



Forest Service
U.S. DEPARTMENT OF AGRICULTURE

Land Between the Lakes National Recreation Area

December 2022

Biennial Monitoring Evaluation Report for the Land Between the Lakes National Recreation Area

Fiscal years 2018-2021



Mission Statement
Land Between the Lakes National Recreation Area

To protect and manage the resources of the Recreation Area for optimum yield of outdoor recreation and environmental education through multiple use management by the Forest Service; to authorize, research, test, and demonstrate innovative programs and cost-effective management of the Recreation Area; to help stimulate the development of the surrounding region; and extend the beneficial results as widely as practicable.

For More Information Contact:

Andrew Mowrey
Land Between the Lakes National Recreation Area
100 Van Morgan Rd
Golden Pond, KY 42211
270-924-2131

www.landbetweenthelakes.us/stewardship/land-resource-management/planning/

In accordance with Federal civil rights law and U.S. Department of Agriculture (USDA) civil rights regulations and policies, the USDA, its Agencies, offices, and employees, and institutions participating in or administering USDA programs are prohibited from discriminating based on race, color, national origin, religion, sex, gender identity (including gender expression), sexual orientation, disability, age, marital status, family/parental status, income derived from a public assistance program, political beliefs, or reprisal or retaliation for prior civil rights activity, in any program or activity conducted or funded by USDA (not all bases apply to all programs). Remedies and complaint filing deadlines vary by program or incident.

Persons with disabilities who require alternative means of communication for program information (e.g., Braille, large print, audiotape, American Sign Language, etc.) should contact the responsible Agency or USDA's TARGET Center at (202) 720-2600 (voice and TTY) or contact USDA through the Federal Relay Service at (800) 877-8339. Additionally, program information may be made available in languages other than English.

To file a program discrimination complaint, complete the USDA Program Discrimination Complaint Form, AD-3027, found online at http://www.ascr.usda.gov/complaint_filing_cust.html and at any USDA office or write a letter addressed to USDA and provide in the letter all of the information requested in the form. To request a copy of the complaint form, call (866) 632-9992. Submit your completed form or letter to USDA by: (1) mail: U.S. Department of Agriculture, Office of the Assistant Secretary for Civil Rights, 1400 Independence Avenue, SW, Washington, D.C. 20250-9410; (2) fax: (202) 690-7442; or (3) email: program.intake@usda.gov.

USDA is an equal opportunity provider, employer, and lender.

Table of Contents

Why Monitoring Matters.....	1
Summary Of This Report	3
Forest Supervisor's Certification	5
Goal 1: Prioritize Projects to Provide Greatest Benefits	6
Goal 2: Emphasize Partnerships and Cooperators	7
Goal 3: Provide Environmental Education Messages.....	9
Goal 4: Manage Natural and Physical Resources to Improve Watershed Quality	10
Goal 5: Use Collaboration Approach to Maintain and Restore Habitat to Support Wildlife Diversity and Recreation	11
Goal 6: Demonstrate and Export Innovative Management Techniques.....	13
Goal 7: Enhance Dispersed Recreation and Environmental Education.....	14
Goal 8: Remain Effective in Supporting National Goals	16
Our Partners	19

Why Monitoring Matters

There is no single correct approach to managing a forest or grassland. Each decision maker must weigh the ecological complexity of these ecosystems, the changing environmental conditions, the many different viewpoints of the public, and uncertainty about long-term consequences.

Data from monitoring can therefore be extremely useful. A robust, transparent, and meaningful monitoring program can provide information on specific resources, management impacts, and overall trends in condition – in other words, feedback on whether we are meeting our management objectives or not.

Each national forest or grassland has a land management plan or “forest or grassland plan” that balances tradeoffs among recreation, timber, water, wilderness, wildlife habitat, and other uses. The plan describes a set of desired conditions – a science-based vision for what forest or grassland conditions should be once the goals of the plan are met. The forest or grassland plan also includes a monitoring program, organized around a set of monitoring questions and indicators that are designed to track progress toward achieving the desired conditions in the plan.

