

**Resource Management Guides  
Morgan-Monroe State Forest  
30-day Public Comment Period (November 8 – December 7, 2023)**

The Indiana State Forest system consists of approximately 160,251 acres of primarily forested land distributed across the state. These lands are managed under the principle that we're stewards of this land for the future. This work is guided through legislation and comprehensive scientific national and international forest certification standards which are independently audited to help insure long-term forest health, resiliency, and sustainability.

Resource management guides (RMGs) are developed to provide long-term, scientific forest management planning tailored to each forest compartment (300-1,000 acres in size) and tract (10 - 300 acres in size). There are 1,590 tracts across the state forest system statewide. Annually, 50-100 tracts are reviewed, and these guides are developed based on current assessments. Through science-based management practices, we prescribe management actions on select tracts every 15-25 year, diversifying the forested landscape and sustaining ecosystems.

The RMGs listed below and contained in this document are part of the properties annually scheduled forest inventories under review for Morgan-Monroe State Forest.

Prescribed Fire RMG - Compartment 3 (Gose Creek)

**To submit a comment on this document, go to:**

<https://www.in.gov/dnr/forestry/state-forest-management/public-comment/submit/>

You must indicate the State Forest Name, Compartment number and Tract number in the "subject or file reference" line to ensure that your comment receives appropriate consideration. Comments received within 30 days of posting will be considered and review posted at:

<https://www.in.gov/dnr/forestry/state-forest-management/public-comment/>

Note: Some graphics may distort due to compression.

**Indiana Department of Natural Resources**  
**Division of Forestry**  
Prescribed Fire  
Resource Management Guide

**Morgan-Monroe State Forest**

**Compartment: 3**

**Tract(s): 1,2,3,11**

**Forester: Phil Jones**

**Date: September 15, 2023**

**Acres: 315**

## Overview

Fire has been present on the landscape since the arrival of the first peoples in North America. Native Americans commonly used fire to influence their landscape to help with agriculture, hunting, and ease of travel. Throughout early settlement and into the 1900s, fire was viewed as an enemy of nature and was extinguished wherever it was found. It is now realized that many of the natural systems in Indiana evolved with fire and require it to thrive, especially oak-hickory forests. The landscape of southern Indiana has been oak-hickory dominated for approximately 4,000 years.

Without fire or other appropriate interventions, many of the oak-hickory dominated areas in our state forests are under threat to convert to other forest types due to an aging overstory combined with a mid-story and understory that are filled with other, usually shade tolerant species. These trees consist primarily of American beech, sugar maple, and red maple with lesser amounts of ironwood, muscledwood, blackgum, and sassafras. The ecological benefits of oak-hickory forests are immense, and the conversion of these forests to other types would be catastrophic.

One of the major factors associated with successful oak regeneration is light intensity. The shaded conditions described above are too extreme for oak establishment. Conversely, too much light from the canopy is also detrimental, as it will allow faster growing species like yellow-poplar to quickly overtop newly established oak seedlings.

When using prescribed fire as a tool for oak regeneration one of the primary objectives is to increase diffuse (scattered) light levels while minimizing canopy gaps. It is believed that oak will become established under the moderate light conditions this would create, while more shade intolerant species will not receive sufficient light for competitive growth.

Controlling fire intensity is critical to accomplishing these goals. The fire needs to be hot enough to kill the shade tolerant species dominant in the midstory and understory, but not so intense as to kill overstory trees. Experienced professionals at Fire Headquarters (FHQ) will develop a complex burn plan tailored to meet these objectives. There are a multitude of components and considerations that must be addressed when developing a burn plan, including but not limited to; weather conditions, smoke dispersal, fuel models, terrain, personnel assignments, ignition and holding plans, communications, contingency plans, and safety.

In addition to creating optimal light conditions, prescribed fire reduces leaf litter to provide conditions more favorable for the establishment of not only oak and hickory, but the herbaceous and shrub layers

that were traditionally associated with them. Fire also releases nutrients being held in dead plant matter and can lower fuel loads to help minimize the risk of uncontrolled wildfires.

## Location

The proposed prescribed burn area is in Morgan County, Washington Township, Section(s) 32, 33–T11N–R1E. It is approximately 4 miles south of Martinsville, Indiana, and located along the south side of Gose Creek Road.

## General Description

The burn unit comprises roughly the south quarter of Morgan-Monroe (MM) Compartment 3. The area consists of almost entirely south facing slopes interspersed with east and west facing ridges. There is one long, linear north facing slope located in the center of the unit in tract 2. The majority of the unit can be characterized as dry to dry-mesic upland forest dominated with chestnut, white, red, and black oaks. A derecho event in the early 1990’s heavily impacted this portion of the state forest. As a result, there are scattered pockets of 30-year-old mixed hardwood stands, mostly dominated with yellow-poplar. These stands vary in size from a ½ to few acres each. Some of these sites located on the dryer south slopes have declining yellow-poplar and significant amounts of advanced oak regeneration. However, the overall composition of the understory and midstory layers throughout the unit is beech-maple.

