. Fire also produces bare ground that allows sunlight to reach native grass sprouts, increasing growth.

Facing page: Carefully managed fires help maintain grasslands for wildlife.

The U.S. Forest Service has a lengthy history of using fire to meet their goals in forests and open lands in Kentucky. With a major push from Kentucky Fish and Wildlife to restore native grasslands beginning in the early 1990s, fire was emphasized to prepare lands for conversion to native plants, promoting recovery of what is believed to have once been more than two million acres of native grasslands in Kentucky.

Prescribed fire also is regularly used by the Kentucky State Nature Preserves Commission, The Nature Conservancy, U.S. Fish and Wildlife Service, Wendell Ford Regional Training Center, Fort Campbell and others. The primary purpose for fire by some is to restore and maintain native plant communities.

Dr. Gwynn Henderson, archeologist for the Kentucky Archeological Survey and the author of "Kentuckians Before Boone," said there is an extensive history of fire being used to alter the landscape of Kentucky. "Fire was used by native peoples on the land in Kentucky for agricultural purposes from 1000 AD to the 1700s, and hasn't stopped," she said.

There is also archeological evidence that populations of grassland and shrub land wildlife species were greater due to the use of fire by native peoples. The use of fire has been a continuous activity on the Kentucky landscape for more than 1,000 years. "The weirdness," Henderson added, "is fire suppression."

A prescribed fire is a carefully planned event.

Unlike a couple of guys who decide to burn off a patch of weeds behind their house, attempting a prescribed fire is the culmination of a planning process that states a clear objective and then develops an approach around a series of carefully considered requirements, predictions and possibilities. Backyard burners typically take few precautions, have no written plan and occasionally violate Kentucky's burning law.

The prescribed burn plan answers a series of questions: Why are we burning this area? How many people, what equipment and what approach is required to do it safely? When is the best time of year to conduct the burn to get the desired result?

The burn plan addresses smoke sensitive areas and actions to be taken if the fire overruns the primary firebreak. It describes specific weather conditions that must occur on burn day. Finally, it details the point at which the burn crew may leave the scene.

In order to launch a prescribed fire on the depot that day, we needed the wind to be no higher than 15 mph at 20 feet above the ground. The humidity level had to surpass 30 percent.

A consistent but gentle breeze helps drive the fire. We avoid situations involving strong winds or dramatic shifts in wind di-

Updrafts from a fire can create vortexes that pull smoke away from the ground.

rection. Wind speed and direction coupled with topography determine where the fire will go and how fast it will get there.

Humidity in the 30-50 percent range reduces moisture in the dead grasses that fuel the fire. Low moisture means better consumption of the grass fuels. The forecasted low humidity of 38 percent and maximum wind speed of 8 mph was ideal.

I had spent the previous two weeks making final arrangements for the burn with White. Marcia Schroder, a wildlife technician with the Kentucky Department of Fish and Wildlife Resources, had done the necessary preparations of the firebreaks months earlier.

Now with a favorable forecast in hand, we made the last entry on the required pre-burn checklist.

The fire crew would include employees from the depot, Kentucky Fish and Wildlife and biologists from the U.S. Fish and Wildlife Service. Two Eastern Kentucky University wildlife management students qualified as Type 2 firefighters would join us. They would have their day as trainees on a real fire.

White could now phone the depot's fire department to request two firemen and a brush fire truck equipped with a 300-gallon water tank. In all, 16 people would participate.

Fire reduces fescue and gives wildlife-friendly native grasses a jumpstart.

We planned a 10 a.m. start to allow the sun enough time to burn the frost off the grass. The clanging of aluminum torches – designed to drip fire from their nozzles – and the sound of the off-road vehicle engines echoed off nearby metal buildings as the staff assembled in the parking lot. Crew members swapped their sweatshirts and ball caps for hardhats and flame-resistant, green and yellow Nomex clothing.

They topped off water tanks, primed water pumps and tossed fire rakes and other tools into their vehicles. They checked their two-way radios before strapping them into harnesses with extra batteries. I double-checked for two first-aid kits and a field weather kit.

Amid all the noise and the smell of the diesel and gasoline drip torch fuel, White was on his cell phone alerting Madison County's emergency dispatch center, the

All fire is completely extinguished before the burn team leaves the field.

Kentucky Division of Forestry and a half dozen other authorities that the burn would soon be underway.

Everyone else set about getting their personal gear in order. Snacks and drinking water bottles were stuffed into pockets. Leather boots were tightly laced and leather gloves slung from belt loops. Women twisted and tied up long hair. Bandanas were fashioned into do-rags. Such are the rituals of prescribed fire.

White and I led a caravan of pickup trucks and trailers to the first burn unit. Upon our arrival at the vehicle staging area, trailer gates slammed to the ground and the crew off-loaded fire equipment. A train of ATVs (all-terrain vehicles) and UTVs (utility task vehicles) formed; we motored along the perimeter of the unit to check out the firebreaks.

The addition of the utility vehicles has significantly improved our ability to conduct prescribed fires. Depending on type, these vehicles can carry two to four people along with 40 to 100 gallons of water. Having several of these water carrying units helps transport staff, increases control of the burn and helps participants mop up embers and small flames at the end of the burn.

We dismounted and formed a loose circle at the downwind point of the unit. I handed out copies of the prescribed burn plan, which contained a map. Locations along the unit perimeter are labeled alphabetically on the map to serve as reference points during the fire. The current map identified our starting position as point D.

As fire boss during this burn, I made staff assignments for the day. I would coordinate movements of the depot's brush truck through White. Squad bosses and ignition specialists were upfront duties. Everyone else would trail behind the rest of the crew in holding positions.

The mandatory briefing with all participants covered the main points: Burn objectives, fuel types, unit description, mop-up procedures and safety. Fire safety reminders included the familiar LCES: Look outs, Communication, Escape routes and Safety zones.

Crew members received reminders to go to black for safety. Because grass burns up quickly, the safest place to be during a large grassland burn is the blackened area where the fire has passed.

It was now 10:55 a.m. White called the depot's Emergency Operations Center to get current, on-site weather. He would make that call every hour during the day, both to keep us informed of weather trends and to provide feedback to the National Weather Service to help refine their future forecasts.

I lit the test fire that starts every burn. The heavy, cool morning air funneled smoke down narrow valleys in a direction opposite to the prevailing upland winds. Once the sun hit the hillside and temperature increased, however, the flames grew larger and the smoke lifted.

Early in the day, we experienced ankle-high fires backing slowly into the wind. By afternoon, we had 15-foot fires running safely toward our backfires and burned out areas. By day's end we had put fire on a total of 350 acres.

Fire had consumed more than 80 percent of the vegetation, exposing bare soil between blackened clumps of grass. All that remained of small cedar trees were charred stems. Cedar trees do not re-sprout if they have no live green needles left.

The fire had singed black locust saplings, but likely would do no more than kill just the tops. The fire didn't spread into the heavily shaded woodlands, sparsely vegetated spots or wet areas. The result was a desirable mosaic of burned land with unburned islands.

As dusk approached, most of the burn crew was heading home. We took a quick trip around both burn units looking for smoke or flames, but none were seen. The depot's fire department would make one last run at dark, just to make sure.

For more information on the use of prescribed fire in Kentucky, visit the Kentucky Prescribed Fire Council website at *kyfire.org*. ■

KENTUCKY'S BURN LAW

During fire seasons, it is illegal to burn anything within 150 feet of any woodland or brush land between the hours of 6 a.m. to 6 p.m. The spring forest fire hazard season runs from Feb. 15 - April 30. The fall forest fire hazard season is Oct. 1 - Dec. 15.