Monitoring of certain resources is required by law, regulation, or directive (see box below for the required nine monitoring topics). Other monitoring occurs depending on specific needs of the national forest or grassland. Every 2 years, each forest or grassland compiles and evaluates the monitoring results and drafts a report like this one. Decision makers, such as forest and grassland supervisors, use these biennial monitoring evaluation reports (BMERs) to update their knowledge and assess progress toward the desired conditions in the forest or grassland plan. The public use these BMERs to understand what’s happening on the land that they depend upon and enjoy.



Figure 1. Adaptive Management Cycle

If the report reveals that we are not quite meeting the mark, then there’s a need to change management in some way; this is adaptively managing. Monitoring data allows us to learn through management and adjust our

strategies based on what we learned. Monitoring also helps us be accountable and transparent to interested and affected parties and colleagues.

Because monitoring can be expensive, time-consuming, and labor-intensive, we rely on the help of our partners and work collaboratively with them to accomplish monitoring objectives. We also rely on existing data sources such as national and regional inventory, monitoring, and research programs; federal, state, or local government agencies; scientists, partners, and members of the public; and information from Tribal communities and Alaska Native Corporations.

BMERs, like this one, are critical to adaptive management because they tell us and the public whether the land management plan is working. We don't make any decisions in BMERs; instead, we simply document and share monitoring results.

Forest Service monitoring programs include questions and indicators that address nine topics.

1. Status of select watershed conditions.
2. Status of select ecological conditions including key characteristics of terrestrial and aquatic ecosystems.
3. Status of focal species to assess the ecological conditions.
4. Status of a select set of the ecological conditions to contribute to the recovery of federally listed threatened and endangered species, conserve proposed and candidate species, and maintain a viable population of each species of conservation concern.
5. Status of visitor use, visitor satisfaction, and progress toward meeting recreation objectives.
6. Measurable changes on the plan area related to climate change and other stressors that might be affecting the plan area.
7. Progress toward meeting the desired conditions and objectives in the plan, including for providing multiple use opportunities.
8. Effects of each management system to determine that they do not substantially and permanently impair the productivity of the land.
9. Status of social, economic, and cultural sustainability.

Figure 2. Forest Service monitoring questions

Summary Of This Report

This 2022 biennial monitoring evaluation report for the Land Between the Lakes National Recreation Area documents monitoring activities that occurred during fiscal years [2018] through [2021]. You can find our Area Plan and other document links under the Stewardship tab on our website at www.landbetweenthelakes.us/stewardship/land-resource-management/planning/. The M&E Report is typically completed biannually. However, due to staffing shortages running concurrently with the Covid-19 pandemic, the fiscal years 18 and 19 report was not completed. Therefore, we include the 2018-2021 fiscal year's results for the United States Department of Agriculture, Forest Service, Land Between the Lakes National Recreation Area (LBNRA).

This report emphasizes the findings and conclusions compiled from various monitoring activities and data sources available on LBNRA. The monitoring and evaluation program serves as an important link between Area Plan implementation and on-the-ground accomplishments. Evaluations in this report serve as a catalyst for any needed changes within the Area Plan or its implementation. The monitoring and evaluation program determines and informs the Area Supervisor about:

- Achievement of Goals and Objectives.
- Adherence to Design Criteria.
- Occurrence of Predicted implementation effects.
- Discovery of emerging or unanticipated issues.

The Goals and Discussion section is broken up into nine topics. One for each of the Area Plan's eight goals with a ninth addressing climate change. Each goal includes a table combining, in one location, the desired condition and trend statements, and relevance discussed in the Area Plan. To make this a meaningful and usable document while still being a manageable size, we have attempted to summarize only the key conclusions within the body of a "monitoring results and evaluations narrative" following each goal's table. It is important to us members of the public understand our efforts to achieve the vision in our Area Plan and our land and resource management outcomes. Submit comments about our M&E Report by mail to: Area Supervisor, 100 Van Morgan Drive, Golden Pond, KY, 42211; by electronic mail to comments-southern-landbetweenlakes@fs.fed.us or by phone to Andy Mowrey, Area Planner, at 270-924-2131. We welcome thoughts and comments about this report or any aspect of our management.