The data in the charts below were compiled from the latest continuous forest inventory (CFI) data. The understory/midstory layers, represented here by the sapling and pole product classes, are dominated with beech and maple as measured by number of live trees and basal area (BA). Even the sawtimber size classes, while still dominated by oak-hickory, appear to be transitioning to a beech-maple cover type. Given the overall aspect and xeric conditions of this area, it is concerning to see such a heavy component of mesophytic, shade tolerant species taking hold.

*Chart 1*

**MM Comp 3 - Percent Basal Area for Product Class by Species Group**

| Species Group   | Sapling | Pole   | Small Saw | Large Saw |
|-----------------|---------|--------|-----------|-----------|
| Oak-Hickory     | 2.04%   | 19.03% | 57.11%    | 63.71%    |
| Beech-Maple     | 71.43%  | 48.87% | 20.64%    | 22.29%    |
| Yellow-Poplar   | 0.00%   | 2.58%  | 3.85%     | 0.00%     |
| Mixed Hardwoods | 16.33%  | 20.81% | 10.70%    | 10.30%    |
| Conifers        | 0.00%   | 1.45%  | 7.70%     | 3.71%     |
| Non Commercial  | 10.20%  | 7.26%  | 0.00%     | 0.00%     |

*Chart 2*

**MM Comp 3 - Percent Live Trees for Product Class by Species Group**

| Species Group | Sapling | Pole   | Small Saw | Large Saw |
|---------------|---------|--------|-----------|-----------|
| Oak-Hickory   | 2.00%   | 22.95% | 61.71%    | 62.71%    |
| Beech-Maple   | 71.67%  | 46.20% | 21.37%    | 22.71%    |

|                        |        |        |       |        |
|------------------------|--------|--------|-------|--------|
| <b>Yellow-Poplar</b>   | 0.00%  | 4.17%  | 2.56% | 0.00%  |
| <b>Mixed Hardwoods</b> | 16.33% | 21.42% | 9.23% | 11.46% |
| <b>Conifers</b>        | 0.00%  | 0.88%  | 5.13% | 3.12%  |
| <b>Non Commercial</b>  | 10.00% | 4.39%  | 0.00% | 0.00%  |

## General Discussion & Prescription

Tract 3, the western most in the unit, was burned in the spring of 2019. The burn successfully eliminated significant amounts of small (1”-2” dia.) beech and maple. Subsequently, oak regeneration was present over much of this area for the first few growing seasons. However, much of this initial regenerative response has waned. There are a few likely reasons for this.

First, multiple studies have recommended frequent/repeated use of prescribed fire to increase oak and hickory regeneration. Typically, single prescribed burns will not reduce enough competition for oak and hickory regeneration to succeed (Arthur et al. 1998). In another study, white oak and hickories were observed to have higher seedling densities in burned stands but were unlikely to advance above the seedling layer in the absence of additional burning (Holzmueller et al. 2009).

A second factor effecting the persistence of oak-hickory seedling density is the size of the shade tolerant species. Decades of fire suppression have allowed many of these understory and midstory competitors to reach sizes where they are resistant to low intensity fires. As previously mentioned, one of the main goals when using fire as an oak regeneration tool is to create the proper light conditions.

The conundrum we face is that in order to eliminate the larger cohorts in these layers we need to use higher intensity fires. However, in doing so we risk severely damaging or killing larger overstory trees, and this is not our objective. Too much of this will result in excessive light reaching the forest floor and stimulating growth for fast growing competitors like yellow-poplar, sycamore, sassafras, etc. An effective solution for this situation is to carry out a timber stand improvement (TSI) operation which targets this particular cohort. Below is a list of effective mechanical and chemical methods that can be used. All trees should be treated with an appropriate herbicide in order to prevent resprouting.

1. Cut with brush cutter – *best for sapling size*
2. Cut with chainsaw – *best for pole size and larger*
3. Girdle – *ideal for medium pole size and larger*
4. Basal Bark Application – *ideal for sapling size and small poles*

A combination of the silvicultural treatments described above, and repeated burns are prescribed for the area. A 3 to 7 year burn frequency is recommended. Oak and hickory regeneration assessments will be made periodically and burn frequency recommendations will be adjusted accordingly. The TSI operation may occur pre or post burn and intensity will vary depending on specific site and stand conditions.

## Other Considerations

There is one recreational feature in the burn area. A portion of the 7.5-mile Tecumseh extension hiking trail will serve as the south fire line for the burn unit. The trail was an old road that use to extend from

the bottom of Gose Creek Road to Rosenbaum Road. This section of the Tecumseh extension trail would be closed for the duration of the burn and mop up period, which is expected to be 1-2 days.

Cultural resources may be present, but their location is protected. Adverse impacts to significant cultural resources will be avoided during the prescribed fire.