Resource specialists answered the 49 monitoring questions to determine if current activities and monitoring described in Chapter 5 (the monitoring program) of our forest plan are moving the forest toward or maintaining the desired conditions or objectives. Using data collected from 2018 to 2021, specialists identified where more data were needed and recommended changes to our forest plan, monitoring plan, or management activities or if a new assessment is needed. It should be noted that staff determined several of the monitoring questions show redundancy and were therefore combined with other questions. This will be noted in the discussion sections of each individual plan goal.

Forest Service monitoring programs include 18 questions that address nine topics.

(There are a total of 49 questions, however many have been combined due to redundancy and overlap)

- Has the Forest Service made progress toward providing satisfactory recreational and environmental educational experiences to visitors while providing for resource stewardship?
- Have resource management projects been integrated?
- Has the Forest Service made progress toward supporting vitality of gateway communities and maintaining/enhancing relationships with its neighbors and regional organizations?
- Has the Forest Service made progress toward successfully changing behaviors as a result of environmental education experiences to visitors?
- Has the Forest Service made progress in reducing erosion and improving watershed conditions and how was this accomplished?
- Has the Forest Service established baseline data for channel classification of its major intermittent and perennial streams?
- How well are species of viability concern being maintained on LBL?
- Are non-native invasives an increasing threat to LBL?
- How is management of LBL affecting recovery of threatened and endangered species?
- How is management of LBL affecting demand for wildlife-related recreation?
- How is management of LBL affecting special habitats and major biological communities?
- Is the forest less likely to be affected by insects, disease, and wildfire?
- Has the Forest Service made progress toward identifying old growth stands on the ground?
- Has LBL produced measurable results from demonstration projects that have led to positive changes on other units?
- How many demonstration products have been exported?
- Have dispersed recreational and environmental educational opportunities at LBL been enhanced?
- Are the goals of the LBL Plan leading to accomplishments that support national objectives?
- Are Plan objectives and standards being applied, and are they accomplishing their intended purpose?

Forest Supervisor's Certification

This report summarizes the monitoring activities that happened on the LBLNRA from fiscal year 2018 through 2021. The detailed resource reports, which were used to build this monitoring report, are available in the project record upon request. I have evaluated the monitoring and evaluation results presented in this report.

I examined the recommended changes to the 2004 forest plan and consider the plan sufficient to continue to guide land and resource management of Land Between the Lakes NRA for the near future. A deeper examination of the recommended changes through engagement with resource specialists and the public is planned during the upcoming fiscal year.

Leisa Cook
Area Supervisor
December 16, 2022

Goal 1: Prioritize Projects to Provide Greatest Benefits

A primary focus for LBLNRA has always been to look at projects in a manner most beneficial to the environment and the public. Since Land Between the Lakes is a National Recreation Area, priorities differ slightly from the typical Forest Service unit regarding management. However, prioritization of projects has always followed a comprehensive and systematic approach. This approach includes maximizing efficiency in how projects are designed and carried out, comprehensive analysis, internal/external scoping, and always keeping focus on the end goals.



Monitoring Questions

- MQ 1/1: Has the Forest Service made progress toward providing satisfactory recreational and environmental educational experiences to visitors while providing for resource stewardship?
- MQ 1/2: Have resource management projects been integrated?

Key Results

Based on a summary of visitor surveys and personal letters/notes received, the area appears to be trending towards providing a positive recreational and educational experience for the public. Based on the activity of new resource projects related to recreation/env. education sites on the area, positive efforts are being made to improve the end user's experience at LBLNRA.

Prescribed fire has been prioritized and executed in the Nature Watch Demonstration Area and dispersed recreation areas during the monitoring period. Unfortunately, due to staffing shortages, this program has not been able to meet its goals. Focus has been on forest health and promoting native species.

Recommended Changes

Increase prescribed fire to additional areas while utilizing as a training/learning approach.

Hire additional staff.

MQ 1/2 should be removed from the report. This question has been answered in other discussions.

Goal 2: Emphasize Partnerships and Cooperators

Partnerships, agreements, and Memoranda of Understandings provide critical resources that augment facilities and services provided to visitors and our communities for recreation activities, habitat management, economic development, and environmental education at Land Between the Lakes. While partnerships have always been a part of how we operate, our Area Plan places added emphasis on the value of working together with outside organizations and communities. We continue to look for opportunities to work together.

Monitoring Questions

- MQ 2/3: Has the Forest Service made progress toward supporting vitality of gateway communities and maintaining/enhancing relationships with its neighbors and regional organizations?

Key Results

The unit has made great progress in recent years to enhance relationships with groups and organizations outside our boundaries. Regular meetings are scheduled with two Kentucky County Judge Executives and one Tennessee County Mayor. Land Between the Lakes has established a great relationship with the Lakes Region Coalition which is made up of area county Chambers of Commerce and Tourism Boards. The unit has an active and beneficial memberships and relationships with local wildlife refuges and National Park Service properties. Marketing and branding often includes the gateway communities around the unit. LBLNRA continues to trend in a positive direction with regards to outreach and supporting local gateway communities. A mutual aid agreement was established with the USFWS Clarks River Wildlife Refuge in 2019, a continuing mutual aid agreement for wildland fire cooperation/support has been ongoing with DoD at Fort Campbell, Kentucky, and with Tennessee State Forestry Commission for Stafford act response during the monitoring period.

The Forest Service is monitoring visitation thru various methods such as point of sale system at all camping and day use facilities and 11 traffic counters at various locations. This is also monitored by our partner organization Land Between the Lakes Association.

The Forest Service is partnered with the University of Tennessee and currently participating in the National Visitor Use Monitoring. This occurs every five years.

Recommended Changes

Consider pursuing additional cooperative agreements offering mutual benefits between parties while also serving the public.

Continue nurturing these relationships and to become more involved in community outreach opportunities.

Goal 3: Provide Environmental Education Messages

Land Between the Lakes incorporates environmental education messages throughout the national recreation area to impact visitors' behaviors. Individual visitors and groups receive messages at facility based and non-facility-based programs, campgrounds, trails, interpretive panels, and field trips. We provide ample opportunities for our visitors to enjoy nature and our natural environment through regular environmental education programs, educator support services, dispersed educational activities, and outreach into our surrounding communities.

Monitoring Questions

- MQ 3/4: Has the Forest Service made progress toward successfully changing behaviors as a result of environmental education experiences to visitors?

Key Results

No monitoring results are available currently.

Recommended Changes

Evaluate this monitoring question and its significance and value-add during review of monitoring program.

Goal 4: Manage Natural and Physical Resources to Improve Watershed Quality

Properly functioning streams, lakes, riparian areas, and wetlands are critical in maintaining water quality, water quantity, riparian habitat, aquatic fauna populations and diversity, and downstream beneficial uses. Riparian areas are the interface between land and streams or rivers. We understand the need to direct resources and policies to sustain critical soil and water resources to support our multiple use mission.

Monitoring Questions and Indicators

- MQ 4/5: Has the Forest Service made progress in reducing erosion and improving watershed conditions and how was this accomplished?
- MQ 4/6: Has the Forest Service established baseline data for channel classification of its major intermittent and perennial streams?

Key Results

No data has been collected since the last report. The last report was compiled in 2018 with no monitoring completed since that time.

Desired range and conditions are addressed in the forest plan. These conditions will serve as benchmarks to compare the trends against as protocols and guidelines are developed.

Prescribed fire burn plans detail specific conditions and methods to allow fire to back down into wet or riparian areas and extinguish themselves. This technique has been applied and post burn monitoring (during the monitoring period) confirms our prescribed fire operations retain duff and leaf litter in riparian areas, along with riparian plants, to reduce erosion and deterioration.