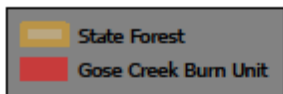
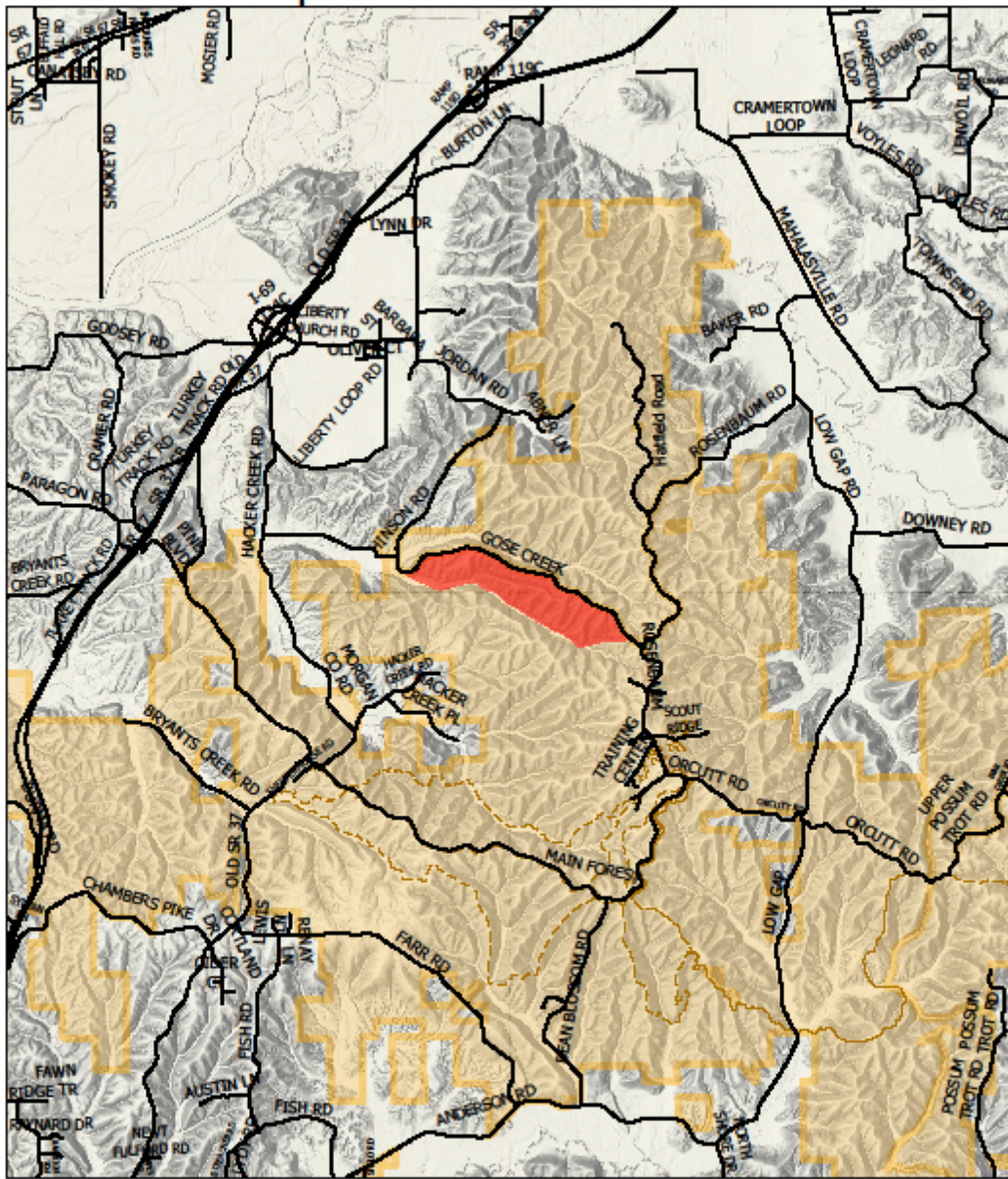
A Natural Heritage Database review was completed for this area, which included review by the Division of Forestry staff wildlife biologist and ecologist/botanist.

If Rare, Threatened or Endangered species (RTE's) were identified or encountered for this area, the activities prescribed in this guide will be conducted in a manner that will not threaten the viability of those species.

### **Literature Cited**

- E.J. Holzmüller, S. Jose, and M.A. Jenkins. 2008. The Response of Understory Species Composition, Diversity, and Seedling Regeneration to Repeated Burning in Southern Appalachian Oak-Hickory Forests *Natural Areas* 29(3): 255-262.
- M.A. Arthur, R.D. Paratley, and B.A. Blankenship. 1998. Single and repeated fires affect survival and regeneration of woody and herbaceous species in an oak-pine forest. *Journal of the Torrey Botanical Society* 125:225-236.

# Morgan-Monroe State Forest Location Map Gose Creek Prescribed Fire



# Morgan-Monroe State Forest Gose Creek Prescribed Fire Map