Recommended Changes

It is recommended that LBL will conduct monitoring, beginning at the project level, to evaluate stream classification and determination of channel function. Data collected will be used to establish parameters and guidelines for future monitoring efforts and to determine what future changes will be needed.

Goal 5: Use Collaboration Approach to Maintain and Restore Habitat to Support Wildlife Diversity and Recreation

Biological diversity is critical to sustaining healthy ecosystems. The Land Between the Lakes supports a natural diversity of species and environments. Some wildlife species depend on young forest or open conditions, while others prefer more mature forest surroundings. Consequently, we work to maintain a variety of terrestrial and aquatic habitats. A diverse habitat varies in number and species of trees, with many different types and amounts of herbaceous and shrubby plants.

Threats to ecosystem health include dense stands of trees, wildfire suppression, and the spread of invasive species, insects, and disease. We are using prescribed fire, defined as planned wildland fire ignited under specific conditions and according to policy, as well as silvicultural treatments to create habitat diversity across the forest. Prescribed fire treatments help us to maintain or restore fire-mediated and fire-dependent forest community types, such as shortleaf pine.

Monitoring Questions

- MQ 5/7: How well are species of viability concern being maintained on LBL?
- MQ 5/8: Are non-native invasives an increasing threat to LBL?
- MQ 5/9-10: How is management of Land Between the Lakes affecting recovery of threatened and endangered (T&E) species?
- MQ 5/11-14: How is management of Land Between the Lakes affecting demand for wildlife-related recreation?
- MQ 5/15-25: How is management of Land Between the Lakes affecting special habitats and major biological communities?
- MQ 5/26-28: Is the forest less likely to be affected by insects, disease, and wildfire?
- MQ 5/29: Has the Forest Service made progress towards identifying old growth stands on the ground?

Key Results

Restoration and maintenance of fire regimes with fire return intervals were sustained in the monitoring period, however, the goal of 10,000 acres was not achieved in any year and the long-term objective of 21,000 acres per average was not maintained. Currently LBLNRA is not meeting the objective of the stated acreage goals which is below the target of 21,000.

The forest is trending towards a more late-successional prescription group due to the lack of forest management. The forest currently traps and monitors spongy moth on a yearly basis, the state of Kentucky also places traps for insects on the forest.

The forest has completed common stand exams and no old growth has been found. Until a full inventory of the forest is completed the core areas are considered future old growth.

Recommended Changes

Continue inventorying the forest resources.

There is a need to assess placement of long-term monitoring points within forest and fire managed prescriptions across the Recreation Area. The points would be used to monitor habitat changes and factors influencing the change. The Fire Management Team have already started the discussion.

Prior to the next monitoring report, our Revised Open Lands Environmental Assessment needs a Supplemental Information Report Review. This review should identify fields that have grown up into young forest, field access issues, and the need for more open lands prescribe burning.

Assess vegetation habitat conditions at all the monitoring points within the next two years. The vegetation point data is over ten years old and major changes have occurred for points due to tornado damage and natural forest succession.

Permanently combine LBL MQ Table questions 5/26-5/29.

Permanently combine LBL MQ Table questions 5/9-10.

Permanently combine LBL MQ Table questions 5/11-14.

Permanently combine LBL MQ Table questions 5/15-25.

Permanently combine LBL MQ Table questions 5/26-28.

Goal 6: Demonstrate and Export Innovative Management Techniques

Short History of Land Between the Lakes Demonstration Laboratory

Shrinking budgets and workforce shifted the unit's demonstration efforts into an internal focus. In recent years, Land Between the Lakes served mostly other forest and public land units in advisory capacities or for site visits that were completed for zero to little costs. We continue to strive to find innovative ways to reduce costs, increase visitation and improve revenue dollars internally. Land Between the Lakes is willing to work with other units or Federal agencies to help implement any of our unique operations at other forests or parks.

Monitoring Questions

- MQ 6/30: Has LBL produced measurable results from demonstration projects that have led to positive changes on other units?
- MQ 6/31: How many demonstration products have been exported?
- MQ 6/49: Will regeneration treatments on the landscape impair soil quality to inhibit natural or artificial regeneration to occur on the treated landscape?

Key Results

Land Between the Lakes has produced measurable results from numerous demonstration projects. However, these projects have not been exported to other units nor had LBL been asked to demonstrate new projects for export. There seems to be a lack of interest or understanding of the unit's Demonstration Authority at higher levels.

Recommended Changes

Recommendation is to champion and educate higher levels of the benefits and advantages of utilizing LBL's Demonstration Authority.

Monitor Prescribed fire treated areas for change of conditions within existing demonstration areas of unit.

MQ 6/49 is a project specific question and should be removed from the table.

Goal 7: Enhance Dispersed Recreation and Environmental Education

Recreation activities provide enjoyment for millions of national forest and grassland visitors. Recreation improves physical and mental health and helps people connect with the outdoors. Participation in recreational activities is how most of us experience our national forests and grasslands.

Through the decades, the types of recreation have changed. We monitor trends in recreation use and visitor satisfaction to help us decide where and how to distribute limited resources among a broad spectrum of recreational opportunities, ranging from primitive to developed.

We also monitor the status of trail maintenance, and trends in illegal recreation. Rising visitor demand, sometimes sparked by social media posts that share location details, along with increasing impacts from trampling, graffiti, and illegal camping, are a challenge.

Monitoring Questions

- MQ 32-35 & 40-44: Have dispersed recreational and environmental educational opportunities at LBL been enhanced?

Key Results

Efforts to apply prescribed fire in locations that are visible, signed, and recognizable to the public, while providing interpretive opportunities through public outreach, have occurred in the monitoring period. Fire prevention activities have reached hundreds of people to educate the public about fire danger, fire use for landscape restoration, and fire safety.

The Forest Service received a \$4,000,000.00 grant for Recreation and Trails. This has allowed trail restoration, relocation, erosion control, construction of trail side rest areas and other enhancements. Some examples of funds being placed on the ground include:

- 80 water trail access points have been created and are currently being maintained.
- Day use and picnic areas have been rehabilitated and upgraded. I.e., South Bison Range Picnic Area and Cedar Pond Picnic Area.

Customer satisfaction surveys are captured online thru our website, letters and comment cards received via mail, and email. These comments are used for planning purposes.

EE facilities have struggled since the outbreak of COVID-19. Restructuring, site plans, and facility workforce analyses are currently ongoing.

Recommended Changes

Continue to apply prescribed fire in locations that are recognizable while providing educational opportunities and public outreach which supports prescribed fire as a management tool for landscape

restoration.

Permanently combine questions 7/32-35 & 40-44.

Goal 8: Remain Effective in Supporting National Goals

The 2004 Area Plan remains aligned with the goals of the USDA Forest Service and Region 8.

Monitoring Questions

- MQ 8/36: Are the goals of the LBL Plan leading to accomplishments that support national objectives?
- MQ 8/37-39: Are Plan objectives and standards being applied, and are they accomplishing their intended purpose?
- MQ 8/48: What changes are occurring in the social, cultural, and economic conditions in the areas influenced by national forests in the region?

Key Results

Based on trends of proposed projects, current projects, and completed projects, the majority of Plan objectives are successful. Currently, shortfalls in meeting national and Plan objectives are primarily a result of staffing shortages, funding shortages, and direct and indirect effects from the Covid-19 pandemic.

MQ 8/48 for social, cultural, and economic conditions in the region will be addressed and evaluated through the Region 8 Broader-Scale Monitoring Strategy. Land Between the Lakes will incorporate the broader-scale monitoring into the monitoring and evaluation reports when the information is available. See the Region 8's Broader-Scale Monitoring Strategy at <https://www.fs.usda.gov/main/r8/landmanagement/planning>. This website described the indicators and procedures that will be used for the broader-scale monitoring questions.

Recommended Changes

Recommend combining MQ's 8/37-8/39 and providing tangible indicators to understand success.

Goal 9: Measurable changes on the forest related to climate change

Forestlands are experiencing increased threats from fire, insect and non-native plant invasions, disease, extreme weather, and drought. Scientists project increases in temperature and changes in rainfall patterns that can make these threats occur more often, with more intensity, and for longer durations. This monitoring category responds to the 2012 Planning Rule about how climate variability has changed, the influence of climate change on the plan area, and the effects of national forests on climate change. The questions and data are provided by the Regional Office.

The Regional Broad-Scale Monitoring Strategy, posted on-line at <https://www.fs.usda.gov/detail/r8/?cid=fseprd994918> structured around the eight monitoring requirements identified in the 2012 Planning Rule at 36 CFR 219.12(a)(5). These regional monitoring reports identify monitoring questions and indicators addressing changes on plan areas related to climate change; and progress toward meeting social, economic, and cultural desired conditions.

- [Broad-Scale Climate Change Monitoring Evaluation Report for the Southern Region](#)
- [Broad-Scale Socioeconomic Monitoring Evaluation Report for the Southern Region](#)
- [Five-Year Report for the Regional Broad-Scale Monitoring Strategy for the Forest Service Southern Region](#)

Monitoring Questions

- MQ 9/45: How has climate variability changed and how is it projected to change across the region?
- MQ 9/46: How is climate variability and change influencing the ecological, social, cultural, and economic conditions and contributions provided by plan areas in the region?
- MQ 9/47: What effect do management units in the region have on a changing climate? Relevant indicators to understand climate change and other stressors are climate extremes, precipitation, sea level rise, temperature, water balance, forest health, nonnative invasive species, phenology, prescribed fire, recreation use and satisfaction, and wildfire

Key Results

- Information supplied by the National Oceanic and Atmospheric Administration indicates that Kentucky has not experienced significant overall warming since the early 20th century.
- Precipitation has generally been near to above average since 1990, although there is no overall trend in Kentucky's average annual precipitation for the 118-year period of record.
- The number of extreme precipitation events (more than 2 inches of precipitation) has been highly variable but with an overall upward trend.

Recommended Changes

Based on these results, we are considering the following possible changes, however no changes are needed currently. The Regional Broad Scale Report is updated every five years and we will tier recommendations to those results.

- Restore ecological integrity to impacted ecosystems. This can have positive effects on disease and pest resistance, as well as wildfire and drought resilience.
- To maintain habitat connectivity in high elevation refugia areas, reduce road density and heavy equipment use where there is an opportunity.
- Use early detection and rapid response to respond to invasive species.
- Reduce impact on aquatic ecosystems affected by drought by favoring tree species that are fire tolerant and have relatively low water use (for example, longleaf pine).
- Remove invasive species that use more water to reduce stress on the aquatic ecosystems. Monitor to determine when it is safe for recreational activities to take place in water recreation areas and effectively communicate the potential risks of higher temperature or high-water levels to visitors. Work with local indigenous populations and cultural groups to provide resources to adapt to the climate-driven changes on their cultural sites.
- Manage tree densities through practices such as thinning and prescribed fire to maximize carbon sequestration and reduce the vulnerability of forest stands to water stress, insect and disease outbreaks, and fire.

Our Partners

Forest partners include, but are not limited to, the following:

University of Kentucky
University of Tennessee
State Historic Preservation Office
Interested Native American Tribes
US Fish and Wildlife Service
Office of Kentucky Nature Preserves
Kentucky Heartwood
Kentucky Department of Fish and Wildlife Resources
Kentucky Division of Forestry
USDA Southern Research Station
Cumberland River Fire Learning Network
The Nature Conservancy
Forest Stewards Guild
Shortleaf Pine Initiative
National Wild Turkey Federation
Ruffed Grouse Society
White Oak Initiative
National Forests Foundation
Office of Surface Mining Reclamation and Enforcement
National Park Service
County Judge Executives
Kentucky Dept. of Transportation
Rocky Mountain Elk Foundation
Oak Woodlands and Forests Fire Consortium
Consortium for Appalachian Fire Managers and Scientists
American Forest Foundation
Green Forests Work
Natural Resource Conservation Service